

REPORT.

OFFICE SECY. OF IOWA STATE AG'L. COL. AND FARM, }
DES MOINES, FEB. 6, 1862. }

To the Honorable Senate and

House of Representatives of the State of Iowa.

In pursuance of Law I have to make the following report of the proceedings of the Board of Trustees of the Iowa State Agricultural College and Farm for the year 1861.

In my report to the Governor of the State for 1860, the following exhibit was made of the receipts and expenditures on the Farm for that year, as also the preceding year, which are incorporated herein that the Legislature may be advised of the total receipts and expenditures since the passage of the Law creating this Institution, as follows, to-wit:

RECEIPTS.

Appropriation by the State.....	\$10,000 00
Bonds of the County of Story.....	10,000 00
Notes of individuals due July 1, 1860.....	4,420 00
Subscriptions.....	990 00
231 acres of land, embracing some of the best in the counties of Story and Boone, most of which is located contiguous to the College Farm, deeded to the State, valued at.....	4,925 00
230 acres of land for which we have bonds for deeds, estimated value.....	1,090 00
	\$31,325 00

EXPENDITURES.

For purchase of Farm 647½ acres.....	\$5,379 12
Of location.....	549 97
For improvement of farm.....	873 10
President pro tem. for per diem and traveling expenses.....	274 30
Agents, stationery, office furniture, printing, clerical services, &c.,.....	176 50
	7,052 99
	\$34,392 01

The following are the receipts and expenditures since my last report up to this date, viz:

RECEIPTS.

Assets, as per last report.....	\$34,392 01
One year's interest (1860) on Story county bonds.....	700 00
Received for sale of one yoke of cattle.....	65 00
" " sundry articles on farm.....	18 94
	\$35,085 95

EXPENDITURES—FOR THE FARM.

Labor.....	\$263 24
Seed.....	36 40
Materials and tools, and repairs of tools.....	148 12
Two yoke of oxen.....	135 00
Bails for fence.....	133 75
Labor on fences.....	114 55
Digging and walling well.....	67 00—1005 16

ERRATA.

On page 16 of Appendix, for Cass county Continued, read "Des Moines county continued."

For report of Benton county, see pages 55 and 111 of Appendix.

On page 66 of Appendix, for A Continued, read "B Continued."

FOR THE HOUSE.

Labor, &c., in brick yard,.....	345 57
Cellar for house,.....	48 00
On house contract,.....	98 12
On brick work,.....	97 32
Labor,.....	5 26 594 27

FOR THE BARN.

Digging cellar,.....	50 88
On superstructure,.....	150 00 230 38

FOR THE BARN AND HOUSE.

On contract for stone-work,.....	151 75
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LUMBER AND SHINGLES.

For house, barn and fence,.....	1,064 88
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STONE AND LIME.

For house and barn,.....	632 42
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SUNDRIES.

For all purposes, about one fourth chargeable to above heads,.....	149 38
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AGENT ON FARM.

Amount paid him in full,.....	615 00 \$4,494 24
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The financial condition of the Farm will appear as follows:

Receipts from all sources,.....	\$25,085 00
Expenditures on the farm,.....	\$4,434 24
Story county bonds on hand,.....	10,000 00
Bills receivable,.....	3,757 59
Subscriptions not paid,.....	877 43
781 acres of land deeded and recorded, estimated value,.....	4,925 00
250 acres of land, bonds for deeds, estimated value,.....	1,040 00
Amount to balance,.....	1 92 15,085 96

Estimated amount of indebtedness on work completed on house and barn, and to be completed,.....	\$ 635 16
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Estimated value of materials on the farm, including crops,.....	516 40
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From the above it will be seen that the institution has, of bonds, lands, subscriptions and notes, to operate with during the present year, to the amount of,.....	20,610 73
In addition, interest at 7 per cent., on Story county bonds,.....	100 00
Also, 250 bushels of wheat,.....	31,440 72

From which deduct an indebtedness (as above) of,.....	635 16
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Leaving a balance of,.....	\$ 8,814 56
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RECEIPTS FOR 1861.

Dr.—To amount of Lands, bonds, notes and subscriptions,.....	\$30,053 70
To new notes and subscriptions,.....	327 23
To Wheat and material sold,.....	167 56
To rent of farm,.....	58 63
	\$31,303 06

DISBURSEMENTS FOR 1861.

Cr.—By amount paid on balance due on barn and house,.....	\$ 646 71
By " " " Farmers' house,.....	1,050 88
By " " " Farm improvements (including balance of \$33 78 due in 1860),.....	844 71
By amount paid agent on farm in full for 1861,.....	360 00
By " " miscellaneous items,.....	45 69 2,385 99
	\$18,816 06

ASSETS FOR 1861.

Story county bonds,.....	\$10,000 00
Interest on Story county bonds due for 1861,.....	700 00
Notes,.....	2,010 99
Subscriptions, bonds and lands, estimated,.....	6,899 43
Charged on books,.....	13 68
	\$19,615 96

The following amounts remain unpaid:

For labor,.....	\$ 31 76
For glass, &c.,.....	5 73
Oliver Mills, Treasurer, percentage on disbursements,.....	28 45
Suel Foster, per diem and travelling expenses, as chairman of Executive Committee for 1860—61,.....	119 96
Oliver Mills, expenses as member of Executive Committee,.....	41 15—\$200 05

Total amount of assets for 1862,..... \$ 19,803 91

In February of 1861 the farm was rented for two years, at \$200 per year, part of which has been paid, and the balance due to the close of his lease will probably be worked out by the tenant in fencing, breaking, and other improvements.

There is an excellent frame barn completed 42 by 60 feet, upon a gentle slope of ground, with underground stables, built with heavy stone walls on three sides, eight feet high, 16 foot posts, with floor lengthwise, so that any length can be added at the south end.

The brick work of a Farmers' House, 32 by 42 feet, two stories high, with pantries and kitchen back, 16 by 24, one and a half stories, also brick, have been erected during the past two years. There is attached to this a wash-room, milk-room and wood-shed, 24 by 24, one story, of wood. The back buildings were erected in 1860 and finished; the front building was put up in 1861 at a cost of \$950, besides the cellar and the brick. The inside of the main building is not finished, but it is enclosed from the weather. To finish it will cost about \$650. Each story is nine feet high, of good brick on solid stone walls, with a cellar under the whole of the house.

All these improvements have been made by the collection of, and paid for with subscriptions and subscription notes, no land having been sold or any of the interest due on the Story county bonds collected. The Executive Committee have been authorized by the Board of Trustees to complete the Farmers' House with such portions of the subscriptions and subscription notes as may be necessary, and to pay the indebtedness reported from the interest on the bonds.

About one hundred and twenty acres are under good fence, and about 80 acres under cultivation, part of which is occupied with an orchard of about six hundred apple trees.

OFFICERS AND TRUSTEES.

The following named Trustees were duly elected to the offices named, at the annual meeting of the Board in January, 1862:

SUEL FOSTER, President pro tem., for one year.

OLIVER MILLS, Treasurer for one year.

SUEL FOSTER, OLIVER MILLS, and W. J. GRAHAM, Executive Committee for one year.

WM. DUANE WILSON, was duly elected Secretary for two years at the annual meeting in 1861.

The following named persons compose the Board of Trustees:
C. E. WHITING, 4th District. M. W. ROBINSON, 1st District.

SUEL FOSTER,	7th District.	TIMOTHY DAY,	2d District.
J. W. HENDERSON,	8th "	OLIVER MILLS,	2d "
PETER MELENDY,	9th "	WM. DUANE WILSON,	5th "
W. J. GRAHAM,	11th "	RICHARD GAINES,	6th "
		JOHN PATTEE,	10th "

SAMUEL J. KIRKWOOD, Governor, and G. G. WRIGHT, President State Agricultural Society, are ex-officio members.

As the term of the six Trustees last named expire in January, 1863, it will devolve upon the present Legislature to fill the vacancies which will occur at that time. And as the member from the Eighth Judicial District, elected at your last Session to fill the vacancy which occurred in January, 1861, has not appeared and taken his seat, it may be necessary to fill that also.

Since your last Session in 1860, there have been but two meetings of the Board of Trustees, the regular annual sessions in 1861 and 1862. One session annually is all that is esteemed necessary.

All of which is respectfully submitted.

WM. DUANE WILSON,
Secretary I. S. A. C. & F.

PURCHASE AND DISTRIBUTION OF SEEDS.

Report of that department of the office of the Secretary of the Iowa State Agricultural College, which embraces the purchase, collection, and distribution of seeds, plants, &c., and the collection and dissemination of statistics in regard to the Agricultural and other industrial interests of the State:

During the years 1860 and 1861 there has been distributed of the cereals sixteen varieties, to-wit: Five of Spring Wheat; four of Winter Wheat; five of Corn, and one of Oats—in quantity, about seventy bushels.

Of vegetable seeds, upwards of one hundred varieties, and of flower seeds, upwards of one hundred and fifty varieties.

Of roots, upwards of 12,000 Cranberry plants for upland culture.

To obtain all of the above, I resorted to the States of New York, Pennsylvania, Connecticut, Illinois, Kentucky, and Iowa principally; and for two of the varieties of cereals to Canada.

Three-fourths in quantity and one-half in variety, were distributed in 1860, the balance in 1861.

Those distributed in 1861, were principally obtained from the Patent Office, embracing nearly all that were allotted to Hon. Jas. Harlan, and Hon. Wm. Vandever.

Most of those distributed in 1860 was through the members of

the Legislature, and those for 1861 to Farmers Clubs and individuals throughout the State, who were pledged to give them a fair trial and report in regard to their success and adaptation to our soil and climate.

Of the cereals distributed in 1861, I have information of the perfect success of the Red Mediterranean and Soules' Winter Wheat, and of the Scotch Fife and Tea Spring Wheat; the old Colony, Dent, and Stowell Evergreen Corn.

Of vegetables I have favorable reports of the Fejee Island Tomato, (said to be very superior), short top long scarlet Radish, (very early and tender), large Drumhead Cabbage, Sugar Parsnip, large York Cabbage, Winningstadt Cabbage, Crested India Lettuce, Mountain Sweet and Black Spanish Watermelon, Marrow Bean, (very superior for bunch, garden or field), Crowder and Tom Thumb Pea, small Sweet Cantelope, Citron Melon and Hubbard Squash, and Silver Skin Onion, (for pickling). A variety of Cabbage called the Stone Mason, obtained in Massachusetts, has proved very successful and acceptable.

Of the Cranberries, I have only about a dozen reports of success. The failures were owing to various causes; the principal of which was improper preparation of soil. It is unsuccessful on high lands. There is no doubt whatever but the Cranberry can be made a profitable crop on lands well adapted to its nature in nearly every township in the State.

The largest portion of the distribution of 1861, were obtained from the Patent Office, and were almost wholly from the European Continent. They embraced many valuable kinds, but the quantity of each was so small that it will require another year to produce sufficient to give them a fair trial.

The distribution of seed for 1861, embraced three varieties of the Imphee Sugar Cane seed and two of the Sorghum. Very little of the Imphee is reported to have given satisfaction for making a good article of syrup, whilst the Sorghum gave very general satisfaction as both good for syrup and sugar. The variety known as the Early Imphee is valuable for its early ripening; thus giving some two weeks working before the Sorghum is ready for the mill. The general testimony, both in and out of the State, appears altogether in favor of the Sorghum or Chinese varieties. In consequence of the great deterioration of the seed in this State, I have obtained sufficient Sorghum seed, which I have the best testimony is pure and well ripened, to distribute this year. If it is well taken care of, the product of seed will be sufficient, perhaps, for the whole State next year.

When the seed-distribution commenced from this office, three-fourths of the State were very badly supplied with good varieties of vegetables. I have information which assures me that this want is now generally supplied, at least amongst those who make it a point to save their own seed; and for those who are careless in this

regard, five times the appropriation made to this office would not be sufficient to supply their demands.

In my efforts to obtain information in regard to the condition of agriculture in this State, I have addressed, during the past year, by private circulars and written letters, not less than six to seven thousand farmers, and by travelling over the State and addressing them in person at least as many more. Notwithstanding all this it is very difficult to arouse them to uniform concerted action for the benefit of their ennobling profession. It appears that almost every effort put forth for that object has to succumb to the exciting topics of the day. Yet there is an advancing and deeper interest in agricultural improvement every year, as is proven by the numerous regular assemblages of farmers during the winter months, called "Farmer's Clubs," where are discussed experimental and practical farming as practiced by its members—by the numerous agricultural books and papers taken by them, and a desire to obtain the best of seed and stock for reproduction. In taking a retrospect of five years it is noticed that in stock we have improved at least twenty-five per cent. on cattle, fifty per cent. on horses, and seventy-five per cent. on hogs. May we not then soon expect a like improvement in every other branch of husbandry? Let us all labor to that end and at the close of the next five years we may see the accomplishment of a so much desired result.

I am endeavoring to accomplish a system of exchange of seeds throughout the State by the intervention of this office, which will enable the farmers of the State to secure a portion of the choice varieties grown in it. The plan of doing this has been inaugurated and will be further developed during the present year.

During the summer of 1860, with the view of ascertaining the condition of agriculture in the north-eastern part of the State, I travelled through the counties of Story, Marshall, Hardin, Grundy, Blackhawk, Bremer, Chickasaw, Floyd, Mitchell, Howard, Winneshieck, Alamakee, Fayette, Jones, Buchanan, Linn, Johnson, Iowa, Poweshieck and Jasper. There is no portion of the State better adapted to agricultural purposes, or where the farms are in a better state of improvement; indeed, in this latter regard, it may be ranked much beyond any other section. There is abundance of water power to drive all the manufactories needed for years. Its soil is generally better adapted to wheat than other portions of the State, the yield for 1860 averaging at least five bushels per acre more than the remainder of the State. The inhabitants, both on the farms and in the villages, will compare favorably, in general intelligence and industry, with any section of the same extent in the United States. It is settled mostly by immigrants from the New England States and New York, and their dwellings are generally surrounded with the same character of improvements and comforts which they left at their former homes. That portion of the North Eastern section of the State lying on the waters of the Cedar River, stretching

to the Minnesota line, is worthy of especial attention as a fruitful agricultural district. In all this, however, I do not wish to detract a laurel from the brows of the valleys of the Des Moines and Iowa rivers, for there is no part of our much favored State, which has contributed or can contribute more to its agricultural wealth than the industrious farmers embraced therein. Of the Western and South Eastern sections of Iowa, lying mostly on the Missouri, and embracing the Nodaway, Nishenabotany and Boyer rivers, those living therein claim an equality, if not a superiority, for agricultural purposes, especially for sheep ranges, on their high rolling prairies, and for stock generally. So highly is our State favored in all the essentials necessary for exhibiting the highest agricultural development of which the soil is capable of contributing, that it is difficult to go amiss in selecting a location for farming purposes. And so wide is the field for a choice, not more than one-fourth of 33,000,000 acres being under cultivation, that the poorest in the land can secure a home to last him for all time, almost "without money and without price."

EXPENDITURES FOR 1860 AND 1861.

The following embrace the expenditures of this office for the years 1860 and 1861, drawn by proper vouchers from the State Treasury:

Seeds and plants purchased, including freight and express charges.....	\$ 633 93
Boxes and bags to pack the same for distribution.....	27 06
Labor, packing seeds and plants.....	21 00
Express charges on boxes and packages forwarded.....	35 20
Express charges on books received.....	9 00
Postage and Stationery.....	312 25
Printing (including \$98 90 for balance of printing on report to last Legislature).....	125 01
Trip of seven weeks through north-eastern part of State in 1860.....	73 74
Attending State and County Fairs in and out of the State, in the falls of 1860 and 1861.....	79 53
Miscellaneous.....	70 24
	\$1,442 14

GENERAL VIEW OF THE AGRICULTURE OF THE STATE

In the preparation of my report for 1862, I have had in view a system of economical practice in the leading branches of husbandry, which is not only necessary, but which I confidently believe would be acceptable to every farmer in the State. So many of the hardy laborers on our fruitful soil, who gave their aid to its productions in past years, even to the close of the last harvest, having gone

the grape crop \$250,000 more, and as much as 20,000 lbs. of Sorghum Sugar worth at least 150,000 dollars, which would make the aggregate about 33,200,000 dollars. An enlightened system of Agriculture, with such rich lands as we possess, should have exhibited a product of at least thirty three per cent greater, which would have given an aggregate of 40,000,000 dollars.

Let us see how correct this statement is:

To have averaged 30 bushels of wheat per acre, instead of 15 or 14 bushels, would have added at least.....	\$3,000,000
To have averaged 60 bushels of Corn instead of 45 bushels per acre, would have added at least.....	2,000,000
To have averaged 50 bushels of oats, instead of 37.....	750,000
Of Potatoes, instead of 47 bushels, 75 bushels per acre.....	315,000
By proper feeding of 1,400,000 hogs at least 50 cts. per head.....	700,000
Of Cattle, sheep and other stock.....	1,500,000
Wastage of fodder, &c., at least \$20 to each farmer.....	1,500,000
	\$2,800,000

All this may be considered as an idle calculation, but we leave it to the unprejudiced and observing mind whether it is an extravagant one. It is only presented for the benefit of those who feel the necessity of economy and a proper system of husbandry, as these are times when they should be considered and acted upon if ever. To meet the State's share of the expenses attendant upon the present war, it behooves man to economize at every point. Even with so large a draft for the war of the hardy laboring sons of the State, who were wont to do their share towards producing what we have, by cultivating fewer acres, and working well what we have, our products will not be lessened during their absence, but doubtless increased to a great extent without making the burthen more heavy. The agricultural credit of the State demands a reform in this particular, and every true patriot should cheerfully apply all the intelligence and skill he can muster to meet the present and any further demands which may be made upon them to sustain the laws of their country.

There are three important matters connected with farming in this State, which if practiced would effect nearly all that is necessary to secure a fair remuneration for the capital invested in and the labor expended upon the land: 1st, Cultivate no more land than can be done thoroughly; 2d, Raise only such produce as can be fed on the land, or such as will pay to transport to the best market; 3d, Know the exact cost of every animal and thing raised on the farm.

I admit, that to carry out even one of these propositions throughout the State would be esteemed a great innovation; but can farming, here or elsewhere, be pursued profitably, without attending faithfully to all? Certainly not. What objections then can there be to their universal adoption? They involve no expense beyond a few dollars, to keep advised of the improvements in agriculture, and for a little blank book to keep the accounts in. There can be no objection then to adopting them on the score of expense. But *will* they be adopted generally? It is feared they will not. Why? That is easier asked than answered. The principal reason is, because

they have not been tried. Let any farmer pursue the practice suggested for but one year, the result will be so satisfactory that we doubt whether it would ever be abandoned, because they would demonstrate to their own satisfaction, that all the beef and pork produced costs as a general thing double what it ought to cost, and that the crops produced are not so large by 25 per cent, as they should be for the labor expended, and that of wheat especially, the cost of production averages from 15 to 25 per cent. more than it sells for; and that mixed farming generally yields a greater income than to depend upon a few specialties. Farmers, generally, think they do well if they have a small amount laid up at the close of the year beyond their expenses, but there are only a few who can tell to what branch to give the credit for the largest share of the profits, or whether a proportion of it can be given to all on which they have expended their means and labor. If a strict account was kept with every class of products this would not be the case. But it may be urged that the season and other circumstances over which he has no control, may render unprofitable one year that which was profitable the year before. True, but it is not one year alone which should determine their practice; a series of five years may be necessary.

What may be remunerative for one or two years may not be so for the other three, and the reverse. It is the general average which must be taken and no isolated season. For instance, would it do to abandon the raising of hogs because the past year gave such a poor, and to some disastrous return? Certainly not; but it may be prudent not to feed so many and feed better what they may have. It would do, however, to abandon the raising of so much wheat, as a series of years has proven that, situated so far as we are from a market for this grain, it does not pay to produce more than may be needed for home consumption.

One of the greatest evils in Iowa husbandry is the small value placed upon little things. Even a small farm of fifty acres is despised because there is so much land can be had at such a low price to make it double or treble in size. Go through the State and inquire into the circumstances of the small farmers and it will be found that they are better in nine cases out of ten, than those who pretend to cultivate large farms. Why? Being compelled, perhaps, to support himself and family on his fifty acres, he makes a good use of what he has; he does not despise small things. As he has not the means to enter into any one thing largely, if any fails, he does not lose much. On the other hand he cannot afford to devote even half of his farm to any one crop. His eyes are used to some purpose, by which he learns the wants of the nearest market, and he produces that which pays him best and is of sure sale at a fair profit. His stock of all kinds is of the best, and it will not pay him to keep many. When he goes to town or his place of trading he does not despise taking a bushel of potatoes, some onions, a cheese or two, cabbage, or even pumpkins, not needed at home, and because not needed

considered worthless; whatever he obtains for them then is clear gain. There are many instances of this class of farmers, who by thus making the small things bring him something, too small as considered by many, have paid for their little farms which they had purchased entirely upon credit, and made themselves snug homes thereby. Those who "despise not the day of small things," and "plow deep whilst sluggards sleep," always have plenty to live on and are never behind with their pecuniary engagements. Taxes are no especial dread to them, as they are always ready to pay them. They know that the aggregate of taxation is made up by a few mills here and a few mills there; a few mills obtained for this and for that esteemed worthless article, will more than meet them.

To such as appreciate the above suggestions, the subjoined papers in regard to the proper cultivation of Corn, Wheat, Sorghum, Flax, &c., &c., and the raising and feeding of Cattle, Hogs, Sheep, &c., have been prepared.

DRAINAGE.

Within the last two or three years the advantage of drainage to up as well as the low lands of the State has been clearly demonstrated, yet there are a great majority of our farmers need information on this important feature in the preparation of lands. The following is taken from a premium essay on this subject:

1st. *The character of lands which require drainage.*—Whenever and wherever so much moisture exists or remains in or on a soil as to saturate it, it should be removed. It has been said that whenever water can be seen on the surface for three hours after the harvest rain, drains are needed. It is not vouched that the latter is a standard that can be implicitly adopted; yet, on valuable lands of most varieties of soil, it is, perhaps, a sufficient guide. Swamp lands, including those covered with small ponds or lakes; and that class of lands, more extensive than generally supposed, existing in many instances on side hills, known to farmers as *cold* and *sour* lands.

Causes.—In swamp lands the water is generally kept upon them by higher surrounding lands, frequently from the issues of springs on the side hills. This higher land is often a mere narrow ridge, sometimes but little higher than the land to be drained.

In the *cold, sour* lands, the evil arises from two causes. 1st, the land is too level to allow a sufficient surface drainage; 2d, the subsoil consists of a tough clay, or other material, of such close texture as to permit the surface water to pass through it very slowly, if at all. Consequently when heavy rains have fallen, too much water

remains on the surface, or in the adjacent soil. It becomes stagnant, and in this condition, instead of furnishing *food* to the plant, as it should do, it becomes a *poison* to it. It causes land to bake in summer, and heave in winter; thus injuring, if not wholly destroying the crop. To the roots of plants it prevents the access of air, with its enriching property, so essential to their vigorous growth and early maturity. Evaporation takes place, causing the *coldness* complained of, and vegetable acids are formed, causing the *sourness*, so that these lands are truly *cold* and *sour*. In proper proportion these vegetable acids are really useful, but it is the excess of them that is productive of so much harm. The soil being cold, and the crops consequently late, they are much more subject to rust, blight, mildews, and frost, than those on warm lands. Much of the sickness of new countries is produced by these stagnant waters. They produce also many insects that become a pest to the farmer, and some of them to the whole community. For all these and other such results of this great evil, thorough drainage is an effectual remedy. The soil when drained only retains so much moisture as is necessary to the best growth and development of the crops. The change is much more gradual than in case of the swamp lands. Time is required to complete this great change, which, though gradual, is nevertheless certain. Some undervalue the effect of drainage on such lands because they do not at once see the full fruits of their labor.

Sub-soil plowing is a species of drainage very valuable and quite efficient for some lands, but insufficient in cases of abundant moisture. Its effect in deepening the soil, and thus by absorption, aiding the escape of the surplus water, renders its value truly great; yet in very wet lands nothing but drainage will yield us all the benefits sought.

We should never lose sight of the fact, that the importance and advantage of drainage results not only from *letting the water out of*, but also from *letting the air into*, the soil. Roots as well as leaves require air. Though the atmosphere contains its portion, yet the food of vegetables is chiefly deposited in the soil. The access of air and heat to their roots is necessary for preparing this food, and for the perfect development of the plant. When the earth is saturated with water the air is excluded.

All cold soils contain much vegetable matter not decomposed, which, if fermented and decomposed, would furnish to them a most valuable manure. Heat and access of air are necessary to produce this decomposition. In the withdrawal of the surplus moisture, and the consequent admission of air and increase of temperature, these requisites are furnished. Decomposition then takes place, and new sources of fertility are developed. Though heat is necessary to develop this chemical action, decomposition itself produces much additional heat. Every farmer can observe a precisely similar process in his stable manure. Without heat and access of air it will

not ferment at all; but with these in proper proportion, fermentation is produced, and a great amount of heat is given out, while decomposition was going on. Soils thus operated upon are warmer even in winter, so that they freeze to a less depth. The winter rains and melting snows find a more ready access to the drains, because there is less ice and frozen earth; and in turn there is less water at the surface to become ice. Water in freezing loses 140° of heat. If the water frozen is on the surface, all this large amount of heat is given off into the atmosphere; if beneath the surface, the atmosphere still receives a large portion. When spring has arrived, before this ice can be dissolved, an equal amount of heat must be drawn from some source. When that soil which is free from ice, is warming up from the genial influence of the early sunshine, and already causing hardy vegetation to peep out, the ice-covered portion is absorbing all the heat from above, and beneath, and around in the almost vain endeavor to remove from its surface its *chilly blanket*. Drainage gives at least a partial relief from this cause of coldness.

In consequence of the increased warmth of drained land, vegetation starts earlier in the spring; it also grows later in the fall, and is less subject to be cut down by early frosts; and more than all, the warm, porous, enriched soil causes a rapid growth in summer, the combined effect of which is to greatly increase the crop. It gives the farmer a longer period for cultivation, for he can not only plow earlier and later in the season, but he can also plow sooner after a rain. Says one writer, "I have seen farmers on drained lands which had once been swamps, plowing when the undrained, rolling lands adjacent, were too wet to admit of it." Rust, blight, mildew, &c., because of the facts enumerated, are almost entirely avoided. The winter killing of wheat and other fall grains by heaving, at least on moist soils, is also prevented.

From estimates—not absolute, of course, but approximate—we have reason to believe that with the natural drainage alone, not more than one-tenth of the water which falls is discharged into the streams receiving it. The remainder is chiefly taken up by evaporation. Now, if every gallon evaporated, takes off enough heat to lower $5\frac{1}{2}$ gallons from the boiling to the freezing point, as we are told, what an immense amount of heat is absorbed from the adjacent soil, that would, if retained, furnish a life-giving property to early as well as late vegetation.

An element still additional in warming the earth, is found in the warm rains and dews which fall upon the surface, and filter through into the drains or ditches, imparting their heat to the particles with which they come in contact. In the summer the atmosphere is warmer than the earth. The difference is equal to several degrees, producing a very considerable beneficial result.

But the soil is not only made warmer by drainage, but porous likewise, so that the roots of plants penetrate the earth to a great

distance in every direction, seeking that food necessary, not to their well being merely, but to their very existence. The importance of the admission of air, both as a result and a means in the production of lightness to the soil, may be judged from a most forcible and appropriate comparison of an experienced agriculturist. He says: "The presence and influence of the air in and to the soil, *is as yeast to a loaf of bread.*"

Draining is essential to the proper action of manures on wet lands. One writer says: "It is useless to manure a field that does not drain, as to feed a stomach that does not digest." Another writer says that "one load of manure on drained land is worth three on undrained land," and many confirm it. Another says: that "to spread manure on a surface that is covered with water four months in the year, is but to throw it away."

It is a generally received opinion amongst those who do not understand the necessity of thorough drainage, that to draw off so much water leaves an insufficient supply. So far from such a result occurring, drained lands actually suffer less from drouth than any others. The reason, on reflection, will be apparent. Drains only remove the superabundant moisture, leaving enough and all that is valuable for the ordinary wants of vegetation. All beyond this is an absolute injury. In seasons of unusual drouth, especially one following a wet spring, the undrained soil, having been soaked and run together like mortar, acquires its nature. As it dries, it bakes and hardens, like our common roads in summer. The roots of vegetables, though ready to perish for want of food and moisture, can scarcely penetrate this hard soil to obtain them, and, consequently, both grains and grasses make a poor return to the husbandman for his expenditure of time and labor. On the contrary, where drained, no stagnant water stands upon this, during the winter or spring, to destroy its porosity. Being loose, it remains moist to the very surface, while hard ground soon dries out. If any one doubts this, let him, in the dry, hot weather of mid-summer, compare the middle of the road with the roadside, and both with the soil in a well tilled field. The first will be hard and very dry, the second looser and moister, the last much looser than either, and proportionally moist. The want of attention to this fact has led many to believe that corn is injured by plowing it in dry weather. But such is not the case, especially on our soils. If the early cultivation has been good, every plowing will influence the crop, no matter how great the drouth. In loose soils, whether produced by drainage or otherwise, whenever there is a want of moisture at or near the surface, it is drawn from beneath where a sufficiency usually exists. Even a dry season, plants upon these soils suffer little, comparatively. This is the result of capillary attraction, a principle in Natural Philosophy, which causes matter and other fluids to rise through small tubes or pores, after their formation.

A few examples: A sponge or lump of sugar is filled with small

cavities or pores; if either be barely touched to water, the water will rise through its pores until the whole has become moist. Oil will rise several inches through a lamp-wick to supply the flame. Take a candle-wick and immerse one end in a vessel of water or oil—let the other end hang over the side of the vessel to a point lower than the surface of the fluid, it will all be drawn out by means of the wick. The syphon is a long, narrow tube, so curved as to occupy a similar position, and will produce a similar result. These are experiments that most of you have seen and all may test. When the earth is drained, or pulverized in any way, it becomes tight and full of pores, like the sponge, or sugar, or candle-wick. If then there is a deficiency at the surface, that beneath will be drawn up by means of capillary attraction, and great must be the destitution if this does not pretty well supply the need.

The atmosphere is justly considered as a source of heat and fertilizing matter. To a mellow soil it is also a source of moisture, in addition to the rains. In warm dry weather, the atmosphere contains more moisture than many are apt to think. For instance, on some hot day in July or August, in a very dry season, if you please, let a pitcher be filled with cold water; immediately, almost, large drops of water are seen standing upon the surface, or even running down the sides! All this is drawn from the surrounding atmosphere; and not merely so, but it is all drawn from that portion which comes into actual contact with the pitcher. The air, by penetrating mellow soils, imparts to them, not only much warmth, but much moisture also. Observation will verify the truth of the conclusion, that a *rich, deep, mellow soil will produce a pretty good crop every year*, whether so by nature or made so by artificial means, if properly cultivated.

In draining, the increase of the crop is very great, of which we have numerous well attested facts. The increase is variously estimated, and varies very much no doubt, under different circumstances. Some say that their next crops after draining have been increased one-third, some one-half, and some double. Succeeding crops are usually still more increased. This increase to the crop will generally in two years, pay the expense of draining. Besides this increase, the increased value of the land is generally equal to the cost, and often several times as great. The almost absolute certainty of a crop every year, which good drainage secures, is sufficient in itself to justify the expense. In view of all these reasons, no farmer having wet land, should delay a single year or month to commence its drainage. If he cannot drain all at once, let him drain a portion, and that will soon bring a return that will enable him to drain the whole. The recent improved machines, which are admirably adapted to most of our soils, can be obtained at a comparative small cost to each farmer, by several uniting together in their purchase. They can thus by their own labor construct drains at a cost not much beyond four cents a rod, and in no other way will they sooner see "the work of their hands returned to them seven fold."

CORN.

The highest average of corn reported in this State has not exceeded forty-five bushels per acre, and in the year 1858 the average was as low as twenty-three and three-fourths bushels per acre. The spring of 1858 was so wet all over the State, that much of the corn was not planted even until late in June, and the seed in several thousand acres rotted in the ground. To arrive at what *might* have been done by all, even in that disastrous year, under the same circumstances, location of land, tillage, &c., the following crops are here republished. They were elicited by the following queries, are from reliable farmers, and embrace every section of the State:

1. What is the highest number of bushels of Corn to the acre raised within the last two years on old soil in your County? If any of seventy-five bushels to the acre in 1858, give them in preference or addition.

2. On what kind of soil were they cultivated? State whether on high or dry land, rolling on flat prairie, or bottom, or near timber, the depth of soil, as well as the kind of sub-soil.

3. If fertilizers were used, what kind and when put on?

4. What crop was grown on the land the previous year, or how long previous and what?

5. Was the land prepared for the crop the year previous—if so, how? If by plowing, what depth?

6. How was the land prepared in the Spring, and if plowed, to what depth?

7. When was it planted, and how? By hand, or by horse or hand planter?

8. How often was it worked when growing, how, and to what depth?

9. When did it ripen?

10. What was the cost of the crop, per acre, when ready for use?

11. What was the name of the variety of Corn planted?

12. In what County was it raised?

Question 1. 70 bushels in 1858; 2, sandy soil on dry rolling land near the timber, soil 18 inches, subsoil dark yellow clay; 3, none; 4, corn; 5, no reply; 6, plowing 6 in.; 7, about 15th of May; 8, worked three times with shovel plow; 9, about middle of October; 10 and 11, no reply; 12, Page county.

1, on weed bottom land 100 bushels per acre on five acres, 75 bu. on 10 acres and 30 bu. on balance of field; 2, high bottom land, flat, near timber, sand and clay loam for 30 feet; 3, none; 4, corn for 4 years; 5 and 6, four to six inches in Spring of 1858; 7, by hand, from 24th to 30th of May; 8, plowed three times and weeds cut down once with hoe; 9, Large Yellow 34th Sept.; 10, Yellow 1st Sept.; labor high, cost \$7.50; 11, don't know, large yellow from Illinois; 12, Harrison county.

1, 100 bu. of ears in 1858; 2, on rolling prairie one-fourth mile from timber, soil about 2 feet, sub-soil yellow clay; 3, none; 4, corn in 57, 110 bu. of ears to the acre; 5, only by hoeing a crop of corn; 6, plowed about 8 inches deep and well harrowed and marked off 2 feet 8 inches both ways; 7, 15th of May by hand; 8, about once in 10 days with a double shovel plow; 9, about 15th Sept.; 10, kept no account; 11, no reply; 12, Tama county. Corn on rolling land was a very good crop, though not as good as it would have been had there been less rain.

1, 70 bu. in 553 on one acre of soil; 2, soil black sandy loam foot of river bluff, on second bottom, small grove of second growth timber on south side; 3, 4 and 5, no reply; 6, broken about the last of March about 2 inches deep with a small breaking plow and a common plow run behind, which broke from 3 to 4 inches deeper, throwing the soil on the soil and covering it up

drainage, the selection of the right position, good seed, early planting, and thorough cultivation, will accomplish this desired result. If twenty farmers, located in all sections of the State, can produce seventy-seven bushels per acre, when others only averaged 23½, why may not others do it? Heavy manuring from the stable once in five years will increase the yield at least one-fourth, of which I have ample testimony.

SEED CORN.

It is almost impossible to designate by name the best variety of Corn for all parts of the State. There are but two distinct varieties of Corn, to-wit: The *Gourd Seed*, or large and soft, and the *Flint*, or hard. That variety should only be grown which is *certain* to mature well. In the northern third of our State, the *Flint* should be the general crop; in the middle third, about half and half; and in the southern third the *Gourd Seed* varieties may generally be safely relied upon to mature well. A mixture may be made to suit any locality by making careful selections from year to year.

The following plan of selecting seed-corn is practised by many of our best farmers and found to be all that is desired: Select from well developed ears and thrifty stalks, six weeks before pulling, when most of them would do for roasting; hang them up near the fire-place or around the stove-pipe in the cooking room, and let them remain there until planting time. Seed prepared in this way, seldom, if ever, requires replanting, and can be planted some two or three weeks earlier than the usual planting time, without regard to weather. Persons who have adopted this mode of saving seed-corn, find that the heart-worm does not prey upon it, and after planting the birds and ground squirrels do not prey upon it, in consequence, some think, from the bitterness of the grain. A farmer in Dallas County has pursued this plan for six years, in Indiana and Iowa, always meeting with marked success.

Much has been said and written and practised, also, with the view of ascertaining from what part of the ear the best germinating seeds may be obtained, to the neglect of more important requisitions. I leave this branch of Corn growing to the curious.

Manuring for Corn.—It is a well demonstrated fact that a field well manured with stable-droppings, &c., once in five years, will increase the crop, for that length of time, at least twenty per cent.

WHEAT.

It is now generally admitted that Wheat is the poorest paying

crop we produce. Some years ago, when immigration to and through the State afforded a market at home, Wheat raising paid about as well as any other farm product; but when our farmers produce from three to four times the quantity needed for home consumption, and it costs nearly all it is worth to take a bushel of grain to the nearest prominent market, it is time they would turn their attention to better paying crops. The grasses, in which is included corn, must ever be the foundation for our wealth as an agricultural people; yet we want a good share of Wheat for our own use, and there are many of our farmers who will continue to make it a leading crop, whether it pays or not, perhaps doubling the venture next year, like the gambler, and lose their labor again, as it is too precarious a crop and cannot be relied upon with the system of cultivation generally practised in our State. The most disastrous years in this State for Wheat and other small grains were 1857 and 1858, when our whole Wheat crop only averaged a fraction over four bushels per acre for 1858, and Oats were nearly an entire failure in the latter year; yet even in those years we have the testimony of some sixty or seventy farmers, living in every section of the State, that they produced good crops, and which averaged over thirty bushels per acre. The leading causes for success in these instances were Fall plowing and drainage. The lands occupied were not drained artificially, but presumed to be so from the fact that these exemplary crops are reported, except in one instance, to be produced on high rolling prairie, both near to and remote from timber. Had attention been paid to the selection of the same kind of land throughout the State, the result would have been an average yield of at least twelve to fourteen bushels per acre.

Preparation of Soil for Wheat.—From reports on file in this office, from personal observation over a large portion of the State, and conversation with farmers generally, we are satisfied that fall plowing for wheat is absolutely necessary to secure a fair crop the next year. Corn ground, from which a crop has been taken the previous year, is generally used for both spring and winter grains, but neither fall plowing nor corn grounds will do near so well if they have not been plowed deep. When we consider that the average depth of plowing for all purposes throughout the State, scarcely reaches four inches, it is not surprising that the average yield is so small. As a general rule for all fields under cultivation, they should be plowed at least ten to twelve inches deep, once in three years, and the average plowing for the other two years, should be not less than from six to eight inches. The month of August is the best time to plow for spring crops as well as winter grains. A month or more of hot weather should intervene between plowing and sowing. By following this rule, a failure of crop will rarely, if ever, occur.

With the soil thus prepared, the seed should be sown as soon in the spring as there is sufficient soil thawed out to cover it with a

harrow. If the soil is not thus prepared by deep plowing the previous year, and the spring is likely to prove dry, the seed should be plowed in; in that case it would be generally later. When the soil had been prepared properly the year before, and the seed sown early, the rust has not been injurious to the crop. Such was the conclusion I arrived at, after examining many fields in neighboring counties last summer.

See that the seed is good, and before sowing it should be duly prepared by washing thoroughly in saturated brine, formed of common salt and water. When removed from the brine, the seed should be sprinkled freely with dry, powdered lime, which has been slaked for at least six months. Recently slaked lime is too caustic, and if thus applied, is liable to impair the chit of the grain.

The sun and winter improve the exposed soil; the brine and lime destroy the seeds of the smut; with such a preparation and sowing at the earliest day insures a heavy berry and an early harvest. At the Farmers' Club at Palo, Illinois, Mr. Westervelt gave the following preparation as successful:

"Last year my club wheat from some cause brought a considerable smut; not liking to give up a pet variety, I determined to 'brine and try.' Procuring a strong brine sufficient to wet or float two bushels of wheat, I mixed a half lb. of blue stone (copperas) and immersed the wheat; I then drained it by putting it up in sacks, wherein I let it stand for from 24 to 48 hours; I then sowed it, but running short of the prepared grain, I hastily wet some in the same preparation and finished out the piece. A little had been sown without brining about a week before.

That which was 48 hours soaking was first up and kept ahead of the dry, sown a week earlier; the balance came up proportionately as it lay stood, and the cleanliness was in the same ratio. That which stood 48 hours in the sack after being wet, in earliest ripe, of best growth, and entirely free from smut. That soaked and sown immediately has some smut, while that sown dry is worse than last year, comparatively a bed of smut. I believe this wash, as a fertilizer, pays ten fold its cost on all farm seeds."

Mr. Stevenson and Mr. Carll confirmed the efficacy of brine and lime to get rid of smut and oats.

Time for cutting Wheat.—The proper time for cutting wheat is a matter of too great importance to our farmers to overlook. From a series of careful experiments, and from observations made from time to time while making them, a correspondent of the German-town (Pa.) *Telegraph*, deduces the following rule to find the best time for cutting: "The field, when examined from a distance, has a green look, but when examined more closely it has a color nearly yellow, and the first two or two and-a-half joints of the straw are quite yellow; the chaff is tinged with various straws of green and yellow, the latter predominating; the well-filled ears are just commencing to turn down at the ends—then cut, but not till then, better a little after than before. My rule always has heretofore been to cut when ripe, but now I prefer to cut from seven to nine days before ripe."

After citing the above as his experience, he gives the following as the experience of others:

In the year 1830 experiments were instituted in England for this same purpose. On the 4th of August a sheaf was cut, both straw and grain, of which were full of sap and in that state which

I have ranked as green. This sheaf stood in the field for two weeks, when it was taken to the barn.

On the 12th of August another sheaf was cut in the state I have called raw: this also stood two weeks before it was taken to the barn.

On September 1st another sheaf was cut and allowed to stand two weeks, and was then taken into the barn.

On November 1st all were cleaned and experimented on and equal measures (bushels, pecks, quarts or pints. It makes no difference.) were weighed with the following result: Green, 55, raw, 58, ripe 60.

The experimenter also saved the straw of each kind, and their comparative value was in the following ratio: Green, 500, raw 475, ripe 450. Their comparative value given by a disinterested miller was as follows: Green, 7 shillings, 11 pence per bushel; raw, 7 shillings, 11 pence per bushel; ripe, 7 shillings, 8 1/2 pence per bushel.

From his tables we may deduce the following advantages of raw over ripe wheat:

In the weight of gross produce,	18 1-6 per cent.
" " equal number of grains,	9 1-6 "
" " quality and value,	3 1-6 "
" " value of straw,	3 "

He also shows a loss of 10 per cent. by cutting green, and a gain of 10 shillings per acre by cutting it when raw, or as he says "two weeks before ripe."

Independent of the actual increase of value we have the following advantages: 1st, straw of a better quality; 2d, a better chance of securing the crop; 3d, a saving of grain in securing it.

The succeeding year by trying the experiment on a larger scale, he found by careful trial that 3 1/2 bushels cut ripe made 151 lbs. flour, 23 lbs. of middlings or "seconds," and 23 lbs. of bran. Also, that 3 1/2 bushels of raw made 174 lbs. flour, 12 lbs. "seconds," and 29 lbs. of bran. Thus showing a gain of 12 lbs. of flour in every 3 1/2 bushels.

Will not our farmers generally test the benefits of this plan and report the result to this office?

The advantages of rolling wheat after sowing are so generally acknowledged, that I have not thought it necessary to recite them here. It is to be hoped, however, that every good farmer will possess himself of an efficient roller for his crops generally. It is as necessary in its place as a good plow or harrow.

There are not less than from thirty to forty alleged varieties of wheat grown in this State, but it is not at all improbable that about two-thirds of them are alike, but known in different localities by different names. The leading varieties are the Club, Tea, Rio Grande and Fife, and generally esteemed in the State in the order named. The Tea (in some localities called China Tea and York Tea) is not so generally cultivated as either of the others, but where cultivated during the last year has generally yielded better. The "Wild Goose" is doubtless the same as the "Club."

Farmers would do well to change their seed once in three years, for after that time, it begins to deteriorate. The "Club" variety, favorably known to our farmers as the best producing grain in the State for several years, is fast losing their confidence. Indeed it began to deteriorate some five or six years ago, and when I took charge of this office, one of my first purchases was some ten bushels of "Club" wheat from Canada. This was distributed in nearly every county in the State, and where the effort was not laughed at, the result has been a marked success. Only a few days since, Mr. C. F. Clarkson, one of the most extensive and enterprising farmers in Grundy County, when on a visit to the capital, informed us that the yield from the "Club" wheat obtained from Canada,

sent him three years ago, from this office, was *twenty-nine* bushels to the acre last year, whilst in an adjoining field the old "Club" produced but *nine* bushels to the acre, the soil and preparation for the crops being the same.

SORGHUM SUGAR AND SYRUP.

During the past four years the State of Iowa has added a very important branch to her agriculture, in the production of Syrup and Sugar. So marked has been the success, that sufficient of the former has been made during the past year to meet all the wants of her people, affording about twenty-five gallons to a family, of a quality equal to the average of the Southern manufactured article heretofore used in the State. This point was the highest ever anticipated by the most sanguine on the introduction of the Chinese Sugar Cane into the State. We will go far beyond it, and make tens of thousands of gallons for exportation, with the aid of the refinery, which has turned it into an article equal, if not superior to the best syrup ever made. But we will not stop here. Our people have successfully demonstrated that sugar can be made with as much ease as our first efforts in procuring a palatable syrup. The year that first demonstrated that important fact, was not more successful with the syrup, than the past year has been in turning syrup into sugar. One hundred and fifty thousand dollars could not purchase the sugar made from Sorghum and Imphee during the past year. Within another four years, every farmer in Iowa, from a half acre of Sorghum, will be able to produce, and doubtless will produce, sufficient Syrup and Sugar for his wants, and have enough of both to spare for numerous families who may become dependent upon them. We cannot be too thankful as a people for our present and prospective independence in this now great necessity of life, when the great sugar-producing plantations of the South are shut out from our reach. Our sister States, Illinois and Ohio, have made almost equally rapid strides in the same direction, and instead of being tributary to others, they will, like Iowa, make many of their sister States tributary to them. The amount of Sorghum Syrup made in Iowa this year, will save in Syrup and Sugar not less than *one million and a half of dollars* for the year 1861. The present year will doubtless show an exhibit of at least half a million more, as extensive preparations are being made to grow a greater breadth of land and manufacture with the most approved machinery. Wooden mills are fast

disappearing and iron crushers taking their places, which, with the most approved evaporating pans and greater skill, cannot fail to prove the truth of our prediction.

In all this, however, we hope no one who reads this, will be induced to go into the culture of sorghum on an extensive scale, as it is extremely doubtful whether it can thus be made profitable, without a greater outlay of capital than one person in ten thousand possesses. The greatest profit is in each farmer raising an acre or two, and two or three of them uniting to buy an iron mill and evaporator. By so doing the cane can all be worked up at the proper time and at the least expense.

SEED—SOIL FOR, AND CULTURE OF SORGHUM.

The location of land best suited to the development of sorghum or imphee for syrup or sugar, should be high and dry, and the soil not the richest, but such as is best suited to wheat or peas. From reports made at a sorghum convention at Rockford, Illinois, late last November, the high sandy soils, highly manured the previous year gave the finest samples of syrup, although not as large yields as richer lands gave. The largest yields per acre were obtained where the seed was planted in drills one way and four feet the other. Prepare the ground thoroughly by plowing as deep as a good team can drag the plow, then harrow it well so as to have the ground in the best of tilth, not allowing a clod to be seen even as large as a hickory nut. If the ground is sufficiently moist, the seed may be soaked twenty-four hours before planting in hot water, and thus hasten its germination—but if not sufficiently moist to secure the seed thus soaked, it should be planted dry. A thorough rolling will be of great benefit in either case. There is a great difference of opinion however, about the necessity of soaking seed at all before planting. By all means have a reasonable assurance that the seed you plant is pure, or all your labor may be lost. Pay a dollar a pound for such seed rather than plant any of which you may have doubts of its purity.

DIRECTIONS FOR MAKING SUGAR AND SYRUP.

Mr. Hedges, of Ohio, inventor of the iron sugar mill, and the most experienced manufacturer in the country, writes to the American Agriculturist about experiments in making up the Chinese Sugar Cane, which, though intended for work on a large scale, will yet be useful as hints to those who want to try their hand on a less quantity.

* The Cane must be allowed to mature fully, not attempting to work it until the seed is fully out of the mill, and as some of the tillers will be rather later than others, it will no doubt be

better to throw them out for fodder than jeopardize the rest. The leaves should be stripped off before cutting, and the top, cut off with the seed some two and a half or two feet down, as there is not much saccharine juice in the upper end. Then if your apparatus is ready, cut and grind as fast as you cut, and boil as fast as you grind, since the less time the stalks or cut cane is exposed the better. The juice, if concentrated by the usual process, will pass through two sieves—first No. 8 and then No. 16, set over a large tin funnel immediately under the mill, (which will be set about three feet from the ground upon three posts firmly bedded in the ground about three feet apart. The funnel is connected to a pipe of two inches diameter, and running under ground past the horses track, and entering a tank either lined with tin or painted thoroughly, and varnished so as to be impervious to the juice and easily washed clean, when left idle for even one hour. The juice is raised by tin buckets or tin or copper pump from this to a clarifier. This may be of sheet-iron No. 8, and about 12 inches deep and large enough to fill your first kettle, and set higher with draw off pipe and stop-cock entering at the bottom. This clarifier is set so that the heat is applied under it after leaving the range of boilers, and may be shut off by damper into another side flue, while you discharge this pan. The heat being applied slowly, a thick scum rises, and when near boiling you change dampers and draw off until the juice begins to show sediment or scum, then clean the pan and fill again, and so on. Now in this first kettle you add lime, well slacked and sifted, until your juice will not change the color of litmus paper, (which can be got at any good drug store quite cheaply.) While the juice is acid, it will change it to a reddish hue, and if this hue does not granulate nor keep sweet as molasses. With our two-horse mill of rollers 17 inches long, we use three boilers, holding 60, 40 and 20 gallons, with the latter immediately over the fire, and set with flaring walls or jambs, rising above each about 6, 8 and 10 inches, and completely cemented with water-lime. The last or 20 gallon boiler should be higher than the 40, and above that the 60, so that the scum will run through the gap into the next kettle behind successively. The scum should also be thrown back whenever accumulated into the hindmost kettle. If you have no experience in testing the syrup in the "battery," a thermometer made for that purpose, can be obtained in most large cities for a dollar or so. It requires to be graduated up to say 250 deg., as about 240 deg. Fahrenheit is considered the proper point. Should the heat arise above this, you must open your fire doors, and throw over the fire an armful of bagasse from the mill, and then discharge the syrup as quickly as possible and refill from the next kettle, thus continuing successively.

The coolers into which you discharge may be of good clear white pine without paint inside, and 12 inches deep, and large enough to hold four charges, and then left to cool and granulate, or if you make molasses only, you will use barrels, staves of oak and heads of pine or cypress, thoroughly made."

The greatest difference of opinion and practice obtains among the published experiments of farmers in regard to the best time for cutting the cane for making both syrup and sugar. Some say it should be cut after it is ripe, others before; some that it should be several days before grinding or that even ten days after cutting will not injure it, and some that it is beneficial to let it lie so long; some, after stripping let the cane lie at least ten days before pressing; some that freezing will not injure it, and some that freezing is beneficial. The general opinion in regard to these particulars appears to coincide with Mr. Hedge's experience and advice.

STATEMENTS FROM IOWA MANUFACTURERS OF SUGAR AND MOLASSES.

Mr. Jonathan Grout, of Lancaster, Keokuk county, who obtained the highest premium on sugar at the January meeting of the State Agricultural Society, in 1861, made the following statement in regard to his mode of culture and manufacture in 1860.

"Used tall Imphee, with long close heads and black seeds; planted 20th of May and made when well ripened, between the 1st and 5th of October. After stripping the stalks, cut tops off about 3½ feet from the ground. Succeeded only with the butts in making sugar. The tops made about as good syrup, but about one-third less in quantity. Crushed with an iron mill, and about forty gallons boiled speedily, and in a pan 35 by 4½ inches on the bottom, until it became very thick, cleared it with lime water, made strong, which was well mixed with juice before it came to boiling point; kept it well skimmed. When done, reduced to about one-fourth of the quantity. Four batches were thus made and mixed together well when poured into the barrel—one batch a day. The quantity had reduced nearly one-half. It was stirred daily, for ten or twelve days. It was then changed into a barrel having a head placed a few inches above the lower head, perforated with thirty or forty small auzer holes, and covered with flannel, having a faucet between the heads to draw off the drained syrup. After draining well, moistened with warm water, stirred it up well, then allowed it to drain again. This was repeated. The sample ex-

hibited went through this process three times, every time becoming fairer. The amount of sugar from the 20 gallons of syrup when all is as dry as sample will be 50 pounds. Twenty gallons of syrup from the Sorghum, made the same way is granulating finely. The syrup granulated is from this Sorghum, before it commenced to granulate."

Mr. Grout's process in 1861, the specimens of sugar and syrup, being equal if not superior to that of 1860, is as follows: The sugar for both years is generally considered good enough for all the purposes for which brown sugar is used. Both are dry and lively.

He says "The sugar is mostly the product of Sorghum, a small paper of Imphee being added only to show the result of both kinds. They were both made from cane brought to me by neighbors to make on shares. The Imphee is from a lot which I made between the 10th and 13th of September, commencing on the 10th. The Sorghum was made during the first part of October. The Imphee is the same I described last year. [See above Statement.] We crushed whole stalks in an iron mill of three rollers, and boiled in sheet iron pans with wooden sides, 20 to 30 gallons at a time; the pans were 25 to 45 inches in size. We usually added a little lime-water to begin with and boiled rapidly until very thick, skimming from the time it began to boil till the green scum ceased to rise. The clear white froth we were careful not to remove. This, I am persuaded, is the principal secret in successful granulation. The clear rich skum which rises towards the last of the boiling is all sugar, and aids materially in the granulation of the whole mass.

We made in this way, this year, between five and six hundred gallons, nearly all of which has granulated more or less. Several barrels in a short time turned so completely to sugar as to leave very little molasses standing above the sugar at the top of open barrels. The draining we have yet done only on a small scale. We have found the draining much facilitated by giving the syrup a chance to run off at the sides as well as at the bottom. [See Statement above for 1860.]

To drain the sugar, of which the sample is a part, we spread flannel in a new willow basket and set it over a vessel sufficiently large to catch the drippings, then poured from a barrel of sugar the molasses which was standing on the top, and placed the wet sugar in a basket, covering the whole, placing it in a room warmed by a stove. [The proper temperature for draining to make sugar is 75 to 85 degrees Fahrenheit.—Sec'y.] After standing a few days it was stirred and moistened with warm water. This process was repeated three or four times. [By referring to his former statement, he doubtless means the stirring takes place after an interval of several days.—Sec'y.] The syrup was made in the same way from Sorghum and put in a tight cask and excluded from the air to keep it from turning all to sugar."

Mrs. Abigail James, of Knoxville, Marion County, exhibited in 1861, the manufacture of 1860, several superior specimens of sugar. She gives her mode as follows:

Sugar and Syrup from the Sorghum; pressed the whole stalk when fully ripe in a wooden

Belcher in St. Louis—I have the full conviction, that from the specimen presented, sugar like Belcher's best crushed sugar would have been the result.

Dry seasons are a great advantage to its growth, and it can be grown even on a flat meadow, and it improves the land.

It should be planted as early as possible, the seed being soaked for about twelve hours in a solution of chloride of lime (about one oz. to a pint of seed). It should not be covered very deep, as it is then liable to rot.

When ready to manufacture, strip your leaf, cut your cane, and press your cane all on the same day if possible, as it prevents the souring or fermenting of the juice, and which latter destroys the flavor of the syrup. The plant has a natural acid which is easily removed, and has been by most people, when tasted in the syrup, called scorched; but the fermented plants, or the juice expressed from the latter, cannot be freed from the acid, or at least our experiments have failed.

Beyond doubt our sugar has as good a body and as firm a crystallization as any of the sugars from our Southern countries, and our sugar when refined will compare with the best now in market.

The sugar I have presented for your examination has been strained through common cloth, and was rather a forced process, and I have no doubt with improved machinery I shall be able to present at the next Fair all that can be desired of this plant.

[The specimen of this Sugar sent to this office, is quite a dark yellow or brown color and not properly drained, but good granulation, and altogether different from and inferior in appearance to the Imphee Sugar made in Iowa, as evidenced from specimens in this office.]

STATEMENT OF GEO. J. MAXWELL, LEXINGTON, OHIO.

Sample of sugar, yield seven pounds of sugar per gallon of syrup, two hundred gallons of syrup to the acre; cane topped when hauled to the mill; cane cut in the field; that from the bolls boiled by itself in Cook's Evaporator. No chemicals—put in warm places and crystallized in a warm kitchen, and becomes a perfect mass of sugar. Suckered a part of cane—perceived no difference in the product; suckers as much good juice as the cane itself.

STATEMENT OF SAMUEL HOOKER.

Mr. Hooker, of Nashville, Schuyler county, sent a jug of syrup, which was in what might be called the "mush" state—probably one-half the quantity had granulated. It is claimed by Mr. Hooker to be from a cane unlike that generally planted, and from his present knowledge, much superior to the common sorghum or cane in general. He speaks of its habits as follows:

"This cane grows straight and tall, and on rich land, very thick; has no suckers, each seed producing a single stalk, and does not readily mix with other seeds. The juice is clearer than that of the common sorghum, and harder to press out of the stalk. From experiment I conclude this stalk contains nearly or quite twice the quantity of juice contained in common cane."

Of the sample on exhibition, he says: "I manufactured, I suppose, about thirty gallons of molasses, using a common box, (six feet by two) bottomed with sheet-iron. A little soda was added for cleaning. It was my first attempt at molasses making. This sample was made by simply stirring and boiling a little longer than for molasses."

[This is a beautiful specimen of Syrup, of a dark yellow color, and rapidly granulating in our office. It received a special premium. A little soda was used in clarifying it.—Sec'y.]

OHIO SUGAR.—A specimen made from Chinese Sugar Cane by Henry Cook, of Mansfield, Ohio, exhibited at the above named meeting in Illinois, has been forwarded to us with the others, and which Secretary Reynolds says "received our highest commendation as a sample of foreign made sugar, not competing with Illinois manufacture. The analysis discloses a little lime." It is well granulated and as dry and as good as the best New Orleans, and for brightness of color also equal. It is the best specimen of Sorghum Sugar we have yet seen. We regret that the process of its manufacture did not accompany it.

In writing of the samples generally, the editor of the Prairie Farmer says:

"There were in all, something over twenty samples of syrup, and some ten or twelve of sugar. Most of these samples were from cane grown in this State—some few lots being from Indiana and Ohio. With the exception of that furnished by Mr. Belcher of this city, none of the syrups have been through any refining process, excepting that of the fire and skimmer; yet many, indeed most of them, were of fine flavor, though the peculiar sorghum or "green taste," was apparent in all, save the refined."

We will close the Illinois reports with the following letter from our Secretary of State, Hon. E. Sells, who takes great interest in the manufacture of Sorghum into Syrup and Sugar.

DES MOINES, IOWA,
January 7, 1892.

GEN. WM. DUANE WILSON, SECRETARY OF AGRICULTURAL COLLEGE:

DEAR SIR:—I have been in correspondence with Mr. James Watt, of Scott county, Illinois, upon the subject of manufacturing Molasses and Sugar from Sorghum.

He informs me that Sorghum, with from two to three stalks in a hill, will produce more Molasses, per acre, than with from four to eight stalks in a hill. That early planting is better than late planting; that Sorghum stripped and piled under shed, for two or three weeks, will produce more Molasses and a better quality, than when manufactured immediately after cutting.

Mr. W. manufactured last season twenty-three hundred gallons in eighteen days, at a cost of twelve cents per gallon. He says: "The expense was greater than it ought to have been—that hereafter he can manufacture at eight cents per gallon."

In manufacturing he uses one-half pound Bicarbonate Soda to forty gallons of juice—putting in the Soda just at the time the juice comes to a boil. By this process the Molasses is free from that green cork-stalk taste, so common in Sorghum Molasses.

Mr. Watt informs me that he has made no effort to make Sugar, because he has not been fully prepared; that next season he expects to engage in making Sugar. With his Molasses on hand, the granulating process has commenced, and early next Spring he intends to manufacture it into Sugar.

He informs me that in the central portion of Illinois, the Sorghum crop will be increased next season more than three hundred per cent. That as a profitable crop and the success of making good Sugar there need be no doubt. The principal and only cause of deterioration is by planting too near broom-corn.

Very respectfully,

ELIJAH SELLS.

SORGHUM IN OHIO.

I will close this branch of my report by giving some estimates made by manufacturers of Sorghum Syrup and Sugar, in Ohio, at the Ohio State Sorghum Convention, held on the 7th of January, 1892, for which I am indebted to Gen. Harris, editor of the Ohio Cultivator.

Mr. Jacobs, of Franklin, thought the planting should be done in accordance with the season and condition of the soil. As a common thing, should be soaked but if soaked or scalded and planted in dry ground, it would fail. The ground should be mellow. One half-gallon of seed to the acre was sufficient. If the seed were wet, it would be better than dry, but it should not be soaked. Thought the cane was in the season of maturity for cutting up when the seed was partly turned. If the seed became ripe, the saccharine matter formed wood and fibre; if cut too green the syrup would be of a lighter color, but less in quantity. The cane should be shocked the field with the butts on the ground, and protected with corn fodder. It improves in richness by standing some time.

The juice ferments very rapidly after being expressed from the cane, or after the cane is frosted. Thinks the best quality of lime should be used, as it arrests fermentation. He uses one pint to one hundred gallons. The juice should be evaporated as rapidly as possible, as the longer it is exposed to a slow heat the darker will be the color of the syrup.

The cane should not be stripped while standing, unless it is to be worked up immediately.

The cane should be planted three and a half feet apart, and allow from eight to ten stalks in a hill. Suckers are objectionable, but if planted as above they will not grow to disadvantage. He cuts the seed head off while in blossom, and then tops the cane again when he goes to work it up, at about the same place he would under other circumstances.

Mr. Hopkins, of Richland, had tried the culture of the cane for two years, and had made 1800 gallons of syrup the past season. Clay soil is the best. Muck will not answer. Cane grown on muck made the best juice. Had made 73 gallons molasses from one acre of muck cane, and 184 from cane grown on clay. He had made a one-horse mill, but it was too small for his operations. Had made sugar whenever he tried.

Mr. Day said that in order to obtain crystallized sugar from the Sorgho cane, shallow evaporation was necessary; that the foreign matter be entirely removed by skimming, and being deposited on the bottom of the pan, that the syrup be boiled to a density of 80 deg. Baume, and the temperature not be allowed to fall below 70 to 80 deg. Fahrenheit, until crystallized. He says if care be used, sugar can be produced at all times from good cane.

Mr. Day stated that the fine sample of sugar exhibited by himself, made by Mr. James Cook, of Mandol, crystallized in forty-eight hours after taken from the evaporator, and was drained of the molasses in one hour's time, by enclosing it in a strong linen bag and subjecting it to a pressure under a cheese or similar press. [Of this specimen see notice in a previous page under the Illinois head.—S.E.C.V.]

Mr. Hopkins wished to know what sized mill was most desirable for working a crop of fifty acres.

Mr. Hedges thought a four horse mill, driving roller not less than twenty inches in diameter and twenty inches long, that the shaft should be large in diameter, upwards of three or three and a half inches, as they will sooner or later break.

Mr. Long thought Giff's No. 7 mill was large enough. He used it with two horses. Thought farmers should buy good mills at first. He said experimenters had made larger and better ones at first, and then had to sell them at a great sacrifice in order to buy larger and better ones.

Mr. Newcomb wished to know what was the most durable article for an evaporator. He thought common iron better than galvanized iron; that the zinc coating wears off in one season, and was poisonous.

Mr. Hedges thought copper was the best, but it was too expensive. He thought common iron was next best, and the thicker the better.

Mr. Jacobs had tried galvanizing iron, thinking he could make a lighter article of syrup, but found that the common iron was most durable and made just as light an article of syrup.

Mr. Newcomb said he used Cook's Evaporator for defeating his juice, and finished his syrup in common parlance. He said, "whenever I want to get rid of the water, I use the evaporator, and do not do without it; he thought it removed the raw and sharp twang. Said he had used soda, but did not like it, it made a light article of syrup but tasted unpleasant.

Dr. Vander was called upon to explain the difference in the properties of lime and soda. He said that the lime was deposited on the bottom of the pan, while the soda would be incorporated through the syrup.

WESTERN PLANTATION SUGAR CANE SYRUP.

Those whose tastes cannot be accommodated by the Sorghum Syrup as made by our farmers, have an excellent resort in that which goes through a regular refining process. Specimens of our Syrup, refined at Belcher's Sugar Refinery at Chicago, exhibit a quality equal to the best Syrup ever made by Belcher. It has none of the "bone-set" taste of the unrefined Syrup, nor the smoky flavor which often occurs in other refined syrups. The company offer to receive Syrup at any of the railroad depots in Chicago, in quantities of five barrels or over, and to refine it at ten cents per gallon, returning to the depot, for each man, an equal amount of Syrup, less its actual loss in refining; or to return seventy-five gallons for every one hundred gallons received. These figures include drayage, cooperage, and repainting the heads.

The company will sell the refined Sorghum under the new name of (now used for the first time) WESTERN PLANTATION SYRUP. Small packages of ten gallons may be obtained of them at fifty-five cents per gallon.

A Syrup refinery may be started at a cost of about \$12,000. The cost of the machinery alone in the works above named, was \$60,000. It has a capacity for refining 100 barrels per day in addition to its regular business. We hope the day is not distant when Iowa will have sugar refineries located at convenient points, and sufficient in capacity to refine all the molasses that may be offered, without incurring the expense of transportation to and from Chicago.

PROFESSOR SPENCER'S EXPERIMENTS.

Mr. O. M. SPENCER, of the Iowa State University, publishes the following interesting and important results of experiments made by him in the manufacture of Sorghum Syrup, which was received too late to appear under the proper heading.

Having been engaged for a week or ten days past in experimenting with the Chinese Sugar Cane, I desire to communicate, through your columns, the result of my observations to your readers. These experiments have been conducted with special reference to the crystallization, and the improvement of the color and flavor of the Sorghum, the most eminent chemists.

With regard to the crystallization of the sugar of the Sorghum, the most eminent chemists seem to agree in the opinion that no satisfactory result can be obtained with a density of 75 deg. Baume. With regard to the quality of the sugar, the density of the cane, as the proportion of sugar is an unfailing index of its ripeness. During the past few days I have tested a number of samples of juice, and found the specific gravity to vary from 1.060 to 1.070. The bulk of the stalk contains a much larger proportion of the saccharine fluid than the top. I tested an ordinary sample with the following result: Specific gravity of the juice from the tops 1.061, of that from the butt 1.066, when passed through the mill separately—and 1.055 when both were run through together. It is evident therefore, that to insure a fair prospect of success in the crystallization of the Sorghum in this latitude, it will be necessary to select the best samples; and having cut off the butt in this latitude, it will be necessary to select the mill separately, reserving the top for molasses, the third or fourth joint, pass them through the mill separately, and the proper ob-

With satisfactory results so far as it regards the specific gravity of the juice, and the proper ob- servance of certain necessary conditions with respect to the temperature—rapid evaporation be- comes of course a necessity in the way of obtaining crystals by the ordinary process, owing to still remain some difficulties in the way of obtaining crystals by the ordinary process, owing to the presence of certain impurities, such as gum, starch and wax, which not only interpose serious obstacles to the commencement of the process of crystallization, but render it impossible to purge the crystals when once obtained.

To improve the color and flavor of the Sorghum has long been a desideratum. In this respect I have met with better success than I anticipated.

The process adopted is in part that known as Roscoe's process. It consists, mainly, in removing the albumen with the sulphate of lime, and then neutralizing and decolorizing with the hydrated protoxide of iron. About 1.001 per cent, of the sulphate of lime, or two ounces for every fifteen gallons of the juice, should be well stirred up in a gallon of rain water, and added to the latter immediately as it comes from the mill, as an exposure to the atmosphere, it is ex- tremely susceptible to chemical changes, principally due to the presence of albumen. It is now heated to the boiling point, when the albumen coagulates, taking with it all the green and un- healthy matters, rises to the top, and is skimmed off. It is better, if practicable, to filter through a mus- lin cloth. About eight per cent, of the protoxide of iron is now added to neutralize and decol- orize it.

Perhaps the best method of introducing the iron is in the form of a saturated aqueous solu- tion, in the proportion of one gallon to every twelve of the juice. It would be advisable for those operating on a large scale, to procure a cask capable of containing from two to three hundred gallons, and having introduced several ounces of the protoxide of iron, fill it up with pure rain water, and allow it to stand for ten or twelve hours. Care should be taken in drawing off the solution not to disturb the undissolved iron, which may be effectively accomplished by means of a siphon, or stop cock introduced at the bottom. The juice is then drawn off from time to time, until the iron is nearly all dis- solved. The juice is now boiled down to nearly the desired consistency, when about one table- spoonful of soda is gradually added to every two gallons of the syrup, which after being stirred and carefully skimmed, is ready to be removed from the boiler.

The results of the above process have been highly satisfactory. I have now in my possession several samples of clear and transparent syrup of a rich and delicate flavor, which compare judiciously with the best of the refined sugar of the cane.

The above process is eminently practicable and very economical. Any one engaged in the manufacture of the syrup can apply it, whilst it involves but trifling expense, and the little additional cost, whilst some of the additional trouble. Two or three cents per gallon will cover the additional cost, whilst some of the leading grocers assure us they would prefer to pay 20 per cent more for such an article than the one manufactured by the ordinary process. Any further information in my power to give will be cheerfully afforded to any desiring it, if they will call upon me at the University, or ad- dress me by letter or otherwise.

In consequence of the deterioration of the Sorghum and Imphee seeds, more or less in every section of the State, I have taken considerable pains to procure a supply of both, which I have every reason to believe is pure. If care is taken by those to whom it is entrusted to keep it pure, the result will be a full supply for next year. Parties wanting small packages can obtain seed by sending stamps to the Secretary of Farmers' College, Des Moines, to prepay postage.

SHEEP AND WOOL.

There is no State in the Union, perhaps, better adapted to the profitable growth of Wool than Iowa; she is at least equal to any of the great wool-growing States of the North, East or Middle States, especially for all the middle or coarser grades, and of the finest of the *Spanish Merino*. So well satisfied are our farmers of this fact that they are only limited by their means in procuring all they can well take care of. In the course of another ten years her product of wool will reach millions of dollars in value. Up to this time wolves and dogs have been the only serious barrier to a greater increase of sheep. The former have nearly disappeared, and thanks to the determination of our present legislature, laws will be enacted which will be certain eventually to remove all the sheep-killers in the latter. These removed, as also the exemption from taxation imposed upon even small flocks, Iowa may be considered the paradise of wool-growers.

It may be interesting, if not profitable, to look at the progress of wool-growing in this State, as well as its present status:

No. of lbs. of wool in 1858, as reported in State Census,	517,441—Sheep estimated	144,000
No. " " 1858, " " " "	627,660 " "	164,400
No. " " 1860, " " " "	631,594—U. S. Census,	244,423
No. " " 1861, Estimated.....	850,000 Estimated.....	340,000

In the estimate for 1861, there is added for natural increase only one-fourth, and about 40,000 for sheep brought into the State. The average amount of wool sheared for the four years is a fraction over three pounds per head, inclusive of lambs, which is an excellent average for sheep that are principally of the common varieties, as our farmers have been able to purchase at a cost of not over \$2 per head on the average. The average value of the sheep of the State is not less than \$2.50 per head, which gives the sum of \$850,000 invested in this item, and the gross product in wool at 25 cents per pound is \$212,500 or 25 per cent. on the capital. In all future years, if protected from dogs, the investment will doubtless net 50 per cent. profit, as at least one-third of the sheep enumerated above, especially for 1860 and 1861, include lambs and sheared sheep brought into the State during those years. If one-third be deducted from the number for 1861 as non-producing wool sheep, the amount of wool shorn, estimated at 25 cents, will give nearly 33 per cent on the capital invested in addition to the increase. At the present price of wool the increase on the capital is fully 50 per cent.

The Dubuque Farmer's Club recently passed the following resolution, in regard to sheep husbandry. Every observing farmer in the State, will when he reads it, give it an affirmative vote also:

Resolved, That the climate and productions of Iowa are admirably adapted to sheep husbandry, that in the depressed condition of the grain and provision markets of the West, present and

prospective, true economy points to sheep-raising as the most remunerative branch of agriculture and that it ought to receive the earnest and favorable attention of the farming community. Mr. Mason, a member of the Club, said that he had fifteen years of practical experience in sheep raising—and had been a dealer in that kind of stock, had slaughtered about 5,000. He said that in New England he found and noticed that small flocks were most profitable. Among the interesting facts stated were that sheep raising is the most profitable branch of stock growing—that the proper food for sheep is timothy and red and white clover, beans and corn, the ruta bags is the best root for them, that the average price of wool for a series of years is about fifty cents per pound—that the skin with the wool on when the sheep is slaughtered for market is worth about a dollar, that the average weight of the mutton is forty pounds, that dogs that are kept on the same farm with sheep will not kill them, that the average weight of fleeces is about five pounds, that he believed the Southdown breed best adapted to this country and that considerable gain the present prices of all the products of sheep raising that it would be a very profitable business to Iowa farmers.

Several other gentlemen spoke on the subject advancing the general idea, that wool requires a less proportion of its value to send it to market than any other stock product, that sheep husbandry ought now to be considered one of the enterprises that our farmers should engage in immediately. Sweet corn was recommended as good food for stock including sheep, that Stowell's variety is the best. A good method is to row the corn and harvest it like hay.

A correspondent in the "Prairie Farmer" says: "he fed 7,000 bushels of ten-cent corn—but worth that price only when hauled seven miles to the railroad, to about 2,000 sheep. One hand fed the seven thousand bushels and eight horses besides. To have taken that corn to market seven miles, one load of 40 bushels every week day, it would have required seven working months. To have taken enough of ten cent corn to market to obtain the same amount of money which the 7,000 bushels fed to sheep produced for the wool it would have required at least four years. On the other hand, I hauled the wool to the railroad at four loads in two days. So I marketed my corn, so to speak, in two days. To ship a bushel of ten cent corn from Central Illinois, (only seven miles from the railroad) to New York costs 50 cents, or five bushels to pay the freight on one bushel." It would cost at least one-third more from Central Iowa. To send ten cents worth of wool to New York or Boston from Central Iowa, would not cost over half of a cent. What a prodigious difference!

The number of sheep sheared by this correspondent in Central Illinois was 1860. Besides the seven thousand bushels of corn fed to them during the winter, his other expenses for the year were: \$168 per year for shepherd, (besides board we presume)—\$110 for washing and shearing; 30 to 40 dollars worth of salt, and perhaps another \$100 for little expenses hard to keep. His gross receipts for the year, in cash was \$4,600—\$3,600 for wool, and \$1,000 for sheep—none of it being for sheep at fancy prices—and he has the same number of sheep left. Why not keep these profits to yourself, may be asked, "as it will induce others to go into the business, and thus overstock the market." "Why my dear sir, I don't pretend to any benevolence in the matter. The fact is the United States imports, and has imported one half the wool manufactured in the country. Now I have been hearing people talk about overstocking the wool market for the past twenty years, and yet I find from census returns and other statistics, that the number of sheep in the United States has not varied but little during that time. I believe that at 33 cents per pound wool growing is as profitable as any other branch

of farming in the State of Illinois, and still more so in States west of us, which have not our railroad facilities. * * * I think the west ought to grow wool, and should engage in it to such an extent as to reduce the price of wool (which I do not believe could be done) so that eastern farmers should sell their sheep to the west and quit the business; they might take up our corn and wheat trade, and make more money out of it than we can, beyond sufficient for home consumption. One consequence of the present rebellion, is that for a great many years there is to be a great deal less cotton raised; a part of which deficit in the world's stock of clothing must be made up in wool. Now, there is no danger of the whole west going into sheep all over at once—because the stock is not to be had."

Mr. McConnell, for many years a successful grower of wool in Illinois, figures up the profits on sheep as follows:

Suppose a man buys, no matter where, one thousand fine woolled ewes, with the necessary number of bucks, for which he pays \$2,50 per head, the account will stand thus:

Dr—One thousand sheep at \$2.50 per head.....	\$2,500
Estimated cost of herding, wintering, washing and shearing, \$1.00 per head.....	1,000
Loss from various causes, 10 per cent.....	250
Total.....	\$3,750
Cr—By increase of flock, 800 lambs, valued at \$2.00 each.....	\$1,600
Four thousand lbs. of wool, average of 4 lbs. each at 4 cts. per lb.....	1,600
Total.....	\$3,200

Showing that the income pays for the flock, cost of keeping and care, within five hundred and fifty dollars, leaving a flock of seven hundred sheep with which to commence the next year. Mr. McConnell's sheep were principally a cross of the Spanish and French.

This exhibits the extent, perhaps, of the profits of sheep husbandry in Illinois, but if it is so great in that State it can be made as large in Iowa. But let us see how near it has been approached here by actual experiment.

Mr. John R. Jamison of Mahaska county, who had five hundred sheep, sheared in one year an amount of wool which realized him \$823.60, and 200 lambs worth \$2.50 per head, \$500—in all \$1,323.60, and lost only three head. This was the product of his own labor alone, with the addition of one hired hand to assist him in raising the corn necessary for the sheep, and cutting hay, and an expense of not over \$25 for help in washing and shearing. The whole amount of corn fed to this flock did not exceed 1500 bushels, and about 30 tons of prairie hay, with the corn fodder that thousands of farmers let go to loss—thus realizing him nearly one dollar per bushel for his corn fed at his own door. Mr. Milliken, of the same county, after relating the above, says, "I am satisfied that wool-growing is the most profitable business a farmer can engage in this State, and also that it promises to be the most certain business for a series of years."

We have ample testimony of the profitableness of sheep husbandry in Iowa, and that, if well fed, and sheltered and properly nursed, they are as healthy as in any State in the Union.

THE BEST BREEDS OF SHEEP FOR IOWA.

What are the best breeds for our State? and where can they be obtained?

The answer to the former depends entirely upon circumstances and locality. If near some large town, and mutton is the object of the breeder, some of the long-wool breeds or the south downs. There is great diversity of opinion which is the best. The long-wools attain to greater size and shear a larger fleece, but being great feeders, in case of long drouths, will not stand as much short keeping. They will not bear to be herded in as large flocks as the short-wools, but probably on account of their great size, where but a small flock is desired, the long-wools may yield the largest profits.

THE LONG-WOOLS.—The *New Leicester* of Great Britain is perhaps the most widely extended and most numerous of the native breeds there. They are not considered so hardy as the other large breeds, and require good shelter and good keeping. They mature early, take on fat easily, their offal is very light, and produce, perhaps, a larger amount of mutton per acre of feed than any other breed.

THE COTSWOLD, another of the long-wooled breeds, is one of the largest of the native breeds of Great Britain, and have been introduced to a considerable extent into the United States. They are hardy and active; can be fattened to an average weight of 100 lbs. in fifteen months; at two years they will weigh from one hundred and twenty to one hundred and fifty pounds. The meat when young is succulent and well flavored; at two years old it becomes too fat and too coarse to be generally esteemed for the table. The wool product is an important item in the Cotswold flock. The wool which is closer upon the body than the Leicester, averages seven to eight pounds each. The staple is long, mellow to the hand, though somewhat coarse in quality. This would appear to be a profitable breed for our farmers who desire quantity of wool and quality of mutton at an early age. Both the breeds mentioned above are in this State in a few localities. We have seen a cross of these breeds at our State Fair, which, the owner stated to us, he liked well both for mutton and wool, and that he considered them hardy and well adapted to our climate, &c.

THE MIDDLE WOOLS embrace the Southdown, Norfolk, Dorset, Ryland, Cheviot and others, all of which are distinguished for their mutton. The *Cheviots* are the most hardy sheep of Great Britain, but have not been introduced into the United States, at least to any

extent, if at all. As the first named is the only one bred to any extent in this country, sufficiently so at least to test its adaptability to our climate, &c., I shall mention a few of its chief characteristics:

The *Southdown* is a native of the Chalky Hills of Southern England, on which grows a short, nutritious grass, well suited to mutton. They have a prominent place in the front rank of good mutton sheep, both in England and in this country. By skillful breeding they have been brought well nigh to perfection as regards shape. They are very heavy, keeping up their condition on moderate pastures, and readily adapting themselves to the different districts and systems of farming in which they are now met with. They are very docile and thrive well when folded on tame pastures. They also do well on the prairies of Iowa. Their disposition to fatten enables them to be brought into market at 12 to 15 months old, when they average 80 pounds. Their meat is of fine quality and flavor at any age. The ewes are very prolific and are excellent mothers, commonly bearing 120 to 130 lambs to the hundred ewes. The fleece, which closely covers the body, produces the most valuable wools. It is short in staple, fine and curling, with spiral ends, and is used for carding purposes generally. The wools of this breed are in great demand for crossing.

THE SHORT-WOOLS.—Of this variety we have but two known to any practical extent in the Northwest, the French and Spanish Merinos. There is some diversity of opinion as to which is the best; both have their admirers, and circumstances and locality will, no doubt, govern their selection. Both do well in this State, but I am not advised that the pure French is as successful as the pure Spanish breed. The French crossed on our common breeds has produced a valuable variety, as does also the Spanish; but I sincerely doubt whether as a pure breed the French is as hardy a family of sheep for this State as the Spanish. An eminent breeder in Illinois, who has in his flocks the pure French and Spanish, as also crosses with both, says "where the French can be herded upon grass most of the year and corn can be grown cheap, they will always prove the most profitable." Mr. Dickinson, of New York, gives this breed the preference for profit. Many breeders of the French say they are of large size, of strong, vigorous constitution, good feeders, and come to maturity at an early age and shear heavy fleeces of a fine quality. The ewes being strong, make excellent breeders. The wethers make good mutton, will fatten readily in large flocks, and will fall but little behind the mutton sheep in weight. When wool and mutton are taken into account they prove to be a profitable breed for the farmer." Breeders of other varieties of sheep, deny that the constitution of the French is sufficiently hardy for the Northwestern States.

THE SPANISH MERINO—prominent, if not foremost, in the short

wools, as adapted to the Northwest—is a smaller breed than the French, and are kept more expressly for wool growing. They can be easily kept as they have strong constitutions. They shear heavy fleeces of splendid quality of wool, but it is usually very gummy, and causes more loss in cleansing than most other kinds. The Spanish being of less size will bear shorter keep than the French, and shear on the average about the same amount of wool.

From the above, our farmers can form a pretty good idea as to the breed of sheep best adapted to their locations and circumstances. Those who have the common breeds would do well to procure a pure Spanish, French or Southdown buck to cross with; and those who wish to unite superior wool and mutton, would do well to get a flock of pure Spanish Ewes and a pure Southdown buck. A correspondent in the *Michigan Farmer* says: "I am well satisfied where mutton is so much of an object as it is here, [and should be in Iowa] either the full blood Southdowns, or a cross between them and the Spanish Merino, are the most profitable sheep we can raise." If mutton of good quality could be procured at all times as readily as beef or pork, more than one-half of the consumption of meat in Iowa, during the Spring and Summer months would be the production of sheep, especially when it can be produced for half the price of beef.

WHERE TO PROCURE SHEEP.

Hon. J. B. Grinnell, of Poweshiek County, who owns near 4,000 sheep, most of which he has procured from Michigan, writes us, under date of December 4, 1861, that the State of Michigan is the State from which to procure cheap and good sheep. The price, after shearing, is from \$1.25 to \$2 per head. Good ewes are now worth \$3 per head." The Michigan sheep are largely crossed with the Spanish Merino.

John Millikin, of Mahaska County, says "That the best time to buy sheep in this county is immediately after clipping; or, if not then, in the month of September in each year, as by that time the ewes and lambs are separated. The price ranges from \$1.50 to \$2.50 or \$3, according to the kind of sheep, ages, &c., but the price of wool another year may change the price of sheep." Perhaps from 500 to 1,000 head may be obtained in Mahaska County this year, 1862.

In Appanoose, Davis, Lee, Washington, and Jefferson counties, an aggregate doubtless of three or four thousand sheep may also be obtained.

In Eastern Ohio, Western Pennsylvania and Western Virginia, large numbers of sheep may be purchased after clipping at from \$1.50 to \$2 per head, of quality sufficiently good to commence a flock. The cost of bringing from 500 to 1,000 head from these States to Central Iowa, would not be over fifty cents per head.

MANAGEMENT OF SHEEP.

The Editor of the *Prairie Farmer* recently visited the farm of A. B. McConnell, Esq., of Sangamon County, Illinois, who, with his brothers, keep from two to five thousand sheep, principally of the French and Spanish families, and publishes in that paper of the 25th of January, 1862, an interesting article in regard to their flock and mode of management. As the practice of a man so experienced and reliable, located on a Western prairie, would be of great advantage to wool growers in Iowa, the following extracts are made from it:

MANAGEMENT IN SUMMER.—In years gone by good herding grounds were to be found in the immediate vicinity, but the gradual influx of settlers renders this more difficult, and it is now a common occurrence to go twenty or thirty miles for this purpose. It will readily be seen, that the time is not far distant, when this privilege will, in many localities of our State, be completely cut off, and by this means the profits of sheep growing will be materially lessened. For this reason thinly settled portions of our own State, or the newer States west of us should be chosen by those coming from abroad to engage in the business. Sheep, in the portion of the State of which we write, are turned upon the prairie about the middle of April. At that time the grass is enough advanced to furnish them with food. Mr. McConnell considers prairie grass superior to tame grass, and by turning in thus early in the season it is kept fed down—kept from becoming rank and hard, and thus furnishes good feed during the whole summer. The wool which is obtained from such a pasture is of a better quality than that from tame grass, and contains a richer resinous matter as believed to be caused by the sheep eating the leaves of the grass. It will take the highest quality of feed to add greatly to the value of prairie ranges. If left to what would prove unhealthy and injurious tracts of land, avoiding the low, wet places, that would prove unhealthy and injurious. It is considered in a convenient location on the range, to which the sheep are driven every night by the shepherd, who should be an experienced, careful man, assiduously attentive to his employer's interests. Mr. M. generally divides his sheep into flocks of from 1,000 to 1,200, each, sometimes going as high as 2,000, but would never exceed that number. Wells should be dug at the fold, as also at other points of the range, from which the troughs should be kept full at all dry times when the water of the sloughs, common upon all prairies, becomes stagnant or dried up. Sheep will generally drink three times a day. If water be kept before them they will pay little of it when needed, but when they are thirsty they will take the full amount. It is necessary for protection against dogs, prairie wolves, or depredators of the human species, who sometimes increase their own flocks at the expense of some one else's. Sheep are early risers, and as soon as they show signs of readiness in the morning should be allowed to ramble off, taking their own course; their inclination or instinct being the truest guide to proper locality and feed. In this manner, without grain or other feed, they are kept till frost comes in the fall, generally from the 1st to the 15th of October, when they are taken home and turned upon tame grass pastures, where as the grass falls the feeding begins, resting till feed when winter comes.

FEEDING MANAGEMENT.—He feeds little or no hay. Corn upon the stalk constitutes almost the entire feed during the Fall and Winter months. Upon his farm the corn is cut up and fed as soon as in proper condition in the fall. It is then drawn and fed to the flock upon the stalk, once per day, in small quantities at first, and gradually increased as needed. The constant aim is to keep the flock in a mild condition, never allowing the sheep to become excited by the feed of the animals. The great object is the growth of wool, and this is always injured by uneven or irregular feeding. His sheep are now upon full feed—all the corn they will eat, none being left over. They are upon the ground feeding at all times, day, morning and night. The sheep are a clean feeder, eating the kernels as they are shelled from the cob. The leaves and husks are left for the hogs, which are not only better but cheaper than hay—a healthy diet and a good promoter of the growth of wool is better for both wool and mutton than hay. The greatest danger to the sheep is the feeding uniformly, over feeding producing fever, which causes the starting of the wool, etc., generally known to all wool growers. In some very open seasons he does not commence giving corn till January, but as a general thing nothing is lost by commencing early. Does not depend upon roots for winter feeding, though he considers them of great value to breeding ewes, towards spring. At that time oats in the straw are fed in moderate quantities to the ewes, reducing, of course, the amount of corn.

Mr. McConnell has in one flock this winter about 1,200, but as a general thing does not believe that over 500 to 600 should be fed together during the winter. He gives them, whether the flock be large or small, plenty of room, and considers nothing more detrimental than small pens or yards. He gives them no shelter, however severe the weather.

In his opinion, however capacious sheds may be furnished them, they will so huddle and crowd together under them as to become over-heated, inducing disease and unthrif. If allowed to range, and permitted to eat they are extremely liable to take cold, while if given plenty of room out doors all such sudden changes are avoided. On the highest and driest part of his range he spreads straw for them to lie upon in order to keep them from contact with the snow or frozen ground, which might become thawed and frozen again, so that the wool would be torn out as the sheep attempted to rise. That the health of the flock can be well maintained by this treatment, the writer can testify, for among the whole two thousand he

did not notice a single animal "running at the nose," or affected with a cough. It is now mid-winter, and only five sheep have thus far died.

The lambs are always wintered separate from the old sheep. His usual method is to plant corn adjoining his grass land, and when it comes time to feed in the fall, turn them into this corn for an hour or two every day at first, letting them eat the corn, and then the grass. As they get used to the corn they are allowed to run upon it or the grass at their own pleasure. They will not waste corn, but will eat more this way, and make up for it in fleece and extra growth of body.

The bucks are not allowed to run with the flock during the winter, as there is danger of their injuring the ewes with lamb. They are furnished a yard by themselves, as are also the yearling sheep, whose teeth being weak the older and stronger members of the flock will get their share of the food.

YARDS FOR HANDLING SHEEP.—We find here convenient yards and sheds for the handling of sheep, and for ewes that need early or in cold weather. At the breeding season the ewes are brought into the yard every day, and one or more rams, apportioned, turned among them. Such as are found ready, are then taken out and bred to such rams as the owner in the particular case desires to breed from. Each ewe has some mark placed upon her to tell to which ram she has been bred. The ewes are sorted along the first of November, and the lambs are born in the first of April, at the time when the mothers can be turned upon the prairie grass, affording plenty of milk. The lambs are castrated when from a week to ten days old.

DISEASES.—Sheep in Central Illinois are subject to few diseases. The foot rot is never known on the prairie. Mr. M. thinks the wide range of pasture afforded may have much to do with it. Has known sheep brought from the east to have it very badly, but it entirely disappeared the second season.

The scab prevails in some flocks. The usual remedy is to dip the flock about once a week for three weeks or so, in a decoction of tobacco and soft soap. Mr. M. mentioned a flock in the vicinity that was nearly cured last season by three dippings in a solution containing tobacco, salubrious and blue, but failed by a great deal of rain for the season.

Ticks are not so prevalent as in the east, yet no flocks are entirely free from them. It is the usual practice to dip the lambs in tobacco decoction after shearing. This tends to destroy them on both sheep and ticks.

LOSS BY DOGS AND SNAKES.—Owing to care and watchfulness during the herding season but few sheep are killed by dogs. For the past five years, till last year he had not lost a sheep, by being killed by dogs. Some of his dogs are of the Bull dog variety. Some are Bells are usually placed upon quite a number of the sheep which tend to frighten away the dogs. The loss in the small flocks throughout the country when they are left to a free range without a shepherd during the summer, is immense. Generally his flocks estimate from the cattle and sheep, which are common upon all his prairies, that from dogs. Sheep thieves also cause trouble. However, from disease, dogs, snakes, and thieves, Mr. McConnell estimates his losses at less than ten per cent.

WASHING AND SHEARING.—Washing in vats is the improved method here. The vat is constructed eighteen feet by six feet inside, being large enough for seven men to work in. It is set so that its upper surface is on a level with the yard, so that nearly all lifting is avoided. The sheep are handled in at the lower end and passed from one man to another until they reach the upper end, when they are rinsed off by the water from the supply troughs. After a rain, is considered the best time to wash them. After washing, they are turned upon clean pasture till shearing time, and are then washed in the vat. Whether in the vat or on the ground, the wool then begins to become oily again, and the shearing can be more easily accomplished.

The shearing is done upon a well swept barn floor, that the wool may be kept clean. The common hand shears are used, no experiment having yet been made with the new machine. The shearing machine is used, but with little confidence in any contrivance for the purpose yet invented, though he thinks the right kind of a machine would be very valuable.

MARKETING WOOL AND SHEEP.—Wool buyers are at the proper season respectfully invited to call and examine the fleeces upon the premises. The proprietor never runs after them. He is generally in no hurry to dispose of his product, believing that late prices are generally the best, and knowing that the wool will gain at least ten per cent. during the first six months after shearing. He has sometimes sent his wool East to be sold on commission—has in most cases done well, but does not altogether like the plan.

The wethers are generally sold for mutton when about 2 or 3 years old. They are then mature, strong, and well adapted for market, and are, in their meat is scarcely inferior in quantity or quality to that of the coarse wool varieties. The ewes are never sold for mutton, but are kept till seven or eight years old, when plenty of opportunities are found for selling them at remunerative prices. He never makes a practice of selling any of his selling ewes, the poorest are the first offered. This keeps up and improves the high character of the flock.

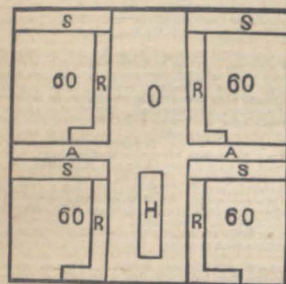
The average weight of the fleece of the whole flock the past season, 1861, was five pounds four ounces.

WINTERING IN IOWA.—In compliance with a request made to Hon. J. B. Grinnell, for an economical plan of sheltering 500 sheep, he forwarded the following:

"To prepare for wintering 500 sheep with straw sheds, enclose a plot of 160 feet square with boards 5½ feet high, to prevent invasion by dogs and wolves. Let it be on rolling ground to ensure dry yards and declining southward, if practicable. A ditch should be

dug around the outside, and the sheds should have but a single roof so declining as to conduct the water to the outside."

"The following diagram represents four enclosures, with a passage way 40 feet wide;



(H) standing for the hay rick; (O) for the well; (A) for the alleys, eight feet wide; (S) for the sheds, made by crochets and poles 14 feet long, covered with straw or prairie hay; (R) represents the racks, each sheep requiring at least one foot in length, the bottom board of the rack being 12 inches high and a space of 8 or 9 inches, according to the size of the sheep.

The above plan opens the sheds in all the folds but one to the South. The ewes may require to be fed under cover during the Spring rains; in such cases extra hay boxes will be required.

"These fixtures may remain for ten years, only the covering of the sheds requiring to be replenished yearly. The water can be raised by a wind mill for a small expense."

"It is my experience that lambs should be kept in the Fall in a stubble field or on fall rye. A thousand sheep will do well herded in the Summer. An enclosure of ten acres will furnish a pasture for 50 sheep. Shearing should not take place until it is warm and the wool is oily. A good shaped Spanish Buck that shears 12 or 15 pounds of wool, is cheap at \$100. Corn to the amount of two bushels to a sheep, fed in the bulk, is worth from 20 to 40 cents a bushel, according to the price of wool."

HOGS—VARIETIES OF, BREEDING, &c.

As a large portion of the cash income of the Farmer is derived from the sale of Hogs, it is a matter of great importance to him to know what is the best breed, and how to breed and feed. In regard to the former the most experienced breeders in the State have not been able to agree, but all admit that the breed which can be brought to the weight of 250 lbs. nett at the earliest age, is the most profitable. Thorough and reliable experiments have not been made in this State to settle this question. How to breed judiciously, not one farmer in

a hundred understands, and how to feed economically they are equally ignorant. This branch of husbandry is too important to the farmers of our State to be so grossly neglected as it is by such a large majority of them.

ON BREEDS, &c.

In regard to the requisite points in any breed, a breeder in the Prairie Farmer, says:

"In the first place, fine smooth hair, not too thick, a smooth soft skin, a deep carcass, and a good length of body. Let the loin and breast be broad, the breadth of the latter denotes good room for the play of the lungs, and consequently a free and healthy circulation, essential to the thriving or fattening of any animal. The bone should be small, and the joints fine; (nothing is more indicative of high breeding) the legs should be no longer than, when fully fat, would just prevent the animal's belly from trailing upon the ground. The leg is the least profitable portion of the hog, and we require no more of it than is absolutely necessary for the support of the rest. See that the feet be firm and sound, that the toes lie well together, and press straightly upon the ground, that the claws are even, upright and healthy. Many say that the head is of little or no consequence, and that a hog may have an ugly head; but I regard the head of any animal as one of the principal points in which pure or impure breeding will be the most obviously indicated. A high bred animal will invariably be found to arrive more speedily at maturity, to take flesh earlier, and with greater facility, and altogether to turn out more profitably than one of questionable or impure stock; and such being the case the head of a hog is by no means a point to be overlooked by the purchaser. The description of a head that I consider most likely to indicate high breeding is one of small bone, not too flat on the forehead, the snout short and convex or curving upward, a thin erect ear, heavy jaw, and a clear bright eye.

And in the selection of a hog the buyer should notice the carriage. If this be dull, heavy or sluggish, reject him as unfit for a breeder. Such a hog as the above will not only live, but keep fat on grass alone while the common long-legged, slab-sided, land-pikes would starve."

In regard to Breeds: It would be useless, says Youatt, to point out certain breeds as being the most profitable or advantageous, so much depends upon the objects for which the animals are raised; and besides, each breeder of any experience has in general his own pet stock or breed, frequently one that has been "made" by himself or his progenitors. This will be found to be the case in all great pig-breeding localities; and it frequently happens that the actual stock from which some of the present choicest races of swine sprang, cannot be traced farther back than one or two human generations.

Such is the case with the Chester Whites, Improved Suffolks, (the Suffolk crossed with the Chinese,) the Magee and the Moss breeds, all of which are bred in this State.

The Berkshire.—This breed of hogs has long been famous for being one of the best breeds in the country, but it was fast disappearing from the pen, until some needed qualities were imparted to it, one of which, early fattening, but at the expense of size. A late writer in the Country Gentleman, describing this breed in Monroe county, in New York, says, "for form and symmetry, good points, docility, quiet and peaceable disposition, aptitude to fatten well, and to return the greatest number of pounds of pork and lard from a given number of bushels of grain, there is no other breed of swine in the world that we can set down as superior to the Berkshires, providing one is satisfied with hogs of a small size" * * *

Many farmers adhere to the Berkshires because they have small bones, and make most superior meat, not only hams, shoulders, and bacon, but mess and prime pork." The same writer speaks of a cross between the Red Russian and Berkshire which produces a very superior kind of swine, not only for market but for home consumption. They possess in addition to all the good points of the Berkshires, greater length, quite as much or greater breadth, and large frames, and are as docile and quiet, and apt to fatten as any other breed.

The Suffolk.—The peculiar characteristics of this breed are generally well known. There are many of the imported Suffolk in this State. For a stock hog they are not as acceptable as some others, but for home use, their peculiarly early fattening qualities with the delicious flavor of the meat, they are equal if not superior to any others in the State. A cross of the improved Suffolk on any of our large breeds, improves the progeny wonderfully.

The Chester White.—This is a breed which originated some 30 years ago in Chester County, Pennsylvania, and was produced by careful breeding. Chester County had set her mind on a white pig—and a white pig she must and would have—when some of the older farmers began to pay more attention to the old stock; they hunted the best they could find to cross their stock with [Iowa Farmers go and do likewise] and the change for the better would soon be a marked one, even as it was in Chester. The characteristics of this breed, as we now find it are: perfectly white hair, thin skin, square build, small head, a fair proportioned snout, deep sides, allowing large quarters and great depths over the shoulders, ears standing erect while young, but *drooping* after six or seven months. Their weight varies according to their keep; if well kept he will average a pound a day for nearly two years if not longer. They may be made to exceed this, and it has been done. They have been made to weigh over nine hundred. There was great care taken to keep from breeding in and in, in perfecting this breed, which had long been known to have a deteriorating effect.

The Magee Hog.—About five or six years ago this breed was first introduced into Jefferson county, from Ohio. They were made in the same way as the Chester White, their leading strain being the Poland. Their fame has already spread over the State. They are large and well made, and a Spring pig, fattens readily, with proper treatment, to weigh nett at eight months after weaning, from 200 to 300 pounds. A litter of this breed took the first premium at our last State Fair against a selection of all the leading improved breeds in the State. This breed is a profitable one for the Farmers of Iowa.

The Improved Leicester.—There are a few pens of this breed in this State, and it is claimed for it that it equals any other pure breed here or elsewhere, for being large, early fattening and profitable.

The Yorkshire.—This breed has been so improved that it is deemed an acquisition to the farm. They have recently been introduced into Butler county. At the last New York State Agricultural Fair, a correspondent writes that he saw "a cross between the Suffolk and Yorkshire which attracted unusual attention. The color is white, with a disposition in some to assume the pink or flesh color. There is little hair or bristle; the breed is almost naked. I have seen nothing finer in every respect than this breed. A pig, in six months, will attain two hundred pounds, on milk alone. Such is the testimony of the farmers in the county (Jefferson) where the Fair was held, and where they claim the breed originated. They are fast spreading, and in my opinion, will soon supplant most others. They seem the perfection of the hog species."

There are in this State, of the pure breeds, the Improved Suffolk, Chester White, Leicester, Berkshire, Yorkshire and Magee. Either of these breeds are good in themselves and very desirable for crossing, and pigs can be had from breeders for from \$5 to \$10.

BREEDING.

Youatt, the best authority, says:

"In the breeding of Swine, as much as in that of any other live stock, it is important to pay great attention, not only to the breed, but also to the choice of individuals. The sow should produce a great number of young ones, and she must be well fed to enable her to support them. Some sows bring forth ten, twelve or even fifteen pigs at a birth, but eight or nine is the usual number, and sows which produce fewer than this should be rejected. It is, however, probable that fecundity depends also on the boar; he should therefore be chosen from a race which multiplies quickly. He must be sound and free from hereditary blemishes; and should be kept separate from the sows till he is about a year old, and has finished his growth. If intended to fatten ultimately, he should serve but two years, and castrated when three years old, else the flesh becomes uneatable. A boar left at liberty with the sows, might suffice

for thirty or forty; but as he is usually shut up, (as should be) and allowed to leap at stated times only, so that the young ones may be born nearly at the same time, it is usual to keep one boar for ten or twelve sows."

"The sow must be chosen from a breed of proper size and shape, sound and free from blemishes and defects. She should have at least twelve teats; for it is observed that each pig selects a teat for itself and keeps to it, so that the pig not having one belonging to it would be starved, if there should be more pigs than teats. She must also be free from bad habits, such as bringing forth dead pigs, lying on or eating them. Discard all such. A sow is capable of conceiving at the age of from seven to ten months, but it is always better not to let her commence breeding too early, as it tends to weaken her when she does. From ten to twelve months old is about the best age. They are generally in heat, however, at the age of four or five months. The period of gestation averages from 109 to 123 days, according to the age, constitution, &c., of the mother. A good breeding sow will produce two if not three litters in a year, but two should be the outside number, and if it is intended to fatten the sow for pork, she should not be suffered to breed beyond her third year. Whenever it is practicable, it should always be so arranged that the animals shall farrow early in the Spring, and at the latter end of Summer or quite the beginning of Autumn." There are numerous advantages for this arrangement of time, not the least of which is the prevention of a litter in weather so cold as to endanger its loss, as is too frequently the case in Iowa. A leading principle in breeding the hog, as well as the horse, the sheep, the ox, the dog, is to make a cautious selection of the male by whom the female is destined to conceive her first progeny, for that male stamps a character upon every subsequent produce (whether for good or bad) by other males; the subsequent progeny of the mother will always partake, more or less, of the character of the father of the first offspring. This is a mysterious law, but it is well established." The indiscriminate connection, by permitting the two sexes to run together at all seasons, a custom which prevails to a great extent in this State, is a prolific source of disease and deterioration of the stock.

Hon. C. E. Whiting, of Onawa, Monona county, Iowa, replies to several queries made to him as follows: "My hogs are of the English Grass breed. They mature early and fatten very easily at any age, but are not first rate breeders. I turn my boars and sows together about the 15th of December, which will bring the pigs mostly by the middle of April. The boar pigs are altered at an early age. The sows I let run until the latter part of August, by which time they are sufficiently developed to enable me to select the best ones for breeders; the remainder are all spayed, which makes them equal, if not superior, to barrows, of the same age, for fattening. Spaying, when done by a skillful hand, is little, if any,

more dangerous than altering the boars. The practice of spaying all sows not needed for breeding cannot be too strongly urged upon the pork growers of Iowa. After the pigs have been weaned a few days, the sows are spayed whilst thin in flesh from suckling their pigs. There is little more danger in this than in the same operation on the young sow, yet the small risk is much more than balanced by the ease and rapidity with which they fatten. On the above plan, I have been able to rear all my stock-hogs without the expense of keeping breeding sows over the second winter."

FEEDING, &C.

A writer in the *Prairie Farmer*, (Chicago, Ill.,) says:

I have been for several years feeding hogs, and have had almost all kinds common to this part of the country, and have come to the conclusion from my observation, that it takes no more feed to put 100 lbs. on a high-bred hog than it does to put from 50 to 75 lbs. on the common scrubs of the country, and I am satisfied that the meat of the former is far superior to that of the latter, and that a man had better always sell his corn for what he can get than to feed it to a scrub hog. But some men can't bear the idea of paying 10 or 15 dollars for a good pig, but suppose by so doing you increase the amount of pork you have for sale 35 per cent. without any increase of feed—a very low estimate of the difference between good and bad hogs—how many hogs will it take to pay for your pig. I have some pigs on my place that have all hogs—how many and fared alike in all respects that are about 10 months old, and my improved pigs, some of them weigh 350 to 375 lbs., while the scrubs weigh from 150 to 175.

A Mr. Taggart, of Wayne, Ohio, at a meeting of the Ohio State Agricultural Society, said he was not in favor of feeding hogs long, to make them weigh large weights. He kept his in the clover field till the beginning of September; then when the corn begins to harden, cuts it up, both ear and stalk, and feeds it to them. "One bushel of corn, in September, will fatten more than one and a half in December." Mr. T. recommended killing by the 15th of November, as being the most profitable time, for then there has been little expenditure of carbon, for the production of heat, when, if left for another month, the cold, wintry storms make this necessary.

A writer in the *Country Gentleman* gives a detailed statement of feeding hogs whole corn and water alone, soaking the corn forty-eight hours in cold water. In consuming 100 bushels of corn, the hogs used the water in which the corn was soaked and 100 pails more, making 400 pails in all. He paid 30 cents a bushel for corn, and including all expenses, labor, &c., his pork cost him nearly three cents a pound. Five pounds of corn made one pound of pork.

A correspondent of the *Prairie Farmer*, in December last, says from his own experiments, that at least 33 per cent. is saved in corn by boiling the ears for feeding hogs.

One great detriment (absolute loss in fact) to profitable hog feeding in Iowa, is in allowing them to roam over all creation nearly to obtain their feed. A good sty should be provided where they should be fed and sheltered, of any size in proportion to the number of pigs kept, divided into apartments of six feet square, with an open space in front of each enclosed so as to keep them in, floored but not covered, with an entrance sufficiently large to permit easy access either way between the pen and open enclosure. Instead of the latter a sufficient space may be railed or boarded in without a flooring, to permit sufficient exercise. The pen must be made weather tight, roof and sides. Both the floor of the pen and the enclosure

should be slanting, which permits greater facility for cleaning, for a hog is naturally a cleanly animal, and thrives best where he has clean quarters. A substantial vessel to hold wash and occasionally water, should be one piece of furniture, and the trough for the food another, which with a good litter of straw inside, the pig house may be said to be furnished. Such pens as these are worth their whole cost for breeding sows to litter in and raise their young. A series of pens for twenty sows, one sow to each, can be made of boards and plank, such as first described for from \$2.50 to \$3 each.

If pigs run on the prairie, give them a good meal the first thing in the morning and when they come at night; they will forage during the day, and thereby amuse, if they do not satisfy themselves. They will never require to be brought home, for the comfortable meal and a good bed will do that. While they are thus treated they will grow, but not fatten much. When fattening keep them in and give them a mid-day meal.

Whilst corn is our great dependence for fattening hogs, it is by no means the only food necessary. Give them other food regularly, if only for a change. Their health requires it as well as the human and they will grow and fatten better. Hardly any kind of food comes amiss to the hog. Vegetables of nearly all kinds, cooked, given once a day, and any kind of slops from the kitchen, will pay as well as a feed of corn in fattening hogs, providing it is one of the three meals required each day. Potatoes stewed or boiled do a pig infinitely more good than raw ones. In feeding for slaughter be careful to give all the pig wants, but no more, and ever keep in mind that you want to fatten him to the required weight at the earliest possible moment. To do so, tickle his appetite with good food and frequent changes. Keep his pigship ever mindful that you want to make pork of him. A writer in the Country Gentleman says that there is a way that some farmers have of giving their hogs *too much water*. It is this—pouring large quantities of it into the swill tub, and then persuading themselves, for the hogs know better, that it is very good feed. Too much slops for either men or hogs will not pay. Another writer in the same paper says, “one of my neighbors—a farmer all his life, and over 70 years of age—fattens his hogs in a dry pen, without water or slop, giving them nothing but dry corn; and I have noted the fact for five years that I lived here, that he has made I think the best—I know the fattest—pork in this county. The hogs while fattening, particularly in dry, warm weather, eat and lie down, walking about but little. Had I known the above twenty years ago, it would have saved me a great deal.” This item is inserted more as a curious fact—if it is one—rather than for imitation. Thank a kind Providence we have plenty of good water in Iowa for man and beast.

The State census for 1858 gives the number of hogs sold in that year as 337,261, at an aggregate value of \$2,111,425. In 1860 two years thereafter, it is safe to say that the number of hogs sold in

that year was one half more, making the number a little over 500,000. It is generally admitted by parties from every section of the State, that the increase for 1861 over that of 1860 is at least one-third, giving for 1861, say 650,000 sold; averaging these at 200 lbs. each, the gross weight would be 130,000,000 lbs. The lowest average sum which is generally admitted that it costs to make a lb. of pork in this State with corn at ten cents, is 2½ cents; this would make each 100 lbs. cost \$2.50, in all \$3,250,000. It is a well demonstrated fact, by proper feeding, &c., of hogs, that pork can be made for from one cent and a half to two cents per pound, and afford a small profit to the feeder, with corn at ten cents per bushel, which is about the general average cost of its production in this State. At this cost our farmers would not lose any thing even at the present low prices; but if it is all sold at these prices, the loss on hogs will not be less than an average of one dollar per head, or in gross over \$600,000; whereas, if bred, fed, &c., properly, they would have made a profit of this amount, which in the aggregate amounts to the sum of \$1,200,000. This is a startling sum in these days, and with such feeding, &c., of hogs as now obtains over the State, and such prices for a few years, it would not be difficult to tell the sad result.

The practice of hogging down, or feeding on the standing corn in the field, is said to be attended with success. It is done to a great extent in Ohio and Illinois. Hon. Mr. Glanville, of Van Buren county, says that he does it with advantage—1st, by turning in the hogs, when the ear is considered hard for roasting ears—2d, then letting his cattle on the same field to eat up clean. The droppings increased the next year's crop of corn at least five bushels per acre.

DISEASES AND REMEDIES.

HOG CHOLERA.—Although this disease has not appeared much amongst the hogs of Iowa, in Illinois it has destroyed them by thousands. The only remedy that I have yet seen is given by Mr. G. W. Miller, of Indiana, in the *Prairie Farmer*, as follows:

I have seen this disease in all its various forms during the last six years, and have tried all remedies that can be thought of, and will say to those gentlemen and all others concerned, that my experience proves to me this disease is at least very much aggravated by what is called in and in breeding, also by keeping large numbers of hogs together. Keep the hogs apart, salt sows and pigs. Never keep more than two sows and their pigs together, if you can possibly avoid it; also avoid breeding hogs together that are nearly related to each other—better put off all your present stock, and commence new; but by all means get a young thrifty pair of some good stock and cross your hogs with him. And here allow me to say, Messrs. Editors, I have never known either the Poland or Essex hogs to be affected with this disease to any extent. They are both dark colored hogs. Can this have any thing to do with their healthiness or exemption from hog disease?

Now for a remedy. When you see a hog thumping in the sides, looking gaunt, and appearing quite feeble and feverish, occasionally coughing, which they will do if they run a few steps, (especially is this the case with young pigs and shoats), catch the hog, or pig, throw him on his side, hold him down, take a long bladed knife and stick it under his tongue, this can be done by putting a stick between his jaws to prevent him shutting his mouth, the blood will run out of a dark color very black and thick, and you see the blood as you let him up. In an hour or two, if he will eat, give him some lard or a piece of fat meat, or some very greasy slop. If he won't eat, in a day or two, pour some greasy slop down him; though they generally die if they won't eat of their own accord. In eighteen hours after you bleed them, if you find them purging and vomiting violently, you cannot do any thing for them; they nearly always die. Salt your hogs in troughs, put ashes and lime in the bottom, mix sulphur and coppers with their

salt, also roasts, if they cough; give them free access to charcoal and old rotten wood; if it is not in their lots, haul it and burn some on the ground to give them ashes and charcoal.

We have abundance of testimony that hogs, especially when kept in the pen, require soft birch pounded up, or wood charcoal, or rotten wood, or wood ashes, at least once or twice a week, to give them a good appetite and keep them in health. The common coal of our State is very good—I have found that hogs eat it with avidity, and sometimes a little course salt may be given.

[From the Davenport Democrat.]

BLACK-TOOTH AMONG SWINE—IMPORTANT TO FARMERS.

This disease which has been known to prove so fatal to swine, has, we are informed, lately made its appearance in this vicinity. The first instance was among the swine of Edwin Smith, of this township. He first observed that one of his small hogs was being singularly affected when attempting to eat the corn which was thrown before it. It would first take an ear of corn in its mouth, then whirl about rapidly and squeal as if in great pain, and then go into a fit. This was the case every time the hog was fed. Mr. Smith was puzzled to know what could be the matter with the animal. At first he thought the trouble was occasioned by the taking of corn up that idea, and waited for further developments. One morning a few days after, the hog was found dead in the pen. He was thrown out, and Mr. S. discovered upon examination of the mouth that there were on either side of the jaw between the tusks and the front teeth, teeth perfectly black. This discovery presented a key to the whole difficulty. He then proceeded to examine some of the balance of the herd, and almost invariably found the disease operating in different stages. Out of about 90 hogs, in his pens, upwards of 80 had the black tooth, or, as some term it (although we can't see the reason why) the hog cholera.

Here was a fair chance to stand a heavy loss. Many of his hogs were very valuable—and all fine stock. He recollected of seeing in his "scrap book" an article which, several years ago, he had taken from a newspaper, and laid away for future reference, which related to a disease of this kind. On hunting it up, he found the case was one in point, and proceeded to apply the remedy. The following is the article:

True Hog Cholera.—A New Discovery.—Mr. J. P. Dunn, of Knight township, in this county, called in our office yesterday and gave us some interesting details in reference to experiments which has been made in his neighborhood on the hog disease, some particulars of which we give for the benefit of our readers.

Mr. Dunn says that it has been discovered that in all hogs afflicted with this disease, there is a "false tooth" found, similar to the "blind tooth" in horses. This tooth is perfectly black in appearance, and seems to be a sort of an erratic, or superfluous offshoot, growing out from the outside of the upper jaw, one on each side, and situated between the tusks and the grinders. Mr. D. informed us that two of his neighbors, Mr. O. P. Alken and Daniel James, had examined a large number of hogs and had found that every diseased hog had this black tooth.

They also extracted these teeth from a number of hogs, by knocking them out, and the hogs so treated soon recovered, some are entirely well and others are now just getting over it. Hogs affected with this disease refuse to eat, but Mr. D. says that as soon as the teeth are extracted they begin to eat corn readily. He was not prepared to say whether the disease was caused by an inability to eat on account of these extra teeth, or whether the teeth were only the result of the disease, and a removal of which would remove the seat of the disease itself. He thinks as it may, sufficient experiments were tried to convince those who saw the trial, that two facts were established: First, that all cholera diseased hogs have these black teeth growing, one out of each upper jaw, as we have described; second, that the removal of these teeth relieves the hog, and is a great remedy if not a certain cure.—*Genesee (Ind.) Express.*

Mr. Smith took a cold chisel, hammer and plenty of oil, and in the course of two days had knocked out all the black teeth, root and branch. It was no small job by any means. He then hunted up the following recipe in his "recipe book," and speedily applied the further remedy therein mentioned.

The following is contributed to the *Journal* from Willsonville, Spencer county, Kentucky, as a "certain cure for hog cholera."

Directions: Please publish the following cure for "hog cholera." Pulverize salt well: Sulphur, 4 pounds; madder, 4 do; saltpetre, 2 do; black antimony, 2 do. If your hogs are sick, give to each, one table spoonful twice a day, night and morning, until cured.

As a preventive, give to each hog one table spoonful twice a week. This remedy has been used extensively in our neighborhood, and in nearly every case has effected a cure. As a preventive, we think it infallible.

THOMAS D. DALE,
M. L. HUFFMAN.

He gives his hogs this medicine in their swill and finds that they are all in a sound thriving condition.

CATTLE.

PROMINENT BREEDS IN IOWA.

Short Horns or Durhams.—The principal marks of a thorough bred Short Horn are thus given in the American Herd Book: "A yellow skin, with a yellow, cream color, or drab nose; this drab may run to a brownish shade called nut-colored, but not smoky or black. The colors of the hair a lively red, (the red running down into a deep cherry, or up into a yellowish,) or a brilliant white, and these red and white colors, either separate in patches or spots by themselves, or intermixed in roan—either color, more or less, prevailing; the horn waxy or a cream color, with little black about it, but what black it has, at the tips; it should also be small, short and slender, either crumpled or gently drooping, or slightly turned up; a general levelness of the back from the shoulders, at the setting on of the neck, to the tail; a fullness and depth of body throughout, with great breadth; short and fine legs; a fine tail; a symmetrical appearance throughout; with a lively, gentle, yet sprightly look of the eye." There are other intermediate points of excellence that may be named to constitute a perfect short horn; but these which are named are usually considered indispensable, as making a truly well bred animal.

For the practical advantages to the Western breeder of this breed, the following extracts are made from an essay of Capt. J. N. Brown, late President of the Illinois State Agricultural Society, a successful breeder of Short Horns in Central Illinois, for the last 18 or 20 years. As he is a practical man he says he deals in facts. "The value of cattle consists chiefly in the amount and quality of milk and beef they will produce at maturity. All admit that the race of cattle that gives the greatest return in milk and butter for the least food, and gives the greatest weight in beef, at the right points, at the earliest period, and with the least expense in feed and attention, is the race we should breed. It was long believed to be impossible to combine the two qualities together. The improvement in breeding during the last century, has proven that the two can be blended. And that in the stock of cattle known as Short-horned Durhams, a degree of perfection hitherto unknown (in the production of milk, butter and beef), has been attained at the earliest maturity, and with the least cost in feed and attention. It costs, at this time in Central Illinois, \$20 to raise a steer to be three years old, and to prepare him by grazing and feeding for the butcher, will cost \$18 more, viz: \$4 for grazing, \$14 for six and a half or seven months corn feeding. The animal costs, when ready for market, \$38."

"The average weight of the native cattle of our country, thus prepared for market, will not be more than 750 lbs. net. It will

require a fraction over five cents per lb. net to make our beef pay for raising and stall feeding for market. Take a mixed blooded Durham calf and give him the treatment of the common stock of the country; or, in other words, expend \$38 in raising and stall-feeding for market, and he will, the spring he is four years old, (that being the age of our cattle when they go into the hands of the butcher) weigh 950 lbs. net. It will cost four cents per pound to produce the beef in the mixed blooded animal, and at five cents per pound, (which is the cost of the beef in the native animal), will give a profit of one cent per pound, or \$9 50 per head in favor of the mixed blooded steer, at the same age and cost. From this statement it will be seen that those engaged in improving the native stock, will realize 20 per cent. more from the same feed than those who from prejudice (or a mistaken economy) still grow the natives."

From information which we have obtained from experienced breeders of the Short Horns, and from observation, we are not satisfied that the breeding of *pure* Short Horns for beef or milk is the best for the farmers of Iowa, beyond their use for improving the natives, especially when the best shelter and feed is not provided, when compared with

The Devons.—The north of Devonshire, in England, has long been celebrated for a breed of cattle, beautiful in the highest degree, and in activity at work and aptitude to fatten unrivalled. The prominent points which should influence in this as in other breeds are: a wide and deep girth about the heart and loins which should extend far along the back; length and roundness over the whole of the ribs; the *hooped* as well as the deep barrel is essential; little space between the ribs and the hips; (this seems to be indispensable in the ox, as it regards a good healthy constitution and a propensity to fatten—but a largeness and drooping of the belly is excusable in the cow, or rather, though it diminishes the beauty of the animal, it leaves room for the udder; and if it is also accompanied by swelling milk veins, it generally indicates her value in the dairy); the hips, without being ragged, should be large, round rather than wide, and presenting when handled plenty muscle and fat; the thighs should be full and long, close together when viewed from behind, or have a good twist, and the farther down they continue close the better; the legs short, varying like other parts according to the destination or purpose of the animal, but decidedly short, for there is an almost inseparable connection between length of leg and lightness of carcass, and shortness of leg and propensity to fatten—the bones of the leg, and they only, being taken as a sample of the bony structure of the frame, should generally be small, but not too small, yet small enough for the well known accompaniment, a propensity to fatten,—if very small it may indicate delicacy of constitution and liability to disease. Last of all, the hide—the most important point of all—thin, but not so thin as to indicate that the animal can endure no hardship; movable, mellow, but not too loose,

and should be particularly well covered with fine long and soft hair.

The more perfect specimens of the Devon breed are thus distinguished: The horn of the *bull* ought to be neither too low nor too high, tapering at the points, not too thick at the root, white below, and of a yellow or waxy color at the tip. The eye should be clear, bright and prominent, showing much of the white, and have around it a circle of a dark orange color. The forehead should be flat, indented and small, for by the smallness of the forehead, the purity of the breed is very much estimated. The cheek should be small, and the muzzle fine; the nose must be of a clear yellow. The nostril should be high and open; the hair curled about the head. The neck should be thick, and that sometimes almost to a fault for symmetry.

Excepting in the head and neck, the form of the bull does not materially differ from that of the ox, but he is considerably smaller. There are exceptions, however, to this rule. The head of the ox is small, very singularly so, relatively to his bulk, yet it has a striking breadth of forehead. It is clean and free from flesh about the jaws. The eye is very prominent, and the animal has a pleasing vivacity of countenance, distinguishing it from the heavy aspect of many other breeds. Its neck is long and thin, admirably adapting it for the collar or yoke.

There are few things more remarkable about the Devon cattle than the comparative smallness of the cow. The bull is a great deal less than the ox, and the cow smaller than the bull. It is almost impossible to procure large and servicable oxen except from a somewhat *roomy* cow. These cows, however, although small, possess that roundness and projection of the two or three last ribs, which make them actually more *roomy* than a careless examination of them would indicate. The cow is particularly distinguished for her full, round, clear eye, the gold colored circle around the eye, and the same color on the inside of the ear, the countenance cheerful, and the muzzle orange or yellow; the jaws free from thickness and the throat from dewlap; the points of the back and hindquarters different from those of other breeds, having more of roundness and beauty, and being free from angles.

The *qualities* of the Devons may be referred to these points: their working, fattening and milking, all of the greatest importance to the farmer of Iowa.

Where the ground is not too heavy the Devon oxen are unrivalled at the plow. They have a quickness of action which no other breed can equal and very few horses excel. They have a docility and goodness of temper, and stoutness and honesty of work to which many horses cannot pretend. It is a common day's work, on fallow land, for four Devon steers to plow two acres with a double furrow plow. [The author, Youatt, from whom we quote, refers to plowing in England, which averages fully double the depth plowed in Iowa.] Four good steers will do as much work in the field, or on

the road, as three horses, and in as quick, and often in quicker time, although farmers calculate two oxen equal to one horse.

The profit derived from the use of oxen, in the district where they are native, arises from the activity to which they are trained. During harvest time, and in catching weather, they are sometimes trotted along with the empty wagons at the rate of six miles an hour, a degree of speed which no other ox but the Devon has been able to stand.

They are usually taken into work at about two years old, and are worked until they are four, or five or six; they are then grazed, or kept on hay, and in ten or twelve months, and without any further trouble, are fit for the market. What deserves consideration is, that an ox must be thus worked for him to attain his fullest size. If he is kept idle until he is five or six, he will invariably be stunted in his growth. At six he reaches his full stature, unless he is naturally disposed to be of more than ordinary size, and then he continues to grow for another half year. The Devon oxen are rarely shod, and very rarely lame.

Their next quality is their disposition to *fatten*, and very few rival them here. Some very satisfactory experiments have been made on this point. They do not, indeed, attain the great weight of some breeds, but in a given time, they acquire more flesh, and with less consumption of food, and their flesh is beautiful in its kind. It is mottled or marked, so pleasing to the eye and to the taste.

For the *Dairy* they are acknowledged to be equal if not superior to the short-horns, not so much for the quantity of milk as its general superior richness. Its property for milk has been greatly increased within the last few years without detriment to its grazing qualities. Those points in which the Devons were deficient thirty years ago, are now fully supplied, and all that is now wanting is a judicious selection of the most perfect of the present breed in order to preserve it in its state of greatest purity.

The Devon cattle are more than usually free from disease, and will submit and thrive on coarser food and more exposure than most other breeds.

It should have been stated before that the Devons are invariably red, except the tip of the tail. The North Devons are a dark red and the South Devons a light red.

A cross of the Devon on our native stock would doubtless be of as great advantage as Mr. Brown says is the case with the Durhams, perhaps more so, as the milking and working qualities would be imparted to a greater extent in addition to earlier maturity.

As these are the only two breeds known to any great extent in this State we have not thought a description of other breeds necessary at this time. If our cattle were all crossed with either of the two mentioned we should have all the leading desirable characteristics required.

The principles which should be observed in *breeding cattle* are so important that we would advise every reader of this article to obtain Flint's book on the Dairy, at a cost of only \$1.25, (worth to every farmer fifty times that amount,) as we have not space here to do the subject justice. Some of the leading ones, however, may be touched upon in the course of this report.

ON THE REARING OF CATTLE.

The following are some hints on the rearing of cattle on our principles, suggested partly from observation, and partly from writers in the *Prairie Farmer* of Illinois:

A few cattle may be kept profitably on every farm and doubtless are; in fact, if not done, much would be wasted on every farm that would make good food for cattle. Strict economy therefore demands that a few head should be kept. Have good native cows, as good as can be had at reasonable prices, which should be mild in temper, &c., also a good bull, of an improved breed if possible; two or three neighbors might club together to get such an one, and keep him at a central point in their neighborhood. He should not be allowed to run on the prairie, and should not be used too much. Too much use injures the animal as well as the offspring.

Calves can generally be bought cheaply in villages and of dairymen, who estimate milk highly; and when such is the case it is desirable and economical to raise two calves to each cow, which should be done by letting them suck regularly, morning and evening. The calves should have a good pasture lot, and the cows may run on the prairie; but the calves should never be permitted to run with the cows. For this there are many reasons: the cows will feed better when not annoyed by the calves, and the calves will form a habit of eating much better, without having the cow to resort to at pleasure, which they will do eight or ten times a day when they have the privilege, which would destroy the milching qualities of the cow, because the udder would not be developed, and would never have the capacity to hold much milk.

When the calves suck the cows are sure to come home regularly, which is quite an item when they run on the prairie; and it is much less trouble to let the calves suck than to milk the cows, to say nothing of feeding the calves, which is the practice with many, but a poor way to make a good calf. To prevent an undue proportion of head and neck the male calves should be castrated when young even before weaning. The weaning should be done gradually, letting the calves suck once a day for a few days and then once in two days; milking the cows at the time the calves don't suck; and now feeding the calves and cows both, should commence so as to keep the calves in a good growing condition, and to make butter for winter use or market. A good meadow of clover, timothy and redtop from which a crop of hay was taken just before harvest, or a

timothy patch cut for seed only, will now be serviceable; in the absence of this a stubble field plowed immediately after harvest, and sown with rye will make good feed. The grain left in harvesting grows and is turned to good account, and the plowing and pasturing leaves the ground clean, and by deep plowing is in an admirable condition for a crop of corn the next spring. When the land is not fenced, so as to admit of pasturage, a strip of corn may be sown just before harvest, and fed daily when large enough.

Continue to feed both cows and calves at milking time; and if they have not free access to water, give it at noon every day. This feeding should be attended to most strictly, and varied somewhat with the severity of the weather, from the first heavy frost until the commencement of winter, and will apply to other stock as well as cows and calves. This is the time when our stock is most neglected, and consequently runs down in flesh most rapidly.

When winter fairly commences dry food must be resorted to, but let the change be gradual. Calves should be kept up with access to a good shed, and feed plenty of good hay, with corn, meal and bran. Cows and other cattle should have good sheds also, sufficient to protect them from the severities of the weather, with hay, cut fodder, or access to a straw stack or corn-field; and in either case a little soft corn; if not, sound corn may be fed, ground if possible, but if not, and fed in large quantity, stock hogs should follow.

The feeding of grain should be done in the evening, and if watered but once a day do it at noon. On grain farms straw and corn stalks may form a greater part of the coarse food. Where there are a dozen head kept, it should be cut up; an expenditure of \$30 for a cutter which will do both will be repaid in one year. In fact, thus prepared, young stock can be wintered on straw alone, but will not much more than live. In the absence of a better plan, when you commence threshing let the chaff of the first setting accumulate near the tail of the machine, and stack the straw of the next setting on top of it, and so to the end; thus most of the chaff may be saved, and is equally good as an equal weight of good hay.

The comfort of the cattle, as well as increasing their thrift, is greatly promoted by having plenty of straw for bedding during cold weather. Here the cutter should be brought into requisition again in cutting the straw for the beds, as it makes them better and more readily absorbs the valuable manures. Straw should never be burned, as is too frequently the case, but stacked up as carefully as grain. It is valuable for making sheds to protect the stock, if too dilatory to feed it as suggested.

Never trust the care of stock to careless hands, for they should be attended to with scrupulous regularity. Good and regular feeding pays as well as any other labor on the farm. As cattle are early risers, they need early breakfasts.

The following important facts in regard to winter treatment of animals, are selected from a prize essay, by a New York Farmer,

published in the January number of the American Agriculturalist, for 1862:

The first point to be secured is the health of the animals, and for this sufficient room and good ventilation are indispensable. Warmth is less important than ventilation, but both should be secured if possible. All barns and stables need ventilators, as outlets for the foul air. When ventilators from stables pass through the hay mow above, they must be made tight, or else the foul air instead of escaping harmlessly will contaminate the hay. Farmers are often at a loss to conjecture why their animals will not touch fodder placed before them. Animals are unwilling to eat fodder which others have breathed upon, what must then their aversion be to that which contains the essence of all the air ejected from the lungs of ten, twenty or thirty animals.

Next in importance to ventilation is room. A false idea of economy prompts many to crowd their animals into half of the room they require. It is far better to err the other way. There are many days in winter when the weather will not warrant our turning stock out any longer than may be necessary to water them and to clean out their stables; and when we not only deprive them of exercise, but cram them up in stables so that they have hardly a chance to move either way, we cannot expect to meet with much success in winter feeding.

At the commencement of winter feeding, the general rule is to give the poorest feed first, and so keep gradually improving—and it is a good rule so far as it goes; but to take cattle up in the Fall and give them nothing but coarse dry straw is absolutely cruel. As for young growing stock they should have the best fodder the farm produces all the year round. Remember that the condition of the animals during the first few years lays the foundation of their future excellence. As far as possible the nutritive value of their food should be the same throughout the season. For the purpose of equalizing the food I use the *Straw Cutter*, a tool which no farmer can afford to be without. Wheat straw contains 13½ per cent. of matter available for food and 86½ per cent. of woody fiber and ash; if fed alone, therefore, it requires a large amount to furnish the requisite nourishment. But if cut up and mixed with hay, roots and meal, it will not only go to nourish the animal, but the woody fiber before useless, will counteract the effects of the otherwise too concentrated food. Will our farmers never learn the profits of stabling cattle? Except here and there one, they leave their cattle in open yards, or worse yet in open fields, [or worse than this, the bleak prairie] to shift for themselves, throwing them daily, bundles of corn stalks or straw, and giving them access to a trough full of ice, which they call water. Did they but know what an increase of milk they would obtain, (one-third more at least,) that shelter is cheaper than fodder, and that manure thus made under cover is much more valuable than that which is washed and watered by every storm, they would, I am sure, immediately change their practice.

The shape and size of the stall is a matter about which every one has his own notions, as also about the best mode of fastening the animals. Of all fastenings I consider wooden stanchions the worst, for besides galling the animals neck, they prevent its moving its head either way, and in fact almost preclude all motion. The form of fastening which I like best is a bent iron rod attached to the side of the stall. On this is a ring sliding up and down, to which is attached a chain which goes round the animal's neck. Two rings or links rather larger than the rest, and placed side by side, allowing the "Key" to pass through each, make doubly sure. No one who has used this arrangement I feel sure is troubled with cattle getting loose.

If we confine our animals to stalls it becomes necessary to provide suitable bedding for them. Good clean straw, and plenty of it, is the best. *I cut up all straw used for bedding* in lengths of 3 or 4 inches. The advantages are much less waste of bedding in cleaning out the stable, and cut straw absorbs liquids much more readily and consequently rots rapidly.

With our cattle well bedded, sheltered and furnished with plenty of pure air, we need but one more thing to put them in a state in which every ounce of food will "tell." This one thing needful is an external application composed of: Curry-comb, Thorough-brush, Elbow-grease, of each *quantum suf*, which mix and apply in early morning daily. The cards and curry-combs must be kept moving. Cattle need and profit by their use fully as much as horses, even in summer. Cattle must be kept clean; filth and irritation from impurities and vermin, cause them to lick themselves inordinately, and the hairs thus taken into the stomach, in time, form compact masses which sometimes destroy the animals. If you have never tried it you will be surprised to see how it will improve an animal's looks as well as its health. It accustoms young animals to being handled, and acts as a preventive against lice. Should these pests appear, I recommend alcohol rubbed in along the back and infested parts; if very strong it should be diluted with water.

The straw cutter has a busy time of it with me. As I have already hinted I cut up every thing, both bedding and feed; straw, hay and corn stalks, all have to pass through the cutter. I found this paid when it cost me \$5 a day to hire it done, and I have since found that it pays still better now that I have a machine of my own. I use straw with hay or stalks, and prefer mixing it as I cut, for I can do the work much more thoroughly. The mixture should consist of two parts or more of straw to every one of corn stalks or hay. The straw keeps the pile from heating, for which purpose, as also for the benefit of the animal's health, an occasional handful of fine salt should be scattered over it. Do not cut too much or you may loose the whole pile.

The animals will do better for an occasional change from hay to

corn stalks, and the reverse, as also from one kind of hay to another. For handling cut feed I find a chaff fork very convenient. Any farmer can make one with a drawing knife and three quarter inch auger. The handle should be 3 feet long and put in rather standing, the tines are 2 feet long and 3 inches apart; the bows are of hickory, steamed and bent. Such a fork will take up a bushel or more of chaff or cut feed at once, and will be found useful for many purposes. Do not feed too much at a time; feed often and in small quantities, and always let the last meal be eaten up clean before you give another. The quantity to be given to each must be regulated by circumstances and experience. Individual animals and the different breeds will differ greatly, and experience and watchfulness alone can make a successful feeder. The rule should be, to feed enough, but to beware of the other extreme; if an animal once gets clogged it will receive a check which a months' feeding will perhaps fail to obliterate. Clean water should be given three times a day. Rock salt should be placed in calf-pens and yards; the animals like it, and it promotes their health; they will only take what they need.

If time and space allowed many valuable hints in regard to feeding, &c., might be added. If what has been suggested be received and acted upon by our farmers generally, it would save thousands of dollars to the State. Iowa has plenty of the best of food for every animal within her borders, much of which is absolutely lost by carelessness, waste, and injudicious feeding. The best of markets is at home, where you make beef, pork, cheese, butter, &c. We slaughter annually not less than 150,000 cattle or export them, and are feeding twice as many more of such as are not fit for the butcher; we have also certainly not less than 300,000 cows in the State; in all amounting to at least 650,000 head, about an average only of seven to each farmer of all kinds, including oxen. Some experienced feeders claim that from injudicious feeding, insufficient shelter, &c., that there is an annual loss of from \$5 to \$10 per head; but suppose we put down the loss at but \$2 per head, the aggregate wealth of the State is depreciated to the amount of \$1,800,000.

BUTTER AND CHEESE MAKING.

If not now it will be but a few years when Iowa will export large quantities of both butter and cheese. There is now made in this State as good specimens of both as in any part of the world. The only regret is that there is not enough of the good made for home use. Were it not so, it would be shipped to the Eastern Cities, when the doubters in regard to western prairie butter being equal to their famed dairies would be more than satisfied, and that

they have done us injustice. The poorer qualities being bought up at almost fabulously low prices are packed and shipped for consumption at the south principally, hence our butter generally, is discredited abroad. All we need is experienced and skillful hands to make an abundance of the best for home use and exportation. To make them more skillful we give them the mode of making butter and cheese in some of the best dairies in the East.

BUTTER MAKING.

Hiram Mills, of Lewis county, New York, who has frequently taken Butter prizes at the New York State Fairs, gives the following as his method, in the transactions for 1888:

Milk set in tin pans on rack or salt shelves, (temperature of room 70 deg. and allowed to stand until it is sour, and sometimes until it thickens, but never should be allowed to stand until it turns spotted, so that injures the flavor of the butter. Cream taken from the milk and kept in the cream-pail until enough is obtained for a churning; use crank churn, propelled by hand, churn from forty to fifty pounds at a time. After the butter has come, draw off the buttermilk and wash with cold water in the churn, unless the butter comes very hard, when the washing is omitted. Rub the butter with cold water and worked thoroughly by hand until it is freed from the milk. Butter taken from the churn and worked by hand until it is freed from the milk, then apply one ounce Ashton salt to one pound of butter, which should be well worked in, to prevent the butter from being streaked; it is then allowed to stand twenty-four hours, after which it is worked with a butter worker, and then is packed in tubs, to which it is worked with a lump of salt, to which is used to preserve the butter. Have generally used this kind of salt in making butter, usually pack in eighty-pound tubs, and as soon as one is filled cover with a thin cloth and then a quantity of salt to exclude the air. Turn the butter in brine, and soak in brine for twenty-four hours.

To which may be added, that there is no doubt that every vessel used in the manufacture of the butter, is kept in a state of perfect sweetness and cleanliness, and that no bad odors approach the dairy.

Chenango and Delaware counties are among the best butter-producing counties in New York; and the following letters, from some of the best butter-makers in those counties, showing how they manage their butter dairies, cannot fail to be read with interest and profit:—

1. From James SHATTUCK, Chenango county. 1. In the first place you ask in regard to churning—We use dog power, having the temperature in warm weather about 55 deg. Fahrenheit, which gives the butter a good solid consistency.

2. When the butter comes, it is removed and washed with cold ice-water until the buttermilk is all removed.

3. It is then salted, about one ounce of salt to a pound of butter, worked in thoroughly, set in a cool place for twenty-four hours, when it is worked just sufficient to remove all the buttermilk.

4. It is then packed in the firkin, and covered tight, so as to exclude the air.

5. When the firkin is filled, then you put on the dog power, and rub the butter, put on a good covering of salt, and then pour on water, which makes a brine. We keep it thus covered until it is ready for market, (it being the only way we could ever keep a dairy perfectly sweet through the season.)

These rules, strictly observed, I will warrant never to fail, if the butter is properly made.

We use good white oak bark. Manner of preparing them before putting in the tubs—All them with cold water, to soak three or four days; a handful of salt thrown in will make them all thoroughly with salt, which turns a better color between the firkin and butter.

All the salt used about butter, in any form, should be good dairy salt, as there is more or less of other salts, which renders it unfit for butter.

Good salt water is also essential, as hard dry water is very objectionable.

II. From S. L. WATKINS, of Delaware county. 1. The cows are milked regularly at the same hour morning and evening. The milk is soon after taken off the cows in the milk-pails after milking, and is immediately carried to the milk-rooms and strained into tin pans. Only about three quarts are put in a pan, so that the milk may never stand more than two inches deep, often less in very hot weather.

2. The milk-room is above ground, and in the summer time kept as cool as possible and well aired. The milk is left to stand in the pans from thirty to thirty-six hours—never more than thirty-six, and then the butter is churned.

3. The cream is put in large tin pails with covers, and if the weather is warm the cream pails are set in the cellar to cool the cream.

The intention is, always to skim the milk before it gets much sour. Cream rises in pans set as above stated very quickly, and the milk sooner it is taken off the cows, the better for the quality and quantity of the butter made from it. Cream will all rise, if the milk is very sour, while if the milk stands in the pans for a long time, the cream will not rise at all, or if allowed to stand too long before skimming, the cream is wasted and injured in quality.

4. Our women have a way of taking off the cream without the use of the skimmer. They use a large tin pan. They run the knife around the milk in the pan to separate the cream from the sides of the pan. Then they set the bottom of the milk-pan at the edge, on the rim of the tin pan, then with the left hand elevate one side of the milk pan so that the cream with the help of very quickly and saves both time and cream.

5. The churning is performed every day. The cream taken off one day is churned the next

morning. The common crank churn is used, and is worked by dog power. This crank churn is used because it is easiest attached to, and worked by dog power, and because it is more convenient to wash the butter in than the dash churn. The churning is done very slowly, requiring from two to three hours. The cream having been in the cellar all night, is always cool enough to commence the churning, but if the weather is very hot, and the temperature of the cream is likely to get too high while churning, cold water is put into the churn, and the cream is very good butter, and may be made when the cream is warmer than 60 deg. when the butter is coming.

7. After the butter has come, the buttermilk is immediately drawn off through a hole in the end of the churn, and then about a half a pail of cold water is thrown into the churn on the butter. The crank of the churn is then turned around a few times, and the water drawn off. After that a whole pail of water or more is thrown on the butter in the churn, and the crank again turned slowly a few times, and the water again drawn off, and the butter is well washed with cold milk. The churn dasher is then taken out, and the remaining water is pressed out of the butter with a ladle.

8. The butter is then taken from the churn and put in the butter bowl and weighed, and it is then salted with one ounce of Ashton salt to a pound of butter. The salt is well worked through the butter with a ladle, and the butter is set in the cellar and stands about twenty-four hours before the salt is dissolved, and after that the butter is carefully worked, and the brine pressed out, and then immediately packed in the firkin.

9. Firkins are prepared for use by filling them with water, and letting them soak eight or ten days. They are then scalded with hot water and rinsed, and after that the inside of the firkin is rubbed with a lump of salt, and it is ready for use, and filled with butter within an inch of the top. A cloth is then put on the butter and covered with salt half an inch deep, and then some brine poured on. The firkin is then covered up with a flat stone. Nothing more is done to them or the butter, except an occasional removal of the brine when it dries away.

Dairies made in this way have frequently been kept at home, in the cellar, as late as March of the following season, before they were sold, and have stood all the tests of time and different tests of taste.

We pack our butter for family use through the following winter and spring, early in the fall, while the grass is good. It often lasts until the next June, and is always preferred to fresh butter made on hay in the winter, or on hay and grass together, in the spring.

STORING BUTTER IN A CELLAR.—During several years of our first farming in Iowa, we found extremely difficult to preserve sweet, for winter use, the butter that we made during the months of June, July and August.

We finally adopted the following plan by which we are successful: We, with a few minutes' work, settled large stone jars into the cellar bottom—it being sandy and dry. By putting nearly the whole jars into the ground, and packing the sand close outside, and the butter inside, especially care to keep it well covered, first with a thin cloth, then a thin layer of salt, and then a board with a weight on it to prevent its being uncovered by accident. Last season we took an oak butter-drink one hundred pounds, and packed it in the jars, and placed it in the cellar, and inserted it in the ground beside the jars, and filled it with butter, which kept as sweet as we could desire. Persons who have a dry cellar, and can avail themselves of the above plan, I think will be amply compensated for their trouble.—[Correspondent in Prairie Farmer.

CHEESE MAKING.

In Herkimer county, New York, the milk is treated as follows:

The evening's and morning's milk from twenty to fifty cows is taken to make one cheese. The evening's milk is usually strained directly after milking into the tub or vat where the milk is to be made, and in warm weather will require to be cooled down, so that it will keep sweet during the night, and may not sour during the process of its manufacture into cheese. This is effected in various ways, by passing running water through a tin worm immersed in the milk; by placing large tin coolers filled with water over the milk tub, and having the water running, or otherwise surrounding the tin vat. It makes but little difference how this is effected, providing the milk is kept at the proper temperature to secure the desired object; it should not be too cool, however, as the milk, if cooled too much, will be injured, and the cheese made from the milk is injured by being kept in too low a temperature, and will not produce so large a quantity of cheese. Again, it is desirable that all the cream be used in the cheese; the less cream there is, the more the cheese will be injured, and the less the cheese will be able to stand. The cheese is made to take the same relative position that it is at first occupied in the milk, and therefore cannot be all worked up in the cheese without more or less waste, but a little attention to these points by the treatment of the milk, will readily secure the best results.

The treatment of milk, in order to secure the best results. All the utensils about the dairy must be kept scrupulously clean and sweet, especially those that come in direct contact with the milk. The tub or vat should be provided with a graduated scale, either at the sides or on a rule, so that the number of gallons of milk used may be ascertained.

By this means the dairyman can always tell whether his cows are losing or gaining from day to day, and he has some basis for determining the quantity of rennet and salt to be used for each cheese. The whole of the milk should be heated to about 85 deg. F. The practice of heating one portion of the milk to a high temperature for the purpose of warming the rest, is neither convenient nor economical; an apparatus, therefore, for heating all the milk alike, it will be seen is important.

Mrs. S. JOHNSON, of Schenley Falls, N. Y., in a letter to the *Country Gentleman*, says: After twenty-five years' experience with the dairy, I have having always kept from twenty to twenty-five cows, I think I can give a very good receipt for new beginners.

For ten pails of milk, as soon as milked, while warm, put in the rennet, according to the

strength, enough to set it. If it does not set it in fifteen minutes, add a little more. When the curd has set, take a long wooden knife and cut through the curd, both ways, carefully. Let it stand about five minutes, then stir with the hand carefully. Place the strainer over the tub, and dip off the whey. Now dip in pans, and set in a cool place over night.

In the morning run up your curd in the same way, and after cutting, put in last night's curd after draining, and squeeze very carefully with the hand. Dip off one pall of whey, and heat scalding hot; if not scalded alike, heat more and stir continually. Then place a ladder over another tub with a strainer and basket, and dip the curd and whey into the strainer. Do not let it settle together. Then remove it back to the tub, and mix one pint of best salt. If sage is wished, three tablespoonfuls is a plenty if dried and sifted. Then put in the hoop, and it is ready for the press. Turn in four or five hours, and let it remain until the next morning; then grease with lard. If the cheese is large, bundle when spread enough. Keep the cheese room dark of days, and raise the windows of nights.

RULES FOR CHEESE MAKING.—A Correspondent of the *Country Gentleman* gives the following two rules, which may be useful to young cheese manufacturers:

1st. To ascertain how much cheese you ought to get from your milk.—Multiply the number of pounds of milk by eleven, point off two figures for decimals, and the product is pounds and decimals of a pound of cheese fresh from the press.

EXAMPLE.—Given, 495 pounds milk—how many pounds of cheese ought it to get? 495 by 11, equal to 5445 pounds, or 54 45-100 pounds.

This rule applies to the summer. In October you may safely make your cheese a little heavier from the same milk, or perhaps the October milk has a little more cheese in it. The rule is founded on experience. Of course this green cheese must lose a great deal in curing, since both the butter and casin constitute but about eight per cent. of milk.

2d. For ascertaining the quantity of Salt for Cheese.—Multiply the number of pounds of milk by three—point off three places for decimals. Your answer is in pounds and decimals of a pound.

EXAMPLE.—How much salt for the curd of 405 lbs. of milk? 495 by 3, equal to 1485, or one pound and 485-1000 of a pound. Now reduce this decimal to ounces, by multiplying by sixteen, point off three decimals as before. Your answer is, 485 by 16, equal to 6 160-1000 ounces, or 1 lb. 6-16 oz., is the quantity of salt required for the cheese of 495 pounds of milk.

WHAT THE STATE HAS DONE IN BUTTER AND CHEESE.

Of Butter, the State Census reports in 1856 that there was made in the State 6,099,208 lbs., and in 1858, 9,432,219 lbs. The amount made in 1861, from 300,000 cows, could not have been less than 15,000,000 lbs. The average for each person in the State in 1856 was nearly 12 lbs. for the year; in 1858, it was 14½ lbs., and in 1861 it was 21½ lbs., as estimated, certainly not less than this, and in all probability much more, as there is a considerable amount exported.

Of Cheese, there is reported as made in 1856, 732,323 lbs., and in 1858, 778,788 lbs. These amounts gave but an average of 1 3-7 lbs. to each person for the year 1856, and 1 1-5 lbs. in 1858. In 1861, from the best information we can obtain, the amount made was not less than 3,000,000 lbs., giving an average of 4½ lbs. to each person. It is hardly probable that more than this amount has been made during the past year, as we continue to import considerable.

BEE CULTURE.

The following essay on Bee Culture is so comprehensive and practical, it is embraced in this report as containing all the essential information needed on this subject. It is taken from the *Iowa Homestead*, an excellent Agricultural paper printed in this city,

where it first appeared on the 13th of February, 1862. This essay which was written by Mrs. ELLEN S. TUPPER, of Washington Co., Iowa, was awarded a special premium of \$10 by the State Agricultural Society, in January last:

"In the Spring of 1859, when visiting a friend, I came across a book entitled, 'Mysteries of Bee keeping, by Quinby.' Previously I had entertained vague notions about bees. I knew they made honey 'for a living,'—lived sometimes in hives, and sometimes in hollow trees, and was sure they would sting. This was about the extent of my knowledge of the natural history of bees. This book attracted me, and when once taken up was not soon laid aside. It possessed a fascination for me which I cannot attempt to describe. I determined to know more about bees. I read the work again and again, and although it was very difficult to obtain bees, I did not rest until I had obtained four stands. With these I commenced my bee-keeping, two years ago last March; and the results of my study and experiments of those three seasons, I propose now to record for the encouragement of others, and especially with the hope that I may induce the wives and daughters of farmers to engage in an employment, peculiarly suited to them, which is full of interest, conducive to health, and at the same time most profitable. As far as my experiments have gone, they show conclusively to my mind, that no branch of agriculture in our State can be made so profitable as this, in proportion to the labor and capital expended. I cannot, in the space allowed me for this essay, enter upon the natural history of the bee. Neither is it necessary to do so, for all this knowledge, so essential to any one engaging in the business, can be obtained from books where it is given more ably and fully, than a novice like myself can do it. I shall confine myself to my own local experience, and give that as concisely as possible."

"PROFITS OF BEE-KEEPING.—I shall hope to interest you most, if I touch first upon this point, just now the vital matter with Iowa farmers. My four colonies cost \$5 each, (the usual price hereabouts.) Two of them were extra good, the other two so poor, that they barely lived until flowers came. These four, under my care, have increased in the three seasons, to 40 stands, all of extra quality—every one of which would bring me \$5 to-day, and for which I would not take twice \$200. The first year I had not far from 100 lbs. of honey in boxes, for sale; worth at the price I have always obtained readily for such honey, \$15. The second summer (of '60,) was considered very unfavorable here; few bees swarmed, and many lost their bees, yet mine not only doubled in number but filled 17 boxes—about 170 lbs., worth \$25. This year, ('61,) besides increasing my numbers largely, I have sold over 500 lbs of honey for \$75. In these accounts I do not reckon the honey we have used freely at home. My hives now are heavier than at any other time, the bees having not only sufficient for winter, but a good surplus for spring. Deducting the original cost of \$20 we have nearly \$300

profit. What other investment of \$20 could I have made so profitable? The cost of keeping is nothing, literally; and I have been amply re-paid for all my labor and time, by the information gained, and the pleasure derived from the occupation."

"KIND OF HIVES."—As I knew nothing about the subject experimentally, I followed Mr. Quinby's directions implicitly—in regard to hives, manner of obtaining honey, and so forth—and though I have procured other books since, and made myself acquainted with other methods of arranging hives, the dread I imbibed from his work, of patent hives, has, *so far*, prevented my experimenting with them. I hope to go further next season, and try faithfully the movable comb hives, of which so much in favor is now said. But, *after I have done this*, will be time enough to speak of their merits; at present I only testify that which I *do know*. Until I have tried them, I may be allowed to doubt, whether the extra cost of any of the movable comb hives, does not exceed the extra profit and convenience. The hives I use are so simple that any boy who can use a saw and hammer can make them, and the expense of seasoned lumber now is very small. My hives are 14 inches high, by 12 inches square, *inside*, with a top board 15 inches high, firmly nailed to the top. This size is large enough in any climate, and if I should change the size, it would be to make it a little smaller. I think it would then hold enough for any winter in our climate, when the bees are wintered properly. These hives rest each, on a separate bottom board, or little stand, raised about four inches from the ground; these stands are placed about 4 feet apart, or more if you have room, but never *less*. This plan is much better than setting them under a shed, or on a bench side by side. If the hives can stand under the shade of trees they need no cover, but if you have no shade for them, two boards nailed together like a roof, is necessary in summer to protect from the sun. The contents of these hives are for the bees alone, and I never disturb them in the possession of it. To obtain surplus honey, holes are made in the top board, and boxes placed over them. If the boxes are made of wood, no cover is needed, but if of glass, a cap 7 inches high and 14 inches square, *inside*, is used to set over the glass boxes. I very much prefer the latter. The process of filling the boxes can be watched without disturbing the bees, and the boxes replaced as soon as filled. The honey looks nicer and sells more readily, when made in this form, than in any other. A more simple home for bees, or easy way of obtaining surplus honey, has never been devised. My success with these has been recorded—if any one has done *better* with the movable comb hives, I desire to see it stated. The fact that it takes a workman to make them, and that they cost from three to five dollars each, must operate against them at present with practical farmers.

"SWARMING.—The troubles attending swarming, and the uncertainty thereof, have formed a great obstacle to the increase and pros-

perity of bees. For want of watching at the proper time, many bees were lost, and some seasons bees refused to swarm at all. Many plans were devised to remedy these evils, and at one time bee palaces, and non-swarming hives, were extensively tried, but without success, for the simple reason, that they were all contrary to their natural laws of increase; therefore, they have all passed out of date. Since the fact was ascertained that bees can raise a new queen from worker eggs, apiarians have made many experiments in artificial swarming, and the fruits of their labors, any one may now reap—since it is perfectly easy to make artificial swarms at the proper season."

"I have practiced this method the last two seasons, with perfect success. It is *easier* to make an artificial swarm, than to have a natural one. In the latter part of May, or first of June, according to the season, as soon as I notice that drones begin to appear, I take a pleasant day, and make swarms from all the hives which are in prosperous condition. Lifting a hive carefully I carry it a rod or two from its stand, and turn it carefully on the top. Those who are afraid of bees can easily make them quiet, by blowing a little tobacco smoke among them. An empty hive is placed over the inverted one, and the holes of entrance in both hives carefully stopped so that not a bee can escape. I then, with two light sticks, drum lightly and steadily on the bottom hive. The bees, disturbed and alarmed, begin to fill themselves with honey, and seeing no other way of escape, mount rapidly to the upper hive, and in half an hour, if the noise is kept up without cessation, you will find the larger part of the bees, with their queen, hanging in the new hive.

This hive must be placed *where the old one stood*, (this is very important,) and the old one placed two feet from its side, or in front of it. If the queen is not with the new swarm, the bees will soon make it manifest, as all will leave and go back to the old hive. If she is with them, (as she will be in nine cases out of ten, if these directions are followed,) the swarm will go to work precisely like a natural one, and with the same prosperity; indeed mine have prospered better than natural ones, for the plain reason that I make them two weeks in advance of the time they generally come. Last season several of my artificial swarms had *filled their hives with honey* before my neighbors' bees begun to swarm. The advantage of the time thus gained to them, at that season of the year, can hardly be over-estimated. The old hive is left, as in natural swarming, with but few bees, but multitudes hatching every day, and brood comb filled with numberless eggs. The bees finding themselves without a queen, proceed at once to raise one, and in two weeks will have a mature mother. That they do this, I of course *know*, having demonstrated it. I have never lost a swarm made in this way, nor a single old hive from which I have driven a swarm—and every one acquainted with bees knows they could not exist the half of a season without a queen, therefore they must have raised one,

after I robbed them of the one they had. Instead of being contented with raising one queen, they always make the matter certain by raising a number, often a dozen. At the end of two weeks the hives must be carefully watched, for if the weather is pleasant, and honey abundant, they will throw off second swarms. By making all the swarms at once, you will find they will all swarm again, at about the same time, if they design doing so, and then you can watch all at once. By listening at the hive in about two weeks, if they design swarming, a singular noise may be heard, called "piping." It sounds like the cry of a young turkey, and is made by the young queens. I never had a second swarm come off, if I did not hear this noise. You will not have as much surplus honey, if you have second swarms—but where an increase in the number of stands is desired, I think little risk will be found in hiving all that come in ordinary seasons—at least I find it so in this locality, where pasturage for them is very abundant. This season I had four from one hive, and five from another, and all filled their hives. I had no spare honey from the old ones, though both are in good condition to winter. Here bees are in such good demand that an increase of stocks is much more desirable than surplus honey.

For Langstroth's, and other forms of movable comb hives, it is claimed that artificial swarming can be managed more easily and safely. I never have found either trouble or risk in managing it in the simple hive—but am anxious to try, and see if there be a better way. But with me, as with many others, the extra expense of the hive must be a great objection at present—and until I have seen the new hive tried, I can only advise beginners in the business to go to work safely and cheaply at first. "Bees will not pay a cent for extra expenses." It has been well said, that the nearer we regulate our operations to their natural habits, the better. The objection, however, which I have heard made to artificial swarming, that it is *not* natural, is very unsound. We do not leave other domestic animal, unguided, but *direct* their instinct by our higher reason, taking care only that we understand that instinct, and do not go contrary thereto."

"THE BEE MOTH.—The ravages of this little insect, great as they have been, have been wrongly understood, and too much blamed. The miller destroys by its progeny of worms, many, indeed, nearly all weak, neglected swarms; but I doubt if it ever seriously injured a strong one well cared for. If your hives are strong, that is, full of bees and have a queen, they will keep away the moth successfully themselves. Much may be done, however, to assist the bee. Every spring morning I lift my hives one by one, from the bottom board, and destroy many worms lurking under the edges. As there are four generations of these little pests in a season, every worm thus destroyed is a great gain. In summer, I often catch the little dusky, brown miller, dodging under and about the hives. A candle fastened to a shingle that has been rubbed with tar, left burning

among the hives in a still evening, will often decoy and trap many. In this, as in every other business, the careful, pains-taking person is the one with whom *luck* will abide, and no one who does not devote time and thought to his bees, need expect to succeed."

"WINTERING BEES.—They should never be left out of doors exposed to our changeable climate, through the winter. They may *live* as cattle do when they stand shivering by a rail fence with no other shelter. Still, the principle we apply to cattle is good with them.—The warmer you keep them, the less they will eat, the fewer will die, and the stronger you will find them in the spring, ready for their summer's work. Many build a house on purpose where they store them for winter. I keep mine in a dry, warm, perfectly dark cellar. About the last of November, (or the first really cold snap,) I remove them to the cellar, from which I take them early in the spring."

"PASTURAGE FOR BEES.—Some writer has observed that where "white clover, Linn, or Basswood, and buckwheat abound, there is the *paradise* of the bee-keeper." In Iowa we have not only these, but numberless "founts of honey," of which eastern bee-keepers never dreamed. *This*, truly, is the paradise of the bee. Where I live, near the river, early in March, my bees find varieties of the willow which yield much pollen and some honey. Before these are gone, come the wild blossoms, crab-apple, plum, thorn, haw, wild cherry, raspberry and blackberry. Then comes the white clover, more abundant every year in this vicinity—and all this time wild flowers abound, and give variety. Then the Maple and Linn throw out their blossoms in countless numbers—and by the first of August until frost, buckwheat keeps them busy. It is easy for the farmer to plant a crop which will assist his surplus honey. My husband sows buckwheat two weeks earlier than his neighbors, that the bees may have the blossoms a longer time. Last year I observed that my bees were idle two weeks before frost came, for want of pasturage. This year we sowed buckwheat on an idle piece of ground, about the time other buckwheat came into blossom. We thus had it in full bloom until frost. My bees were thus enabled to finish a number of boxes, partly filled before, and the flowers being cut the day before frost, and well cured, made excellent fodder, which the milk cows ate with avidity. It is well known that common bees do not obtain much honey from the red clover. There has been a cross between this and the white clover, introduced into this country, from Germany. It is called the "Swedish white clover," and is said to surpass both the red and white varieties, as a forage and hay crop, and also to be the richest honey producing plant in the world. We have received from the importer in Philadelphia, a small quantity of the seed, wishing another year, to test its adaptation to our climate."

"In thus "relating my experience," I have been obliged to leave out many items of interest, and study brevity, instead of elegance

of style and language. I have endeavored to make myself understood, and trust I may awaken an interest in some who have paid no attention to the subject, if I do not impart any new ideas to old bee keepers. To all newly interested I would recommend "Quinby's Mysteries of Bee Beeping explained," a work no one who has a single stand of bees can afford to do without. Neither would I forget my indebtedness to "Langstroth on the Honey Bee," a book more fascinating to me than any work of fiction I ever read. Both of these works should be upon the table of every farmer, who would cultivate in his children a taste for natural history, to the exclusion of a love for the pernicious works of fiction so abundant at the present day.—*Brighton, Washington Co., Iowa.*

SUBSTITUTES FOR FENCING.

The cost of board and rail fencing on our prairie farms is so great that numerous substitutes have been tried, such as hedging with *Osage Orange*, Hawthorn, Osier Willow, Locusts, and by ditching. The *Osage Orange* hedge, notwithstanding numerous failures, is now generally considered a success in this State, where properly cultivated and attended to.

The Hawthorn of this State is the same that is so successfully used in England for hedging, and is also used in this State, and can be made to turn cattle in three years. Take the berries early in the fall, when fully ripe, and put them in sand and soil well mixed; let them freeze and lay until spring, keeping them in a cool place until fall, then dampen and freeze them again. The second spring thin them out, and when the earth is sufficiently warm to sprout corn, plant them in the nursery, and keep them clear of weeds. Transplant in a soil that is naturally dry and fertile, or one that has been made so by art. The situation should be airy. The practice in Europe is to plant the young trees in a straight line, from four to six inches apart, either upon an embankment or on the level surface, owing to the richness or dryness of the soil. In the preparation for planting a suitable bank is first constructed for the reception of the plant. The direct line of the Hedge being staked out the bank is commenced by ditching, by forming it with the excavated earth.

The *French Osier*, a variety of willow, makes a good hedge, is the best for making baskets, and is good for fire wood, five acres producing sufficient in five years to supply one family thereafter. If cultivated for basket ware alone, the product will range from one to four tons per acre. The chief benefit to this State in the culture of the Osier will be for Hedging purposes and protection to Fruit trees on our prairies. The most natural soils for the Osier are those

found on our prairies. It is perfectly hardy, and experience has proven that they stand our Northern winters, and the roots, shoots and leaves are so bitter to the taste that animals will not browse upon them or gophers destroy the roots. The following description of the plant is given by a writer on this subject:

In early spring its beauty is unsurpassed, for before other flowers appear, excepting the *Magnolia*, *Cornus*, and *Cypripedium*, this tree is a mass of dazzling bloom, its immense catkins exhibiting all the brightest hues of the rainbow. Its gorgeous flowers, covered with bees, filling the air with the joyous murmuring of their music; and its dense, rich foliage, is the last to yield to the saddening influence of early winter. The remarkable vigor of this Osier, together with its hardiness and beauty, makes it a desirable tree for ornament as well as for fencing, hence it may be well to leave an occasional one growing upright in the line of fence, for that purpose and for shade. In its native forest it grows to the height of sixty to eighty feet, and three feet in diameter.

HON. A. CONVERSE, of New Hartford, Butler county, Iowa, who cultivates the Osier Willow for Hedging, says that any soil on which corn will grow and is well prepared, by plowing a foot deep and harrowed smooth, will grow the willow successfully. The land being flat he sets a line of stakes to have the line straight, then takes a board of any length convenient to handle, twelve inches wide, in which a notch is cut every twelve inches on each side, alternating the notches so as to have them six inches apart on opposite sides. One side of the board is laid against the stakes; the cuttings, which are to be nine inches long, trimmed at one end wedge shaped, are then inserted eight inches in the ground, nearly straight, at every notch on each side of the board, so that the lower end will be in as moist ground as possible; cultivate same as corn, keeping them clear of weeds. Late in the fall throw a heavy furrow towards the hedge on each side, to prevent washing by rains, &c. Trim only in early spring. They should be planted as early in the spring as the ground can be prepared. They grow in a whip like stock in one year to the height of ten or twelve feet. Various modes are practiced to make a barrier against stock, such as netting them together diamond shape, tying the tops together with strong twine, &c. Another mode is recommended of driving stakes into the ground every ten feet to support a slight rail across them around which the willow may be secured.

Several thousand cuttings will be distributed this spring from this office, through the members of the Legislature, for trial in every section of the State.

Ditching.—Hon. J. Wilson Williams, of Des Moines county, Iowa, has furnished us with his plan of making a ditch fence which is the best and most successful of any of which we have any knowledge, as follows:

"A cheap and easy mode of making fence in low wet grounds, or in grounds not too rolling or sandy, is to cut a ditch and throw the dirt excavated on one side into a well shaped embankment. The ditch should be four feet wide at top and ten inches wide at bottom and two and half feet deep. The embankment should be well faced with sods two and a half feet in height, laid up regularly with joints neatly broken like mason work, with slight inclination

towards embankment; and natural surface of sod outwards so that the grass thereon will grow. The top of the embankment should be sloped at an obtuse angle and left so as not easily to dry out to the injury of the facing sod. The sods on the face of the embankment should be placed at least one foot back from the edge of the ditch, so as to leave strength enough in the sod between embankment and ditch to support the weight of embankment and keep it from sliding into the ditch, when the sod underneath embankment becomes rotten.

On the outside of ditch and about one foot therefrom, drive with wooden maul short posts about nine feet apart, on which spike a rail; the posts to rise twenty inches above surface of ground. This rail will effectually prevent cattle from getting into the ditch, and by nailing two boards below the rail, a good fence against hogs is made.

On the inside and near the foot of the embankment, plant a hedge of Gooseberry, Locust, or Osage Orange—the latter is preferable—which cultivate sufficiently to keep weeds down and no more, as too rapid a growth will cause the plant to winter-kill.

In a few years this will be a perfect fence, which winds will not blow down, water will not wash away, nor fires burn up. Twenty five cents per rod will make the ditch and embankment.

FLAX AND FLAX COTTON.

Southern Cotton has, for several years past, been purchased at such low prices, that it has entered into the great majority of fabrics worn by our people. Some thirty years ago nearly all the light cheap summer goods worn by our farmers were the product of flax and spun and wove in private families. But cheap cotton, and cheap modes of its manufacture, have almost entirely supplanted the good old linen goods which our fathers were so proud to wear. But a new interest has been awakened recently in the culture of flax, growing out of the fact that, in the present and perhaps in all future years, owing to limited production in the Southern States, it cannot be obtained within fifty per cent of the average price for the past five or six years. There is also another cause for this interest, the discovery that flax can be made, at least to some extent, to supply the place of cotton in all our cheaper fabrics, at a cost not to exceed the average price of cotton for the past five years.—We regret that we cannot report its complete success of manufacture on cotton machinery, recent experiments having exhibited that something more must be known in regard to its preparation for working as cheaply as cotton. From a well digested report on the

subject of Flax Cotton, made by Mr. George F. Wilson, to the Rhode Island Legislature, placed in our hands a few days since by Senator Redfield, of Dallas County, in this State, the following extract is made:

"But I do believe that we have sufficient knowledge about the cultivation and preparation of flax to warrant an energetic attempt to develop it as an industrial pursuit in this country, and I have no doubt of a good measure of success, if the attempt is carefully and judiciously managed. There can be no great loss to the farmers in raising a small quantity of flax for the seed alone. I do know that from flax straw, raised and ripened for the seed, a good article of fibre, suitable for coarse goods, can be prepared, with the aid of McBride's flax gin and Mr. Lea's process, at a very reasonable cost; and when it is ready for market, it can be sold at once, to be wrought on machinery such as has been in use for the manufacture of flax for a long series of years. I have no doubt of the readiness of Mr. Lea and Mr. McBride to co-operate with any gentlemen who desire to engage in the business upon the most liberal terms."

At Fairfield in Jefferson county, and Mt. Pleasant in Henry county, in this State, manufactories have been established to break the flax and separate the lint from the wood for exportation, but for want of material they are not employed half the time. It is not likely they will be, nor similar establishments until a market is also afforded for the seed. We are not advised of the price given by these establishments for the raw material, but it is sufficient, at least, to pay for the whole cost of seed sown, cultivation and cutting, leaving the yield of seed for profit to the producer.

In view of the fact that there will for a long time be a good demand for the fibre for this new mode of manufacture, as well as a profitable demand for the seed to convert into oil, it is to be hoped that both kinds of manufactories will be established at suitable points all over the State, that our farmers may be encouraged to add flax culture to their other products.

When the culture of flax used to be one of the staples of the farm the crop used to be as certain as any other product, and where grown in Iowa by those who understand it, the yield has been as remunerative as the average of crops, when grown for the seed alone. Flax can be produced on almost any soil capable of yielding a fair crop of Indian corn or potatoes. Of course, the better the soil the better the crop. The land best suited for the growth of flax has a clay subsoil and a mellow top soil. Any good loamy soil, however, will yield remuneratively under proper treatment. The soil should be plowed deep in the fall, for this crop especially. As soon as possible in the spring, get on to the ground with the harrow and the clod crusher and thoroughly pulverize it. About two bushels of cleaned seed is the usual quantity sown, either broadcast or drilled if broadcast a fine harrow should be used to cover—then roll it, but not too heavily. Two bushels to the acre produces a thick stalk

and a fine fibre, but a poor seed. One bushel to the acre produces a thin stalk and a poor fibre, but a good seed. The value of the crop depends very much upon its freeness from all weeds and foreign substances. The drilling process will facilitate the weeding of it over broadcast sowing. The crop depends much upon the seed. It is not well to grow from the same seed for successive years, but to change often, securing that which is plump and oily. Riga or Calcutta seed gives a heavier and longer straw than our American seed, and if to be obtained at a fair price should be preferred. In Great Britain the Riga flax is preferred and is imported from the Baltic. That from Germany, which is of fine quality, will be next preferred. The seed from Russia is mostly used there for the manufacture of oil.

In harvesting for the new process of manufacture, the crop is cut with a scythe or reaping machine, which may also be done when raised for the seed alone. The usual yield of straw is from 3,000 to 4,000 pounds, and seed from 12 to 16 bushels per acre.

COTTON—COTTON.

In the preceding article on Flax, we refer to it as having been successfully worked into a condition to supply the place in coarse fabrics of Southern Cotton. This is called *Fibritia*, or Flax Cotton. Wonders in this direction do not cease here. The whole surface of our productive earth have been searched to find other localities than our southern States where cotton may be produced successfully, to meet the present and growing wants of the people of the world. Southern Illinois is about to contribute a small share to this end, as she was wont to do in years gone by, from which she had been diverted only because other crops paid better when southern slave labor cheapened this great staple. It can now be made to pay, and her fields will soon be whitened again with the bursting pods of this necessary and so much coveted product. Even Iowa has proven that she can successfully grow it within her borders, whether remuneratively or not has to be determined. From specimens of Cotton in this office, from the Counties of Des Moines and Washington, the curious may have tangible evidence. That grown in Des Moines County, by Squire Harris of Burlington, is the best specimen, equal to any upland Cotton grown in Tennessee, and has been grown to the amount of forty or fifty pounds for the last four years, which has been ginned, spun, and worked into stockings in and for his family. The Washington County specimen, by Mr. Tripp, has been grown for only one year, in a small patch, from which, he informs us, he made three pickings. It was planted in

hills about the same distance apart as corn, about the same time, and received no more cultivation. Mr. Harris informed us that it could be grown successfully in all the southern half of Iowa, and pay better than wheat. We have no idea that it can ever approach with us to anything like a staple crop, yet through the favor of Mr. Harris, we shall be enabled to furnish our members of the Legislature with a few seed for trial and to gratify curiosity.

Whilst Illinois and Iowa, and perhaps other of the free states, may be enabled to contribute their mite to the great aggregate of the world's production, by growing some of the southern varieties of cotton, another wonder is presented to us from Peru, called

PERENNIAL COTTON.

In the higher and colder latitudes of Southern America, R. C. Kendall, Esq., of Maryland, "found the *Gossypium Arboreum* attaining the dignity of a tree, the average size of the northern peach tree, growing beautifully symmetrical and very compact, having its seasons, blooming and perfecting its fruit with great uniformity; giving an abundant yield of long staple, fine fibre, pure white cotton, fully equaling the best 'sea island' ever grown." "This was in a region," says Mr. K., "where the snow lies three months out of the twelve; where the vicissitudes of climate are greater than they are in New England; and where not only the natives, but the furred animals sometimes froze to death." He also says, "that the tree readily adapts itself to all reasonable and very many unreasonable conditions of soil and climate."

Mr. Kendall says, after deducting all expenses, the profit per acre of cotton in the southern States, is not over \$4.50, whilst the Perennial Cotton Trees will yield a profit of \$95 per acre. He recommends seeds of the tree from the higher latitudes of Chili, which he assures the public as fully capable of producing trees in any northern climate quite as hardy as the apple tree, and that the time for planting is either in November or April. The plant is perfected in its sixth or seventh year.

Much more is said of this wonderful tree, but we have given enough to almost stagger belief. If true, its introduction into the northern States will create a greater revolution in cottondom than the arch traitor Davis is likely to accomplish. Shall we bide our time and wait for further developments, or shall we invest twenty cents per seed now and try the experiment of growing cotton on this wonderful ever bearing tree?

RAIL ROADS IN IOWA.

OFFICE OF SECRETARY OF STATE, }
 DES MOINES, IOWA, MARCH 1, 1892 }

Gen. Wm. Duane Wilson, Sec'y Ag'l. College:

SIR: In reply to your inquiry in regard to the number of Rail Roads completed and now in running order in this State, I have the honor to inform you that the

Burlington and Missouri R. R. Co., have completed and are now running from Burlington in Des Moines County, to Ottumwa in Wapello County, a distance of *seventy-five miles*.

The Mississippi and Missouri River Rail Road, is completed and in running order from Davenport in Scott County, to Brooklyn in Iowa County, a distance of *one hundred and ten miles*; and from Milton Junction, in Muscatine County, to Washington, in Washington County, a distance of *fifty-one miles*.

The Dubuque and Sioux City Rail Road, (formerly Dubuque and Pacific Rail Road) is completed and in running order from Dubuque to Cedar Falls, in Blackhawk County, a distance of *one hundred miles*.

The Keokuk, Fort Des Moines and Minnesota Rail Road is completed and in running order from Keokuk, in Lee County, to Eddyville, in Wapello County, a distance of *ninety-two miles*.

The Chicago, Iowa, and Nebraska Rail Road, is completed and in running order, from Clinton, in Clinton County, to Cedar Rapids, in Linn County, a distance of *eighty-two miles*.

The Cedar Rapids and Missouri River Rail Road—a continuation of the Chicago, Iowa, and Nebraska Rail Road—is completed and in running order to a point *forty miles* west of Cedar Rapids, and graded to Marshalltown, in Marshall County, making the total length of said Road completed, *one hundred and twenty-two miles*.

The Dubuque, Marion and Western Rail Road, is completed and in running order from Farley, in Dubuque County, to within eight miles of Marion, Linn County, a distance of *fifty-five miles*, and graded to Marion. Farley is the point where said Road joins with the Dubuque and Sioux City Rail Road.

The Keokuk, Mt. Pleasant and Muscatine Rail Road, is completed and in running order from Keokuk, Lee County, to Ft. Madison, in Lee County, a distance of *twenty-five miles*.

Total length of Rail Roads in Iowa, completed and in running order, *six hundred and thirty miles*.

E. SELLS, *Sec'y of State*.

NOTE IN REGARD TO MAKING SORGHUM SUGAR, &C.

The following is an abstract of a statement in regard to manufacturing the best specimen of Sorghum sugar we have yet seen in all the Northwest, made by C. Bozarth, Esq., of Butler Co., Iowa, but which was received too late to be inserted under the appropriate heading:

Likes the Chinese Cane or Sorghum best; plants early; soaks seed for 24 hours in warm water, then puts the seed in a bag in a warm place, until sprouted about half an inch long before planting, which makes it come up at least a week earlier, plants from 15 to 20 grains in a hill, when four inches high thins out, leaving six to eight stalks in the hill, which prevents suckers and ripens sooner, and cultivates well. The cane makes sugar easier, when not cut until the seed is ripe. A hickory stick about three feet long is used to strip the blades, with which a good hand will strip off about half an acre a day. [Mr. B., from his statement appears to grind the whole stalk both for sugar and syrup, and in regard to pans, boiling, &c., differs in no way from the essentials described by others.] Before the sap is transferred to pans, or after boiling, when the syrup is cold, he adds from a gill to a third of a pint of the milk of lime to every thirty gallons of juice or the syrup from this quantity. This preparation is made with new stone lime, which is put into a tight vessel, covered over with water and kept covered until slaked; when used stir up to the consistency of good, thick white-wash, and stirred into the juice or syrup when cold; prefers putting the lime in the juice or sap before boiling. Let it come to a boil gradually, and it is sufficiently done for good molasses when it strings out like hairs in pouring it out slowly and in a small stream. When wanted to make sugar, he boils from five to eight minutes longer. He checks the fire in this latter process every few minutes to prevent scorching. He uses the common pans made of galvanized iron bottoms and wooden sides, 6½ feet long and thirty inches wide. Last year Mr. B. made 200 pounds of sugar, and this year from five to six hundred. He drains for sugar in wooden pots made funnel shape, holding from three to four gallons, which answer very well; but says tight barrels, with small holes in the bottom, set over another barrel to receive the molasses, are just as good. When set in a warm place it has required from three to six weeks to drain. He experiences no difficulty in making good sugar, as is certainly evidenced from the fine specimen now in this office. As to soil, Mr. B. says that his cane was grown on good prairie, sandy, clay loam, and that the quality of the soil has a good deal to do with the quality of the cane.

CIRCULAR IN REGARD TO SEEDS, &c.

To Farmers and other Correspondents of this Office :

That the operations of this office may be more extended and direct in the advancing the agricultural interests of the State, I respectfully commend to the serious consideration of, and adoption by our farmers and others, the following suggestions :

1st. As the organization of Farmers' Clubs, when regular meetings are kept up, have proved of great benefit, especially to those who are its members, it is hoped that if you are not a member of such a Club, you will unite yourself with one as soon as possible; or, if you have none convenient to attend its meetings regularly, that you will have one organized as soon as possible in your own immediate neighborhood. All such organizations are the especial correspondents of this office, and the first to receive the benefits arising from the general distribution of seeds, etc., as was the case last year.

2d. To ascertain, as accurately as possible, the wants of your community in any variety of seed or plant, whether for garden or field culture, and report to this office, specifying by name the varieties most needed.

3d. Report at the same time any superior variety of seed for quality or productiveness, which is grown in your section of the County, whether for field or garden, with the name of the party growing it, the quantity, if any, he may have to sell, and the price. By strict attention to this I may be enabled to obtain some excellent and much needed varieties, not in general cultivation in this State well adapted to our soil and climate without sending out of the State for them.

EXCHANGE OF SEED.—Much may be done by exchanging seed through the medium of this office, and with very little cost to either party. For instance, any person who has one or more varieties of seed which he esteems rare and valuable, by sending them to this office and designating what kind he wishes in return for them, can be accommodated if they are on hand, or can be obtained without too great expense.

SPECIMENS OF SEEDS, &c., TO BE KEPT IN THIS OFFICE.—Ever since I took charge of this office, I have made great exertions to obtain specimens of every principal variety of seed grown in the State, both cereal and vegetable. I have succeeded to but a very limited extent when compared with what should be done to give a proper idea of the relative value of the seeds, &c., grown in the whole State, yet what is here is of considerable interest and profit to all who examine them. By giving a few of the advantages of such a depository in the Capitol of the State, they may induce a general desire among our farmers and others to make it as full as possible, as well as infuse such a pride that at least every Farmer's Club or School District, or Township in the State, will take pains to be represented by the best they produce :

1st. It will exhibit to a certain extent, and entirely it is to be hoped, in one place, the several varieties of the best seed and grain grown in the State, that all who feel an interest therein may have the opportunity of seeing and comparing them for all time to come, or as long as they may be preserved.

2d. Information can thus be had where the best is produced and who produces it, which will be published throughout the State with other important matters connected therewith, in regard to cultivation, yield, etc., which is to be transmitted with the specimens, as prescribed hereafter.

3d. By pursuing this system from year to year, it can be ascertained by comparing the specimens of one year with another, whether there is any improvement or deterioration; and by comparing the modes of cultivation, with the knowledge of other influences, such as rain, drouth, etc., the causes of the deterioration or improvement may be satisfactorily obtained.

4th. By comparison the true name can be given to each variety. At present the same varieties of Wheat, Corn, Oats, etc., are known in several parts of the State by different names.

5th. When in certain sections of the State a deterioration of the quality of the seed occurs and not in others, the information derived from the reports of this office in regard thereto, based on the data and specimens furnished, will enable parties to learn where to obtain the best and most productive seed.

What is here proposed to be accomplished for the whole State, could be done more readily and satisfactorily by each County Agricultural Society, for that County, by placing in the hands of a suitable committee, at the time of the County Fair, specimens of the best seed grown in each school district. This committee should compare them, and select a portion of the best of each variety to forward by mail or other opportunity, to this office, at the expense of the Society, retaining the balance in the President's or Secretary's office for future examination and comparison, as suggested above for the State. When this is not done by such Societies or other County Organizations, the next best plan would be to send such specimens from each individual or district, *direct to this office.*

All the specimens as they are received, are placed in glass bottles, with the name of the variety of seed given, the name of the producer, and where grown, with a number on the bottle referring to these and other particulars, which are recorded in a book kept for that purpose, under a corresponding number, for convenient reference.

As some of those who wish to send seed may be deterred from the supposed difficulty of making up a secure package, I suggest that they have made and always keep on hand, small bags about 2½ by 4 inches in size, made of common white cotton. When filled sew them up tightly, and direct to this office on the bag. Number each bag, that they may be readily designated in the accompanying letter. Prepay the postage or they will not be forwarded, the postage being only *one cent an ounce* for packages not heavier than *eight ounces*. When requested the amount will be refunded, or any reasonable request for seeds, cuttings, &c., made by the parties sending seeds, &c., will be faithfully complied with, if within the power of this office. Private opportunities frequently occur to send seeds.

When a package of seed is forwarded please send by letter the name of the variety, average yield per acre, and other necessary particulars in regard thereto.

To answer all the above may take more writing than most farmers may feel inclined to do, yet it is to be hoped that they will apply themselves to the task for their own benefit, with the reflection that they are only performing a duty which they owe to each other as well as to the general agricultural interests of the State, and one which will doubtless repay them amply for any trouble or expense incurred.

All which is respectfully submitted.

WM. DUANE WILSON,
Secretary Iowa Farmers' College.

SHIPMENTS OF STOCK AND PRODUCE FROM THE STATE, FOR 1862—IN PART.

The following reports of shipments of Produce, and Cattle, and Hogs, for the year 1861, have been furnished us. They are not as full as was desired, but they will serve perhaps as an approximation to the aggregate shipped from the Mississippi exporting points:

BURLINGTON—BY BURLINGTON & MISSOURI RIVER R. R. COMPANY.

Cattle, No.	25,928	value about	\$ 500,000
Hogs, live, No.	115,173	value about	460,000
Wheat, lbs.	5,705,729	value about	60,000
Corn, lbs.	3,323,490	value about	6,500
Grass seed, lbs.	695,803	value about	22,000
Dressed Hogs, lbs.	651,455	value about	14,000

Total valuation, \$1,062,500

MCGREGOR—BY RAIL AND WATER.

Wheat, bush. (including 14,415 barrels flour)	1,620,775	value about	\$ 950,000
Land, acre	3,280	value about	30,000
Butter, lbs.	265,940	value about	22,000
Eggs, bbls.	454	value about	5,500
Hire, green and dry, lbs.	261,575	value about	16,000
Dressed Hogs, 3,280 weight	\$120,928	value about	62,000

Total value, \$1,088,500

DAVENPORT—BY RAIL ROAD AND RIVER.

Flour, lbs.	152,525	on hand	5,700	average price for year	\$4.301	total value	\$680,513
Wheat, bush.	607,282	on hand	22,231		524		445,000
Corn, bush.	235,519				15		28,452
Oats, bush.	45,267				134		7,136
Barley, bush.	225,735				264		61,356
Potatoes, bu.	39,918				12		4,009
Cattle, bush.	35,707				19		3,064
Malt, bush.	31,700				500		11,500
Dressed Hogs, (no report of number shipped)					4,601		7

Total value of above items, \$1,201,100

THE average price of WHEAT for the past twelve years at Davenport, is as follows: In 1850, 62½ cts; 1851, 47½ cts; 1852, 44 cts; 1853, 54½ cts; 1854, 63½ cts; 1855, 112 cts; 1856, 84½ cts; 1857, 79½ cts; 1858, 92 cts; 1859, 74 cts; 1860, 83½ cts; 1861, 62½ cts. Average price for the twelve years 67½ cents.—Davenport Gazette.

It was not until the preceding report had been prepared that the publication of the aggregate of our shipments from the State for the past year suggested itself. I immediately addressed letters to parties at the leading shipping points on the Mississippi river, but have only been able to procure what is given above.

From Burlington none of the exports by river are given, and for Davenport Hogs are not embraced, and we have no reports from Dubuque, Muscatine or Keokuk. The aggregate for these given is in value about \$3,394,966; the total shipments from the Mississippi ports would probably reach an aggregate of eight or nine millions.

The following estimate of the number of Hogs packed at the points named in this State, is taken from the Cincinnati Price Current, of February 25th, 1862:

	1861	1862
Burlington	37,500	40,000
Des Moines	2,500	8,800
Keokuk	45,500	40,000
Bloomfield	4,000	2,500
Drakeville	914	1,200
Birmingham	900	1,100
Wapello	247	747
Ottumwa	22,000	25,000
Total	116,561	119,047

POPULATION, SORGHUM, SHEEP AND WOOL.

The following Statistics were obtained from the United States Census for 1860:

COUNTIES.	Whites	Free Colored	TOTAL	Sorghum produced in millions of bushels	Sheep No. of	Wool pounds of
Adair	984		984	3,791	494	1,581
Albany	1,835		1,835	4,677	506	1,584
Alamakee	13,330	6	13,336	1,581	1,563	8,068
Appanoose	11,353	13	11,366	38,588	3,179	24,928
Audubon	454		454	133	102	508
Benton	8,501	1	8,502	15,417	3,710	4,911
Black Hawk	14,949	14	14,963	7,341	1,406	9,108
Boone	4,331		4,331	9,597	3,363	7,317
Bremer	4,910	5	4,915	5,094	914	2,607
Buchanan	1,906		1,906	9,915	1,511	4,404
Bureau Vista	57		57			
Bucombe (unorganized)						
Butler	3,729	1	3,734	4,307	534	1,651
Calhoun	147		147			
Carroll	381		381	1,073	35	84
Cass	1,612		1,612	3,669	427	994
Cedar	13,957	12	13,969	34,028	2,223	8,000
Cerro Gordo	940		940	190	143	421
Cherokee	68		68			
Chickasaw	4,333	5	4,338	619	808	6,114
Clarke	5,427		5,427	22,033	3,543	8,475
Clay	52		52			
Clinton	20,703	25	20,728	3,160	3,064	5,727
Crawford	18,225	13	18,238	8,633	1,768	1,633
Dallas	823		823	617	54	145
Davis	5,244		5,244	29,578	3,910	9,651
Decatur	13,708	1	13,709	32,917	13,230	32,908
Delaware	1,028		1,028	7,757	3,650	4,972
Des Moines	10,012	28	10,040	14,928	5,466	14,391
Dickinson	180		180			
Dubuque	31,093	69	31,162	2,712	2,027	6,758
Emmett	15		15			
Fayette	13,019	54	13,073	1,774	4,071	10,398
Floyd	3,746		3,746	1,128	953	2,597
Franklin	1,000		1,000	49	96	143
Freemont	3,609	5	3,614	6,723	2,973	2,853
Greene	1,374		1,374	2,795	858	810
Grun y	793		793	1,137	1,107	2,146
Guilford	3,938		3,938	15,364	1,159	7,777
Hamilton	1,699		1,699	1,039	328	625
Hancock	179		179		33	100
Hardin	5,440		5,440	9,473	1,860	7,777
Harrison	3,622	1	3,623	7,366	686	1,543
Henry	18,675	24	18,700	56,641	7,229	19,161
Howard	3,167	1	3,168		472	1,094
Humboldt	392		392	833	40	54
Ia	43		43			
Iowa	6,029		6,029	18,370	2,196	8,992
Jackson	18,457	7	18,464	11,313	4,325	12,387
Jasper	9,886		9,887	49,223	3,430	9,012
Jefferson	15,037		15,037	18,436	10,942	29,005
Johnson	17,592	28	17,620	12,785	5,173	11,047
Jones	13,248	7	13,255	10,444	2,184	8,775
Keokuk	13,394	7	13,394	62,776	8,963	22,016
Kossuth	19		19			
Lee	25,935	247	26,222	25,973	8,716	37,598
Linn	18,940	10	18,950	22,041	6,963	16,211
Louis	10,376	94	10,470	12,277	3,406	9,004
Lucas	5,765		5,765	19,222	3,454	8,453
Madison	7,338		7,338	37,483	4,969	9,033
Malaska	14,800	16	14,816	46,967	15,619	32,794
Marion	16,753	34	16,787	14,399	10,460	25,919
Marshall	6,015		6,015	14,069	3,125	8,819
Mills	4,462	19	4,481	8,928	9,011	4,829
Mississippi	8,409		8,409	616	855	451
Monona	823		823	1,391	188	1,050

POPULATION, SORGHUM, SHEEP AND WOOL.—Continued.

COUNTIES.	Whites	Free colored	TOTAL	Sorghum galvas of	Sheep No. of	Wool pounds of
Monroe	8,699	2	8,611	38,568	6,454	19,692
Montgomery	1,346		1,356	1,021	473	1,361
Muscatine	16,339	105	16,444	18,163	1,747	4,519
Oscola (unorganized)	8		8			
O'Brien	4,418	1	4,419	18,971	3,051	7,879
Palo Alto	123		133			
Plymouth	146	8	148			
Pocahontas	103		103			
Polk	11,612	13	11,625	23,821	4,044	10,526
Pottawattamie	4,853	9	4,862	2,527	815	1,642
Poweshiek	5,670		5,670	15,326	4,683	8,881
Ringgold	2,923		2,923	7,633	743	2,342
Sac	246		246	347	64	146
Scott	25,921	39	25,960	6,344	1,876	4,943
Sioux	10		10			
Shelby	817	1	818	805	228	750
Story	4,052		4,052	9,539	1,181	3,148
Tama	5,295		5,285	10,507	858	2,509
Taylor	3,599		3,399	10,734	2,400	5,105
Union	2,012		2,012			
Van Buren	17,079	4	17,083	89,717	7,432	19,432
Wapello	14,480	38	14,518	31,183	9,129	24,717
Warren	10,298	14	10,282	50,966	4,833	13,638
Washington	14,230	13	14,233	44,859	6,927	18,401
Wayne	6,400	11	6,411	14,220	4,912	13,086
Webster	2,500	4	2,504	1,108	665	1,040
Winnebago	165		165		11	27
Winneshek	13,942		13,942	5,514	3,859	10,162
Woodbury	1,116	3	1,119	550	130	350
Worth	756		756	121	150	373
Wright	653		653	210	41	98
Total	679,925	1,023	674,948	1,159,368	251,433	651,122

CORRECTIONS.

Page 4, 2d line from top, for "2d district," read "3d district."

Page 7, 15th line from top, for "one fourth," read "one-eighth."

Page 10, 2d line from top, for "\$150,000" read "\$1,500."

Page 10, 28th line from bottom, insert "every" after word "behavees."

OF THE
WARDEN
OF THE
IOWA PENITENTIARY,
TO THE GOVERNOR

OF THE

STATE OF IOWA.

DECEMBER 16, 1861.

DES MOINES:
F. W. PALMER, STATE PRINTER.
1863.