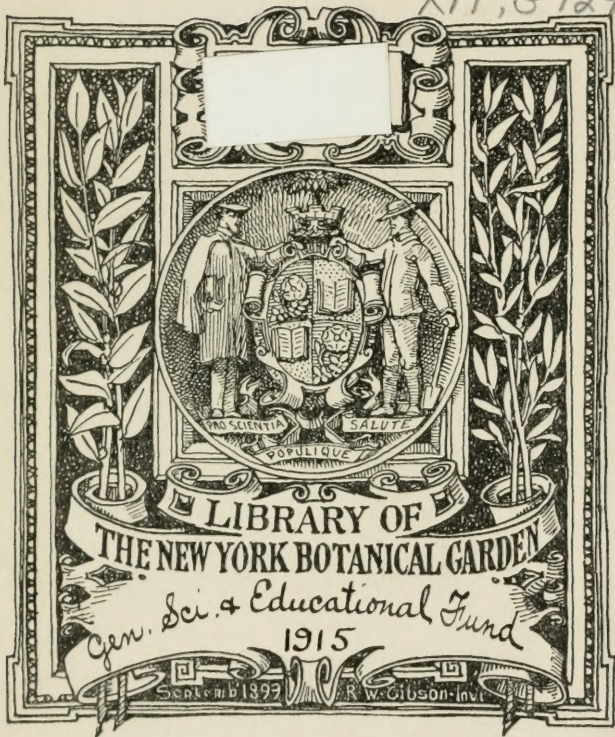


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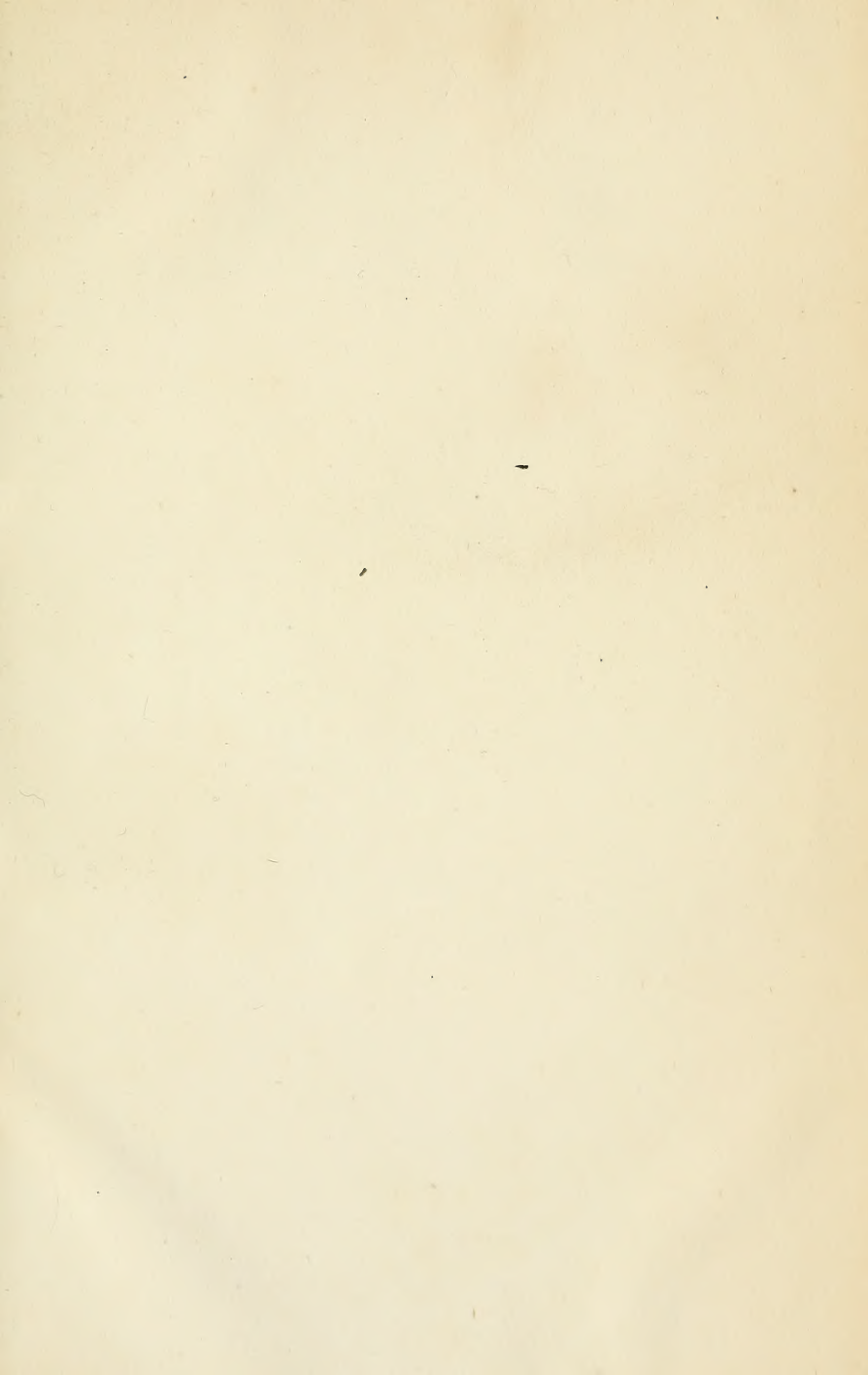


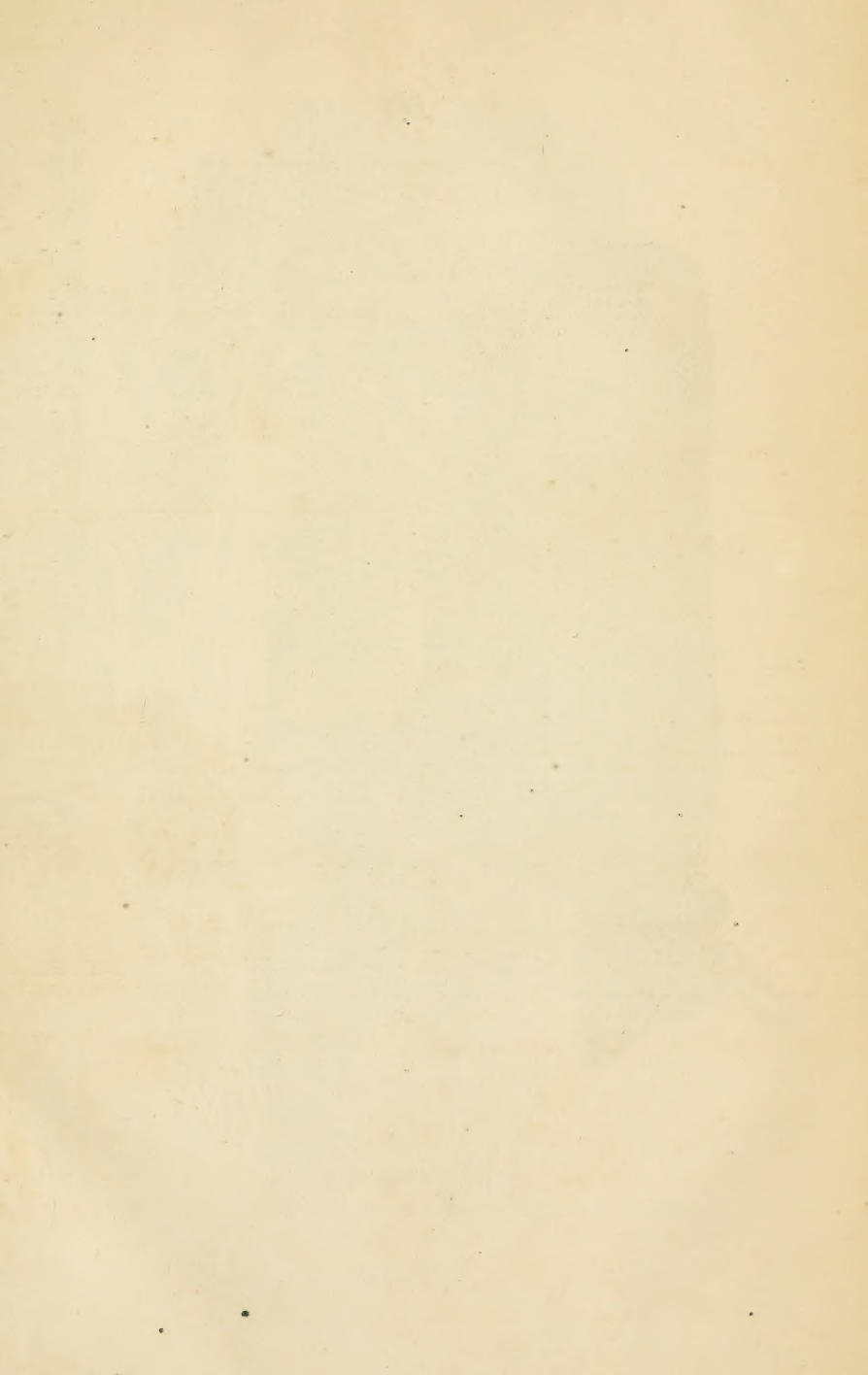
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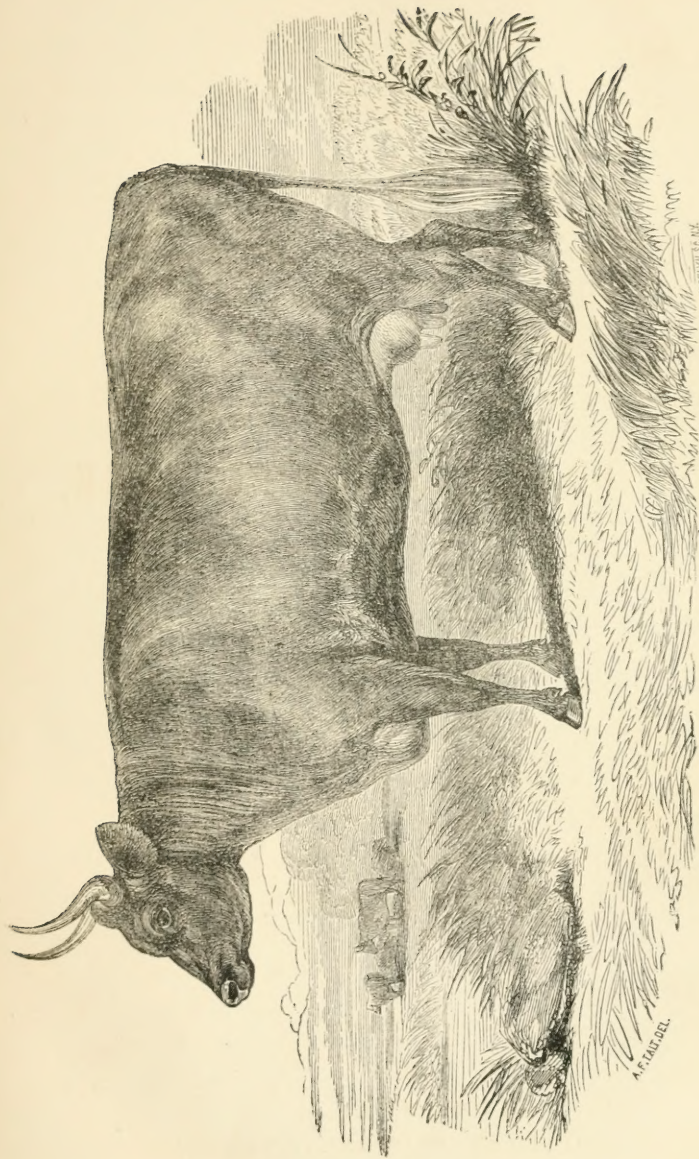
Gen. Sci. & Educational Fund
1915

Sept. 1897

R. W. Gibson. inv.







JENNY. (790.)

Winner of first prize in Class "Imported Devon Cows," at the New York State Agricultural Show at Elmira, 1855, and the United States Agricultural Show at Boston, 1855. Bred by George Turner, Esq., of Barton, near Exeter, Eng. The property of Edward G. Faile, West Farms, Westchester County, New York.

FOURTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

MAINE BOARD OF AGRICULTURE,

1859.

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1859

BOARD OF AGRICULTURE....1859.

ROBERT MARTIN, *President.*

N. T. TRUE, *Vice President.*

S. L. GOODALE, *Secretary.*

NAME.	SOCIETY.	P. O. ADDRESS.
(Term expires January, 1860*)		
Joseph Avery,	Lincoln County,	West Jefferson.
William R. Flint,	West Somerset,	North Anson.
Francis Fuller,	Kennebec County,	East Winthrop.
Robert Martin,	Androscoggin County,	West Danville.
Calvin Chamberlain,	Maine State,	Foxcroft.
Francis L. Rice,	West Oxford,	Denmark.
John K. Russell,	Somerset Central,	Skowhegan.
J. D. Tucker,	Waldo County,	Lincolntown.
(Term expires January, 1861.)		
John F. Anderson,	Cumberland County,	South Windham.
B. C. Bailey,	Sagadahoc County,	Bath.
W. E. Drummond,	North Kennebec,	Winslow.
S. L. Goodale,	York County,	Saco.
Daniel Lancaster,	South Kennebec,	Farmingdale.
William M. Palmer,	East Somerset,	Hartland.
Elijah B. Stackpole,	West Penobscot,	Kenduskeag.
N. T. True,	Oxford County,	Bethel.
(Term expires January, 1862.)		
Seward Dill,	North Franklin,	Phillips.
E. L. Hammond,	Piscataquis,	Atkinson.
Ashur Davis,	North Somerset,	South Solon.
Albert Noyes,	Bangor Horticultural,	Bangor.
Hugh Porter,	Washington County,	Pembroke.
Hiram Russ,	Franklin County,	Farmington.
Hiram Stevens,	North Aroostook,	Maple Grove.
Wm. C. Hammatt,	North Penobscot,	Howland.
Alfred Cushman,	Penobscot & Aroostook Union,	Golden Ridge.
Samuel Wasson,	Hancock County,	Franklin.

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STATE OF MAINE

REPORT.

To the Senate and House of Representatives :

IN accordance with the provisions of the statute establishing the Board of Agriculture, I have the honor to present herewith my Annual Report, embodying in the first place "a detailed report of its doings" at its last session.

The Board assembled at the Agricultural room in the Capitol at Augusta, on Wednesday, January 19th, 1859, at 10 o'clock, A. M., and was called to order by the Secretary, and Robert Martin, Esq. chosen Chairman *pro tem*.

Messrs. Dill, Lancaster and Rice were appointed a committee on credentials, who subsequently reported as present the following members :

- Seward Dill of Phillips, from North Franklin Society.
- E. B. Stackpole of Kenduskeag, from West Penobscot Society.
- Asher Davis of Solon, from North Somerset Society.
- Albert Noyes of Bangor, from Bangor Horticultural Society.
- Hugh Porter of Pembroke, from Washington County Society.
- Hiram Russ of Farmington, from Franklin County Society.
- Joseph Avery of Jefferson, from Lincoln County Society.
- Hiram Stevens of Maple Grove, from North Aroostook Society.
- William R. Flint of North Anson, from West Somerset Society.
- Francis Fuller of Winthrop, from Kennebec County Society.
- Robert Martin of Danville, from Androscoggin County Society.
- Calvin Chamberlain of Foxcroft, from Maine State Agricultural Society.
- Francis L. Rice of Denmark, from West Oxford Society.
- J. D. Tucker of Lincolnville, from Waldo County Society.

MAR 17 1915

John F. Anderson of Windham, from Cumberland County Society.

B. C. Bailey of Bath, from Sagadahoc County Society.

William E. Drummond of Winslow, from North Kennebec Society.

S. L. Goodale of Saco, from York County Society.

Daniel Lancaster of Farmingdale, from South Kennebec Society.

William M. Palmer of Hartland, from East Somerset Society.

E. L. Hammond of Atkinson, from Piscataquis Central Society.

N. T. True of Bethel, from Oxford County Society.

Samuel Wasson of Franklin, from Hancock County Society.

William C. Hammatt of Howland, from North Penobscot Society.

Alfred Cushman of Golden Ridge, from Penobscot and Aroostook Union Society.

Permanent organization was effected by the election of officers for the year ensuing, as follows :

ROBERT MARTIN, *President*.

N. T. TRUE, *Vice President*.

S. L. GOODALE, *Secretary*.

The rules of order of last year were adopted for the present session.

BAKER WESTON was elected *Messenger* to the Board.

Messrs. Flint, Lancaster and Tucker were appointed a committee on Elections. This committee subsequently reported the above named members as duly elected and entitled to seats.

On motion of the Secretary, a business committee was appointed by the Chair to present subjects for discussion: Messrs. Goodale, True and Anderson.

Mr. True in behalf of a committee of last session, on the subject of a cabinet and library, reported in favor of asking an appropriation from the legislature to procure book cases and conveniences for preserving specimens. The report was accepted and the same committee charged with the preparation and circulation of a petition for the same. [The petition was favorably received by the legislature then in session and the appropriation granted.]

Mr. Anderson of Cumberland, said he was appointed at the last session of the Board, a committee to report upon the following topic, viz: "What further agencies for the advancement of agriculture should be adopted, and if any, to report plans, &c. Although he

had been neither negligent nor unthoughtful of his duty, he confessed that he had been unable to prepare anything upon this topic, satisfactory to himself, or which he thought would meet the expectations of the Board. He suggested that the committee be discharged from the consideration of the subject, and that pending the report of the business committee, it be discussed in committee of the whole, which suggestion was adopted, with the understanding that at this time also, members have leave to report on the condition and operations of the several societies for the past year, and regarding the position and prospects of agriculture in their various parts of the state.

Mr. Anderson had already got excused as a member of the committee, on the ground that he had nothing new to advance, but would remark, that he had presented the subject to the club of which he was a member, and many suggestions had been broached—such as the importation of best varieties of foreign stock; the establishment of a model farm; general instruction in agricultural chemistry; the employment of public lecturers to itinerate the state; the establishment of a paper under the auspices of the state, &c. Nothing definite came of the discussion, however, except a vote recommending the establishment of a library of agricultural and kindred works, under the control of the state society, to be loaned on call to local clubs and societies.

Mr. Russ of Franklin, was a member of the committee upon this subject, last year, but was unable to suggest anything of value. He would therefore speak of the condition of the society he represented. The society numbers four hundred members, have located the fair, fenced and graded the grounds, and erected thereon suitable buildings. The show last fall was superior to that of any former year. The society has purchased two full-blood Durham bulls at an expense of six hundred dollars, which did not prove so profitable an investment in all respects as was hoped for, many of the cows served by them proving farrow. Improvement was manifest in various kinds of stock and also in crops.

Mr. Wasson of Hancock, was a new member at this Board, and represented a society as yet in its infancy. He did not feel competent, at this stage of the session, to enter upon the discussion of the

topic under consideration, and preferred to speak of the condition and prospects of his society.

There has not until recently been any agricultural society in Hancock county for many years. In 1790 a society was formed, and flourished for a time, but it failed, and one of the principal causes of its failure was the impression that got abroad among the farmers, that the highest premiums could not go out of two families. The failure of this attempt left such a discouraging impression upon the old farmers of that region, that no successful effort has been made until last year to establish another. When we moved to secure a new society, we could get but seven names on the petition; but we got our charter, and the first exhibition was a decided success. We had over four hundred animals on the ground. Our farmers are now turning their attention more to the raising of calves—and are becoming interested in all the various branches of practical husbandry. The habit of our people, hitherto, has been to fish a little, and lumber a little, and farm a *very* little; but the time has come when they must pay more attention to farming—or starve. Interest is increasing rapidly. Two years ago I had books for distribution, but nobody wanted them. The farmers would not take and carry them home when given to them. Now, I cannot get enough to meet the demand. Persons have come thirty miles to get a copy of the report of our secretary. This year I have received one hundred books, and already I have three applicants to every book I have.

There is considerable attention given to the cultivation of the cranberry in our part of the state. A neighbor of mine had a heath where cranberries grow among the bushes. He simply took away the bushes, let in the light, and the result was a fine crop. In another case, sand was carted on at the rate of from six to eight loads to one-fourth of an acre. Another man started a patch on a salt marsh. He took a large variety of the cranberry, which grows on a bush about four feet high, with a bark like the dog-wood. It is not so good as the low cranberry, though very palatable. The small are worth twice as much in the market as the large. This cranberry grows on the borders of our heath or bogs, which are found in large tracts, some of them containing a thousand acres, and when you go on them they shake a long distance around you. It is at the borders of these, near the solid ground that cranberries

grow. My neighbor took up a patch two rods square, cleared off the turf, and made beds a foot square, and in each of them put seeds and covered them with straw and they have done finely.

In reply to an inquiry of the secretary in regard to the use of marine manures in his section, he spoke of the application of a mixture of muck and eel-grass and rock-weed; also, the pogy—a fish caught in immense numbers on the coast for its oil, and afterwards used very successfully as a top-dressing to the soil. Crops have been much improved by mixing the pogy-chum with gravel and ploughing it in. It is a remarkable fact that the coarse wire-grass has given place to herds-grass by the use of the pogy-chum. The chum could formerly be obtained at twelve and one-half cents per barrel; but since its use as a manure, it has risen to one dollar per barrel. Mr. W. said the effect of muscle-bed manure also was very marked. In the winter of 1839 his father had a piece of clay land which grew nothing but white weed. He hauled on one hundred loads of muscle bed, which killed out the white weed, and herds grass came up profusely in its place. Nothing but herds grass has grown on the land since then until lately, when the white weed again made its appearance. The ground was not seeded at all.

Mr. Dill of North Franklin, was not prepared to discuss the topic presented, but would speak of his society. Its condition is improving. Have not, as yet, been able to locate, although the subject is in agitation. Its geographical situation is not favorable to location. The notion among us that farming does not pay is nearly exploded. He cited several instances of successful farming. One man cleared twelve hundred dollars this year on his farm. Improvement is going on, not only in the farms, but among the people. They are waking up to their true interests.

Mr. D. presented the following statistics of exports from Franklin county, based upon an average of several years, as follows:

75,000 sheep.			
200,000 pounds wool,	-	-	\$70,000
20,000 wool-skins,	-	-	15,000
30,000 lambs,	-	-	45,000
4,000 cattle,	-	-	100,000
200 horses,	-	-	20,000
120,000 pounds clover seed,	-	-	15,000

4,000 bushels herdsgrass,	-	-	12,000
10,000 pounds honey,	-	-	2,000
2,000 barrels beans,	-	-	10,000
10,000 pounds lake trout,	-	-	1,000
6,000 patridges,	-	-	2,000
160,000 dozen eggs,	-	-	20,000
25 tons poultry,	-	-	5,000
45 tons butter,	-	-	18,000
4,000 bushels potatoes,	-	-	2,000
20 tons round hog,	-	-	3,200
100 tons hay,	-	-	1,000
45 tons potash,	-	-	5,400
40,000 pairs socks and mittens,	-	-	10,000
200 tons starch,	-	-	20,000
Furs of various kinds,	-	-	3,000
Dried apples,	-	-	62,000
Green apples,	-	-	30,000
3,000 pounds beeswax,	-	-	1,000
Sash, doors and blinds,	-	-	1,000
Sole leather,	-	-	3,000
Calf skins,	-	-	500
400 veal calves,	-	-	2,400
Handsleds,	-	-	200
Sale work on clothing,	-	-	2,000
Harnesses,	-	-	1,000
Chairs,	-	-	400
Boots and shoes,	-	-	12,000
15,000 dozen shovel handles,	-	-	12,000
Mop woods and irons,	-	-	500
Sleighs and wagons,	-	-	3,000
2,000 pounds spruce gum,	-	-	400
1,000,000 shaved shingles,	-	-	3,500
100,000 sawed shingles,	-	-	250
100,000 clapboards,	-	-	2,000
Cash for lumbering,	-	-	10,000
Hops,	-	-	2,000
Total,	-	-	\$528,350

Mr. Dill also accompanied the above statistics with explanatory remarks upon some of the items included in the list.

Mr. Flint said Somerset county received \$150,000 per annum from sheep sold, without detriment to the flocks. The statistics of Mr. Dill were no doubt true; and yet that county is now half forest. The Dead river country is capable of producing as much as the whole county now does. The same is true of Somerset county. That whole section is a most inviting field to farmers, far in advance of the west.

Mr. Dill said there was no better land in the world.

Mr. True said that the way to send the people into the settling lands, is to call attention to the resources of the state. We all remember how this was effected by the labors of Dr. Holmes, some years ago, and more recently by the labors of our secretary. He had been surprised at some facts that had lately come to his knowledge in reference to the northern part of Oxford county.

Mr. Rice said that some years ago he went over that section and from that time to the present he has had no doubt that if a young man, about starting for California or the west, with four or five hundred dollars, would go in there, and suffer the same privations, he would do far better. The best part of Oxford county is today covered with forest. There is no better field than our own state presents. Every capability of the state should be brought out, and the northern part of Oxford is equal to any part of the state.

Mr. Hammatt of North Penobscot said his society had greatly revived the last year, and more interest was felt; they held a good show the past autumn which seems to have had much influence in awakening an interest in agriculture.

Mr. Hammond of Piscataquis said that his society had increased the interest in farming—had enlarged their premiums. A new interest has been felt in procuring the reports of the secretary of this Board, and they had been under the necessity of requiring that the volumes be passed from family to family. There is increasing interest in sheep growing. South Downs have been introduced within the year to a limited extent.

There is excellent soil in Piscataquis, and of late the farmers by deep ploughing are reaping advantages beyond the past. One field of fifteen acres, badly exhausted was ploughed three inches deeper

than ever before, and three bushels of plaster applied, and six hundred bushels of oats raised from it. There have been good crops grown in my neighborhood. One neighbor raised from one acre, eighty-two bushels shelled corn, fifty-six pounds to the bushel. Another on one acre and twelve square rods, one hundred sixty-five bushels of ears. This was on interval land. Another broke up two acres interval land, and raised one hundred sixty bushels oats. This land is flowed, and where the water backs on, it leaves the surface covered with a black mud. People are becoming more impressed with the importance of manures, and although *not much* has been yet actually accomplished, decided improvement is manifest.

Mr. Baily of Sagadahoc thought that progress in agriculture could best be advanced by learning the right use and application of soils, manures and labor. Here is a great field for investigation and we need besides to disseminate among the mass of the farmers what a part know already. He alluded to a specimen of high farming in New Jersey, which he had witnessed, and which was very successful, yielding a profit of ten thousand dollars per annum. The owner attributed his success to a free use of manure. In the course of his remarks he advanced the idea that it was unnecessary to seed grass lands provided they were plowed deep and the proper fertilizing elements applied to the soil. [This proposition was controverted by Messrs. Hammatt, Cushman and others as being at variance with the experience of all practical farmers.]

Mr. B. spoke of increasing interest within the limits of the Sagadahoc society and of a greater demand for the secretary's reports, and for other agricultural reading than heretofore.

Mr. Lancaster of South Kennebec said that what is needed most is to overcome the prevailing indisposition to engage in farming pursuits. This has been already done to some extent. The popular idea that farming don't pay, has driven large numbers of our most intelligent and enterprising young men out of the business, until few except elderly men were left to carry it on. The stampede at one time was such that the advertising columns of our agricultural journals were filled with notices of farms for sale. This is not the case now. The current has changed. People go into farming who have been engaged in other pursuits. They are beginning to find it will pay.

In reference to his society he said that much improvement had been made in stock. Some opposition was manifested to the Jersey stock, but a change of opinion is taking place in regard to its value. It is now highly esteemed for dairy purposes. The Devon has been largely introduced, people like the idea of a uniform color for matching. The Durhams are in higher esteem generally than any other stock. My own preferences are for other breeds, believing that smaller and more compact stock, are more profitable than the overgrown. He was not in favor of large cattle for working purposes; he thought the experience at the late state fair demonstrated that smaller cattle were more efficient, active and useful.

Mr. Stackpole of West Penobscot, spoke of his society as flourishing. The territory is small, comprising only thirteen towns. It consists of two hundred eight members—receiving three hundred sixty-three dollars from all sources, and paying out for premiums two hundred fifty-eight dollars. Crops within the limits of the society have increased fifty per cent. Good crops of corn, potatoes and some kinds of grain—some of barley as high as fifty-seven bushels to the acre. Buckwheat is getting to be a valuable crop. We raise as large crops of corn, I think as in any part of the state, eighty bushels to the acre being not an uncommon crop, and sixty bushels are raised by most farmers who pay proper attention to its cultivation. Some of our corn crops received premiums at the state fair. Wheat is very uncertain with us. The midge and rust injure it so that it is not sown so much as a few years ago. Barley, oats and peas are valuable, and are raised by most farmers with success. We are extensively engaged in rearing stock. Horses are raised by many farmers, and I think we produce as good horses as can be found in any state in the Union, but in my opinion too many are raised for profit. There have been some good Short Horn and Devon cattle introduced, and great interest is taken in the improvement of stock. We have not kept so many sheep as we might, but farmers are becoming convinced that they are very profitable, and will probably increase their flocks.

Dairies receive no special interest, but in this and also in some other respects we are sure of a better time coming.

Mr. Rice of West Oxford said the greatest want was suitable markets, and in this light regarded the increase of manufacturing in

Maine as the most certain and speedy method of assisting agriculture. Farmers lack capital, many go into the business of farming because they have not the means to go into anything else. Another disadvantage is, that we are unable to obtain manure in sufficient quantities. If it could be obtained we should be able to raise as large crops as any state in the Union. A different sentiment should be cultivated in regard to the profession of the farmer—he should be made to feel that his calling is laudable and honorable. He suggested the idea of so conducting the farm connected with the state reform school as to answer all the requirements of a model farm.*

Mr. Rice said the West Oxford society had purchased a lot and enclosed it, and last fall had a better show than ever before, and the society is now strong and prosperous. They have erected a building, and are nearly out of debt.

The Hungarian stock promises to excel any other that has ever been introduced in his vicinity. They are very hardy and thrive well on meadow hay. One two years old heifer, in two weeks made fifteen pounds of butter. The steers not as large as the Durham, but very hardy, and will prove superior in this respect to either the Durhams or Devons. It was imported by Mr. Cushing of Massachusetts, and introduced into the county by Mr. Pierce of Hiram.

Mr. Porter of Washington reported increasing interest and highly commendable progress among the farmers of his vicinity. More attention is paid to manures and composting them, to farm buildings and fences—new implements and improved stock.

Mr. Drummond of North Kennebec said his society had secured grounds, and located at Waterville, they were in debt for it and were making an effort to pay it. We have some full blood stock, and grades of various kinds. Sheep are increasing among us. There is an increasing interest manifested by our farmers in agricultural matters. This is greatly helped by the formation of farmers' clubs. These have had the effect to help all kinds of crops and to improve both our stock, soil and productions.

* The same idea was broached in the original draft of the report on Agricultural Education and elicited some discussion. The plan has been fully tried in Massachusetts during some years past and found unsatisfactory. The connection which has existed between the Board of Agriculture and the Reform School farm was dissolved last year to the satisfaction of all concerned.

Mr. Davis of North Somerset said the society he represented was in a healthy condition. At the last fair its show of neat stock surpassed any that he had ever seen, with one exception—the last state fair. The Durham cattle are favorites, with his neighbors, and it was lately thought the Hereford made a good cross, but he thought the Devon the best, all things considered. The Durhams are very large, and coarse limbed, and the Devon cross seems to make the handsomest, best built animal. The Ayrshires, he thought well of. The Devon seems a little undersized, but the Durhams are too large and they cannot stand our winters so well. He thought the Durham and Devon crossed, to be the best for northern Maine. There is a good deal of interest in sheep, a cross of the French and Spanish Merinos is deemed the best, the Cotswold are highly esteemed, although as yet the flocks are small. The society is doing much in various departments, especially in stock. We feel that the labors of the Board have accomplished great good.

Mr. Fuller of the Kennebec society, said that the increase of interest in his neighborhood has been very considerable. The farms and products are steadily improving in value. He alluded particularly to the orchards of the county. Farmers in Kennebec are raising from fifty to five hundred dollars a year in apples. He knew one man in Winthrop who raised last year two hundred barrels of russets, which will sell at three dollars per barrel. The stock of the county is improving. The general opinion is, that the Durham blood is essential to perfect stock. A cross between the Durham and Alderneys is better for dairies. On the whole the society is prospering.

Mr. Avery of Lincoln spoke of the improved condition of his society, and the increased interest felt in agriculture throughout the county. The people have been hitherto largely engaged in ship-building and limeburning, but the recent depression in these branches of industry has given a new impetus to agricultural pursuits. It has taught them the importance of relying more upon the cultivation of the soil, for the means of livelihood. They are now giving much attention to manuring, to the clearing up and reclaiming lands heretofore regarded as worthless, and which have in most instances rendered good returns for the labor expended on them. Grass is becoming a very important crop and more hay is raised and shipped

than is consumed. The fair last year was a good one, the show of stock unusually large and indicating a satisfactory improvement in breeds. In reply to a question of Mr. Flint, he said that wages to farm hands were from eight to twelve dollars per month. The experience of the best farmers in his section shows that it will pay in the long run to employ suitable help at the highest prices.

Mr. Flint of West Somerset, said his society, which is the oldest established in the county, had been distinguished for improvement in stock and sheep husbandry. The latter, especially, had been very earnestly prosecuted. The amount of wool raised exceeds that of any two counties in the state. As to cattle, Durham grades are preferred, especially for working purposes. Other breeds, perhaps the Devon and Hereford might be introduced to good advantage. The interest in horse raising has declined of late, not because good horses are valued less, but because the business had assumed an undue importance. It is a bad state of things, in a community, where horses are kept in flocks, and sheep not at all. A good degree of attention was devoted to labor saving implements and machinery. Sub-soiling as yet, had been little practiced, although, in his judgment it deserved great attention. The mower and harvester had been used, but failed in giving complete satisfaction owing to their heavy and cumbersome make. The annual show and fair was well attended, and was a good exhibition. Interesting addresses by Messrs. Lang and Sayward, were listened to by a large audience. The society has not received, heretofore, much profit pecuniarily from its shows—their fields are open and their exhibitions free. This induces a large attendance of those who are really interested in agricultural matters, but little money is made by it. Measures have been taken to enclose grounds and establish a fee for admittance to future exhibitions, in order to replenish the treasury. He thought the policy, however, somewhat doubtful. The influence of this Board, and the reports of the secretary had been most salutary. Men of all pursuits sought for the reports and read them with great interest, and he believed a most desirable revolution in public sentiment, upon the subject of farming, will be the result of the knowledge thus acquired.

Mr. Stevens of North Aroostook, said his society has increased one hundred per cent. within the year. The county is admirable

for stock, the true interest of the farmer. Now, instead of raising grass-seed for sale, as formerly, we sow our seed, and raise hay for our stock. The Devon is highly prized, as far as tested. So is the Durham and the Hereford. The county produces large numbers of fine horses. The sheep are very superior and the mutton excellent.

He presented some statistics of the crops in township letter C, in first range, lying next to the boundary line of New Brunswick, a few miles south of the Aroostook river. Two years ago last summer, this township was surveyed by the state, and at that time four men only had made a beginning in it. Last summer there were thirty who raised crops. Another season this number will be greatly increased by those who prepared their land last summer for their first crop. The amount of grain of all kinds was 12,754 bushels; of potatoes and turnips 3,521 bushels. This, at fifty cents per bushel, which is a very low figure, over 1,000 bushels being wheat and rye, would amount to \$8,137.50. He believed that the crop in the township next season, will be one hundred per cent. greater than last season. There are one hundred good farming towns in the county which are capable of doing as well, and in a short time they will be peopled by the hardy and energetic sons of New England. For the encouragement of those who wish to settle in Aroostook, he would say, that there are several townships yet unoccupied, lying along the borders of the county adjoining New Brunswick, and that the state is anxious to give it to actual settlers, while the British are building a railroad along the boundary line which will serve the purposes of the settlers as well as if built (in the same place) at their own cost.

He spoke of one settler who commenced—a stranger and ignorant of the country—in June, 1856. He employed a man to clear forty-seven acres; the trees were felled and limbed, and in the summer of 1857 the land was burned. May 10, 1858, he sowed five and one-half bushels of wheat on five acres, which produced one hundred forty-three bushels. Oats, two thousand bushels on twenty-seven acres. Millet, ten bushels on one-half acre. Buckwheat, one hundred bushels on three acres. Rye, two hundred eight bushels on eight acres. Potatoes, two hundred bushels on one and a quarter acres. Rutabagas, four hundred bushels on two acres. His land, clearing, interest, labor, &c., cost \$1,094. The whole

product is worth, at market valuation, \$1,357.50. The net profit of the crop for last year, after paying all expenses, \$263.50. He is perfectly satisfied with the place as his permanent home.

Mr. Cushman of Penobscot and Aroostook Union said, the society which I represent embraces a territory seventy-five miles in length; consequently, those at the extremes neither join the society or attend its fairs. During the short time our society has been in operation, its influence is very manifest. Improvement in the mode of cultivating Indian corn, the selection of seeds, the cultivation of fruits, and in neat stock, has been quite extensive. The past season, although most unfavorable by reason of severe drouth, excessive wet, and early frost, has produced some very good crops. They are reported of eighty-five bushels of corn, thirty-nine of wheat, twenty-five of rye, seventy-five of oats, seventy-two of buckwheat, over four hundred of potatoes, and nine hundred eighty of carrots, per acre. It is now demonstrated that fruit can be grown there as well as in other sections of the state. At our last fair about fifty varieties of apples were exhibited, well grown and matured. The smaller fruits flourish abundantly.

Improvement in neat stock is just begun. At our last fair were two calves—one only four months old, weighing four hundred seventy pounds, and the other sixteen and one-half months old, weighing 1,300 pounds; and other good stock. Our farmers formerly raised large quantities of hay for lumbering purposes, but now see the evil of it, and are turning their attention to stock raising. Sheep are rapidly multiplying; and their large size and good condition show that the climate and soil are admirably adapted to them.

Buckwheat, though formerly neglected by many, is now considered the most valuable crop we have. It produces a large crop with very little labor. It is best sown as late as the middle of June; and for domestic fowl and fattening swine, it has no equal. It is common for pigs fattened upon it, to weigh when fifteen to eighteen months old, from four hundred to nearly six hundred pounds.

I have no means of producing statistics, as the gentleman from Franklin did; yet could I do it, the sale of hay, grain, live stock, beef and pork, would show an exportation of a very considerable amount.

The following communication from Dr. Rogers, secretary of this society and resident in Patten was read:

“In consequence of the injury done to wheat by the rust and weevil in past years, the farmers in Patten have engaged more largely in growing oats. It is a surer crop and finds a ready market at a fair price. Rye yields a fair crop here and is a good substitute for wheat, when the rust and weevil destroy wheat.

Corn is a surer crop in this climate than wheat. I have raised good sound corn every year, with one or two exceptions, for the last ten years. The Dutton corn is the best variety. I think corn does best, planted on the same land, several years in succession. The land should be suitably manured each year. It should be planted as early as the twentieth of May, and unless there should be a heavy frost in August, which is seldom the case, it will get ripe. I think planting the hills near together, three feet between the rows and twenty inches between the hills, increases the crop.

Wheat in good years yields from fifteen to thirty-five bushels to the acre. Our farmers commonly raise wheat on burnt land. But it will grow well on ploughed land if well manured. I think wheat sown early in May, or in April if the season is favorable, is most likely to do well.

Mr. Jacob Frye of Patten, raised in 1857, 1,350 bushels of oats, worth in cash \$675. Raised in 1858, 658 bushels of oats, worth in cash, \$329.

Mr. Andrew McCourt of Patten, raised this year, 587 bushels of oats, worth in cash, \$293.50.

Messrs. Samuel and William Waters of Patten, raised this year, 789 bushels of oats, worth in cash, \$394.50. Also, 58 bushels of wheat, worth in cash, \$87.

Mr. John R. Hammond of Patten, raised this year, 800 bushels of oats, worth in cash, \$400.

Mr. William H. Hunt of Patten, raised this year, on eight acres of land, 400 bushels of oats, worth in cash, \$200. Also, 60 bushels wheat, worth in cash, \$90.

Mr. L. Rogers of Patten, raised this year, 371 bushels of oats, 53 bushels of rye, worth in cash, \$228. Also, 20 bushels of corn, worth in cash, \$30. Income of four cows, \$109.

Mr. Samuel Wiggins raised on his farm in Patten, 38 bushels of wheat on one acre, on pasture land ploughed in June, and cross ploughed in the spring.

Mr. James B. Hill of Patten, raised 36 bushels of wheat on one acre of land ploughed in the spring and well manured.

For the oat crop, Mr. Frye ploughs in a crop of grass in June or July and lets it lay in furrow until the following spring, then harrows it with a heavy harrow, but does not cross plough.

Mr. Waters ploughs in a crop of grass in June or July, and cross ploughs in the fall. Land cultivated in this manner will yield from forty to fifty bushels of oats to the acre."

Mr. Dill mentioned the case of a farmer in Rangely, named Toothaker, who raised 1,400 bushels of grain, and 221 tons of hay, which paid him a profit of \$1,200. He also called attention to the fact once before mentioned by him, of a piece of ground which was cropped with oats five years successively, the yield increasing from year to year from twenty to forty bushels to the acre.

Mr. Hammatt said we might mistake if we were guided by such statistics. He knew a man to raise fifteen successive crops of oats, but it would be hard to tell what was raised the last time. He ploughed in his stubble and used no manure. Towards the end the yield was not worth harvesting, and the land was ruined for grass. The idea that the productiveness of land thus treated increased instead of deteriorated, he believed was contrary to all experience. If it were true, farming could be carried on with very little labor or expense.

Mr. Dill said he called attention to this subject for the purpose of eliciting discussion. The ideas of Mr. H. were mainly in accordance with his own.

In case of the land above referred to, it was weedy and bushy, and he had no doubt that culture improved it. He had known of other places where, because the land was not properly subdued, people supposed it was ruined, when it was only not properly tilled.

Mr. Cushman said that oats were a very exhausting crop, and it was a fact generally understood, that grass will not catch after repeated cropping with oats. The plan was a ruinous one.

Mr. Davis of North Somerset agreed with the speakers on this point. He had known instances in his vicinity, where farmers had raised oats a few years, obtaining fair crops, but the land when seeded down would not catch, and all attempts to redeem it had been only partially successful. Oats should only be sowed on new

lands, or where the soil is highly manured, as for other crops. He mentioned a man whose land had run out by this method, but had been only partially reclaimed by hauling on muck and manure, the ruinous results being still apparent. Rotation of crops is the only true method.

The business committee reported a series of topics for consideration, which were assigned to committees, as follows :

No. 1. To what extent, and by what means can labor saving machinery and improved implements, be most advantageously introduced? Messrs. Chamberlain, Davis and Fuller.

No. 2. Is it as needful for farmers to educate themselves thoroughly in their calling, as for mechanics, physicians, merchants, or lawyers? If so, by what means can it best be accomplished? Messrs. True, Porter and Russ.

No. 3. Ought farmers to hope for success without such constant and undivided attention as warrants the hope of success in other branches of business? Messrs. Anderson, Hammond and Stackpole.

No. 4. Is it advisable to urge the completion of the geological and agricultural survey of the state? Messrs. Wasson, Cushman and Dill.

No. 5. Is there need of fences other than to enclose pasture lands? Messrs. Flint, Lancaster and Chamberlain.

No. 6. What crop, if any, in our climate and system of husbandry can be made to yield similar advantages to those derived from the turnip in England? Messrs. Hammatt, Noyes and Anderson.

No. 7. Ought the Board of Agriculture to be empowered by law to fix the times of holding the shows of agricultural societies? Messrs. Rice, Drummond and Bailey.

No. 8. What proportion of the funds of agricultural societies, if any, should be expended in promoting general farm improvements? Messrs. Dill, Goodale and Stevens.

No. 9. What books may we best recommend to agricultural societies to be given in premiums? Messrs. Goodale, Avery and Noyes.

No. 10. Is it expedient that the Board of Agriculture at this session recommend the breeds of stock, horses, neat cattle, sheep and swine, most profitable to be bred and raised by the farmers of Maine? Messrs. Hammond, Palmer and True.

No. 11. Can the keeping of domestic fowls be made profitable? If so, what kinds are best, and what is the best treatment and method of using their manure? Messrs. Rice, Russ and Tucker.

No. 12. Can the cultivation of the small fruits be made profitable? If so, what varieties are best, and what is the best mode of culture? Messrs. Noyes, Dill and Lancaster.

No. 13. By what means can the settlement of the new and fertile soils of Maine be best secured? Messrs. Stevens, Cushman and Dill.

No. 14. What breeds and classes of horses are most deserving attention and encouragement in Maine, and what is the best mode of rearing and training them? Messrs. Tucker, Davis and Wasson.

Mr. Chamberlain subsequently reported on the first Topic, as follows:

“To what extent and by what means can labor saving machinery and improved implements be most advantageously introduced?”

This topic, in the minds of your committee, is so intimately connected with the whole subject of husbandry, if not underlying its whole successful prosecution, as to invite a wide range of thought in its consideration; and if in our hasty treatment of the subject, we have found it easier to deviate somewhat from the direct line of sight, we hope to be pardoned for circumlocution, if we succeed in coming to the text in the end.

Taking a view from our present stand-point, we find the circumstances attending the American farmer, are to a certain extent peculiar to the nation, and distinctive from that of older and more densely peopled countries. So long as we have cheap fertile lands, inviting the husbandman to enter upon and enjoy, so long will the wages of labor be high compared with products.

Manufactures are affected alike with the farm. This condition of things has tended to stimulate the inventive genius of our people to substitute machinery for the bone and sinew of human organism. In the department of manufactures, this substitution has been carried very much farther than in the agricultural. This arises in part from the conditions in the case, yet an item in this difference undoubtedly is the difficulty that inventors and makers of improved implements encounter in the apathy so generally prevailing among farmers themselves in relation to adopting such improvements.

In past time it has been remarked of farmers as a fault, that they are too slow—too indifferent to progress. This may be their *virtue*, as the conservative power of the commonwealth. But we fear the circumstance as related by the English nobleman too often has found a counterpart. Some time after he had sent his people an improved plow, he found it had been laid aside; when they assigned as a reason—“we be all of one mind, that it make the weeds grow.”

Farm laborers often lack the skill and tact requisite to adjust and apply a new and complicated machine or implement. The machinery of the workshop is superintended by schooled intelligence.

The farmer, unlike the manufacturer, seldom goes abroad to learn from observation the workings of the *wonders of progress* that are abroad in the world. The success of the merchant and the manufacturer, depends on their intelligence and quick adaptation of means to ends. The farmer may remain at home, and “set his face as a flint,” against book-farming and all innovation; and continue to live—merely vegetate by a round of labors such as were performed in a former age; but without an “eye to the main chance,” he is often found grumbling at the profligacy of the times, and the ruinous, “high-pressure,” progress of the age, that recklessly outruns all sober sense, sedate customs and commendable stability.

We, who had our start in life in the rural districts, find that we need something like the startling blast from a steam-whistle to quicken our pulsation and keep us well up with the progress of the day. The boy of today is a being measurably progressed from the boy of a past age. He opens his eyes on busier scenes. At every turn his points of contact receive a stimulus. The well appointed school-room, improved books, a more extended round of studies, a freer intercourse with men and things,—these improved facilities early develop the man and fit him to occupy an advanced standpoint.

With this glance at our condition, we may look forward, and be entirely safe in saying, that we are not likely to be overwhelmed with labor.

Whether we are to continue as heretofore without a leading agricultural interest, or whether we shall aim to make stock husbandry a prominent feature in our practice, it abates nothing from the interest and importance to be attached to the inquiry, whether we

shall earnestly seek to accomplish greater results by improved mechanical aids.

Gentlemen of this Board, who have carefully followed our able secretary through his valuable reports, must see clearly the capabilities, and the fitness of our soil for grazing as a leading pursuit; and are prepared to predicate an opinion, that we may look for a vast increase in the numbers and value of our domestic animals at no distant day, on something more tangible than the idle fancies of a fertile imagination. Allowing the convictions of gentlemen to coincide with the views of the secretary on this point, and we are ready to proceed with our inquiry as to the connection our Topic holds to our general interest.

One English writer says, "we are justified and compelled to adopt every useful implement and mechanical invention which will cheapen the cost of production." This word, "justified," clearly refers to the condition of things there, under which it might look as injustice to the dependent laborer who delved with the spade, to introduce machines that should supersede spade labor. That such introduction cheapened the cost of production, there seemed to be no doubt. Again we read from an English farmer, "*Root cultivation* is the farmer's sheet anchor and the nation's safety-valve. If we build a house on a poor foundation, the labor of the superstructure is wasted; and unless we commence farming by endeavoring to produce great green crops, we shall find our future success and stability very uncertain indeed." An American farmer says, "many farmers who now pride themselves in raising fair crops of oats, would find it to their advantage to raise twenty times their value in carrots on the same amount of ground."

A common saying in the Mother country may be borrowed, and in time hold good here as there, "without *roots* there is no stock; without stock there is no manure; without manure there is no grain and hay." While the statistics of England and of the continent of Europe, show beyond cavil, that the "*shift system*," based on the root crop, has tended directly to increase the value of domestic animals and the acreable products of the cereals more than a hundred per cent. in a quarter of a century, and vastly augmented the product of pasture and meadow, may we not safely follow in the same direction? When it has been demonstrated and made clear to our

comprehension, that the product of an acre of carrots or mangolds is an equivalent for fifteen or twenty tons of hay, may we not safely advance in root-culture beyond the bounds of the kitchen garden?

The farmer of Maine needs but few words from us on the necessity of improved implements for harvesting purposes. The best scythes, forks, horse-rakes, grain-cradles, &c., that can be obtained, are being tried and adopted; for like his razor, he has a *feeling sense* of the importance to be attached to their good qualities.

Mowing machines have been bought and used to an extent which plainly shows a creditable desire on the part of our farmers, to avail themselves of the advantages to be derived from a perfect instrument of this sort. So much attention is now being given to them, so great is the concentration of mechanical science on this machine which is destined to occupy so important a position in these northern states, as to warrant the hope that it may, ere long, emerge from its present imperfect condition,—modified and improved in the essential of resistance to the propelling power,—simplified and perfected so as to do our work in a fully satisfactory manner. Manufacturers will then have no reason whatever to complain that farmers fail to give them due encouragement.

But in the matter of tillage, and in preparing crops for market or consumption,—the power that has been conferred on this Board in the organic act—*the power to talk*, may profitably be directed and applied without stint. In this, as in spiritual affairs, we need “line upon line, and precept upon precept.” While we aim high for future achievement, let us make sure of progress, even if it be slow. It is wise in us today to learn from those who are in advance of us in the general progression.

We know an intelligent farmer and market gardener, who ten years ago tilled thirty acres, employing sufficient force to ensure greatest profits; and who made it a point to secure and test every farm implement that came before the public as an improvement. At the close of the last season, he informs us, that he has in the last ten years gradually extended his operations to one hundred twenty acres—the general style of crops continuing the same,—and has in the mean time had no occasion to make addition to the number of his men.

This fourfold increase of worked area, has been accomplished solely by adopting every improvement in tools and machinery.

In some portions of our state, farmers are now conducting their operations with less manual labor than formerly, by reason of increased wages. This decrease in help is hardly compensated by facilities afforded in the use of the few improved implements they have secured.

Farmers have been discouraged from growing roots by reason of the great amount of labor required in their culture. The recently published account of the premium crop of carrots in Kennebec county is noticeable. The crop was grown on a sandy loam,—the two preceding crops being carrots; the dressing, compost—made mostly of muck; all the antecedents tending to show good tilth and the absence of weeds; yet the item of weeding is set down at the rate of twenty-four days per acre. Reasoning from our experience with a stony soil, we should conclude that by the use of a wheel-hoe that may be made for a dollar, the above crop could have been tended with half that expenditure of time, and the ground left at the end of the season, absolutely free from weeds. Field culture of roots, on any extended area, can be conducted with greater economy by horse-implements than by hand. But other means and agencies than mere words must be summoned to aid us in fixing in the minds of the generality of farmers, a due appreciation of the importance of this subject. They often find words alone very evanescent things. They want a “visible and tangible embodiment of science” in the shape of improved implements, often thrust in their faces.

Too much importance cannot well be attached to agricultural exhibitions, for the impetus they have contributed to such advancement in the art of husbandry as has been witnessed. These call the farmer and his sons from home. It is their school, the terms of which are short, but its lessons have an enduring impress. It is these exhibitions on which we must rely more than on our use of language, for the success that shall attend the present effort. At these shows, while we look with pleasure and pride on the results of labor and skill as displayed in our stock, and in the products of the field and the garden, we look on the other side with equal interest, to the implements by the aid of which all these mighty results have

been accomplished. We may be privileged to speak of what the State Agricultural Society has *not* yet accomplished in its short history, to aid the inquirer in his researches in this direction, and what it may seem desirable that it should attempt to accomplish in the immediate future.

Through the want of pecuniary means to indulge in any extended system of liberality towards the mechanic, no money premiums have been offered to be awarded beyond the state. Beyond the common privilege to be enjoyed on these occasions—that of advertising—but little inducement has yet been extended to mechanics either within or beyond the state, to fill up our exhibitions. The hope of even an *honorable mention* in the society's transactions, may now well nigh have died out from the mind of the most sanguine.

From the first two exhibitions no reports in that class have yet reached the public eye. From the *third*, a brief report is found; and we wish to be understood as aiming no disrespect in any direction, when we express ourselves in relation to it, that it comes very far short of what such report should be.

In relation to the *fourth*, and coming report for that class, we will venture the prediction, that new and important machines, designed and apparently adapted to supply pressing wants, are passed over without even a mention. We say never a word of this by way of complaint for any neglect of duty by any gentleman.

In the workings of these voluntary associations, men are invited to the post of judges, with neither opportunity on the part of the executive of the society to examine into their fitness to discharge the duties of the trust, nor power to so order circumstances as to secure their attendance. Gentlemen, through their love for the cause, will make an effort to respond to such call; and often at the sacrifice of business they make long journeys, spending time and money, and depriving themselves of the enjoyment of the show in its other departments,—and when all is passed, we have not left to us even the miserable right to complain of anything, short of gross acts of favoritism or rank injustice.

Much importance is, and of right should be attached by the public to awards of the state society, and if these shall be incorrectly made, much mischief may be done by misleading the farmer, and

encouraging the manufacturer to continue to produce what may prove a useless article, resulting in his loss in the end.

With all the difficulties and embarrassments inhering to this organization,—yielding slowly and reluctantly to our desires for progress, still we are compelled at the present moment, to look upon this as the highway over which to direct our efforts for the acceleration of that progression, which is already sure,—but to our minds too slow to keep time with the music composed by the secretary of this Board, as the *Farmer's March*.

After all is done that may be, to secure the presence of implements at the show, a great difficulty is encountered in the fact that men of ordinary perceptions,—even any man,—may be wholly misled in judging of new mechanical combinations, without an opportunity to base an opinion upon practical trials. At the time, and during the continuance of a show and fair, such trials cannot be entered upon and conducted to any great extent. With the opinions at present entertained by your committee, in regard to the radical defects in the great majority of tools now in use in the state for the pulverization of soil, we deem it our duty to call the attention of the state society to this point, and respectfully and earnestly recommend that a trial of plows and other implements be by them undertaken and prosecuted, at an early day, under such regulations as, in the opinion of the society, may result in correct decisions.

Agricultural implements are now manufactured in the state to an extent to meet a very considerable portion of the consumption. Plows in particular, are probably made to supply nine-tenths of the demand. Of this implement of prime necessity, the principle involved in the best phase of its construction,—the extent of its sliding surfaces,—probably abstracts two-thirds from the propelling force, to overcome the friction. With so small a portion of absolute power remaining for direct effect, it may readily be concluded that plows variously proportioned may differ widely in their efficiency. Plows may be found in the market so essentially differing, that one ploughing with one implement will produce a finer tilth than two ploughings with another. In our most hopeful moments, we cannot look for the plow to be dispensed with for some time to come.

As we have no model of excellence—no standard of perfection in

the plow anywhere, Yankee ingenuity never having brought it strictly under the application of scientific principles we have no reliable guide in our selections short of the trial.

But few trials of plows are on record. One only has ever been attempted on this Continent, that resulted in any marked success. The one had at Albany in 1850, conducted by a committee appointed by the State Agricultural Society of New York, is full of instruction, and may, so far as their experiments extended, be safely taken as a basis for operations here. Sufficient time has elapsed since that trial to witness essential modifications in the implement, whether for better or worse, no one may presume to know. The expenses of a trial need not be very great.

A scale of premiums, open to competition, would be desirable; and plows of all the patterns now made and sold in the state, should be collected and passed upon. Men of competent qualifications may be induced to aid the cause in the capacity of judges, by the payment of their current expenses. This trial should embrace harvesting and other machines.

Encouragement should be given for the introduction and trial of machines, other than plows, for deep and thorough pulverization of the soil.

The society should own a dynamometer for testing the amount of draft. A good instrument may be had for fifty dollars.

Hoping to see the means provided and the preliminary steps soon taken for the accomplishment of the important purposes here briefly indicated;—we only desire to add definitely our opinion, that the extent to which each individual farmer should introduce improved implements, may be limited only by the means at his command for such purpose; subject only to that condition of things when he cannot longer add machines nor employ brute force to propel them, as a substitute for, and as an alleviation of the “wear and tear” of the only animal who has a soul; and the *means* and *agencies* to be employed for supplying that knowledge, through which each for himself, will see, understand and act for his own best interest, such as are feebly indicated above.

All of which is respectfully submitted.

CALVIN CHAMBERLAIN, *per order.*

The remarks upon mowing machines in the report as first read,

elicited some discussion, which was shared in by Messrs. Anderson, Flint, Goodale and others. A slight modification of the language being made by the chairman, (and which is incorporated above,) the report was unanimously adopted.

Mr. True, chairman of committee on second Topic, reported as follows :

“ The subject of Agricultural Education has, for many years, been an important problem to the men of progress in this country. Theorists have been inclined to look to European countries for a solution of this question; but whenever this has been tried, it has resulted in an attempt to engraft upon American soil, habits, customs, and modes of agriculture entirely different from what this climate and country will warrant.

Agricultural schools and colleges have been organized in Europe with good success. But it must be borne in mind, that in Europe, men of all classes are in a certain sense, cultivators of the soil. In England the landholder may have his thousands of acres under cultivation. He wants a superintendent of such immense estates. He must be a man educated to agriculture as a science, and as a profession. He secures a man thoroughly educated for this purpose, who, with the title of land steward, is well acquainted with agricultural chemistry, the laws of breeding cattle, in fact, everything pertaining to his calling. This superintendent calls to his aid the poor farmers, who are hired at the lowest possible price, to carry on the labor under his direction. These are virtually slaves to the better educated men.

But we find a different state of things in this Republic. Equality of thought, and equality in social and intellectual position seems to be the watchword in agriculture here. Adopting the European method of cultivation, we must virtually reduce to servitude nineteen-twentieths of our rural population for the advantage of the other twentieth. The heart of every American freeman revolts at such a thought.

We must then come to the conclusion, that the genius of our institutions will not admit the introduction of agricultural schools and colleges on the same basis as in Europe. Under our present system of agriculture, it is expected that every man and boy shall devote his energies to manual labor. No substitute for this has yet been

found. In our changeable climate, confining a young man within the walls of a school-room for any length of time, almost invariably enervates his system, and he loaths the sight of agricultural labor. Germans may sit in their chairs and smoke eighteen out of twenty-four hours and grow corpulent by the process; but in this country it is entirely different.

In accordance with the spirit of our institutions, education should be general, as well as particular. A few men should in every profession have a special education for some special department. Every community needs at least one skillful *surgeon*, though it have many good *physicians*. So we need a few men in our country who are pre-eminent as chemists or as veterinary surgeons, or mathematicians, but to make every body a chemist or mathematician is one of those utopian ideas that will never be realized. Your close book student is apt to become the abstract thinker, but poorly fitted for physical labor. Young men too will repair to some institution and attend to the study of chemistry, and the fond father hopes to have his son with him on his farm. But the boy has seen an opening somewhere else, and he enters it, leaving his father to plod along the same old way. The chairman of your committee has had some experience on this point sufficient to substantiate his position. He could enumerate several hundred young men who have attended to the study of chemistry, and many of them agricultural chemistry and mineralogy; but he can refer to only two of that whole number who have become practical farmers. Not that their education would be lost to them or the community, but it is diverted from its original design.

We must then, come to the conclusion, that under the present influences bearing upon us, it will not be the best policy to pursue, to establish agricultural schools with the expectation of directly educating the farmer.

It must be borne in mind, that we have in Maine, at least one hundred thousand persons engaged in agricultural labor. To educate so large a number must be a work of time, and whatever mode may be adopted, must be, as much as possible, adapted to the great mass of farmers.

The question then arises, how shall the farmer be better educated? Here is a broad field of inquiry, and your committee believe it can to a certain extent be answered.

We think we must first look to the elevation of the common school where every boy is expected to lay the foundation for all his future success in life. It is a fact, that any boy can acquire sufficient knowledge of arithmetic, grammar, geography and penmanship in the common school, at the present day, to prepare him to pursue any special branch of study to fit him to be a scientific farmer. Now how shall he know something of chemistry? In almost every town, there is a high school, or academy, at least, one term in a year; and for the want of something better, let the young man attend to the study of the elements of chemistry for one term only, if not convenient to remain longer, and he can after that, be his own teacher if he will.

The intelligent and successful farmer must be a constant learner. The lawyer, who lays aside his books, is soon out of practice; the physician, who is not posted up in every new improvement, will soon be outstripped by his competitor; and so will the shrewd farmer at the present day find it equally necessary to catch at every new mode of cultivation, every new implement of real value, and new principle advanced.

With this spirit of inquiry he becomes a reader, and a thinker. He is thereby stimulated to exertion.

But farmers want models before them.

It is said, that the late Professor Cleveland, when he entered on his duties as professor at Bowdoin College, did not know one mineral from another. A small box of rocks picked up by him, and sent to a neighboring college to be labelled, was the first and probably the only direct instruction on the science from teachers which he ever received, yet he acquired a world wide renown in that science. The reason is this. He had made a *beginning* in the science, and then could pursue it alone.

Many a farmer will express a wish to become acquainted with chemistry. He buys a work on that subject, but it is all a sealed book to him, and he throws it down in disgust. Now he needed a little instruction from some friend in order to give him a start, and then the whole difficulty is overcome. We need good models in everything. A model farmer influences all around him. If we had good teachers in everything, we should all be better scholars.

The practical farmer is in a scientific and practical school when he frequents the farmer's club.

Perhaps there is no agency so effectual towards stimulating farmers as this humble one. Practical, common sense men can then educate themselves in almost everything.

Another step not yet sufficiently noticed, is a small agricultural library in every farmer's home. Almost any man can lay out five dollars for provender for a favorite horse without any difficulty, to whom five dollars expended in books would look frightful. Five dollars judiciously expended in books will, if carefully studied, make a learned farmer. Let the farmer purchase Browne's Book of Manures, a Fruit Book; one on the Diseases of Animals, another on the Breeds of Animals, one on Agricultural Chemistry, the simpler the book, the better. With these books, together with his agricultural papers, State and Patent Office Reports, and other matter pertaining to his calling, he will become the high minded, intelligent and successful farmer.

As preliminary to the establishment of agricultural institutions, might be mentioned a course of lectures to farmers, delivered in a plain, simple manner, by a competent person, in such a way as to induce the formation and support of the farmer's club. As the presence of a few minerals gave Professor Cleveland a stimulus to prosecute successfully his favorite study, so the presentation of the simplest truth, in the form of lectures, will excite many a young farmer to pursue the study and practice of scientific farming.

It is believed that a work on Agricultural Chemistry more simple in arrangement than most of those now in use would be of utility to the great mass of that class of farmers who have within them the spirit of inquiry, but whose early advantages of education have been more limited than are enjoyed at the present day.

Your committee believe it as necessary for the farmer to be as thorough in his profession as that of any other occupation to ensure complete success. The house carpenter, who becomes complete master of his trade, and knows how to draft his work, is sure of a higher compensation than he who knows nothing but to follow another. Whether we acknowledge it or not, "*knowledge is power,*" and the greater our knowledge of our calling, the greater our influence and command over the minds of others. In other occupations it is presumed that the individual is already acquainted with his subject before he comes before the public; then why not the farmer?

Your committee wish now to express their convictions in regard to an agricultural school as a means of advancing the cause of agriculture. That the time will come when such a school will be established in Maine, your committee entertain not a doubt; but it will, if successful, be a model school for the few, who shall be the teachers of the many. Your committee are of the opinion, that measures to elevate the condition of our primary schools should precede that of an agricultural college. In due time, such an institution will be an efficient aid to the scientific farmer.

Could some better arrangement be made by which a portion of the public money expended for primary schools should be devoted to the special study of the higher branches by young men, it might be one step in the right direction towards a thorough education of farmers.

Finally, your committee express the opinion, that the farmer should, first of all, learn to respect himself, and he will soon secure the respect of every other class of society; and it will serve to elevate him, to that social rank in society which he really deserves. Let him educate his body, mind and heart, so that when the body begins to fail, his intellect will still be active, and when that too, begins to wane, he will still have a warm and well cultivated heart beating within the walls of his breast, to sustain and cheer him in the decline of life, and prepare him for a peaceful rest and a blessed immortality.

All of which is respectfully submitted.

N. T. TRUE, *Chairman.*

The report as above was adopted. It embraces several alterations which were made by the chairman, after discussion by Messrs. Wasson, Flint, True, Anderson, Martin, Porter, Goodale and others; and so much as referred to the establishment of a model farm upon the lands connected with the State Reform School at Westbrook, was stricken out.

Mr. Anderson, chairman of committee on third Topic, reported as follows:

Your committee on Topic No. 3, have given it attention, and report that farmers are *not* to hope for success without bestowing upon their business such attention as warrants the hope of success in other branches of business. But while this is the reply to the

question submitted, your committee ask leave to go a little further and state that, from the observation of its several members, a belief is entertained that most farmers of the state, who hope for success, seem to expect it to come to them not only without careful attention to their especial business, but with their attention divided and distracted by everything and anything outside of their farms which comes under their notice; and they continually suffer these outside things to infringe upon the time which they, as reasonable men ought to devote to their farms.

Your committee do not here intend to reflect upon the ability, nor general intelligence, nor shrewdness of the farmers of the state; for it is believed that most farmers, although they may hope for success, have but little faith in its attending their farming operations; which appears to be manifested by the great readiness with which they seize upon weak promises of pay elsewhere; by their almost universal neglect of the farm when they have capital to invest; by the little interest they take in studying up the best methods of doing all the different kinds of farm work, when compared with what they manifest in any speculative scheme, or in the political movements or wire pulling of the day; by their want of zeal in their own cause and their evident general disinclination to go into it with their heart and their strength; and their unwillingness to seek scientific knowledge from the matured reasoning and practice of minds leading in the direction they ought to pursue. It has suggested itself to the minds of your committee to delineate, each one for himself, from his own personal observation in those farming communities where he is best acquainted with the actual condition of things, the picture presented by imagining the mechanics and manufacturers, the merchants, physicians, lawyers and clergy of Maine giving to their respective callings just the attention,—and no more,—that the farmers of Maine give to their calling: the merchant confining himself to the limited custom of his own town, and thinking only of turning the odd half and quarter cent to his way of the trade; the manufacturer constantly neglecting to allow his, or another's invention to aid him to new machinery; the minister of the Gospel refusing to study any works of others because he might thus be accused of obtaining his ideas from books; the mechanic working on by hand as his father worked and scorning steam as a motive power; the

lawyer practicing only upon decisions of his own court and contenting himself with, what is now called, the dirty work of his profession; the physician unheeding all ancient and modern discoveries of his science and practicing upon the prescriptions of his sire. And this picture resolved itself into a series of dissolving views representing listless men at slovenly work upon badly proportioned, ill designed structures of all sorts and kinds; useless fabrics in unsaleable heaps with a confused medley of charlatans, quacks, pettifoggers and pulpit politicians. And then from these depressing views, the minds of your committee, acting and reacting upon each others thoughts, came back to the real life of today and observed and reflected upon the position in society which these lawyers, doctors, ministers, merchants, manufacturers and mechanics really do hold, and it seemed to be very clear that their success was owing to their constant and undivided attention to their business; to their true faith in it, and towards it; to their instantly seizing upon every means and appliance to onward progress; to their determination to fathom and put in requisition every resource within their reach. And reflecting still that the very existence of these lofty lords of society depends entirely upon these lowly tillers of the earth, with all the want of earnest undivided attention which the farmers of today yield to their avocation—the grandest art and profession of all, because the most important of all. Your committee feel impelled to urge upon those who, by farming, now accomplish so much and labor so little, to apply all their mental and physical energies to conducting the business of their farms; they should not only have a theoretical but a practical knowledge of the best modes of raising and feeding live stock, making and applying manure, draining and tilling the ground, and of the plants best adapted to the different kinds of soil, and they should give close, earnest, *zealous* personal attention to their business; and acquiring faith in their own peculiar occupation show faith in works, and so make their own success and consequent promotion sure.

JOHN F. ANDERSON, }
 E. L. HAMMOND, } *Committee.*
 E. B. STACKPOLE, }

This report elicited a somewhat animated discussion. The secretary remarked, that for some years past he had seen and conversed

with many farmers in all parts of the state, and unless those he met were more active, intelligent and progressive than the average, he deemed the picture too darkly drawn.

Mr. Hammatt could not agree with the report; he had known as lazy lawyers and men of other professions. He repudiated the idea that farmers could not have any of the luxuries of life without ruining themselves. Live, active, intelligent farmers in Maine, can secure for themselves and families the comforts and luxuries of life, as easily as any other class of men. What are their fine horses and carriages but luxuries, which few other professions can enjoy? Can the great body of mechanics do any such thing?

Lumbermen have to work night and day to get a living. Farmers can get a living with as little wear and tear as the merchant or any other class.

There is a growing interest in farming, and in all that pertains to agriculture. Our farmers are anxious to come in competition with others, and secure success above their fellows, and new attention is secured to this business all over the state, and I cannot think it is wise to report that farmers are inattentive or uninterested in their business; I hope the committee will modify their report.

Mr. Davis said that in the portions of the state with which he was acquainted, there was altogether a better feeling, and a higher estimate of farming and of the value of farms than formerly.

He could hardly assent to the report.

Dr. True thought the chairman had not taken exactly the right view of this matter. He might have said, with perfect truth, that the majority of farmers do not work over two hundred days in a year, and yet they live as well as any other class. Merchants have to work early and late to get a living, while farmers are at a show and spending, instead of earning money.

Mr. Flint thought if farmers sought only the substantial good of life, they could secure it with only so much labor as was necessary to health. There is no need of delving with that intensity which was needed in other employments. But when farmers undertook to go into the fancies, and luxuries, and follies of artificial life, they always found them a load they could not carry.

Mr. Hammatt could not agree with the gentleman from Somerset,

that farmers must deny themselves all the luxuries of life. That gentleman does not do this. He eats as good food, drinks as good *water*, rides as good a horse, drives as good a carriage as he pleases. Other farmers can do this if they choose, as well as he, and not over-work themselves either, by laboring no more than is compatible with health. I do not believe that it is necessary for farmers to deny themselves all luxuries to secure success. It rather requires zeal and energy and thought and persistency, to ensure the highest success.

Mr. Cushman thought the term lazy could hardly be applied to farmers, merely because they did not work as many hours or as many days as men engaged in other professions and employments. There is no necessity for their doing this. They could carry on their business successfully without it.

Mr. Anderson defended his position. He thought no good could come of trying to cover up and smooth over the thing. The only way to remedy the evil and make progress, is to probe the sore to the bottom and ascertain its real nature, then a successful remedy could be applied. It is useless to deny that there is a want of faith in their profession on the part of farmers. We may as well tell the whole truth, for it cannot be concealed that farmers do not enter into their business with that zeal and real energy we see in other professions. They do not toil with the persistency that marks the successful merchant and artizan, nor do they invest capital when they have it, with that freeness and confidence which is shown in other sorts of business. When farmers come to have faith in their business, work every day in it as do men engaged in other occupations, apply capital in its prosecution, study the best method of using labor, capital and manure, and pursue it with the same energy and zeal, the march of improvement will go forward with a speed not yet attained.

One other thing is also needful; they should have more self respect—as it is, they think too little of themselves. They often act as if they were inferior to others. If men as individuals or classes would be respected, they must first respect themselves.

Mr. Hammond approved of the report. He understood it to say that farmers must confine their attention to their farming; not divide

it with other employments, but give to it both their undivided energies and their capital, and that until this was done, the highest success could not be secured. In this view he most fully coincided.

Mr. Porter agreed with the report. It is true that many of our farmers are not so industrious, energetic and persevering as they ought to be, and both themselves and their farms bear the mark of their shiftlessness, as plainly as Cain bore his mark. It is useless to think that farmers can succeed in their business, any more than others, without intelligence, energy and enterprise. What is most wanted among our farmers to bring them up to the mark, and wipe out the mark of inferiority, is faith, force, energy and activity.

After some further remarks the report was adopted.

Mr. Wasson, for committee on fourth Topic, made a report in which the great necessity of a geological survey of the state was fully admitted and its importance forcibly set forth, but concluded with the recommendation that the Board do not urge it at this time, believing that in the present low condition of the finances of the state, the attempt would be futile and perhaps prejudice future action. The report was accepted and laid on the table.

The next day Mr. Anderson moved a reconsideration of the vote whereby it was accepted, and that it be recommitted with instructions. He said it was made the explicit duty of this Board, by the act establishing the same, *to investigate* all subjects pertaining to agriculture, and *to make such recommendations* and suggestions as its interests required.

Mr. Flint was in favor of the survey, but was afraid that those who do not see the necessity of it might be prejudiced against the Board, and therefore thought it not best to urge it at present.

Mr. Wasson prized a geological and agricultural survey as much as any one could. He admitted that the demand came from every part of the state. But any effort to obtain it now, is futile. Ever since 1824, attempts had been made, and yet little had been done. Such is the low condition of the finances of the state, that although we ought to have the survey, we know in all probability what the answer will be, and therefore we ought not to ask it.

Mr. Hammatt took a different view. It is our duty to recommend to the legislature what we fully believe will conduce to the highest agricultural welfare in the state. It is the province of the legisla-

ture in deciding upon the expediency of adopting what we recommend, to consider the condition of the treasury.

Dr. True remarked, that the topic under consideration involves principles that are difficult to discuss so as to convince the unconvinced. It is difficult to point out specifically the benefits that would arise from a geological survey of the state. Public sentiment has, for many years, felt that it should be done; but various causes have served to prevent its completion.

Massachusetts, New York, and other states have adopted the policy of developing their natural resources, and are now reaping an abundant harvest. New York alone has expended well nigh half a million of dollars to complete the survey of her territory; in this respect, perhaps, she as a state, stands foremost in the world.

There are many unsettled questions which geologists have referred to a complete survey of Maine for a solution. Every river from the St. Croix to the Piscataqua needs to have its history recorded. Its soils, its muck beds, its marine manures, its rocks, its minerals, its fossils, its mines, its quarries of slate and lime and marble, its forest lands, all need the scrutinizing eye of the mineralogist, the chemist, and the geologist. The quarries of marble and slate which are so valuable to Vermont, on recent investigation are found to extend over into northern Maine. Not a foot of soil on our territory is unworthy the investigation of the man of science.

Then there is a negative influence which is of no little value. The excitable and visionary man is deterred from carrying out schemes which he has laid, in violation of the well known laws of nature. Men will not be left to hunt for gold where there is none. Some secret nook in yonder mountain will no longer be reported as the place where a mass of gold or silver was found but never made known. Pyrites will not be mistaken for the precious metal, nor tourmaline for coal. Men will not then dig into solid granite for coal, because the geologist tells them better.

I have no doubt the labors of the Board of Agriculture, and especially the survey of our secretary in Aroostook in 1857, saved to the state last year a million of dollars worth of men and capital. It might cost five thousand dollars to continue the geological survey of the state, but I believe that for every one thousand dollars expended in this way, there will be a saving of one million of dollars,

in men and capital. Nor is this a mere matter of belief. It can be demonstrated by the safest rules of sound political economy which time will not allow here to present.

I am aware, that retrenchment is the order of the day, and I would go for that as heartily as any other man, but as one would arrest the falling of his whole house by setting beneath it a single prop, so may we, by a little attention to the wants of our body politic, place it on a firmer and broader basis than ever before. It is for the interest of the whole state that it should be done. He had no doubt that an appropriation could be obtained,—men's views have changed on this subject, and those who a few years ago opposed it, now advocate it.

The secretary here stated that in 1855, a resolve passed the legislature authorizing a continuation of the survey, but it failed because of a requirement incorporated into the resolve, that at least two specimens of soil in each town should be analysed; a requirement at once useless and fatal. The cost of so many analyses would be greater than the appropriation, and had this not been required analyses would, as a matter of course, have been made in all cases where they appeared necessary.

Mr. Bailey dissented from the conclusions of the report. He thought we ought to urge this measure, and *now*. The declarations of the report as to the necessity of the survey demanded that it should be forthwith done. Nothing else is of so much consequence to agriculture. The state now does not produce one-tenth of what might be raised. Suppose it costs ten thousand dollars to make the survey, what is that, if by expending it we can produce a hundred times as much? It is wasteful to delay it longer. It would be the most profitable investment that could be made, and this Board owes it to the interest it represents, to ask of the legislature an appropriation to make the survey.

After some further discussion the report was recommitted, and subsequently reported and adopted, as follows:

The committee to whom was recommitted with instructions, the following topic:—Is it advisable to recommend a completion of the geological and agricultural survey, report:

That in this "age of progress," few can doubt that the actual state of the country with its available resources, the origin and

composition of soils, can only be developed by geological research, and that a geological and agricultural survey would be one of the best investments ever made.

The importance of such a survey will suggest itself on a moment's consideration, its object being to ascertain the mineral wealth of the country, the fertility and capabilities of its soil, and consequently its value as a public or private possession, and it is only by invoking the "hand of science" that such information can be obtained. It is a well settled principle in theory, and better established in practice, that agriculture, which draws largely on the science of geology—lies at the foundation of all national wealth and strength, and any state or people that will encourage this necessary and advantageous pursuit, is on the highway to prosperity. In view of these facts and believing that the interests of agriculture in common with all the industrial interests of the state, demand a thorough geological exploration and agricultural survey, we would recommend a completion of the same.

S. WASSON,	}	<i>Committee.</i>
S. DILL,		
A. CUSHMAN,		

The committee on the fifth Topic, asked leave to report after the close of the session to the secretary, which was granted.

Mr. Hammatt, for committee on sixth Topic, submitted the following report:

It would seem by the wording of the question propounded, that to the turnip crop is awarded in the mind of the questioner the great benefits which have been derived by the agricultural interest in England from their system of rotation of crops.

The systems of rotation of crops in England being such as to yield largely of grain and very little hay, compared with the practice in New England, necessarily involve the adoption, for general cultivation, of some crop which shall answer the purpose of winter food for stock; and as the farmers and stock growers feed hay to their animals to a very limited extent, they have adopted the turnip as the cheapest and best substitute for it, and, it is presumed that under the circumstances, considering that they make up, with a very small amount of hay or straw, the whole diet of these animals,—it is the best variety of the root crop they can use. But in this

state, where grass is our principal and cheapest forage crop, it seems to us, that we should rather endeavor to produce and preserve for winter use a sufficiency of roots to furnish a desirable change and variety of food for our animals during the winter months, and to enable us to use advantageously much rough fodder in place of good hay, which could thus be greatly economised.

Inasmuch as the turnip crop in England is relied upon as the principal food for sheep during the winter, taking the place, almost entirely, of the various kinds of fodder and grain which in this state we are obliged to supply to our stock, our answer might very properly begin and end with the simple but emphatic word, none! But presuming that the Board did not expect or desire quite so short a reply, we will venture to express very briefly, our opinion, based upon our own experience and observation, that the turnip, however extensively cultivated in this state, would not "yield similar advantages" to the agricultural interests that it has in England. Neither would the cultivation of any one of the different varieties of vegetables, however extensively it might be adopted by the farmers of Maine. No root crop can in our climate be made to constitute, advantageously, so large a proportion of the winter food of sheep and neat stock, as does the turnip in England.

We can, perhaps, produce nearly as heavy crops and of quite as good quality as are produced there, it is, however, almost impossible to secure from frost the requisite quantity to support a large stock of sheep and cattle through our six months of winter, but notwithstanding the presumed impossibility of gaining the whole point, may we not by adopting more extensively the cultivation of turnips, beets and carrots, approximate very nearly to it?

The turnip, in our climate, may generally be raised in large quantities, at less cost than any other root crop, but it is more liable to injury from insects, and is of less value as food for stock than either the mangold-wurzel or carrot.

The mangold-wurzel we esteem the most valuable of the roots referred to, on account of its certainty, with proper cultivation, to yield a large crop, and of its nutritive properties, equal to either the others. It keeps well, and is not, so far as our observation extends, liable to the attacks of insects or vermin in its early growth.

Carrots, too, may be produced, sometimes, in great quantities and at low cost, but our experience in their cultivation and consumption, has led to the conviction, that the mangold-wurzel is better adapted to our climate, and to the present manner of prosecuting our agricultural operations.

Upon the whole we cannot refrain from expressing the opinion, that the interests of the farmers of Maine would be very much promoted by a more extensive cultivation of root crops, as winter food for stock. A liberal supply of turnips, beets or carrots, during the winter, is sure to bring our stock out in the spring in good health and flesh, so that when they are turned to pasture, they are in a condition to receive that benefit from the young grass which it is intended by nature to yield, instead of wasting the earliest and best part of the pasturing season in recruiting their health and strength, which have been wasted and prostrated during winter in the vain endeavor to "hold their own" upon poor hay and straw.

WILLIAM C. HAMMATT, }
 ALBERT NOYES, } *Committee.*
 JOHN F. ANDERSON, }

Mr. True remarked, that we had a wide diversity of soils in Maine, and one kind would prove better in one locality and another in a different soil. In Aroostook and York counties, differences of soil and climate are very great. The clays of Cumberland county hardly exist in Oxford. Consequently widely different methods of cultivation must prevail.

It must also be borne in mind, that we have had three unusually wet summers in succession. We may soon have a series of dry summers which will dampen the arder of strong advocates of root culture. He had found the Norfolk white and purple strap leaf turnips among the best varieties.

His father once had a piece of land where the soil had been washed in to the depth of some four feet. This land he planted to parsnips. When he took off the crop he weighed it, and found its produce was equal to forty-two tons to the acre. The parsnip requires a very deep soil, and on rich soil they are very productive.

Mr. Porter said the turnip crop was very important, not merely on account of its value for stock, but as an agent to improve the soil. He did not think there was any substitute for this root for

such a purpose. It left the soil where it grew in the best possible condition for subsequent crops.

Mr. Dill said he knew farmers who would not use turnips for their stock if they could be had for nothing. As for himself he liked them, but cattle fed with them were more likely to suffer from cold, unless in warm barns, than if fed on hay alone.

Mr. Drummond said a neighbor raised fifteen hundred bushels of turnips, gave them to the cattle and they were in no better, if so good, condition as those without roots. I feed hogs as well as neat stock on turnips raw. I feed one-half of the winter on turnips and the other half on mangold. My neighbor gave too much of them to his cattle which was the cause of difference between his and mine—his suffering loss, and mine gaining.

Mr. Tucker said his neighbors fed their hogs on turnips and they did well. I feed my horses with carrots and oats, and consider they do better than on twice the quantity of oats alone. My usual feed is six quarts of oats and the same amount of carrots, and I never found horses do better.

Mr. Palmer said he thought very highly of carrots for horses and to fatten hogs. They were better cooked than raw. Carrots and pumpkins boiled together will fatten hogs cheaper than anything else. He had raised at the rate of upwards of fifteen hundred bushels of carrots to the acre. Turnips are colder than carrots. If you fill one half of a bin with turnips and the other half with carrots, the turnips will freeze solid, while the carrots will not freeze at all. Nothing will fatten a horse so quick as boiled carrots.

Mr. Martin had raised at the rate of three hundred dollars worth of carrots to the acre. The year following sowed to carrots again, but the seed failed to germinate. Ploughed up and sowed turnips broadcast the ninth of July, and had an immense crop. But he should have preferred to have his carrots succeed, because he thought them better for animals than turnips.

He had fed carrots to horses and other animals, and was entirely satisfied with the result. He considered a bushel of carrots equal in value to half a bushel of oats. But animals fed on roots should be kept in warm stables, or the results will not be so satisfactory.

Mr. Lancaster thought very highly of roots and had been particularly successful with turnips, manuring about the same as for pota-

toes. A good crop is from five hundred to six hundred bushels to the acre, but I sometimes get from eight hundred to nine hundred bushels.

Last year I ploughed up my ground in the fall. In the spring ploughed again, spread on manure and harrowed it in. Sowed the seed between the twelfth and twentieth of June. When up, I sowed on guano mixed with plaster, broadcast, and cultivated it in, at the rate of one hundred and fifty pounds per acre. I find planting on ridges the best, especially if the land is wet. I am now feeding my sheep on straw and turnips, and they look as well as those fed on hay without turnips. With us, turnips do better than mangolds.

Mr. Flint said he was troubled with the rutabagas rotting in the field. He had the same trouble with the green globe turnip, more than half of which rotted in the field. He did not think it strange that differences of opinion should exist as to the various kinds of root crops, for we have much yet to learn, both as to their culture and comparative value with other articles of food.

Mr. Hammatt strongly urged the mangold for late feeding. He never saw an animal that would not eat them, though he had known animals to dislike them a little at first. Very large crops could be grown and without so much labor as for other roots. They look feeble at first but soon grow vigorously and yield abundantly.

Mr. Cushman had tried beets, carrots and turnips, and gave a decided preference to carrots. He was desirous of learning the comparative value of roots and hay.

The Secretary said, it was not easy to give an exact answer to this inquiry. So far as the simple amount of nutritive matter which roots contain, is concerned, it could not be rated at over a quarter or a third as much as good hay, and if used as the principal article of food we must reckon chiefly according to this, but when fed in smaller quantities as an auxilliary to hay and coarser fodder we receive benefit not only from the nutritive matter they contain but from the assistance they render in the digestion and assimilation of other articles of food. So great is this, that to the extent necessary for this purpose they are probably fully equal, pound for pound, to good hay. Carrots contained a trifle the most of nutritive matter, beets about the same, say twelve to thirteen per cent ; Swedish

turnips ten to eleven per cent. ; English turnips nine to nine and one-half per cent.

Mr. Goodale further remarked, that although he proposed this topic for consideration, he did by no means maintain that the extensive culture of the turnip would accomplish for us what it had done for England. We were differently situated. Our climate was very unlike theirs. In England many roots were left in the field for consumption where they grew, and when harvested, a comparatively slight protection would suffice to protect them from the frosts of winter—here all must be secured in root cellars; and yet he believed that the culture of roots promised well enough with us to warrant its increase a hundred fold. In the state at large they had been sadly neglected—totally neglected, (if we except the potato, by a majority of farmers,) as a *field crop*.

When we grow as many acres as we now do rods, we may approximate the right proportion. The value of roots is not comprised in a single item. Their cultivation is the best preparation of soil for other crops. They yield a very large amount of nutritive matter. By their help we can sustain more cattle and sheep, and can also give them such a variety of food as will cause them to thrive better than when confined to dry fodder, however good it be.

The stock thus fed will in turn so increase the supply of manure that we can grow heavy crops of grain and not be dependent upon other states for bread stuffs.

Perhaps no single crop will ever be to us just what the turnip is to England, but I am not sure that roots and Indian corn together may not. My estimate of Indian corn is very high. I think it well entitled to be called, as it has been, "meal, meadow and manure," and sometimes am inclined to look upon the extent and style of its culture, at least in the southern half of the state, as a fair index to the condition of agriculture among us.

As to the root to be preferred, he would not decide dogmatically, nor confine himself to one, to the exclusion of others, each farmer should decide according to his soil and other circumstances. Each root has its advantages and disadvantages. The mangold would thrive in a heavier soil than suited the carrot or turnip. The parsnip could remain in the ground all winter. The turnip was liable to the fly and the carrot to rust. The turnip was best in early

winter and became corky if kept late. The mangold was best if fed out after midwinter and if given early would cause scouring. His object in presenting the topic was simply to get at the facts of experience and invite attention to the importance of extended root culture.

The report was adopted.

Mr. Rice, from the committee on seventh Topic, presented the following report:

Ought the Board of Agriculture to be empowered by law to fix the time of holding the shows of agricultural societies?

In discussing the question under consideration, your committee perceive two objects, the attainment of which is aimed at in instituting the above inquiry.

1st. The making our county societies more effectually auxiliary to the state society by having all the exhibitions of the former precede that of the latter,—that choice specimens exhibited at the county shows might be selected for exhibition at the fair of the state society.

2d. It is desirable that an arrangement be made by which no two contiguous societies should hold their fairs at the same time, thereby exciting a negative influence on each other and to a greater or less extent neutralizing the beneficial results of both.

In considering the first of these propositions your committee feel that however desirable in itself, the accomplishment of the object is attended with paramount difficulties;

For instance, if the county societies are required to hold their fairs at a much earlier day than heretofore, farmers will not have gathered in their crops, and of course will be unprepared to exhibit. On the contrary, if the state society be required to defer its exhibition to a later period, there is reason to apprehend unfavorable weather and a bad state of roads; thereby reducing the attendance and proportionately diminishing the influence and benefits of the exhibition.

Your committee would therefore suggest that this Board, instead of asking to be vested with additional power in this matter, simply recommend to the several societies throughout the state, that they strive to promote the interest of the state fair, both by their personal attendance, and by forwarding specimens of their productions for

exhibition ; and that the trustees of the several societies be requested in fixing the time of their fairs to consult the officers of contiguous societies, and so far as practicable, so to arrange them that they shall not conflict with each other.

F. L. RICE, *Chairman.*

The report was adopted.

The committee on eighth Topic, reported as follows :

The committee charged to inquire " what proportion of the funds of agricultural societies, if any, should be expended in promoting general or permanent farm improvements?" report :

That while the plan now in common use, of awarding premiums on animals, vegetable products, implements and articles, shown at our fairs, has been productive of much good, and ought by no means to be discontinued, they yet believe that by this plan only a small portion of the great field of improvement which is open to the farmers of Maine, receives any direct or sufficient encouragement or stimulus. We believe the time has come when our societies should commence a new line of effort, aiming at greater and more important results, although, doubtless, making less display at our annual exhibitions.

It is far easier to bestow careful treatment and liberal feeding or manuring upon an animal or a crop, so as to secure the highest prizes awarded for such, than it is to bring up to a similar standard of excellence all the stock and all the crops of the farm ; easier far, than to arrange the whole farm, its buildings, fences, and all else which pertains to it, in the best possible order, and to put the whole in the best condition. And your committee feel confident that the latter *should be the aim* of every farmer, rather than a single great crop, or a wonderfully fine animal.

Some feeble efforts have been attempted of this sort, by many of our societies, but experience has fully shown that the small premiums offered of five, ten, or fifteen dollars " for the best managed farm," have failed of accomplishing much good.

But where large prospective prizes have been offered for the greatest improvement to be made during a series of years, the happiest results have followed. As an instance in point, we refer to what has recently taken place in Cumberland county, from the offer two or three years of one prize of one hundred dollars, and a second

of fifty dollars, for the greatest improvements to be made in two years.

What have been the results? The highly intelligent committee who went, each year, over the whole ground, in their report, speak not only of the *earnest, ardent efforts* of some fifteen or twenty competitors, for the greatest improvement in their power, but of "the deep interest manifested by those *whose farms were not entered*, to see, and discuss the economy of the improvements made, and in many instances to commence the work of reform upon their own premises; giving evidence that this class of premiums is about to accomplish an amount of good to the agriculture of the county, not easily to be estimated. It is truly gratifying to observe the spirit of inquiry everywhere manifested, as to the best methods of conducting farm operations. The old ruts in which the fathers teamed so sturdily and persistently, are being carefully examined: and, though perhaps they were well adapted to the circumstances of those who marked them out. they are now often found too deep and heavy, too hilly and circuitous for these latter times. Improvement is now the order of the day; improved stock, improved buildings, improved implements, improved orchards, gardens, mowing, pastures, *improved everything*. Men of intelligence, energy and perseverance, and with abundant capital, are enlisting in it, and, if we mistake not the signs of the times, farming in Cumberland county is soon to assume a rank, as an occupation, second to no other, either in point of the skill with which it is conducted, or the profits which it will be made to return."

What has come to pass in Cumberland, may be safely calculated upon wherever a similar movement is started in other counties, and the actual benefit accruing to the agricultural community, will, in the opinion of your committee, be many fold greater and more lasting, than by expending the same sum in prizes upon extra fine productions, brought to the fair; leaving behind upon the farm, possibly, many things which the owner would be less anxious to have properly appreciated by a discriminating committee.

But we are met by the objection that many of our agricultural societies are not able to devote the requisite amount for this purpose, without great inconvenience or sacrifice; perhaps, would be obliged to suspend their ordinary operations for a year, in order to do it.

Without expressing an opinion whether this would be advisable or not, we beg to make a suggestion, viz: let ten, twenty, or thirty per cent. of the required sum (according to circumstances,) be laid aside from the usual expenditure, for this special purpose, and be put at interest; meantime, agitate the subject, awaken an interest in it, and at the proper time announce the prizes and allow not less than three years, perhaps four or five, in which to accomplish the improvements.

Another objection may be made,—that it will cost something for a committee to visit all the competitors, and examine carefully their operations,—to note down year by year the changes taking place on each farm, and to compare results.

We answer, very true,—but is it not worth something to visit all the go-ahead farmers, and to have the opportunity of examining, and criticising, and comparing, and profiting by what can be seen and learned in such a trip? Farmers suffer much by isolation, by the lack of opportunity of visiting and examining each other's sphere of operations. They meet at church, and occasionally at market. What they need is to meet oftener *in their factories, and beside their machinery while it is running*. Now, we say that placing a man on such a committee, is putting him into a better agricultural school than can be found elsewhere in all New England, and if he deduct fair tuition fees from the needful expense, there will not be a frightful sum remaining to be provided for otherwise.

Respectfully submitted.

SEWARD DILL,	} Committee.
S. L. GOODALE,	
HIRAM STEVENS,	

The committees on ninth and eleventh Topics, asked leave to report after the session, which was granted.

Mr. Hammond, for committee on tenth Topic, read a report, which was, after discussion, recommitted with leave to report at the next session,

Mr. Noyes, from the committee on Topic No. 12, made a report, as follows:

Can the cultivation of the smaller fruits be made profitable? If so, what varieties are best, and what are the best methods of cultivation?

Your committee to whom was assigned the above topic, would ask leave to report.

We are of opinion, that the cultivation of the smaller fruits is altogether too much neglected. Whether this neglect arises from the false impression that there are no dollars and cents to be seen, or from a want of reliable information as to the best kinds and method of cultivation, your committee are not prepared to say; but certain it is, when this important branch of horticulture has been attempted on a somewhat extensive scale, it has invariably been attended with profit, not only to the pocket directly, but in the perceptible health of the household. Take for instance the currant, the smallest of the small fruits, and see to what a variety of useful purposes it can be made subservient, and the ease and facility with which it can be grown, adapting itself to all soils, and never disappointing in a crop. The same may be said of the cooling and refreshing raspberry—several varieties of which are of magnificent size and exquisite flavor, which have more recently been introduced, and which command good prices in our markets, and which can be grown in large quantities on a small piece of ground.

Your committee regret not having any data at hand, by which to give a more full and reliable account of the profits arising from, and the best methods of cultivating the smaller fruits in general. And they would suggest the propriety of assigning this important subject to a committee of one or more, whose duty it should be to gather facts and prepare a statement for publication in the secretary's next annual report.

Respectfully submitted.

ALBERT NOYES.

The report was accepted, and in accordance with the suggestion at its close, Mr. Noyes was charged with the preparation of the statement for publication.

Mr. Stevens, for the committee on thirteenth Topic, read a report, which, after some discussion and slight verbal amendments, was adopted, as follows:

By what means can the settlement of the new and fertile lands of Maine best be secured?

This is an important question—important alike to every citizen of the state, and involves in its answer the future greatness and pros-

perity of the commonwealth, because it involves the unfolding and development of its immense internal resources now lying dormant and unknown. The settlement of the new and fertile lands of Maine therefore interests alike the farmer, the artisan, the merchant and the professional men of the state—and directly and indirectly affects their prosperity as individuals, as well as a body politic.

Among the means to be adopted to secure this great end, we answer,—first, better facilities of communication with the older parts of the state,—thus enabling us to retain all its trade and its business within our own borders—and affording our citizens a quick and economical mode of reaching those lands, there to hew out for themselves farms in the wilderness.

Secondly, by keeping before the people the capabilities and resources of this region, which has until quite recently been an unknown world to most of our people. There are various ways of doing this.

By the partial geological and agricultural survey of the state much knowledge was disseminated. And if this survey could be completed, and a knowledge of the agricultural capabilities of our wild lands be placed before the public eye, it would be a prominent means to bring about the object under consideration.

The land agent's circular has been instrumental in directing the attention of the people to these lands, and more especially the existence of a Board of Agriculture, in connection with the energetic and well-timed labors of its secretary, who, in the summer of 1857, traveled through Aroostook county for the purpose of learning something of its agricultural capabilities and resources. This information has been disseminated throughout the state by means of his annual report at once, and has been effectual in calling the attention of the great mass of the people to the fertile land of northern Maine. For the past year, much knowledge of Aroostook county has been disseminated through the columns of the Aroostook Pioneer, a weekly paper printed in the very heart of the public lands. This press ought to be liberally supported by the people of the state, whose best interests it has done and is still doing, so much to advance.

HIRAM STEVENS,
ALFRED CUSHMAN,
SEWARD DILL, } *Committee.*

Mr. Tucker, for committee on fourteenth Topic, reported as follows;

“What breeds and classes of horses are most deserving attention and encouragement in Maine, and what is the best mode of rearing and training them?”

Your committee do not expect in this brief report to meet the views of the members of this board or of others that are engaged in raising horses; all have their favorite breeds. Neither does your committee expect to be able to give you a particular description or history of all the valuable breeds of horses that there are even in New England. There is perhaps no animal on which there is more difference of opinion than on the horse. The Morgan horse has been reared with success and is a hardy animal; his constitution is adapted to our climate. The Morgan combines all that seems necessary to make a good horse, being of medium size and powerful action, good feeders, possessing docility of disposition and mature at an early age. Your committee would here meet an objection often made against the Morgans, that they lack in size. There would be no difficulty in increasing the size of the Morgans, but when we have increased their size shall we have the Morgan horse? What we have gained in size we have lost in symmetry, compactness, ease of motion and vigor. The question of size is of great importance in breeding, and one in regard to which breeders are very liable to mistake. Committees and agricultural societies often encourage erroneous opinions on the subject; a large colt is likely to get a premium, all are not critical judges, and under a load of fat, but few are capable of pointing out the defects in the animal. Every departure from the medium size of a race of animals is attended with a loss of power and action, and a departure from the medium size should not be permitted except for a special purpose.

The Messenger horses have been reared quite extensively and with great profit to many farmers in Maine, who have had the pleasure of filling their pockets with the hard cash—the proceeds of the sale of a fine Messenger. The Messengers do not mature as young as the Morgans, being of much larger size, but when matured, they are capable of great endurance, and are usually of good disposition. A great number of the Morgans and Messengers have proved to be fast trotters.

There are many other breeds of horses that are entitled to honorable mention. The Black Hawks are not second to any breed. They make fine carriage and saddle horses, and for style and action are unsurpassed. Are very fine limbed and active, being a branch of the family of Morgan horses they partake largely of the vigor of the Morgans. The Hamiltonians and Eaton horses have gained celebrity, and are the favorites of many, being of the Messenger family; that is enough to recommend them. The Indian Chiefs, Drews, and Fox horses, all have their admirers, and some of them have created quite a sensation among the horse fanciers.

Your committee hardly feel competent to decide which or what breeds of horses should be most encouraged in Maine. Without doubt, more profit has been realized from the Morgans and Messengers than from any other breeds. One very important point in raising horses is to propagate from the most pure blood to be found, of whatever breed you may wish to raise.

The classes of horses to be considered are: 1st. The stock horse. 2d. The brood mare. 3d. The family carriage horse. 4th. The roadster. 5th. The trotter. 6th. The farm or draught horse. 7th. The racer. Your committee will be able only to glance at the different classes. First is the stock horse, like begets like, and a good stock horse is indispensable in propagating good stock, and without him our effort to raise good horses could not be crowned with success. Second. A brood mare is very important, and good mares should be used for breeding. It is too much the practice with farmers, if they have a mare that is of no other use, to put her to breeding; that is a great mistake, and should be corrected. To raise a good colt, the sire and dam should be of good symmetry, and the practice of using a sire much larger than the dam is not usually attended with good results, the reverse would do better; to have them nearly equal in size would be most desirable. Third. The family carriage horse is almost one of the indispensables, but very few would be willing to be deprived of the services of this noble animal. A horse of this class should be trained to the saddle, as he is hardly a family horse unless he can be used under the saddle. He should also be of docile disposition, and great care should be observed in selecting a horse for this use. Fourth. A good roadster must have speed, bottom, life and ambition, and be a good feeder,

of good disposition and well broken. All combined, will make a good roadster. Fifth. The trotter. This class has its friends and its enemies. They have more enemies in words than in acts. When a trotting match comes off all are there. Those that have denounced it are there. All classes of citizens are represented. All are interested. Sixth. The farm and draught horse. This horse should be heavy. The services of this class cannot be dispensed with. With him we carry on our farm, haul our produce to market, and as he is coming into more general use upon the farm, he too, should receive attention. Seventh, and last, is the racer. But little is known of him in Maine, and in these days of traveling by steam, and communication by telegraph, our fast young men have not found any use for this class of horses.

The six classes first mentioned appear to be deserving of attention and encouragement in Maine. The rearing of horses is important and one that interests each member of this Board and every farmer in Maine. It is a subject that is too much neglected. In raising good horses it is very important to start right, and after starting right, do right. Those that have been most successful in raising good horses have worked their mares but very little, if any. If they are used, their treatment should be kind and not overworked; neither before nor after she drops her foal until it is weaned. Colts do as well weaned on hay. It is the practice of many to put them in stables to wean them; that is objectionable, it is injurious for them to stand on a hard floor. Colts do much better to run in a yard with a warm shelter to go into at their pleasure. They should have the best of care the first winter. A plenty of good hay and water with one quart of oats per day, will be sure to improve your colt, and he will come out looking finely in the spring.

Colts should not be neglected. After their first winter they should be kept growing. You cannot expect a good horse from a poor half-starved neglected colt. Colts will do better not to be stabled until three or four years old, unless the floor is well littered. A manure yard with a good shed to go under would be better, then they would get exercise which is conducive to health.

The proper training of horses is very much neglected. Many suppose when their young horse gets so that he will go in the road and haul a carriage he is well trained, or at least sufficiently so that

he will come to it in time. The reason that there are so many unpleasant driving horses is from the fact that they were not well trained to commence with. A young horse should be made acquainted with the bit and check rein, as it is customary with most persons to drive their horses on a check rein. The age most proper to commence to train a colt is to halter break him when you commence to wean him. Keep him acquainted with the halter ever after. The time to commence driving depends much upon the breed your horse is, and how near his maturity. Three years old is young enough to commence driving any young horse in harness, and then with but light loads. The great difficulty in training colts young is, that we are likely to use them too much. A good colt with good keeping and well trained will be very sure to make a good horse.

All of which is respectfully submitted.

J. D. TUCKER, *Chairman.*

Report accepted.

Mr. Fuller of the Kennebec society, stated that he had been instructed by the trustees of his society to request the Board to recommend that the legislature appropriate three hundred dollars annually to each of the agricultural societies in the state, and he accordingly offered a resolve to that effect, although his private opinion was adverse to its adoption.

Upon discussion by Messrs. Flint, Hammatt, Dill and others, the resolve was laid upon the table.

Mr. Anderson moved, that the following be added to the rules of order :

No member shall speak more than twice to the same question without first obtaining leave of the Board, unless he be the mover, proposer or introducer of the matter pending; in which case he shall be permitted to speak in reply, but not until every member choosing to speak, shall have spoken.

The motion was carried.

Mr. Noyes thought the Board had overlooked one department of agriculture. He alluded to the Honey Bee. He read a letter upon the subject from Mr. R. S. Torrey of Bangor, stating that the keeping of Honey Bees was a desirable and profitable department of farming, having this advantage, that it might be conducted by females in the family to whom it would prove a pleasing and profi-

table pursuit; that aged persons could attend to the bees when they could not walk over the farm to labor; that even children could assist in this department, and find agreeable occupation; that the keeping of the Honey Bee, especially in the northern counties, combined in an eminent degree both pleasure and profit, and served to mingle the useful with the sweet. The letter further stated the principle upon which was constructed the Davis' Patent Platform Bee Hive, with Torrey's Improvements, and recommended that the Board refer the whole subject to a committee for a full investigation.

Mr. Dill stated, that he had had considerable experience in the culture of bees. He had received the most profit from them kept in Colton's hive. He thought attention enough had not been paid to their cultivation.

A committee consisting of Mr. Noyes and Mr. Dill were raised to report at the next session of this Board.

Mr. Wasson called the particular attention of the Board to the paper of Hon. P. Barnes, on drainage, printed in the secretary's report. He thought it worthy of especial consideration and commendation, not only on account of its value, but of the circumstances of the case, and the source whence it originated. He therefore begged to offer the following resolution:

Resolved, That the secretary of the Board be instructed to present the thanks of the Board to Hon. Phineas Barnes for his valuable paper on drainage and flowage, published in the last report, and that the secretary be also instructed to present the draft of a law accompanying this report to the joint committee on agriculture of the present legislature, and urge the adoption of the same.

The resolution passed by a unanimous vote.

The secretary offered the following resolve, which was adopted:

Resolved, That in the opinion of this Board the adoption by the state of some thorough and efficient system by which reliable and extensive statistical information could be obtained and laid before the people, would greatly conduce to the prosperity of the commonwealth by developing our known and unknown, active and dormant resources, our facilities for all industrial pursuits, and by increasing our population, products, wealth and power.

The secretary was instructed to present the same to the appropriate committee of the legislature, and to urge favorable action thereon.

Specimens of seed corn were presented by Messrs. Dill and Flint, potatoes by Mr. Lancaster, and seeds of the Hubbard squash by the secretary, all of which were distributed among the members for trial.

Distribution of so many agricultural documents as were bound was made by a committee appointed for the purpose, and on motion of Mr. Hammatt, it was voted, that the further distribution of reports or other documents which are or may be within the control of the Board, be left to the discretion of the secretary.

It was also voted, that Messrs. Martin, Anderson and Goodale, be a committee to confer with the several agricultural societies in the state, and if practicable to arrange and announce the time for the several exhibitions of said societies; in accordance with the recommendation of this Board.

The following was also adopted :

Resolved, That the secretary of the Board with the advice of the president, be authorized to act in behalf of the Board, in any matters demanding action in the recess.

On motion of Mr. Dill, it was

Resolved, That each member select (before adjournment) one topic upon which to report to the secretary, on or before thirtieth of September next; and subsequently, another topic for discussion at the next session of the Board, upon which he will then present his views, either verbally or by written report, as he may prefer.

The topics selected to be investigated and reported upon as above, are as follows :

The soiling system : Calvin Chamberlain.

Clearing of new lands : Alfred Cushman.

Renovation of exhausted lands : E. L. Hammond.

Shelter cheaper than fodder : William R. Flint.

Marine manures : B. C. Bailey, Samuel Wasson.

Feeding of farm stock : Robert Martin, W. E. Drummond

Best breed of cattle for general use : Ashur Davis.

Horses : J. D. Tucker.

Loss arising from a surplus of horses : Seward Dill.

Profits of growing pork : William M. Palmer.

Potatoes and their culture : E. B. Stackpole.

Planting of orchards : Joseph Avery.

Culture of the smaller fruits: Albert Noyes.

How to make farming profitable: Hugh Porter.

Application of manures: Francis Fuller.

Facilities of northern Maine for stock growing: Hiram Stevens.

Culture of Indian Corn: Hiram Russ.

Renovation of old orchards: N. T. True.

Climate and soil of Maine in connection with Agriculture: Wm. C. Hammatt.

Sheep: J. F. Anderson.

Poultry: F. L. Rice.

After the passage of complimentary votes to the president and secretary, and to the reporters for the public press, the Board adjourned without day.



TEFANIA.

1084.—Winner of the first prize in the two-year-old class of Devons, at the New York State Agricultural Show, at Elmira, 1855, and at the United States Agricultural Show, at Boston, 1855; and first at the show of the American Institute at New York, 1859, and second at the United States Agricultural Show, at Philadelphia, 1856. Imported and owned by Edward G. Faile, West Farms, Westchester Co., New York, and bred by George Turner, of Barton, near Exeter, England.

In order to the successful prosecution of any undertaking, and not less so in regard to agriculture than in other departments of business, it is needful that we have both a clear idea of the end to be attained and of the means best adapted to accomplish that end.

The ultimate end aimed at in agricultural operations is the production of *human* food, and this to the greatest amount practicable from a given area of land; but when we inquire as to the means by which the desired end may best be accomplished, we enter upon a subject, which in regard to its general outlines as well as in regard to details, has not received the degree of attention which its importance demands; and one upon which many farmers have no such clear views or well grounded opinions as are needful in order to direct their operations to a successful issue. If our soils were inexhaustible and all we get from them, year after year was so much clear gain, the answer could be given very briefly and easily—but so far is this from being the fact, that if we should attempt simply to sow grain and grow bread, we should soon find our lands barren and ourselves hungry and starving.

Experience has abundantly demonstrated that to grow *full* crops year after year, the land must be supplied with as much as it is deprived of in the crops taken off. If the whole of these were obtained from the soil, the whole would have to be returned to it, to make good the deprivation, but happily such is not the case. Only a part is thus obtained, and so, if we return such a part, we can live on as well as before, and if we return more to the soil than came from it, we can grow richer by adding to its original fertility.

Such is the lesson taught by the experience of all who ever tilled the soil, and yet until the pinch of necessity is actually felt, few have profited by it as they should. Instances are not wanting in the present generation where farmers in Maine have taken oats after oats from unmanured land to be sold for consumption in a logging swamp, until the crops were scarcely worth harvesting, and both the owner and his land sadly impoverished thereby.

If we look back to the first settlements of the country we find

the early colonists giving their attention chiefly to the growth of grain, their cattle being allowed to shift for themselves and left to subsist as they best could on the natural grasses, herbage and browse within their reach.

In subsequent years the sons of these same colonists in their progress westward have pursued much the same mode. After a period, varying with the natural fertility of the soil, but equally sure to come, whether at Plymouth or Jamestown, in the Genessee valley, in Ohio, or on the prairies farther west, the yield of grain is found seriously to diminish, insomuch that the inquiry is forced upon them, how shall we live? The same inquiry was long ago forced upon the attention of others. The problem has been satisfactorily solved and we may profit by their experience, if we will.

We are accustomed and with good reason too, to regard the agriculture of England as immensely in advance of ours, their average crops of grain being larger than our best ones grown upon virgin soils (except in rare instances) and some of their land so rich as to require two grain crops in succession to reduce it to a condition fit for the next crop in their rotation. But such was not always their condition. Less than three centuries since, Sir Hugh Platt, an agricultural writer of the sixteenth century, thus states his motive for undertaking to give instruction in husbandry. "What eie doth not pittie to see the great weeknes and decay of our ancient and common mother the earth, which now is grown so aged and stricken in years, and so wounded at the hart with the ploughmans goad, that she beginneth to faint under the husbandmans hand and groaneth for the decay of her natural balsam. For whose good health and recovery and for the better comfort of sundry simple and needy farmers of this land I have partly undertaken these strange labours, altogether abhorring from my profession, that they might both know and practise some further secrets in their husbandry for the better manuring of their leane and barren groundes with some new sorts of marle not yet knowne or not sufficiently regarded by the best experienced men of our daies." Seeing that he recommends hair, fish, malt dust, salt, ashes, the offal of slaughter-houses, &c. as among the useful fertilizers "not yet brought into any public use," it can hardly be wondered at that the land began "to faint under the husbandmans hand."

The first step to be taken in such case doubtless is to practice the utmost economy in regard to all fertilizing materials at command, but this, of itself alone, is insufficient; and another step is equally needful,—namely, to manufacture a greater amount of manure, and this we can do by reason of our facilities for growing abundant crops of grass. We can produce food for animals in larger quantities and with greater ease than we can grow human food, and this, *if consumed upon the farm* by cattle and sheep will yield beef and mutton, butter, cheese and wool—and more—for by its consumption we make *both meat and manure*, and we can sell the one and retain the other, so that, if the plan be judiciously carried out, each succeeding year will find both the amount which may be sold from the farm, and the ability of the farm to produce, steadily increasing.

We are so accustomed to a mixed husbandry and to the use of as much manure as can be had from the present small amount of stock kept, that this strain of remark may appear to many the utterance of self evident propositions and so entirely superfluous and unnecessary, but notwithstanding the fact, that scarcely a farm can be found in New England where more or less stock is not kept, the manure from which is almost the only reliance by which to enrich the land, there is reason to believe that very few comparatively among our farmers are conscious to the full extent and in all its force, of the connection which exists between the production of animal food and that of human food; nor is it easy, without extensive and minute statistical information, to present the same in its full force.

Unfortunately the value of such information has never been appreciated among our people, and consequently we have little in the way of statistics in this country to which to look, but in respect of other countries we are better supplied, and an examination of facts will abundantly show that such is the intimate and necessary connection between a stock husbandry and continuous and increasing fertility of soil, that it is safe to regard the degree of attention given to the culture of food for animals, as a certain index to the progress of agriculture, and this not in our own country only but in all northern countries of moderate natural fertility, (these being the only countries where agriculture has ever made any progress worth speaking of.)

The relative proportion of meadow and pasture land compared with the whole amount cultivated, appears to be in various countries as follows: in France one-fifth, in Germany one-fourth, in Great Britain three-fifths, in Holland five-sixths.

France, possessing a soil and climate naturally more favorable to success in agriculture than that of the British Isles, has one-fifth only devoted to meadow and pasture, while more than two-fifths are in cereal crops, but in Great Britain with three-fifths in meadow and pasture, only one-fifth is cropped with grain. Let us now look at the results of such widely differing systems of husbandry. In France upon one hundred and five millions of acres of cultivated land the annual production of meat amounts to eight hundred and eighty millions of pounds, or about eight and one-third pounds per acre, while in Great Britain, upon fifty millions of acres, the production is eleven hundred millions of pounds, or twenty-two pounds per acre. The grain crops of these countries also presents a contrast equally striking. In France the average production of grain, including wheat, rye, buckwheat and maize is only a fraction over twelve bushels per acre, while in Great Britain the average production of *wheat* (alone) amounts to twenty-eight bushels per acre. In the British islands the production of food for cattle is considerably greater than in the whole of France with twice the extent of surface, and the quantity of manure is proportionably three or four times greater, the yield of grain more than twice as great per acre, in quantity, and three times as much in money value.

In Holland, where nearly the whole surface is devoted to hay and pasture, land bears a higher value and commands a higher rent than in any other country.

The significance of such facts cannot be mistaken. They show plainly that an indirect course is not only the surest, but the only safe one, towards accomplishing the end of agriculture.

The prevalent husbandry of Maine is a mixed one and it will be long, if the time ever comes, when it will be otherwise, but whether sooner or later, it is of great importance for farmers to investigate and ascertain, the relative adaptation of stock and arable husbandry to the circumstances and surroundings amid which they are placed, so that they may bestow their labor where it will yield the best returns and at the same time increase the fertility of the soil.

My own conviction is, that the hopes of Maine in an agricultural point of view, centre in her meadows and pastures. When she becomes a great producing state, it will be chiefly for meat, wool and dairy products. For the production of these she is eminently fitted by nature, and by a judicious pursuit of stock husbandry will her arable culture be best promoted.

Assuming that the views here presented, and which also constitute a prominent part of the burden of previous reports, are admitted as correct, the inquiry next in order would seem to be, How may the greatest amount and value of *forage* be produced at least cost? and next to this, What animals or what breeds will give the most valuable returns in proportion to the food consumed?

The importance of cultivating roots, both as an ameliorating crop and as furnishing a large amount of cattle food, has been urged in former reports; but when all the attention is paid to these which they deserve, (and it is believed that as many acres might be profitably cultivated as there are now square rods grown,) still the chief reliance for forage is, and always must be, upon grass and hay; and in response to a desire, strongly, although informally, expressed by many members of the Board of Agriculture, during the past year, I will attempt, not an elaborate treatise on the grasses of Maine, but, to submit a few observations on the hay crop and some facts regarding the grasses known to possess agricultural value; their qualities, habits, relative value, adaptation to different soils, methods of culture and of harvesting, which it is hoped may be of use in directing a larger share of attention to, as it appears to my mind, this vital element in our agricultural progress.

The grasses are a vast order of plants comprising several hundred genera and probably not less than three thousand species. It strikes one at the outset, as a somewhat remarkable fact, that of this vast number only three or four, perhaps half a dozen at the most, are under general cultivation in New England. A large proportion of these thousands are undoubtedly of little economical value, and some no better than weeds upon the farm; yet it is highly probable that there are some, perhaps many, not yet introduced to, or improved by cultivation, which are naturally, or by cultivation may be made to surpass our herdsgrass, redtop and clover. "It is not at all certain that we have the best kinds, nor that those we have are

brought to the greatest degree of perfection. Doubtless grasses might be improved by a proper course of culture as well as fruits and blooded stock. New and peculiar varieties might be produced, suited to different purposes, combining the excellencies of two or more species, and thus adding largely to the value of our pastures and meadows. This improvement would also extend to the stock fed upon the improved grasses, yielding us a better article of beef, butter, &c. Loudon, in his *Encyclopedia of Agriculture*, relates that the introduction into the island of Jamaica of a grass from Guinea, (*Panicum polygonatum*,) as food for birds, has been the cause of the increase of horned cattle in that island, until it has a better supply, both for the butcher and planter, than almost any other country. Few markets in Europe furnish beef of better quality and at a cheaper rate than is now done by the people of Jamaica."*

A very promising field of discovery is here open to the diligent, patient and interested observer, whose labors may be rewarded by acquisitions of inestimable value to the agricultural interests of the country.

Before commencing my remarks on the grasses, viewed simply as forage plants yielding a crop of hay, it has seemed to me, that as this report is intended for general circulation among farmers and farmers' sons, there may be many, especially among the latter, who would be glad to learn something of their natural history, their structure, and of the means of distinguishing them accurately one from another, who yet have no ready means of access to works on botany for this purpose; and that for such persons, a few pages devoted to this object might be highly useful in assisting them to observe, and in exciting a desire for minute and extensive knowledge which would lead to study and to the procuring of such assistance as would be required; and for this reason are the subjoined remarks added.

The first division in the vegetable kingdom, made by botanists, is into Flowering plants, called PHENOGAMIA, (a term derived from two Greek words significant of the fact,) which produce flowers, and also seeds which contain in embryo new plants of the same species; and

*Lapham on the grasses of Wisconsin.

next, Flowerless plants, called CRYPTOGAMIA, which have neither flowers nor seeds, but are propagated by means of little bodies of homogeneous structure, and not containing any embryo. Among these are the mosses, lichens, ferns, (commonly called brakes,) mushrooms, &c., &c. Phænogamia or flowering plants, are next divided into two classes, based on the fact that in one the plants grow by accretions to the outside, and in the other they grow from the inside, crowding outwards. The first of these is called EXOGENOUS, signifying *outside growers*. Cut off smoothly a twig from a rose bush or a limb from an apple tree, and you find it made up of bark, wood and pith, and that the limb has increased by additions to the outside. Plants of this class have seeds made up of two flat or rounded pieces fitting closely to each other, called seed leaves, lobes, or cotyledons, and are therefore called *di-cotyledonous*. They may also be recognized by examining the leaves, which have *netted* veins. Nearly all trees in cold and temperate latitudes belong to this class. The second class is called ENDOGENOUS, signifying *inside growers*. If we cut a corn stalk or a stem of asparagus or a palm tree, if we were where the palm grows, we find an entirely different structure from what prevails in the outside growers. The inside is not divided into bark, wood and pith, but is all alike, and does its growing from the inside, crowding outwards the expanding covering of the stalk. The seeds of this class have but one lobe or cotyledon, as we see in a grain of wheat or kernel of corn, and are therefore called *mono-cotyledonous*. Plants of this class have leaves with *parallel* veins. It includes all the grasses, properly so called. Clover, which is spoken of in common language as a grass, is not one in a botanical sense, as it belongs to the class exogens, having a seed with two lobes and netted veins.

These two *classes* are next separated into a few SUB-CLASSES, and these into many ORDERS; the orders into GENERA, of which each genus may be composed of one or of many SPECIES, and each species into more or less VARIETIES, which is the lowest grade of subdivision, unless it be into individuals.

The Grasses (Gramineæ) are an *order*; the Phleum, Agrostis, Poa, &c., are each a *genus*. Phleum pratense, (Herdsgrass,) Agrostis vulgaris, (Redtop,) Poa pratensis, (June grass,) are each a *species* of their several genera, the Phleum, Agrostis and Poa.

Plants (and animals too) will perpetuate their own *species*, but not always their own *variety*; and especially when under cultivation, which has a tendency to effect changes. The very term variety, carries the idea of variation, as that of species does the idea of specific or essential identity. Thus the seed of an apple will always produce an apple—never a pear or plum—but the seed of a Baldwin apple *will not* always produce a Baldwin apple, it being a particular form or variety produced by cultivation in a species peculiarly prone to variation. Any particular variety of fruit can be continued only by extension of the original individual, (by means of buds, scions or cuttings.) So in animals; the sheep, the horse, the ass, are each distinct *species*, and perpetuate their own species, although their progeny may vary in form, size, &c. If, as in the case of the two last named, propagation sometimes takes place between allied species, it ends with the individual produced; the mule or hybrid being incapable of propagation. So in plants, impregnation sometimes takes place between allied species, and hybrids or mules are the result, and these are usually sterile; but when different *varieties* (of the same species,) are crossed, we have what are termed *cross breeds*, and these not only propagate by seed but are often of great value.

It is by no means improbable that culture and crossing are yet to give us forage plants superior to any now known; for it should be recollected that the *cultivation* of grasses is but in its infancy as yet. It may be worthy of mention in this connection, that the plants known as artificial grasses (clover, &c.) were cultivated in Europe at an earlier date than natural or proper grasses. It is stated on good authority, that Red clover was first sown in England about the year 1645—little more than two centuries ago—white and yellow clover soon after. Rye grass appears to have been first cultivated there in 1677, but none of the other natural grasses for nearly a century, or about 1750, when it was the practice of some innovating practitioners or progressive farmers to sow along with their clovers, seeds shaken out of the best natural meadow (upland) hay.* In New England the case is different. The necessities of the colonists led them to sow natural grasses before it was practiced in England,

* Morton's Cyclopaedia of Agriculture.

probably two hundred years ago, and many years before clover was introduced.

In what follows on this branch of our subject, I have borrowed freely from the treatise of Prof. Buckman on the Natural History of British Grasses, his observations being remarkably accurate and comprehensive.

“Grasses, as they appear over the surface of the earth, naturally divide into two sections—cereal or cultivated corn grasses, and natural or wild grasses. Now the first of these do not appear to grow anywhere as wild plants, but may in all cases be deemed as derivatives obtained from wild examples by cultivation through a long series of years, and hence the varieties—not species—which will be found to abound in all of them. These variations maintain a great permanency of form, if the circumstances of cultivation be strictly maintained; but left to themselves they would either die out altogether, or revert again to some original wild type.

The natural grasses may conveniently be divided into the following groups:

1. *Jungle* or Bush Grasses.
2. *Aquatic* or Water Grasses.
3. *Marine* or Seaside Grasses.
4. *Meadow* or Pasture Grasses.
5. *Agrarian* or Fallow Grasses.

Jungle grasses are those which for the most part have a tendency to grow in a distinct and separate manner, assuming in some tropical examples where they reach their maximum, the height of 50 or 60 feet, presenting more the aspect of trees than the lowly herbs of our northern species.

In our own country, though we fall far short in size, yet many of our species have the same disposition of growing in distinct bunches, having no inclination to form a matted turf, but mix with shrubs or grow as separate plants beneath tall trees, or maintain a distinctive form even in meadows. Of these the following may be named as examples:

Aira cæspitosa—Turfy Hair Grass;

Avena pratensis—Meadow Oat Grass, (narrow leaved;)

Festuca elatior—Tall Fescue Grass.

There are others, which if cultivated by themselves, assume the same distinctive and even cushion form of growth, as

Festuca ovina—Sheep's Fescue;

Dactylis glomerata—Orchard Grass.

These grow in tufts when sown thin, if the land be poor; but it can be prevented by close pasturing, fine harrowing and rolling, which take away all mosses and decaying grasses prejudicial to the formation of a good turf. Rolling presses the whole together and makes the soil firmer, a matter of much consequence in maintaining a fine, close sward.

Aquatic or *Water Grasses* are those which grow by the margin of rivers, in brooks and ditches or around the edges of ponds. These are not generally of any agricultural value, yet as sometimes seen in open meadows they give indication of a wet or swampy soil, and that draining is needful. Among the more common of these water grasses are,

Arundo phragmites—Common Reed Grass;

Phalaris arundinacea—Reed Canary Grass;

Poa fluitans—Floating Meadow Grass;

Alopecurus geniculatus—Floating Foxtail Grass;

Zizania aquatica—Wild Rice.

Of these, the wild rice is sometimes cultivated at the South, and the floating foxtail in Europe.

Marine Grasses. Under this head come the grasses which inhabit our salt marshes, the contiguity of salt water or marine mud being requisite for their growth. Of these, the following will serve as examples:

Ammophila arundinacea—Beech Grass or mat weed;

Spartina stricta—Salt Marsh Grass;

Poa maritima—Goose Grass;

Juncus bulbosus—Black Grass.

Meadow Grasses. By far the greater number of valuable grasses may be arranged under this head. They are those which supply us chiefly with hay, as also pasturage for cattle. Occurring as these do, over the country, under widely differing circumstances of climate, elevation, soil and modes of farming, an attentive study of them should enable us, upon examination of any district, to arrive at facts regarding the nature and value of any tract of ground with almost as much certainty as though we had long resided upon the soil, and had drawn our conclusions from what is called "practical experience;" and yet, though one may be termed "scientific," and the

other "practical," they are equally the results of observation, and both constitute knowledge of a practical kind. Of these, some of the more common are,

Phleum pratense—Herdsgrass or Timothy;

Agrostis vulgaris—Redtop;

Poa pratensis—June Grass or common Spear Grass;

Dactylis glomerata—Orchard Grass or Cocksfoot;

Alopecurus pratensis—Meadow Foxtail;

Festuca pratensis—Meadow Fescue Grass.

Agrarian or *Fallow Grasses* are those which occur in land under tillage. They are all weeds and some of them great pests.

Among these are,

Agrostis stolonifera—Creeping Bent Grass;

Bromus secalinus—Chess, Cheat, Rye brome grass, Willard's Bromus;

Bromus mollis—Soft Brome Grass;

Poa trivialis—Rough Meadow Grass;

Poa annua—Annual or Spear Meadow Grass;

Triticum repens—Couch or Twitch Grass.

The latter three are sometimes sown, but appearing often where not wanted, they are very troublesome and difficult to eradicate. The last named is the most so.

In treating of the structure and anatomy of the grasses, it is well to remark at the outset, that they form an exceedingly natural group, and although they have such differences that species can be recognized by careful analysis, they yet have such agreement in common that the most casual observation is usually sufficient to determine one of the family to be a "grass," or to enable us to refer it to the *Gramineæ* as the natural order of plants to which it belongs.

There being then such similarity of parts in species of grasses, and these parts often minute, it follows that in order to understand descriptions so as to enable us to distinguish one species from another, or to *analyze* them, we must first understand the minute distinctive characters which such parts present. This done, the student may soon know them tolerably well; but otherwise, although he may learn *names*, it will be only in a traditionary manner and with constant liability to error, according as his informer may be well or ill acquainted with the subject.



Poa Pratensis.

A. Fibres; B. Rhizome; C. Culm; D. Node; E. Sheath; F. Ligule; G. Blade; H. Glumes; I. Glumels—Paleæ; J. Pollen; K. Filament; L. Anther; M. Seeds; N. Style; O. Stigma; P. Barren Shoot.

In grasses we meet with the following parts, all of which though tolerably constant in form in individuals of each species, yet in their variations in *different species* make up the sum of those distinctive characters which enable the botanist to separate one species from another. Such are

The Root, or descending axis, consisting of root fibres and rhizome ;

Culm, or ascending axis, consisting of stem with its nodes and joints ;

Leaves, the appendages of the axis, consisting of sheath, ligule and lamina ;

Flowers, or *reproductive organs*, consisting of floral envelopes, stamens and pistils ;

Seeds, or *fruit*, consisting of grains of various forms and sizes.

The roots of grasses usually consist of small fibres, which in starting from the seed, burst through the radicle or seed-root like the inner valve of a telescope from the outer ; this, which is called by the botanists, endorhizal, from two Greek words signifying, *within a sheath*, may well be observed in the germination of such large grasses as are presented in the cereals, as corn, wheat, barley, &c. Roots are sometimes hard and wiry, especially in such species as grow in damp and boggy places ; whilst in others they are exceedingly flexible, the main roots often creeping great distances in search of food, and then branching off into innumerable fibrils or rootlets, the ends of which, consisting of the newest cells or growth, form the spongioles or suckers by which nutriment is taken from the soil into the plant-system. It is hence necessary in the cultivation of grasses that the soil for the reception of the seed should be of good *tillth*, and especially that its mechanical consistency should be such that it will not greatly expand in moisture and so push the roots out of place, or crack in drought, in which case the rootlets or active parts in life and increase are broken away just at the period when they are most required. Roots are without buds, from which it will be seen that all the parts of a grass which grow beneath the surface are not always true roots, such for instance as the runners in the common couch or witch grass, (*Triticum repens.*) These receive the name of *Rhizomes*, or underground stems, and it is by means of these that the couch tribe of grasses so quickly spread from a com-

mon and small centre into large patches; as though they creep for a considerable distance, yet their points ultimately rise to the surface and then expand into new leaves, and in fact form distinct and perfect individuals, which if separated from the parent, all the more rapidly give rise to independent colonies, and indeed these scions do as their parents did before them. Several species of grasses have this tendency, and consequently when it occurs it forms a good distinctive character. Hence, though the *Triticum repens* has a rhizome, the *T. caninum* is furnished only with a fibrous root. Some of the *Poas*, as *Poa pratensis* and *P. compressa*, have rhizomes, while *Poa annua* and *P. trivialis* are without any. Several species of grass become useful from this very structure, in keeping together banks of sea coast, canals and the like.

Culm—stem. The stems of grasses are usually hollow and rounded, (except in *Poa compressa*, in which the name has been given from its oval form as though it had been subjected to pressure.)

The stem is separated into long or short lengths called *joints*, by the intervention of *nodes* (knots) which are solid, and tend much to strengthen the structure of the plant, to which end they will be found to be closer at the base where the strain would be greatest on account of these light plants swaying forward and backward in the wind, and more remote upwards in the culm, from which are suspended the newer and more active leaves. Stems vary in being smooth, ribbed, armed with hairs which may be long or short, bristly or downy. The nodes again, may be of a different color from the culm, or like it may be smooth or armed in a similar manner.

The leaves consist of the following parts :

The sheath—*petiole* or leaf stalk of other plants ;

The ligule or tongue ;

The lamina—blade or flat part of the leaf.

The sheath is the footstalk of the leaf. This takes its rise from the nodes, one from each, arranged on alternate sides of the culm. The whole length of the sheath, which is variable, is folded around the culm, from which it can be loosened by unwinding, without fracture, a circumstance which serves to distinguish the grasses from the sedges, (*Carex*;) as the sheath of the latter is a continuous tube in which the solid and often triangular culm is *inserted*, not folded. This is a distinctive character of great importance to observe, inas-

much as sedges and grasses are outwardly much alike—indeed some species of the latter are called *Carnation grass*—but greatly different in quality; grasses being for the most part nutritious plants, whilst sedges are not only usually innutritious, but from the harshness of their herbage, are often a source of injury and annoyance to the creatures that from starvation are sometimes doomed to eat of them.

The blade—lamina, is the expanded part of the leaf. It is sometimes large and drooping, as in the larger or flag-like grasses, but occasionally it is very minute, especially when compared with the sheath, as in the *Avena pubescens*, (Soft Oat Grass.) In some species the blade is long and the sheath short. The blade is traversed by longitudinal parallel lines which are called the *leaf veins* or *nervures*; these may be *broad, narrow, rigid, soft, armed with rough hairs*, and so on, all of which are not only points of distinction in species, but aid in making up the sum of those differences which will ever be found in good and bad pasture grasses: as for instance, grasses in which the herbage is covered with long downy hairs, are mostly poor and innutritious in quality; on the other hand, those of a harsh and rigid structure, with serrated leaves, whose edges act as a saw, and whose flat blades perform the office of a file, even if nutritious, would nevertheless be refused by cattle on account of their mechanical inconvenience.

The ligule, from the Latin *ligula*—spoon, scoop or strap. At the point where the sheath ends and the blade begins, occurs a thin and usually white semi-transparent membrane, termed the ligule or tongue. This, as it varies so much in size and form, will be frequently referred to in examining species, by some such terms as the following:

Short, in *Poa pratensis*—Smooth-stalked Meadow Grass;

Pointed, in *Poa trivialis*—Rough-stalked Meadow Grass;

Notched, in *Bromus mollis*—Soft Brome Grass;

In pairs, in *Ammophila arundinacea*—Sea Sand Reed.

Its value as a distinctive character may be drawn from an examination of *Poa pratensis* and *P. trivialis*, as it assists at a glance, to distinguish two grasses much alike in appearance, though very distinct in habit and general properties. The use which this part of the leaf subserves would appear to be that of more securely fast-

ening the upper part of the sheath to the culm, as without it the wind would tear the leaves downwards, in which case their functions would become much disturbed and they would soon wither and die.

The flower in grasses consists of the elements of an entire plant, each bunch, spikelet or *locusta* of flowers being but a grass in miniature, consisting of a central axis or stem with its alternately arranged leaves, the stamens, pistils and seeds in the axils of which are but buds; this fact may at once be seen in *viviparous* specimens, such as are often found in the *Lolium perenne* (Perennial rye-grass) and *Cynosurus cristatus*, (Crested dog's-tail,) in which instead of flowers, we have complete buds, which have been detached and grown as distinct plants of their respective species.

In these examples the case is very different from that of germination in the ear which takes place in lodged and damp wheat, as in the latter the seeds have been perfected, and germination takes place from heat and moisture in the usual manner; but in *viviparous growth*, the envelopes and their organs, instead of growing seeds on the principle of arrested development, go on growing into branches, and no seed is consequently perfected.

Flowers consist of the following parts :

Glume, from the Latin <i>gluma</i> , husk or chaff,	} Floral envelopes.
outer chaff scales,	
Glumel, or (<i>palea</i> , a Latin word of nearly similar signification with <i>gluma</i>), inner	} Floral envelopes.
chaff scales,	
Stamens, }	} Fertilizing organs.
Pistils, }	

Seeds—grain—reproductive organs.

Floral envelopes, upon the theory here adopted, consist of metamorphosed leaves; they are arranged in pairs, and each scale starts from an opposite side of the central axis, but not from the same point. The outer pair subserves the same use as the *Calyx* in other plants, and receives the name of *calyx glume*; the inner pair or pairs—for sometimes several occur in a single glume—is termed *glumel* or *palea*, and the pieces of which either are formed, obtain the name of valves; the lower one being the outer, and the upper one the inner of each respectively.

The glumes differ in shape, and in the presence or absence of lon-

itudinal lines or ribs; it may be large enough to *include* or *conceal* the *glumel*, or it may be considerably smaller than the latter.

The glumel or palea is often found to be armed by a projecting spine or beard; this is of greater or less length, and is termed the *awn*, and may be well observed in bearded wheat and in wild and cultivated barleys. This organ when long and stiff, and armed as it is sometimes with projecting *spicula*, renders grasses wherever they occur, exceedingly objectionable, especially for hay, though the grass may be good if kept from flowering by constant depasturing; such are the species of *Hordeum*, (wild barley.)

The fertilizing organs consist of the stamens, which possess the following parts:

The filament or thread which supports

The anther or case in which is secreted

The pollen or fecundating dust.

The filament, by reason of its length, may cause the anther to be *exserted* or standing out from the flower, or from shortness to be *inserted* or included in its valves.

The anther may be varied in its color as follows:

Colorless, as in *Poa annua*—Annual Meadow Grass;

Flesh color, in *Phleum pratense*—Timothy Grass;

Rose, in *Alopecurus pratensis*—Meadow Foxtail;

Purple, in *Aira cæspitosa*—Hassock Grass;

Yellow, in *Bromus mollis*—Soft Brome;

Orange, in *Bromus erectus*—Upright Brome.

The pollen is usually of a light straw color.

The *Pistil* consists of a style, which is in one, or as it were, split into two parts, each surmounted by a *stigma*, either pointed or feathery; they are mostly very pale in color, but occasionally highly tinted.

The grasses with but few exceptions, belong to the Linnean order *Digynia*, (having two stigmata,) and the L. class *Triandria*, (having three stamens.)

Seeds are sometimes loose in the chaff-scales, as in the wheat; in others the glumel is adherent, as in barley, a circumstance which may readily explain how readily wheat grain is shed when "dead ripe," as the attachment of the seeds to the chaff-scales is much less firm than that of the flower to the flower stalk.

We will again mention all these parts together and commend their study, with a grass in hand :

Root	{	Fibres—the true root fibres.		
	{	Rhizome—creeping underground stems.		
Stem,	{	Culm—the whole above-ground stem.		
	{	Joint—a single length from node to node.		
	{	Node—the hard knot between the joints.		
Leaf,	{	Sheath—the folding portion of a leaf.		
	{	Ligule—the tongue of the leaf.		
	{	Blade—the lamina or free part of the leaf.		
Floral envelopes,	{	Glumes—the outer chaff-scales in pairs.		
	{	Glumels or paleæ—the inner chaff-scales in pairs.		
Fertiling Organs,	{	Stamen,	{	Filament—the thread supporting the anther.
			{	Anther—the pouch containing the pollen.
			{	Pollen—the fertilizing dust.
	{	Pistil,	{	Style—the support of the stigma.
			{	Stigma—the receptacle for the pollen.

Seeds—the reproductive organs.

A barren shoot—a flowerless branch.

Thus far we have described the separate parts of the structure of the grasses; we have now to point out the terms used to designate them when taken together, as follows :

Herbage, that is, the leaf portion, principally concerned in pasture.

Culm, or parts which grow upright and make up so much of the bulk and weight of hay.

Heads of flowers; the various forms which they assume.

The quality of grasses depends so much upon the quantity and physical character of the herbage that, for agricultural purposes, these should always be noted with great care; hence if for hay, both bulk and quality is much influenced by luxuriant leafage, a character in which grasses will be found to differ in a remarkable degree; if however, this be rough and unpalatable, no matter how great its quantity, such should be discouraged. Again, if for pasturing, it will be necessary to note such facts as *longevity*, and how the species succeeds in sending up herbage under continual mutilation by feeding off. Many grass fields are at first mown for hay, and afterwards pastured; so that it is well to encourage the growth of all such species as will be found adapted to our soil, and will yield us the best return in both hay and herbage. Connected with this, we must not omit *duration*; as for permanent pasture, *peren-*

nia grasses are absolutely necessary, annual species having nothing to recommend them.

The *Culms* of grasses, whether *hard* and *wiry* or soft and pliable, bitter or saccharine, scanty or abundant, should also receive attention; as hay both in quality and bulk, will much depend upon these circumstances.

Heads of flowers. These are aggregated from single *locusta*, spikelets, or smaller bunches or bundles of flowers, which may vary in the following manner:

- a A single glumel to each pair of glume valves;
- b Two glumels and sets of flowers to a pair of glumes;
- c Three or more glumels to each pair of glume valves.

Each flower, or *locusta* of flowers as b and c would be termed, may be attached to the stem in various ways:

On short upright foot-stalks (pedicels) in which the flowers unite into a compact head or *spike*, as in the Foxtail grasses;

On longer upright foot-stalks (pedicels) forming an upright panicle as in soft Brome;

On long and flexile foot-stalks, (pedicels,) a drooping panicle, as rough-stalked Brome.

It is not proposed to give technical descriptions of all the grasses which may be mentioned, but a few are added for the purpose of drawing the attention of the young farmer, who may be so disposed, to their minute differences, and this with the hope that many will procure the necessary aids and prosecute their investigations with diligence and perseverance.

PHLEUM.—Stamens 3; styles 2; flowers spiked; spikelets single flowered; spike compact; glumes distinct; glumel of two equal awnless valves.

Phleum pratense—Timothy—Herds Grass of New England. Glumes equal, truncated, with long points; each valve having a row of stiff hairs on the back; leaves long, flat, rough, with long sheaths; perennial.

AGROSTIS.*—Stamens 3; styles 2; spikelets in an open panicle; single flowered; glumes of two unequal valves, often longer than the glumel, the inner valve of which is sometimes minute or wanting, the outer either awned or awnless.

* Name derived from the Greek *Agros*, a field.

Agrostis vulgaris—Red Top—Herds Grass of Pennsylvania. Heads or flowers spreading, exceedingly light and elegant, mostly purple; culms one to two feet high; slender leaves, three to six or eight inches long; stolons more or less creeping; whole plant smooth; perennial.

Alopectrus.—Stamens 3; styles 2; glumes nearly equal, united at base, compressed, keeled, awnless; glumel of a single valve, awned from below; styles commonly united; stigmas long and plumose.

Alopecurus pratensis—Meadow Foxtail.—Spike cylindrical, dense, soft, blunt at the apex, about two inches in length; general appearance much like Timothy, except the spike is shorter and softer.

Anthoxanthum.—Stamens 2; styles 2; panicle spicate; glumes thin, acute, keeled, of unequal length; glumel double, outer one with short awns.

Anthoxanthum Odoratum—Sweet-scented vernal Grass.—Panicle contracted into a loose oblong spike, one to three inches long; culm erect, twelve to eighteen inches high; leaves two to five inches long; sheath nerved; ligule elongated; perennial.

Poa.†—Stamens 3; styles 2; panicle lax; locusta of from five to ten florets; glume of unequal valves; the inner glumel notched at the extremity.

Poa annua—Annual Spear Grass.—Locusta of about five florets, not webbed; annual.

Poa trivialis—Rough-stalked Meadow Grass.—Locusta of about three acute webbed florets; leaves with a rough sheath; ligule pointed; perennial.

Poa Pratensis—June Grass—Spear Grass—Kentucky Blue Grass—Smooth-stalked Meadow Grass—Locusta of about four acute flowers with a web culm and herbage smooth; ligule short and blunt; rhizome creeping; perennial.

Poa compressa—Blue Grass—Flat-stalked Meadow Grass.—Culms flat, oval on a transverse section; rhizome creeping; perennial.

* Name from the Greek *Alopes*, a fox, and *oura*, a tail, alluding to the form of the spike.

† An ancient Greek name for herbage or pasture.

We come now to consider the agricultural character and value of some of the grasses as forage plants.



a Meadow Foxtail--(Alopecurus Pratensis.)

b A spikelet magnified.

c The floret, consisting of a single awned glume (or palea) removed from the glumes.

Alopecurus pratensis—Meadow Foxtail.—This is called by some of our farmers, June grass, a name more properly applied to *Poa pratensis*. In its general appearance, it closely resembles Timothy or Herdsgrass, but the spike is soft while that of Timothy is rough, and it blooms earlier, besides which, it gives a luxuriant aftermath. It is a very valuable pasture grass, being of early and rapid growth, and well relished by cattle, particularly by horses and sheep, although in nutritive powers it is not equal to some others. As a hay grass it does not appear to be worth cultivating here, although it is esteemed as such in England. Dickson says, "Of all the English grasses, this appears to be the most adapted for cutting twice." Buckman says, "This is a common native grass, especially in moist meadows and rich pastures, for which situations it is admirably adapted, as it yields a large proportion of hay and a quick growth of aftermath; it should always form part of the grass of irrigated meadows, as it is very early and bears cropping well, sending up culms and a plentiful supply of herbage for the hay crop, after first depasturing by sheep. In laying down land for permanent pasture, it should always take a place with other grasses." Judge Buel says, "It does best in moist soils, whether of loams, clays, or reclaimed bogs." Mr. Flint says, "It thrives on all soils except the driest sands and gravels. * * * We have many grasses superior to it for cultivation, but for permanent pasture, it is superior to Timothy, which is not a suitable pasture grass."

Phleum pratense—Timothy—Herds Grass of New England—Meadow Catstail of England.—This is a native of England, early introduced from thence by Timothy Hanson of Maryland, from whom it derived the name by which it is most extensively known. According to some, it was first discovered in a swamp, early in the last century, by one Mr. Hurd of Piscataqua, with whose name it thus became associated. It forms the greatest portion of what is commonly termed English hay, being the best known and most largely cultivated of all the grasses. Although of foreign origin, it is, in this country, held in far higher esteem and is cultivated to a much greater extent, proportionally to others, than where it is indigenous. Taking all its qualities into consideration, it is the most valuable of meadow grasses; for although it is deficient in aftermath and second to others as a pasture grass, yet being highly nutritious and peculiar

ially adapted to our climate and to the wants of every description of farm stock, it has no superior for hay. It is a grass of easy cultivation, and particularly well adapted for growth upon moist, peaty and loamy soils, upon which when in good condition, from three to four tons per acre are sometimes cut; upon lighter and drier soils, tolerable crops are obtained with care, but it is never so much at home upon them, or so profitable as upon those first named. It seeds freely and abundantly, as much as thirty bushels of seed, it is said. having sometimes been obtained from an acre.

It has been a general practice with farmers to sow this grass with clover; but in many sections, this mode is falling into disuse, owing to the different periods at which they are severally fit for the scythe. If both be grown together, the crop cannot be cut so as to secure the best properties of each. The discussions which have prevailed so widely with regard to the proper time to cut grass, as also those regarding the proper height at which to cut, have had reference, in a great measure, to this grass. If cut when coming into bloom, it doubtless makes more palatable hay, but gives less weight per acre. and increases the liability of the plant to be killed out by drouth. and of subsequent crops, when not so killed, being weakened, owing to the peculiar formation and requirements of the plant. It is a grass of peculiar structure, in that it has a bulb or tuber above the roots, in which seems to be centered much of the vitality of the plant, and which it is important should at all times be kept in healthy condition.

The following, from the pen of Prof. J. P. Kirtland of Ohio, is commended to the careful study of all who cultivate this grass. "The proper time for cutting Timothy meadows, (Herdsgrass of N. England,) with reference to securing the best quality of hay, has been a fruitful subject of observation and remark. Little or no attention has been paid to the influence of the time and manner of cutting, over the health, permanency and productiveness of such meadows. A vague idea prevails among farmers, that if the mowing be performed before the seed of this species of grass be ripe, it will run out, from a failure to re-seed the ground. Every observing farmer has noticed that in some instances, extensive tracts of Timothy sward have suddenly died soon after the removal of the crop of hay, while in others, the sward continued healthy, and for a

series of years, produced abundantly of this grass. The rationale of such opposite results under apparently similar circumstances, had never been explained, so far as my observation extends.

My neighbor, Richard McCrary, an intelligent and practical farmer, has recently presented me with the annexed propositions and conclusions, as the result of his experience on this subject. These he illustrated by specimens of the grass in every condition to which he alludes. It is hoped they will be thoroughly scanned by persons competent to test their accuracy.

If they bear this test, to Mr. McCrary the credit of the discovery of the facts solely belongs; and I have no doubt the community will consider him as having conferred an important benefit.

1. Timothy grass is a perennial plant, which renews itself by an annual formation of "bulbs," or, perhaps, more correctly speaking, tubers, in which all the vitality of the plant is concentrated during winter. These form, in whatever locality the plant is found, without reference to the dryness or moisture. From these proceed the stalks which support the leaves and the head, and from the same source spread out the numerous fibres forming the true roots.

To insure a perfect development of these tubers, a certain amount of nutrition must be assimilated in the leaves, and returning to the base of the plant through the stalk.

3. As soon as this process of nutrition is completed, it becomes manifest by the appearance of a state of desiccation, or dryness, always commencing above either the first or second joint of the stem, near the crown of the tuber. From this point, the desiccation gradually progresses upward, and the last portion of the stalk that yields up its freshness is that adjoining the head. Coincident with the beginning of this process, is the full development of the seed, and with its progress they mature. Its earliest appearance is evidence that both the tubers and seeds have received the requisite supplies of nutrition, and that neither the stalks nor the leaves are longer necessary to aid them in completing their maturity.

4. If the stalk be cut from the tuber before this evidence of maturity has appeared, the necessary supplies of nutrition will be arrested; their proper growth will cease, and an effort will be made to repair the injury, by sending out small lateral tubers, from which weak and unhealthy stalks will proceed, at the expense of the orig-

inal tubers. All will ultimately perish, either by the drouth of autumn, or the cold of winter.

5. The tubers, together with one or two of the lower joints of the stalk, remain fresh and green during the winter, if left to take their natural course, but, if by any means, this green portion be severed at any time of the year, the result will be the death of the plant.

From these five propositions, the following conclusions are drawn :

1. That Timothy grass cannot, under any circumstances, be adapted for pasture, as the close nipping of horses and sheep is fatal to the tubers, which are also extensively destroyed by swine.

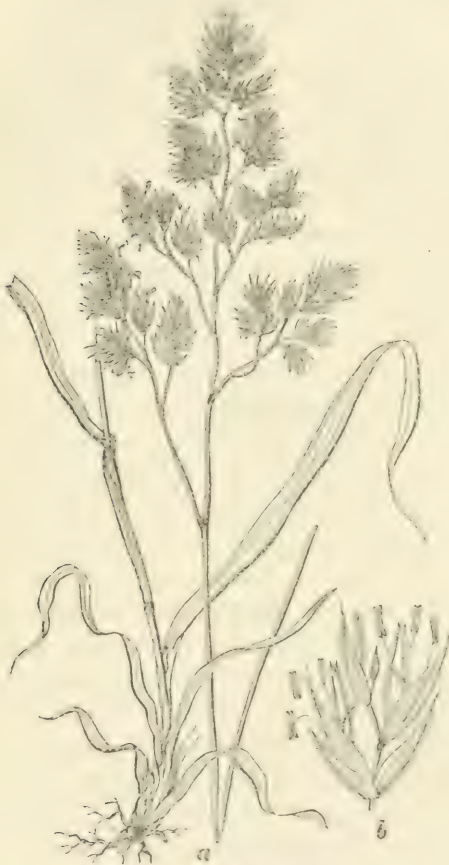
2. That the proper period for mowing Timothy is at any time after the process of desiccation has commenced on the stalk, as noticed in proposition third. It is not very essential whether it is performed a week earlier or later, provided that evidence of maturity has become manifest.

3. All attempts at close shaving the sward should be avoided while using the scythe, and in guaging mowing machines, care should be taken to set them to run so high that they will not cut the Timothy below the second joint above the tuber.

Agrostis vulgaris—Redtop of New England—Herdsgrass of Pennsylvania and Southern States. This valuable grass, well known to our farmers, and more commonly cultivated than any other except Timothy, is of European origin, and was introduced at an early period in the settlement of New England. It succeeds best on rather moist soils and grows better than most grasses on wet and cold uplands, producing a goodly quantity of hay, rather light in proportion to its bulk, and of good quality, though not of the very best. Its chief excellence lies in the fact that it is well adapted to our climate, very permanent, equally good for meadows and pastures, and yields a fair crop, both as to quantity and quality. As a pasture grass, it is esteemed for yielding a good and regular growth throughout the season, which is readily eaten by horses and cattle, especially if fed close—if allowed to grow up to seed, it is less relished and often refused.

This grass varies somewhat in its botanical characters and very much in its size and general appearance, according to the soil and the culture it receives. As seen in poor dry pastures, it is often

not more than five or six inches in height, and commonly called fine top. In rich moist soils, it grows from one and a half to two and a half feet high, and has a deeper color. These variations have led to some confusion and the bestowal of different names upon the same species.



a—Orchard Grass, (*Dactylis Glomerata*.)

b—A spikelet magnified.

Dactylis glomerata—Orchard Grass, Cocksfoot. This is one of the most valuable pasture grasses, although as yet cultivated in this State to only a very limited extent. It was at one time extolled beyond its merits as a meadow grass, but when made into hay being

found light and weak compared with Timothy, and so failing to fulfil the undue expectations excited, it fell too far below a just estimate. Another objection to its use for hay, is its habit of growth, being a jungle grass, and when mixed with others, standing in tussocks above the general surface, and so renders the sward uneven and not easy for smooth mowing. For meadows, it is best by itself, and seed enough should be sown to have the plants cover the whole surface and make an even sward. Its cultivation, however, as a meadow grass, is still extensive in some of the middle states, where it is by many preferred to Timothy to mix with clover on account of its earlier ripening, being in the best stage for cutting at the same time as the clover. There seems to be little doubt that it might be more extensively introduced to advantage among us, especially as a useful auxiliary in grazing and soiling. It is an early grass, starting with the first warmth of spring and affording a good bite sooner than almost any other. It is of unusually rapid growth, no one exceeding it in the quickness and vigor with which it shoots forth after being cut or eaten off, and it continues to grow until the ground freezes. It affords a good supply of foliage, the leaves being numerous, and if allowed to grow, reaching a height of two feet or more, with comparatively few flowering stems or seed stalks. It bears drouth better than other grasses, remaining green and vigorous when many others are dried up, and its roots being near the surface it is refreshed and invigorated by showers which produce no effect on clover. It is also one of the most permanent of grasses, being very tenacious of life when once fairly established. Orchard grass is less exhausting than Timothy, will bear considerable shade, succeeds well on all tolerably dry, friable soils of medium quality, and is said to be particularly adapted to those of a slaty character.

Judge Buel says of it—"Orchard grass is one of the most abiding grasses we have. * * Its early and rapid growth and its resistance of drouth render it peculiarly adapted to pasture, but all agree that to obtain its greatest value it should be kept closely cropped. Sheep will pass over every other grass to feed upon it. * * In July, I made a movable calf-pen thirteen feet square, in which two calves ten and twelve weeks old were confined in a field of Orchard grass. The pen was removed twice a day on to fresh feed, and the grass uniformly fed close. The growth was so rapid that the feeding

might be repeated on a good bite every fifth day. * It is suited to all arable soils. The seed is easily gathered, but on account of its peculiar lightness (the bushel weighing but twelve to fourteen pounds) the seed should be spread on a floor and sprinkled with water a day or two before it is sown, that it may swell and more readily vegetate. Sow two bushels on an acre with barley or other spring grain." Some recommend as much as three bushels per acre.

Arthur Young, to whom belongs the credit of having drawn to the culture of grasses in England the attention they deserve, speaks in high commendation of this grass, and took great pains to induce farmers to adopt its cultivation, and particularly as a substitute for Rye grass with clover.

Col. Powell of Pennsylvania, a breeder of fine animals, and a gentleman of scientific attainments, travel and nice observation, says, "I have tried Orchard grass for ten years. It produces more pasturage than any artificial grass I have ever seen in America."

Poa annua—Annual Speargrass. Very common by roadsides and in pastures, especially in the moister pastures. The estimation in which it is held varies greatly both among scientific men and practical farmers.

Mr. Flint in his work on grasses, says—"This modest and beautiful grass flowers throughout the whole summer, and forms a very large part of the sward of New England pastures, producing an early and sweet feed, exceedingly relished by cattle."

Prof. Buckman says—"In an agricultural point of view, this grass may be considered as a weed, as it has scarcely any feeding properties; and though it sometimes presents an apparently green turf over alluvial flats, and anywhere with a muddy subsoil, such grass affords as the farmers say 'no heart' in it. On some land of Lord de Mauley's, celebrated for scouring cattle, this grass was a prevailing one."

Poa trivialis—Rough Stalked Meadow Grass. This is less common than the *Poa pratensis*, and may be distinguished from it by the sheaths being rough and the roots being fibrous. It is found only in soils which are quite moist. Sinclair, Parnell, and some other writers, speak very highly of the properties of this grass, but there is reason to believe that it has been overestimated. It is very

late in its growth, and furnishes a good bite of succulent feed at a time when few others do, which may account for the observed partiality of cattle for it at such times. In agricultural value it ranks higher than *Poa annua* and inferior to *Poa pratensis*.

Poa pratensis—June Grass—Smooth-stalked Meadow Grass—Spear Grass—Kentucky Blue Grass. (For a cut of this grass see page 72.)

This is one of the most common and widely diffused grasses, and varying much in size and appearance, according to soil and culture. It is an early and excellent pasture grass, and in good soils makes a fair quantity of very good hay. In Ohio and Kentucky, it is known as Blue grass and highly valued, forming the principal feed in the famous Blue grass pastures. It starts early and grows late in autumn, but suffers more than some other grasses from drouth. It is less injured by cold and other climatic changes than almost any other species, and where milder winters prevail, is chiefly depended on for winter pasturage; and where snows cover the ground in winter, the previous year's growth is sometimes eaten in spring, before starting into new growth. Dairy cows fed upon it, will, it is said, furnish butter of superior quality. It grows in nearly all soils, being largest in such as are rich and rather moist. It frequently comes in of itself; does not come to perfection as a pasture grass in less than three or four years, and so is unsuited to alternate husbandry. Its chief value is as a permanent pasture grass. Among English writers, Sinclair and Dixon both say it exhausts the soil more than other grasses; an opinion from which Buckman entirely dissents, saying it exhausts only by producing grass, and "all good grasses exhaust the soil, if taken off in the shape of hay, and this one especially, by reason of its good crops; but such should be invigorated by manuring and good cultivation, for which this species amply repays."

Poa serotina—Fowl Meadow, Swamp Wire Grass, False Red-top. The Fowl Meadow is one of the few valuable grasses indigenous to America, and its excellence has been long known.

Rev. Jared Elliot of Killingworth, Conn., in his *Essays on Field Husbandry*, published in 1747, says—"it is sometimes called Duck grass, and is supposed to have been brought into a poor piece of meadow in Dedham, Mass., by ducks and other wild water fowl,

and thence called by such an odd name. * * It grows tall and thick, makes a more soft and pliable hay than Herdsgrass, besides it is a good grass not in abundance inferior to English grasses. It yields a good burden, three loads to the acre. This grass has another good quality which renders it very valuable in a country where help is so much wanting; it will not spoil or suffer, although it stand beyond the common time for mowing. It may be cut any time from July to October. * * This I wondered at, but viewing it attentively, I think I have found the reason of it. When it is grown about three feet high, it falls down, but doth not rot like other grasses when lodged. In a little time after, at every joint it puts forth a new branch; now to maintain this young brood of suckers there must be a plentiful course of sap conveyed up through the main stem; by this means the grass is kept green and fit for mowing all this long period."

Fowl meadow is properly a swamp grass, as it will not succeed on land dry enough for grain: on the other hand it will not thrive in soils which have an excess of water. It is most at home in very moist localities, and those which are occasionally overflowed but not long covered with water. In such situations it is of great value, producing abundantly of excellent hay. It does not, as quoted above, become hard or strawey by long standing, but is always soft. The general opinion is, that it is best cut in August.

Mr. Howard says—"Its tenacity of life is not great. Farmers who desire to keep up its growth, say it should be allowed to shed seed occasionally, in order that new plants may be produced."

Hon. Fred. Helbrook says—"This grass grows in patches, here and there, in the intervale lands near my residence. It has come in of itself and held long possession in certain places, and grows very vigorously wherever it has foothold. It somewhat resembles Redtop in general shape and appearance of stalk head and seed, but the head is of a lighter and paler color and the stalk grows taller and quite slender and delicate, while the bottom or lower foliage is very abundant and fine. It undoubtedly excels Herdsgrass and Redtop for a large product and fine quality of hay. It turns out a full swath to the scythe, the hay is easily cured, remarkably soft, tender and succulent, excellent for milch cows, and particularly for working oxen, during their labors in the spring season. It is not

liable to injury from the flooding of the land by freshets. That is a great merit, for these lowest portions of our river lands are subject to overflows, and after a winter or spring freshet, the water not unfrequently remains on the land a week or fortnight at a time, and sometimes before one flood has entirely subsided, another succeeds, and keeps the land wet for three or four weeks. I infer that the flooding is an advantage rather than otherwise, from the fact that wherever this grass has come in of itself, it has invariably done so on those portions of the meadow which are overflowed. The Fowl meadow grass will last for an indefinite period. The self-seeded patches in our meadow have flourished there for a long time in spite of wind and tide, yielding as full and good crops now as at any former period."

Poa compressa—Wire Grass—Flat-stalked Meadow Grass—Blue Grass, (not the Blue Grass of Kentucky.) This is a very hardy species, growing even on the driest soils and upon rocks barely covered with earth. It is readily distinguished from *Poa pratensis* by its flattened stem and darker green color. Mr. Howard* says, "It is perhaps the most nutritive grass known. All grazing animals eat it with avidity, and sheep are known to fatten faster on it than on any other. It shrinks less in drying than any other species, and makes in proportion to its bulk the heaviest, and at the same time the best hay, though the yield per acre would not be large." Dr. Darlington says, "cows which feed on it yield the richest milk and finest butter." A serious objection to it for hay is its scanty production of herbage, besides which it is, in arable culture as really a pest as *Triticum repens*, Witch grass—its creeping roots retaining life with great tenacity, even under much exposure. For dry, ledgy pastures and rocky knolls never under the plow, it is a highly valuable grass.

Poa nemoralis—Wood Meadow Grass. This is not so often met with as the above named species, and has never been much cultivated. It is readily eaten by cattle, and would probably succeed in moist and shady places.

Several other species of *Poa* are sometimes met with, among which

* Prize Essay on Grasses.—New-York Transactions, 1855.

are *Poa fluitans*, Floating Meadow grass, or Manna grass, *Poa aquatica*, &c.

Festuca pratensis—Meadow Fescue. This is the most common of the fescue family, and a valuable pasture grass, somewhat conspicuous by reason of its glossy green foliage. It ripens with the June grass, earlier than most others, and so readily propagates itself by self-sowing. It is recommended by English writers to be used in mixtures for seeding pastures, but is rarely if ever sown purposely in this country. Its long tender, succulent leaves are abundant and readily eaten by cattle. Its habit is somewhat of the jungle or tussock style, causing an uneven surface, and is oftenest found in moist pastures and rich grass fields. The *F. elatior*—Tall fescue, and the *F. loliacea*—Slender spiked fescue, often ranked as distinct species, are varieties of the same species, the apparent difference in which has been caused by cultivation. It is said to be identical with the Randall grass of Virginia.

Festuca ovina—Sheep's Fescue. This grows from eight to ten inches in height in dense tufts. It receives its name from the eagerness with which it is eaten by sheep. *F. duriuscula*, Hard fescue, and *F. rubra*, Red fescue, are probably varieties of the same species.

Bromus secalinus—Chess, Cheat, Willard's Bromus. There are several species of Bromus, with regard to all of which the farmer's principal interest is to keep well rid of them. Notwithstanding the above named species has long been a well known pest in all wheat growing sections, it is only a few years since it was brought prominently into notice and extolled, as humbugs are wont to be, as a new and valuable grass, producing very abundantly of a quality superior to any other species, under the name of "Willard's Bromus." Four and five dollars per bushel were paid in many instances, besides giving a pledge that it should not be allowed to go to seed, (this in order to keep the cheat going or growing beyond the first season, as being an annual weed it would both show its true colors the first year and die if not cut early.) The cheat went so smoothly for a while, that in some instances prominent officers of Agricultural Societies in a neighboring State were induced to use their influence to extend its cultivation.

Triticum repens—Couch Grass—Witch Grass—Twitch Grass—

Quitch Grass, &c.—This is one of the most catholic of all grasses, in its tastes and habits, in so much that scarcely a garden or field, pasture or roadside can be found, be the soil what it may, which is not occupied by it to greater or less extent; and if permitted, its long creeping roots—or more properly, *rhizomes*, (underground stems,)—pushing in every direction, will soon have full possession, and monopolize all the plant food within its reach. It is commonly regarded as a troublesome pest, from the difficulty of eradicating it, and the injury it does by choking other plants. Cattle eat it readily enough, either as grass or hay, and on loose sands its roots are useful in binding the surface. Detested as it usually is, some farmers advocate its culture for hay. One told me not long since, that he would be glad to sow ten bushels of the seed on his farm. Another writes me: “Its value for dry forage, I consider equal to either Herdsglass, Redtop or Clover. I do not sow the seed because it is unnecessary, my farm having been well stocked with it when I purchased; but had it not been so, I do not hesitate to declare, that with my present knowledge of its value, I should labor diligently to introduce it.”

Viewed simply as a grass for hay, the principal objection to it is that it gives but a moderate crop at the best, standing very thin; and if the soil be rich, it lodges and turns yellow, before fully grown; besides, it rapidly exhausts the soil, and also checks the growth of better grasses, by what is called ‘binding out.’

Phalaris arundinacea—Reed Canary Grass.—This fine looking, deep green grass, frequently arrests attention by its luxuriant growth and promising appearance, but is of little or no agricultural value, except as indicating by its presence, the need of draining; and where such land is properly drained, it dies out. The liability of this grass to become filled with ergot, if it stands beyond the time of flowering, is sufficient to condemn it, were its nutritive properties far greater than they are. A variety of this grass with white stripes in the leaves, known as Ribbon grass, is sometimes cultivated as an ornamental plant. This peculiarity it loses however upon being transferred to wet situations.

Ammophila arundinacea—Beach Grass—Mat Grass—Sea Sand Reed.—This is remarkable for its creeping root, or, more properly, rhizome, which is sometimes twenty to thirty feet in length. It is

a very common occupant of the sea-side in all countries, and although of no agricultural value, it has many times been cultivated. as from its peculiar growth, it operates very beneficially in tying up and keeping together the sands of the coast. In England it is preserved and carefully looked after, by act of Parliament, for this reason. Congress has expended at various times, upwards of thirty thousand dollars in its culture on Cape Cod, for the protection of Provincetown harbor from the blowing sands which were driven in by north winds, and which threatened its destruction. Its culture, where needful, is of the easiest and simplest character possible. It may be worth a trial on deep railroad cuttings, in sands liable to blow, or in sandy clays liable to slide from wet and frosts. Dr. Darlington, in his Agricultural Botany, ranks this grass as a species of *Calamagrostis*.

Anthoxanthum odoratum—Sweet-scented Vernal Grass—Vanilla Grass.—This is particularly noticeable for its fragrance, which is said to be owing to the presence of benzoic acid. Its strong aromatic odor is perceptible, upon being bruised when green, and given off freely when drying, and is imparted to other grasses when cured with them. One author speaks very highly of it, and deems the peculiar flavor of the spring butter sold in Philadelphia, to be in consequence of its forming a considerable part of the feed in pastures in that vicinity. It is not generally believed to be either very rich in nutritive properties or particularly acceptable to cattle. It starts quite early in spring, and runs to seed sooner than almost any other. Mr. Flint, in his work on Grasses, says, that it is also one of the latest in autumn, and esteems it as a pasture grass when mixed largely with others. The seed was widely distributed from the Patent Office, a few years since. I should judge it to be indigenous to Maine, having seen it in many sections, on both dry and moist soils, growing most freely however, on the latter.

Panicum germanicum—German Millet, Hungarian Grass, Honeyblade, Golden Leaf, &c. Much has been said and written lately about Hungarian grass and Honeyblade as new and superior grasses destined to eclipse all others. Upon trial they prove very similar to, if not identical with, what has long been known as German or Hungarian Millet. Encomiums of the highest character as to its productiveness and value have come to us chiefly from the West,



Sweet Scented Vernal Grass, (*Anthoxanthum Odoratum*.)

and there is little doubt but that this grass is admirably adapted to their rich mellow soils, nor that upon such soils it is highly productive and of good quality, and a very desirable crop where it is as difficult to grow Timothy as it is upon the prairies.

In the Eastern and Middle States it was sufficiently proved years ago as an annual plant yielding a very tolerable substitute for other hay, but not better than is supplied by Indian corn, oats or barley when cut green. It requires a rich soil, and is deemed rather an exhausting crop. If cut for fodder, it should be before the seeds fill, as otherwise the stems are hard and stiff. The well known Barn

grass, *Fanicum Crus-galli*, is a member of the same family, and has been occasionally tried for green fodder, and by some has been stated to be both nutritive and very acceptable to cattle.

Zea mays—Maize—Indian Corn. This is a proper grass in a botanical view, although like wheat, barley and oats, usually grown for its grain; yet as a fodder plant it is of exceeding value, and has come to be so appreciated by our farmers that many now grow it to greater or less extent, especially for feeding to milch cows during the summer drouth which occurs so often that it is always safe and wise to be prepared for it. As a resource in such case, it is the most valuable plant we possess, and deserves more extended culture. The only difficulty in the way of storing immense crops of dry fodder from Indian corn, is the extreme juiciness of the stalks and foliage. We yet need extensive and continued experiments to show the most feasible and economical method of curing it for winter use. Several methods have been suggested, and to a limited extent tried, but not sufficiently. One is to spread it upon racks in a building roofed over and open at the sides, and another by artificial heat in a manner analogous to kiln drying—both are said to have proved successful.

The amount which could be grown upon an acre is very large, greater than from any other plant, and when well cured it is exceedingly palatable and nutritious.

For this purpose it is deemed best to sow the Southern or Western dent corn in drills two and a half to three feet asunder, so as to allow the passage of the cultivator between the drills, and at the rate of three or four bushels per acre. When grown for winter use it should be sown quite thick and early, as thus it is more easily dried. If for soiling purposes, it should be sown at intervals of a week or ten days, beginning the latter part of May, and in all cases upon land in deep and fine tilth and well manured.

Sorghum ——— ? Chinese Sugar Cane.—This plant was introduced a few years since, with high recommendations both for the production of syrup and sugar and as a forage plant. In its latter capacity, the most contradictory results have been observed; and as many still deem it valuable for late fodder, it may be well, by way of caution, here to quote the following, translated from an article by the Marquis de Vibrave, published in a recent No. of the "Journal D' Agriculture Pratique." "If the effects observed, not

only in my cultivation, but also in that of many of my neighbors, be frequently renewed, we must necessarily ascribe to this plant a deleterious influence. On a farm of mine, twenty five horned cattle have been fed exclusively on Sorgho during a month; and from the day on which it was introduced, the journal of the farm shows a diminution of one half of the profits of the dairy; and this decrease was observed every month of feeding with it. Besides this, my neighbors assert that the cows fed on it are sterile."

ARTIFICIAL GRASSES. Among the plants used for the production of hay, and which are not properly grasses, but in every day language are spoken of as such, the one in most general cultivation is

Trifolium pratense—or Red Clover. Of this there are two pretty distinct varieties, the one commonly known as Northern and the other as Southern or Western Clover. The first attains a much greater height, has coarser stems, and ripens considerably later than the last. The Southern or Western gives a better second crop, produces seed more freely, and by itself, makes a better quality of hay, on account of the fineness of the stems and greater abundance of the foliage and bloom. Each has its warm advocates for preference, and both being so well known to most farmers, either from experience or observation, or both, it is scarcely necessary to discuss their comparative merits farther.

There is also considerable diversity of opinion among farmers with regard to the value of clover hay, much of which has probably arisen from the treatment bestowed in curing. If cured in the ordinary manner in which other hay is treated, the stems become brittle and the leaves and flowers, the most valuable part, become browned, crisp, and many fall off, and are lost. In this case it is inferior to herdsgrass or to good upland meadow hay from mixed grasses, but when cut in season and cured so as to preserve all its natural qualities, it is not deemed inferior, and many think it better for milch cows and for young and growing stock, while for working cattle its value is fully three-quarters that of hay from mixed herdsgrass and red-top, and perhaps more. The preferable mode of curing is to cut after the dew is off, and when thoroughly wilted, fork it into small cocks where it remains with no farther disturbance, unless it be a lightening or turning of the cock with the fork, until fit for the barn, whither it may be carried with safety while yet damper to

the touch than ordinary hay—if the weather be fair and dry usually by the third or fourth day.

Trifolium repens—White Clover—Dutch Clover—Honeysuckle. This is a very hardy perennial species, everywhere common and in some years very abundant. It is a valuable plant in pastures, adding considerably both to the amount and quality of the herbage. It is not much cultivated for hay, but in many fields of tenacious and moist soil, it gives a thick bottom which materially increases the crop; most abundant in moist seasons, often appearing in a wet year where it had not been observed before. This plant richly deserves a far greater degree of attention from the farmers of Maine than it has yet received.

Trifolium hybridum—Hybrid, Alsike or Swedish Clover. Of this variety I cannot speak from personal knowledge, it having been brought to my notice, not long since, by the late Dr. Cuming, Vet. Surgeon, of St. John, and known to readers of previous Reports, as a valuable contributor, and whose acquaintance with scientific and practical agriculture was both extensive and intimate. He spoke of it as being of comparatively recent introduction into Scotland when he left; as rapidly coming into favor wherever tried, and that not unlikely it might prove a valuable acquisition in New England. It has long been cultivated in Sweden, and is strongly recommended by writers, for cold, moist and stiff soils. It resembles the common red clover in duration, height and mode of growth. It has been said to last fifteen or twenty years, which is an error arising from the facility with which it sows itself when the flowers are left to mature. It is usually mown once for hay, and then left for pasturage. The stems are hollow, not creeping, but spreading unless sown close. It blooms profusely, the flowers resembling those of white clover, but larger and of a rose color mixed with white, and turning downwards, as they fade. They emit a sweet, agreeable odor, and afford an excellent forage for bees. The seed has been recently disseminated by the Patent Office, but what success has attended it, I do not learn.

In a publication issued by the Canadian Board of Agriculture, there is a communication from Mr. Patrick R. Wright of Coburg, under date of February, 1858, from which the following is taken:

“Having had enquiry made by several of my friends, who were

aware of my having cultivated the 'Alsike clover' for several years, and believing I am the only one who has done so in Canada, I wish to draw the attention of farmers to this new and admirable variety of the *Trifolium*.

"The Alsike clover is indigenous to Sweden, where it has been cultivated for the last century, and has in some cases been known to grow to the height of four feet; but in England, Scotland, and in *Canada*, about two and a half feet may be the average height. The root is fibrous, and the heads globular. The plant bears a greater resemblance to the white than to the red clover, and although its stems are recumbent, they do not root into the ground like those of the white clover; in short it may be described as a 'giant' white clover with flesh colored leaves. It will yield in the old country, two mowings annually, but in Canada one mowing, with a heavy second crop for pasture will prove the most profitable course to follow.

"Linnæus observed the Alsike clover growing on poor, bare, obdurate clays in the Morea, where no other plants could be made to vegetate; and yet under such unfavorable circumstances, this clover flourished with an uncommon luxuriance, and yielded shoots as tender and succulent, though not so abundant, as if reared in the most richly manured fields.

"Sturm says, it is found in Holland, and that he has tried its cultivation, along with that of a great number of other clovers placed under the same circumstances, and the result convinced him that there is no other kind of clover equal to it for the purposes of cattle feeding. With these remarks I most cordially concur. Both sheep and cattle are so fond of it, that the common clover, or Timothy and clover mixed, are quite disregarded, if access could be forced to the Alsike, both as pasture and hay. The common red clover will last only two years in perfection, and often if the soil is cold and moist, nearly half the plants will rot, besides its liability to be thrown out or winter-killed, and in the second year bald patches will be found in every part of the field; besides that, in September and October, many crops left for seed, are lost in consequence of the heavy rains during that period, while the Alsike clover, on the contrary, ripening its seeds perfectly *the first crop*, and continuing its vigor much longer, much risk and expense are avoided, and a larger

profit accrues; and when this plant is once established, it will remain for many years in full vigor, and produce annually, a great quantity of herbage of excellent quality. Four years ago, I obtained from Messrs. Lawson of Edinburg, five pounds of seeds, which I sowed to one acre, and as I was cautious in my experiment, mixed it with about two or three pounds of Timothy. It stood the winter admirably, and I cut the following year, certainly *not less than three tons* of the finest clover hay I had ever seen. In the end of June, and before ripening its seeds, I expected to have the second crop run to seed, which it did not, but produced an unparalleled mass of feed, so close and even and about one foot in length, that I could have fancied it would bear one up to walk over it. The second year I had an equal quantity mixed with Timothy, and I found the clover, when the seeds ripened, to suit the time for cutting the Timothy exactly, without blackening and going to waste, as the common red does. I consider this as its *greatest* recommendation, for we all know well, that red clover and Timothy, the usual mixture sown, is on account of the inequality of ripening, but ill suited for producing an abundant crop of *first class hay*, as the one or the other must be partially sacrificed. The third cutting, last year, was heavier than either of the former, such as only a first rate machine could have given the *coup de grace* to. By shaking, I got as much seed as has covered four acres with as fine a plant, and as thick as can be expected, and I feel confident in taking twelve tons of hay from the piece this year."

In a later communication, of July 6, 1858, accompanying a sample of the clover sent to the Board for examination, he says, "Upon my four acres, three men have been mowing three and a half days. There will be about fifteen tons."

Among the foreign notices of this clover, I find a report of a trial in East Lothian, Scotland, on an extensive scale, (upwards of sixty acres.) After stating the details of culture and results, the writer adds: "I have, therefore, every reason to be satisfied with the experiments I have made with this species of clover, having found it to grow freely and thick, and to be the earliest and finest herbage for any description of stock, that requires early, fine clover, especially up to midsummer. It is an invaluable auxilliary to red clover, and quite capable of forming a substitute for it. It has the

disadvantage of not bearing a drought so well as the Red, owing, I presume, to the fact that the surfaces of its leaves being less, and thereby not extracting so much support and moisture from the atmosphere during nights and mornings, as the other. It has a much finer stalk and its roots are not so strong, nor do they strike so deep, which may be the reason of its not standing the drouth so well." He adds his belief, that it is quite as well adapted to light as to heavy soils. From what I have been able to learn of this variety, I deem it worthy of careful trial in Maine.

I have already remarked that clover is not properly a *grass*, as it belongs to an entirely different order, viz:—the *Leguminosæ*, and not to the *Graminææ*—this, to be sure, does not concern the farmer who only desires a good crop of hay, but it is also true that the botanical distinction is not more marked than are their different requirements, for the proper grasses are greatly stimulated in growth by the salts of ammonia, which produce little effect upon clover. Clover, on the other hand, is greatly stimulated by the application of mineral manures, as gypsum, phosphate of lime, &c., which scarcely increase the growth of grasses at all.

This fact was very distinctly brought out in a series of carefully conducted experiments by Messrs. Lawes and Gilbert, reported in the last number of the Journal of the Royal Agricultural Society of England, and which were instituted to show the effects of different manures on permanent meadow land. These were quite too extended and elaborate to allow of even a brief abstract being given here, but I quote a single paragraph, which will suffice on this point:

"It will be shown in some detail in a subsequent section that the description of the increase differed extremely. In fact, where the ammoniacal salts were employed, the increase was exclusively due to the increased growth of *Graminaceous* plants—the so called *Natural Grasses*—there being scarcely a *Leguminous* plant to be found upon the plot. Where the purely mineral manures were used, on the other hand, the *grasses*, properly so called, were observed scarcely to have increased at all; whilst the whole plot was thickly covered with Perennial Red Clover, (*Trifolium pratense perenne*), and some other Leguminous plants. Such a result is perfectly consistent with what has been before established regarding the (so to speak) characteristic adaptation of mineral and nitro-

genous manures respectively to those crops of the respective families which are grown in our rotations." Farm yard manure, which contains both ammoniacal salts and mineral matters, was found to be of great benefit to both.

The hay crop of Maine is estimated at not far from one million of tons, and its value at ten millions of dollars annually*—quite as much, if not more than the value of all the other cultivated crops of the State taken together; and the most important interest in the State. If to this we add pasturage, the amount is materially increased—perhaps doubled.

The importance of this crop appears not only from its actual and comparative value as expressed by dollars, but from other considerations. In this climate we are compelled to feed stock for half the year from winter stores, and for these we must depend chiefly upon hay. Upon this then depend largely our flocks and herds, and upon these, our ability to enrich the soil so as to insure a yield not of the products of a stock husbandry merely, but bread for ourselves. Never was a truer saying, and seldom one of broader and deeper import, than the utterance of the Voice, "all flesh is grass."

From the nature of our surroundings, grass is and always must be the staple crop of Maine. The climate, it is true, if no other crops were to be grown, might be found better adapted to it if more equably moist and mild in spring; but look this vast country over, to Florida at the south, to California at the west, and see if, on the whole, any other State whatever has greater facilities in this regard than we!—the long winters even which we are so apt to deem a serious drawback, afford a protection to the tender herb in the warm blanket of snow which is not to be lightly esteemed, and which many others are deprived of.

Much of our soil is so "natural to grass," that when in condition to yield good crops of other products, we have to be active and vigilant to keep it out when this is desirable.

* This may be deemed by some too large an estimate for the past few years, in some of which the hay crop has not been very large, but when we note the fact, that in 1850 the census returns show a crop of 755,889 tons, and recollect too the proneness which always exists to *understate* in response to questions which may be supposed even to squint towards taxation, and also the large increase within ten years past, I think the reader will agree with me that it is a moderate one.

Such indications would naturally lead a stranger to the conclusion that grass is largely grown in Maine, and an examination will show that notwithstanding the present barren condition of so many fields, we still cut, in proportion to our population, about twice as much hay as the average of the States of the Union.

Such being the magnitude of this interest, it is patent that nothing else upon the farm better deserves earnest and thoughtful attention. If improvement can be effected by which the crop can be increased only a hundredth part, this will secure a gain to the farmers' pocket of one hundred thousand dollars—if increased one-tenth, it will amount to one million of dollars—if one half, the gain will be five millions, and if doubled, no less than ten millions of dollars; and if pasturage be included, as much as ten millions more.

I know of no reason why such an increase, or even a much greater one, in amount and value, may not be effected.

When we look at the thousands of wet meadows and unreclaimed swamps, many of them of considerable extent, containing untold quantities of vegetable food, and into which the mineral riches of hill and upland adjoining has been gathering for ages past, and which need but to be relieved of injurious water and supplied with air in its place, to equal in fertility for grass the best intervals by our rivers' side—when we look at the loss and waste of manure which prevails upon the great majority of farms in the State—when we look at the unclaimed fertilizers of the ocean—seaweed, muscle bed, fish refuse, etc., which are easily available along a sea-coast more extensive and more indented than that of any other State in the Union—when we look at the great diversity of methods employed in the preparation of the soil—in seeding down—in the treatment after seeding, in the time of cutting and the style of harvesting, all of which certainly cannot be the best, we cannot fail to see ample means of securing a vast, perhaps indefinite, increase, and of corresponding prosperity.

Suppose we look for a moment, more critically to the result of improvement upon a single point.

The hay crop of Maine is now harvested from more than a million of acres, perhaps a million and a quarter, or a million and a half. Suppose the same amount cut from half the surface, would there be any gain, and if so, how much? The cost of cutting, curing and

storing a ton of hay grown on an acre and a quarter, in average seasons, cannot be reckoned less than \$2 50, (many farmers put it at \$3 or upwards,) at present prices of labor.*

Two tons upon the same area can be cut, cured and stored, in circumstances otherwise similar for \$3.50 or an additional dollar per acre, and probably for less—a saving of 75 cents per ton, which upon the crop of the State, would amount to \$750,000. It might be said, and with truth, that the quality of hay grown at the rate of a ton and a half or upwards, per acre, is not fully so good as that grown at the rate of only a ton per acre; but when we recollect that by the supposed change, one-half the land now occupied as meadow would be left for pasturage, we find here a gain far out-

*I have found considerable difficulty in ascertaining with anything approaching exactness, the usual cost of baying in the State at large.

The following, from S. F. Perley, Esq., late President of the State Agricultural Society, is much the most precise and definite reply I have received.

"In answer to your question as to the cost of harvesting hay, I offer, in tabular form" figures, which I extract from my farm journal. It is proper to remark that the season has been extraordinarily favorable for the hay harvest. No time has been lost, and no work twice done; hay once spread was sure to be fit for the barn.

Number of Field.	No. Acres.	Dist. fm barn to center of field, in rods.	Yield per acre. lbs.	Cost of harvesting, per ton.	Cost of harvesting, per acre.
4	5	100	800	\$3 54	\$1 42
6	5	90	800	3 51	1 41
5	5	150	1,600	2 81	2 53
11	7½	50	1,600	2 78	1 84
10	5	50	2,400	2 32	2 78
1	3	40	2,600	2 32	3 10
8	12	30	3,000	1 77	2 52

You will perceive that my fields yield from 800 pounds to 3,000 pounds, per acre. The cost of harvesting being varied by the distance from the buildings, I have given a column of distances. The labor employed was equal to

Able bodied men's labor, 50 days, \$1.50 per day,	\$75 00
Machine labor, 3½ " 5.00 "	17 50
Horses " 11 " 75 "	8 25
Ox " 4½ " 1.00 "	4 50

42 tons, \$105 25—\$2 51 average.

The actual cost was somewhat below the above average, as part of my labor was hired by the month, which comes lower than day labor. The per diem can be changed to suit the locality.

I cannot give the cost of harvesting an acre, bearing two tons, from actual trial, as no one of my fields averaged that amount. But you will see that the *greater* the yield the *less per ton*, and the *more per acre*, the cost, and vice versa."

weighing the trifling inferiority in quality, and which should, in fact increase, rather than lessen, the estimated saving by a better husbandry. That such a gain is practicable, has been proved again and again. Repeatedly have farmers told me—"I now cut over but about half as much land as formerly, but I get fully as much hay, and get it easier." This is one, and only one, of the many ways in which saving or profit can be effected; and similar calculations on other points in hay culture, would show that immense gain to the agricultural interests of the State would result from the adoption of possible improvements in its culture and harvesting.

The value of hay as food for animals depends in large measure upon the time when it is cut and the method in which it is cured, yet notwithstanding the acknowledged importance of these points and the length of time during which the attention of thousands of interested observers has been directed to them, no conclusions have been arrived at which command universal concurrence. Consequently, practice varies according to the views held. Some cut as soon as the bloom appears, or even earlier, and others at all subsequent stages until the seeds fall, and the plants are so dry that the product may be stored almost as soon as cut. Such differences of practice must necessarily be followed by a wide variation in its value. That such variation actually exists, is evidenced by the fact, that upon the same quantity of hay, and this made from the same grasses, the stock of one farmer will thrive and that of another will dwindle. If hay was directly consumed by men and women, instead of being, as it is, an indirect means of their sustenance, it seems altogether likely that there would be, ere this, more general acquiescence on both the above points, and that the variation which might still prevail could be accounted for on the ground of differing tastes, as some would prefer more salt in their butter than others.

Upon the *value of grass* there is far less difference of opinion. Few will hesitate to admit that animals upon good pasturage, supposing them to come out in spring in a condition which enables them to progress at once and without waiting to repair the wastes of winter, will thrive more rapidly, on grass only, than upon any other food.

The principal point to be inquired into in order to decide the best period for cutting, is, when does grass contain the most nutriment?

And to this, no definite and precise answer can be given, which will be alike correct in all cases, for the reason that in different grasses, this stage is not the same, being earlier in some than in others; but for a general answer, both theory and the opinions derived from the experience of the great majority of intelligent and observing farmers, concur in the reply—When in full blossom, or while the bloom is falling. At this period, most grasses have, so far as can be judged, obtained from the soil and from the atmosphere, the greatest amount which they will have at any stage of growth, which is of value as food for animals, and these exist at this period in the most valuable form. The changes which take place subsequently, are chiefly within the plant; a part of the starch, sugar, gum, albumen, &c., soon go to assist in the formation of seed, and a part to constitute woody fibre, which is indigestible and worthless; and so much as is thus converted, is actual loss. Of hay cut at a later stage, cattle will doubtless eat less, and some infer from this, that it will “spend better;” but the true reason why they eat less is, because the system can digest and assimilate less. The actual benefit derived from hay is in proportion to the available nutriment contained in it.

There are other considerations, however, than simply the amount of nutriment, which should be taken into consideration in determining the preferable time to cut grass, as the use to which it is to be put. Many believe, that if designed for milch cows, it might be cut earlier than if for working oxen. The fact, that early cut hay is more palatable and better relished than late cut, should be an inducement, where all cannot be cut at exactly the best time, to begin in good season.

The difference between hay and straw, lies chiefly in the fact, that in the latter, most of the virtues of the plant have concentrated in the grain, and while, if this is to be used for seed, we cannot improve upon nature's process of ripening, and so do well to let it mature thoroughly in the field, we know that wheat cut before it is ripe, shows a handsomer kernel and makes better bread than if allowed to stand until perfectly mature.

Another reason for early rather than late cutting is, the increased quantity of aftermath. Allowing that with some grasses, the seed crop contains more nutriment than the flowering crop, the rowen obtainable, may, and we know often does, more than outweigh the

difference. One other consideration should be mentioned: the desirableness of leaving the plant when cut in the condition promising the greatest future usefulness. Many species of grasses may be cut with impunity at any stage; but as already noticed, with regard to Timothy, (Herdsgrass,) page 84, and such may possibly be the case with some others, there seems reason to believe that unless a certain stage of maturity be reached, the bulb or tuber at the bottom, may be weakened, and if drouth follows, perhaps killed. But in this connexion, it should not be forgotten, that in all herbaceous vegetation there is a tendency to die, wholly, or in part, on the production of seed. Thus annuals die at once, when they have attained the end of their growth, namely, seed for the reproduction of their species; and in many of them their duration may be continued for an indefinite period, by preventing this consummation. It is a common practice among gardeners in cultivating the annual mignonette, when a durable plant is desired, to deprive it of its flower-buds, as often as they appear. By so doing, the plant assumes the appearance of a woody shrub, and will live for three or four years, dying, however, after being allowed to produce seed.

Winter wheat which has been repeatedly cut down during its first summer's growth, has been known to survive the following winter and to produce a tolerable crop the summer after. The results of such experiments show that not allowing seeding in due season has a tendency to prolong the duration of life in plants; and it is upon this principle that by pasturing meadows they will maintain a continuous production of herbage, when were they cropped for hay they would fail, and this the more rapidly in proportion as the grass was older before being cut. So that, as a general rule, it is bad practice not to make hay early. Otherwise what is gained in quantity is mostly prejudiced in quality, and the after consequences are always unfavorable, circumstances arising not solely from the impoverishment of the soil.*

I have dwelt upon the proper period for cutting, longer than otherwise might seem expedient, partly from a conviction that in the State at large far greater loss is sustained by too late than by too early cutting, and partly in view of the fact that improved facilities

* Buckman.

for harvesting enable the farmer better than formerly to choose his time.

When an acre can be cut in an hour which formerly required the best part of a day, and raked with a proportionate saving of time, it is evident that this subject assumes a greater importance than when, however well he might be advised as to the best time, he was compelled to lose considerably at one end or the other, not to say at both.

The nutritive value of the different grasses compared with one another is a subject of great importance, and one which has received much attention. Its study either by the aid of chemical analysis or by actual trials in feeding, is beset with difficulties. Every good farmer can understand how the age, condition and temperament of an animal, and the treatment in other respects than that of feeding, together with a thousand other circumstances difficult of accurate estimation, might vary results; and the great discrepancies in the nutritive values of various vegetable foods as assigned to them by different authors who base their statements upon feeding experiments, also show that there is abundant margin for fallacies to creep in, by this mode. Every good chemist, too, is ready to admit that his utmost skill and care will not unfrequently give results widely differing from those obtained from actual feeding. The labors of both have not been without a degree of practical value, and as science and practice never advanced more rapidly than now, or were so willing to walk hand in hand, we may hope that by and bye, through the united labors of the feeder in the stall and the chemist in his laboratory, we may attain much greater light, and reliable results by which we may be safely guided.

The first extensive and careful experiments which threw light upon this subject, were instituted by the Duke of Bedford, and carried out and published under the superintendence of Mr. George Sinclair, in 1824. The method then adopted to ascertain the nutritive value of any grass, although directed by Sir Humphrey Davy, and the best which chemical science at that comparatively early day could give, was exceedingly imperfect. It was simply this: submit the grass to the action of hot water till all its soluble parts are taken up; then separate the liquor, and evaporate to dryness. The product of solid matter was deemed the nutritive matter of the grass.

Subsequent to this, Boussingault, an eminent German chemist, attempted to establish by a more scientific mode, a theoretical table of the nutrition of articles of food, founded on the amount of nitrogen they contain; (because the nitrogenous or flesh-forming constituents in food, being the most important and most expensive materials, their determination affords a better basis for forming an approximate estimate of the entire relative value of articles of food than the determination of the fat, or heat, or bone producing constituents;) but when he came to test by this table, their practical value, he found it to be, in many cases, at variance with the experience of acknowledged good farmers and feeders, and confessed that the amount of nitrogen in a food must be regarded as one factor only, though a very important one in estimating the nutritive equivalent.

More recently still, Prof. Way has made extensive and minute investigations, and his results are undoubtedly the nearest approximation to accuracy which have yet been obtained. His chief inquiries were, to ascertain,

First, The proportion of albuminous or flesh-forming substances; that is to say, all which contain nitrogen, and which when digested, go to form the muscles or flesh, and cartilages, and to repair the constant waste which goes on in the animal system;

Next, The proportion of oily or fatty matters, which so directly tend to increasing the fat of the system; also the proportion of heat producing principles or elements of respiration, as sugar, starch, gum, &c., containing no nitrogen, but which are used in sustaining animal heat, by furnishing carbon, and if not wholly needed for this, assist in the formation of fat;

Next, The proportion of woody fibre; (inert and worthless;) and

Lastly, The amount of mineral matter or ash, a portion of which goes to the formation of bone.

The researches of Prof. Way, covering as they do, all the different classes of constituents, and having been conducted with great skill and scrupulous care, may justly be deemed of great value, and relied upon with considerable confidence.

The results of his analysis of some of the natural and artificial grasses, are as follows:

Analysis of Grasses. One hundred parts as taken from the Field.

	Water.	Albuminous or flesh forming constituents.	Fatty matters.	Heat-producing constituents.	Woody fibre.	Ash, or mineral matters.
Meadow Foxtail,	80.20	2.44	.52	8.59	6.70	1.55
Sweet Scented Vernal,	80.55	2.05	.67	8.54	7.15	1.24
Tall Oat Grass,	72.65	3.55	.87	11.21	9.37	2.36
Orchard Grass,	70.00	4.06	.94	13.30	10.11	1.50
Hard Fescue Grass,	69.33	3.70	1.02	12.46	11.83	1.66
Perennial Rye Grass,	71.43	3.37	.91	12.08	10.06	2.15
Italian Rye Grass,	75.61	2.45	.80	14.11	4.82	2.21
Timothy Grass,	57.21	4.86	1.50	22.85	11.32	2.26
Annual Spear Grass,	79.14	2.47	.71	10.79	6.30	.59
June Grass,	67.14	3.41	.86	14.15	12.49	1.95
Rough Stalked Meadow Grass,	73.60	2.58	.97	10.54	10.11	2.20

ARTIFICIAL GRASSES.

Red Clover,	81.01	4.27	.69	8.45	3.76	1.82
Perennial Clover,	81.05	3.64	.78	8.04	4.91	1.58
White Clover,	79.71	3.80	.89	8.14	5.38	2.08

Analysis of grasses. One hundred parts of the grass dried at 212° Fahr.

	Albuminous or flesh forming substances.	Fatty matters.	Heat-sustaining substances.	Woody fibre.	Ash, or mineral matter.
Meadow Foxtail,	12.32	2.92	43.12	33.83	7.81
Sweet Scented Vernal Grass,	10.43	3.41	43.48	36.36	6.32
Tall Oat Grass,	12.95	3.19	38.03	34.24	11.59
Orchard Grass,	13.53	3.14	44.32	33.70	5.31
Hard Fescue Grass,	12.10	3.34	40.43	38.71	5.42
Perennial Rye Grass,	11.85	3.17	42.24	35.20	7.54
Italian Rye Grass,	10.10	3.27	57.82	19.76	9.05
Timothy Grass,	11.36	3.55	53.35	26.46	5.28
Annual Spear Grass,	11.83	3.42	51.70	30.32	2.83
June Grass,	10.35	2.63	43.06	38.02	5.94
Rough Stalked Meadow Grass,	9.80	3.67	40.17	38.03	8.33
ARTIFICIAL GRASSES.					
Red Clover,	22.55	3.67	44.47	19.75	9.56
Perennial Clover,	19.18	4.09	42.42	25.96	8.35
White Clover,	18.76	4.38	40.04	26.53	10.29

The harvesting of hay is one of the most important operations which the farmer is called upon to undertake, and requires for its successful accomplishment, great activity and industry, close attention and skillful management.

Of the time when it should be cut, we have already spoken. Of the height at which it should be cut, it may suffice to say that this should vary according to circumstances. Where the meadow is chiefly of well grown herdsgrass, (Timothy,) and the season hot and dry, it is not deemed safe to cut closer than below the second joint, (see pages 84-85,) but where other grasses chiefly prevail, and especially if the meadows be partially exhausted and the crop light and fine, and the season a moist one, it may well be cut much closer, leaving perhaps as little as may be. Wet meadows or swales, yielding what is called "fresh hay," and upland meadows, receiving a top-dressing soon after, may be cut very closely.

Grass, in its best estate, being universally acknowledged to be unsurpassed for food, and being incapable of preservation on account of the amount of water it contains, the problem in hay-making at first blush would seem to be, how to deprive it of water in the easiest and quickest manner, to an extent sufficient to enable it to be stored with safety; and the answer which most naturally suggests itself to this is, to expose it as fully as possible to drying winds and sunshine; but in practice this method is found to result in a hardening and brittleness of the stalks and leaves, and a loss of sweetness, flavor and aroma. The deprivation of water is not the only point to be considered. In grasses at the proper stage for cutting, we find the nutritive juices to hold much sugar, gum, vegetable albumen, &c., which are capable of undergoing certain spontaneous changes, in regard to the nature of which we are very imperfectly informed. One of these, the process of fermentation, is one of the most obscure of all chemical processes, but happily although science may not yet be able to explain fully all which occurs, practice has not left us ignorant of its results.

It is a well established fact that a partial sweating of grass is needful in the process of curing, in order to develop and secure the best properties of good hay. It is also important that this should not be violent, but gentle and gradual in its progress, and that it be

arrested at the proper stage, as otherwise the changes attending it would result in damage and loss. In such sweating, which is a partial fermentation, there take place many different chemical changes, which together with their effects are more fully set forth than I have ever seen elsewhere, in a communication received from Dr. Samuel L. Dana, well known as a distinguished chemist, in reply to a note of inquiry touching this matter, and which is as follows :

“ Growing grass is a mass of ferments and fermentable principles, combined with neutral substances and mineral matters. By ferments, I mean matter capable of exciting fermentation. By fermentation, I mean a change in the state of a body attended with production of carbonic acid and alcohol. By fermentable principles, I mean bodies capable of undergoing fermentation : or simply a change without loss of substance. By neutral principles, I mean fatty and waxy matter. By mineral substances, I mean the earths and salts, which form the ash of burned grass.

The elements above enumerated form the skeleton of the grass, which is clothed with green drapery, composed of a neutral substance, which like the coloring matter of blood contains iron as one of its components. The whole plant is rendered plump and soft by an excess of water—the sap of the vegetable.

The ferments are composed of four chemical elements—carbon, oxygen, hydrogen, and nitrogen. They form a distinct group, composed of albumen, gluten, &c., united to sulphur and phosphorus.

The fermentable matters also form a distinct group of well defined vegetable principles, all connected by a common bond, and behaving much alike under similar circumstances. This group comprises :

1. Woody fibre.
2. Starchy matter.
3. Gummy matter.
4. Sugary matter.

These are composed of carbon, hydrogen and oxygen, only the last two being in just the proportion to form water.

5. Jelly matter composed like the above, but with oxygen in excess.

If the members of these two groups were in a perfectly dry state, no change would occur. They are capable of acting on each other

only in the presence of air and moisture. This is the condition of freshly cut grass, free from dew or external wet.

The question then presents itself, what are the changes occurring in hay-making.

1. The ferments begin, almost as soon as life ceases, to act on the sugary matter. This is changed by a true fermentation into carbonic acid and alcohol, accompanied by various ethers and essences—dependant on the peculiarity of the ferment. This last always undergoes change during its action on fermentable matter. Both lose weight from the escape of gas.

2. The starchy matter cannot ferment like sugar. Certain albuminous ferments rapidly convert starch without loss of substance into gum, and ultimately this into sugar. This is effected by diastase, a substance produced by fermentation. Hence malt quickly changes the starch into gum and sugar in the brewer's mash.

Starch is also changed into gum and sugar, by the long action of weak acids, even by very weak vinegar, but we have no evidence that carbonic acid evolved during fermentation so acts, nor that vegetable acids, existent in plants, change starch to gum and sugar, as they promote the conversion of sugar into alcohol.

In *wet* hay, it is possible that the starch swollen by previous heating may be converted to gum by exposure, an effect well known to be produced on starched clothes in damp weather. They iron limpsy.

3. Gummy and jelly matters—these change not. Gum is already food in a soluble state, but by prolonged wet, the gum becomes acid.

4. The woody fibre will undergo no change in hay-making, unless by prolonged wet. In this case, ferments act on it, and it undergoes change with loss of substance.

5. The neutral bodies—fat, wax, and the green drapery suffer change by converting grass to hay, even in the most favorable weather. I do not know the nature of this change. It is quite obscure. It is connected no doubt with the formation of alcohol and ethers, during the fermentation of the sugar, and is attended by a loss of fat and wax.

6. The mineral matters change not in hay-making so as to cause any loss of substance.

These various changes occur in curing in the best manner grass into hay. There is in this case, a certain loss of substance. Each

species of grass loses in proportion to its amount of ferment and fermentable matter, modified by the amount of sap, and by the weather. It is certain, cure hay how you may, that a loss of vegetable substance occurs. Experiments are yet wanting to determine if grass rapidly dried by artificial heat, preserves its nutritive powers unimpaired. If so, then artificial drying would require the dried grass to be pressed like screwed hay, to exclude air and moisture; for the best dried grass is greedy of the last. If it becomes moist, loss will occur. This loss is due chiefly to the change of sugar into carbonic acid, alcohol and volatile essences—the ethers derived from alcohol. This occasions a loss of actual nutriment. All we get in return is apparently the smell of new made, or making, hay. But this is more than the smell of a dinner, which you know was decided long ago to equal the jingling of money. This odor, the aroma of new hay-making in the cock, is probably worth more than the weight of the lost substance. I believe it is the result of experience, that all cattle eat hay, which has given off its odor by *sweating* in the cock or mow, better than that which has not undergone that process. Hence if artificial drying were practicable, it would not be advisable. So a bright, hot sun, shining in an atmosphere whose degree of moisture is far below saturation, rapidly dries grass, without making it into hay. If this sun-dried grass is cocked up, it rarely sweats and fills the air with its grateful fragrance.

In all its relations, sugar is the most active cause of the loss of weight and nutrition in hay-making. The amount of loss depends on the amount of sugar and the activity of the fermentation. After the alcoholic production has ceased, if the hay is damp, then the alcohol is converted into various acids, as the ferment becomes acid or alkaline.

Very little loss is due to any change on starchy matter. It is merely converted from an insoluble to a soluble state, from starch to gum, probably without loss of nutritive power.

Still less loss is due to gum-changes. Gum may become sugar by the action of ferments; but this change is not probable in hay-making. The loss then would be consequent on the production of alcohol.

The loss of fat and wax, in connection with formation of alcohol, has been alluded to. These escape volatile in part, and next to sugar, are the most prolific sources of loss. But the fat and wax

are by hay-making rendered more soluble by drenching rains or cold water. In this connection it may be worth while to ask, how these changes in hay-making affect its liability to injury from weathering and rain.

Of course the sugar and gum will be washed out, and so will the starch in proportion as it has been changed to gum. The action of moisture on starch has already been noticed. The chances are that hay will lose more by a drenching rain than by gaseous exhalations. By repeated rains, hay loses twenty per cent. of its nitrogen, and a total loss of thirty-six per cent. of its weight. Of its ash parts, it will give up to cold water about nine-tenths of its potash and soda, one-half to three-fourths of phosphorus, one-third to one-fourth of its lime. Magnesia and silica are also washed out. The practical lesson from all this is, get rid of the moisture of grass as rapidly as is consistent with the aromatic fermentation, then as far as possible exclude air and wet."

The effect of fermentation in causing changes to take place in vegetable products is forcibly illustrated in the case of several dye-stuffs, as indigo, litmus, woad, &c., none of which could be obtained from the several vegetables supplying them without the aid of fermentation. We know too that the tobacco of commerce does not consist simply of the dried leaves of the plant, but is an article in the manufacture of which a degree of fermentation could not be dispensed with.

The drying of grass in order to the best product of hay, should be gradual, and conducted with as little direct exposure to the sun's rays as may be. The proverb, which instructs us to "make hay while the sun shines," has its weak as well as its strong side. The experience of ages has agreed with no controversy whatever, that all medicinal herbs are better dried in the shade, and if so with medicinal herbs, why not equally so with nutritive herbs. This it is true cannot be fully accomplished with the hay crop, but the method of curing in swath and cock is a near approach to it. This method has long been in use for clover, but while more imperatively necessary for this and for coarse rank herdsgrass, it may be adopted with very decided, if not with equal benefit to the great bulk of hay cured. The preferable mode in all cases, is believed to be to let the grass lie as it falls, if cut by the mower, or if a heavy crop and cut

with the scythe, spread somewhat, *until thoroughly wilted*, then while yet warm, let it be raked and put in cocks of sufficient size to take on a sweat, at the same time not so large as to induce rapid or excessive fermentation in case the weather proves too wet to allow its being opened. If thus put in cocks, when only thoroughly wilted, (not dried,) and these of moderate size, and then *let alone*, there is little probability of serious injury from fermentation, while if rain falls, and it be let alone, it is probably less liable to injury from this course than if left in any other way. If, on the other hand, the weather proves dry, we may be sure that while the first sweating goes on, moisture is evolved from the inside of the cock as well as from the outside. A thickening of the juices takes place with a good degree of uniformity throughout the mass, and in most cases, if opened the next day, a comparatively short exposure will suffice to fit it for carting home. It seems scarcely necessary to say that hay in the process of curing should be sedulously guarded against rains and dews, and this the more so, as it approaches a state of fitness for the mow. If the soluble portion be washed out by rain, what remains is little better than indigestible woody fibre.

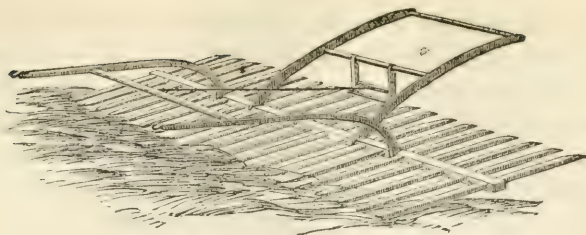
A point which seems less understood, and upon which, particularly in a season so remarkably favorable as the past, there is danger of erring, is the liability to dry hay too much. The degree of dryness needful to insure the best quality, is just so much as will save it from injurious fermentation when stored. If so dry that it does not settle to a good degree of compactness in the mow, we may be sure that it has passed the best stage. I have seen many mows this year into which the hand and arm could be thrust, with perfect ease, its whole length, and doubtless much farther, were the arm longer. Critical observation will enable one to determine the proper stage of dryness with tolerable accuracy. If over-dried, there is a brittleness or tendency to crumble upon handling, which sufficiently indicates the fact.

To no other source has the New England farmer to look with greater confidence for aid in his calling, than to the mechanical ingenuity of his countrymen, which may produce implements or machinery capable of economizing or rendering more effective human labor. The agriculturist, formerly slow to perceive that any change was necessary in the modes of culture or in the tools used by his

fathers, now realizes that changes may be made which shall be greatly to his advantage. True, all changes are not improvements, and no one more than the farmer has need to be cautious in adopting every new thing which is offered as a labor-saving implement, or as a wonderful improvement of any kind,—too often has he been sadly humbugged and spent his money for what was neither bread nor would help him earn his bread; but if there were really no improvements, there would be no pretence of any, and we have but to glance at the transformations which have taken place within the memory of man in the implements at present in use, to see that great gain has been effected.

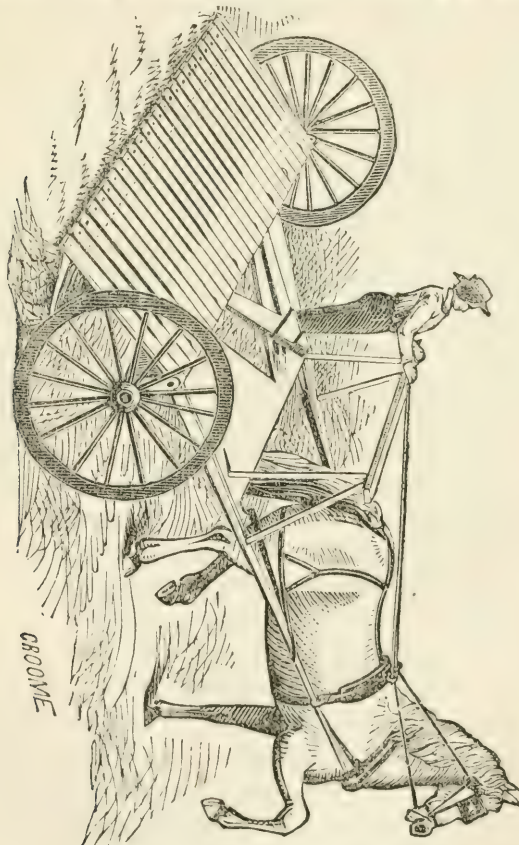
In no department of industry is the ingenuity of the mechanic more busy, than in that of agriculture. The reports of the Patent Office furnish the gratifying information “that the greatest number of patents applied for and issued of any one class, are connected with agriculture, and the fewest with that of war,” and this in the proportion of ten to one. We may safely ascribe this in great measure to the increasing scarcity of farm laborers and the higher price of labor, together with a growing appreciation in the minds of farmers of the need of employing any machine or implement which shall prove itself labor-saving and economical. It is an omen of good. When farmers' sons come to realize that science and art are ready to contribute to their necessities, and that by “gearing mind to matter,” they may earn a comfortable livelihood without becoming mere drudges, plodding forever a toilsome beaten track, but reserving time, not for luxurious idleness, but for mental improvement, and may thus assert for themselves and for their profession the position in the estimation of the world which the Almighty has decreed to them, they will be less prone than now, to leave the homestead and business of their boyhood for the glittering and deceitful prospects of city life.

Mechanical ingenuity has done as much and probably more, towards lightening the labors of the hay harvest, than towards any other department of agricultural labor. The horse-rake and mowing-machine, where they have been introduced, have wrought a revolution in hay-making. The former, from its simpler construction and more moderate cost, compared with the latter, has come to be very generally used and its advantages to be as uniformly admitted.



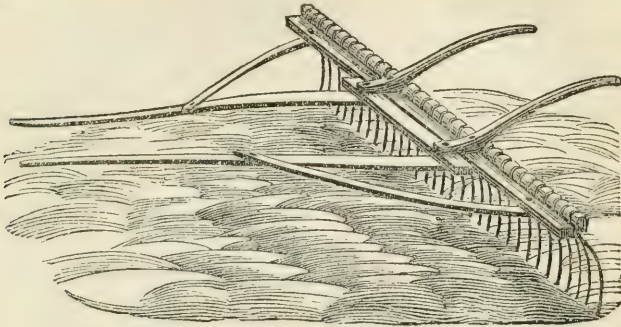
Revolving Horse Rake.

Judging from the replies to my circular of last spring, it would appear that the revolver is preferred by many farmers as doing good work easily, with all kinds of grass, upon smooth fields, while others whose fields are rough or encumbered with more or less



Delano's Independent Horse Rake.

obstructions, find the independent or wheel-rake much more satisfactory. The estimates furnished me by practical farmers, as to the saving effected by the use of the horse-rake, varies so much, viz: from a third to three-fourths, as to suggest a great difference of value in the implements used.



Spring Tooth Horse Rake.

The spring tooth horse-rake is, by some farmers, considered a desirable instrument upon new and rough grounds. It requires considerable strength to be applied by the holder, and is more liable than the above named to collect bits of loose turf, dust, &c., among the hay.

In what I may have to say about mowing-machines, it will be no part of my object to attempt to prove that any one is better than all others, or that any are perfect, or so good, or so cheap, as they probably will be a few years hence; but rather to state my conviction, and if possible, to enforce it as a fact, that the best machines of to-day, are so good and so cheap, that no farmer, who cuts fifty acres of grass upon land in tolerable condition for a machine to work upon, can afford to forego its advantages, even if he be obliged for this alone to become the owner of one. Nor is this always necessary, for in every neighborhood some one can be found of more than usual mechanical ingenuity and fitness, to use a mower, who might be entrusted with one purchased with the joint funds of several, and cut the grass for each, to the mutual benefit of all. Mowing-machines are not so great a novelty as some suppose. Many years ago, attempts were made in England to construct machines for mowing and reaping by horse power; but these first attempts generally met with very indifferent success. About 1805, Samuel Adams of

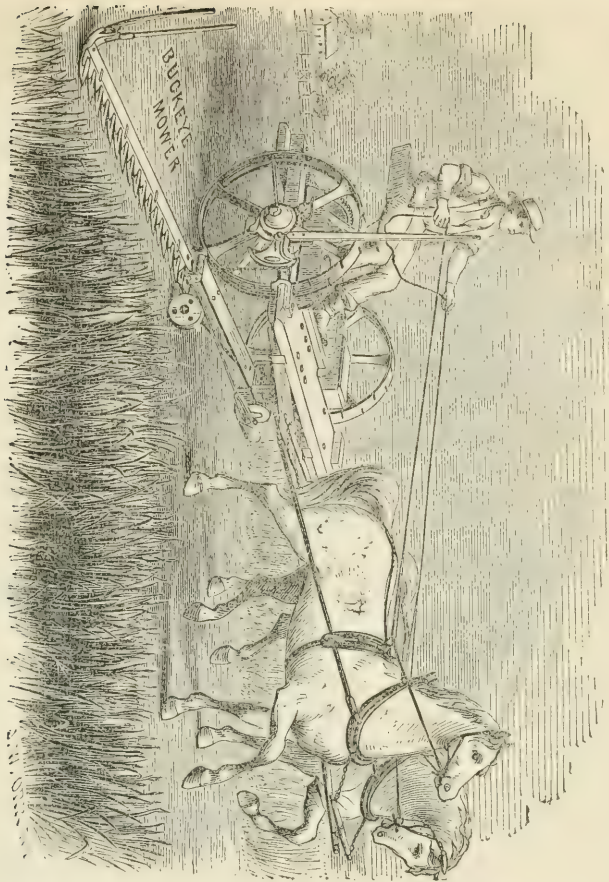
Kingston, Mass., invented and patented a machine, which however, failed to come into much use. About 1830, William Manning of New Jersey, invented a mower, and a few years later, the Ambler patent came out, both of which proved partially successful. About fifteen years ago, Hussey's reaper, and soon after, McCormick's, made their appearance. Within ten years, both mowers and reapers have greatly multiplied; improvements have succeeded one another with great rapidity, until at the present time, we have, beyond any doubt, several machines amply capable of relieving the farmer of a vast amount of the severest and most fatiguing labor connected with the farm, by substituting brute power at an economical rate in place of human muscles: nor are reliefs from exhausting labor and economy in the cost of cutting grass by any means the only advantages which these machines offer the farmer, for they enable him to cut his grass just when in its best condition, and so effect a very material increase of the value of his product over what it would be, if dependent entirely upon the manual labor usually at his command.

It should not be forgotten also, that the labors of farmers' wives, always sufficient to keep them busily employed, are often at the season of haying, so increased by the employment of a gang of extra hired hands, as to be seriously onerous and too often beyond their ability. Farmers' wives in Maine, have at best, a weary burden of care and labor. True, they do not, as in some other countries, labor in the field, (doubtless more open air exercise would be beneficial, and would be indulged in too, *if only they could find time for it*;) but including all—the physical labor, care and responsibility which is imposed upon, or assumed by, or some how or other by common consent, devolves upon them, nowhere in the world are women more severely tasked than they; and whatever may lighten their burdens, be it a sewing-machine or a mowing-machine, deserves attention—certainly from every husband and father.

Among the mowing machines which have been successfully used of late in this State, I present herewith, illustrations and descriptions of several, as offered by the proprietors.

Buckeye Mower.

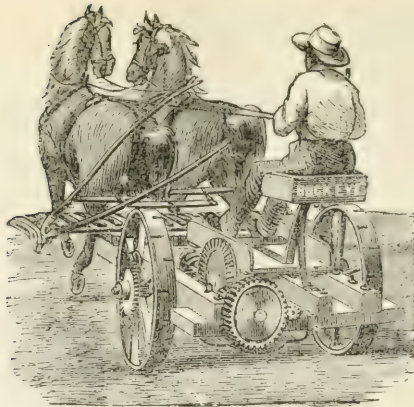
Of this mower, the proprietor, John P. Adrianne, 165 Greenwich street, New York, and Worcester, Mass., in his circular, says:



The Buckeye Mower as it appears in the Field.

“Its peculiar construction commands universal approval; the frame being supported on the two driving wheels, and the cutter bar attached to the frame by a double hinge joint, the cutters conform to the surface of the land independent of any working of the frame, either end of the bar being free to rise or fall without affecting the other.

The cutters are easily raised to pass obstructions by means of a lever at the right of the driver, and when so raised there is nothing outside of the driving wheel to obstruct the passage of the machine. *When not in use, the cutters can be folded over on the front of the frame in such a manner that the machine can be driven any distance*



As it appears on the road.

on the road. This feature belongs exclusively to this machine; and, besides its compactness, the convenience of having a machine always ready, or that may be made ready in less than a minute, for driving off one mile or more, is worthy the consideration of every farmer.

It is light draft,—a team weighing nine hundred pounds each, being sufficient to cut and spread an acre an hour, and work ten hours a day. It has no side draft, no weight on the horses' necks, and backs with the ease of a cart; the knives ceasing to vibrate while the machine is backing. It is almost noiseless in its operation; works well on any ground, side hills or salt meadows, and in any grass, whether lodged or standing. It will cut well, at a slow speed of either horses or oxen, and can be operated by a farmer's boy who can drive a span of horses. Among its numerous points of excellence are the following:

1. It is a two-wheeled machine—the wheels supporting the frame are both driving wheels, and operate together or independently, as required in driving the knives.

2. By the use of two driving wheels, you can make short turns to the right or left, without clogging or stopping the knives, which cannot be done with machines having but one driving wheel.

3. Instead of cogs, each driving wheel has two palls which work into ratchets and drive the gearing.

4. The palls are so constructed as to be held in or out of gear by the spring.

5. The knives never work when the machine is backed, and it takes no more power than to back an empty cart; this is an excel-

lent feature, and prevents injury to the knives when a small stone or other obstruction gets caught between them and the fingers.

6. The cutter bar is attached to the frame by a double hinge joint, which allows it to follow the surface of the land, without being affected by the working of the frame, and over knolls, ridges and through hollows, the independent action of the cutters is perfect—either end of the bar raising without affecting the other—and at no time has it to sustain the frame and gearing, as is the case with machines where the bar is rigidly attached.

7. The cutters are easily raised to pass obstructions by means of the lever, which is always under the control of the operator.

8. The cutter bar is in front of the driving wheels, and the seat in the rear, thus enabling the driver to see the operation of the cutters without interfering with his driving, and avoiding those dreadful accidents which frequently occur when the seat is directly over, or a little in advance of the cutter.

9. The gearing is all permanently arranged in the centre of the frame, distant from the driving wheels, thus avoiding all tendency of its being clogged up with mud or dirt.

10. The cutter bar being attached to the machine by means of hinges, can be folded up on the top of the machine without removing connecting rod, knife, or track clearer, as will be seen in the engraving.

11. The palls on the driving wheels can readily be thrown out of gear, and, by folding the cutter bar as above stated, the machine becomes as portable as a common cart.

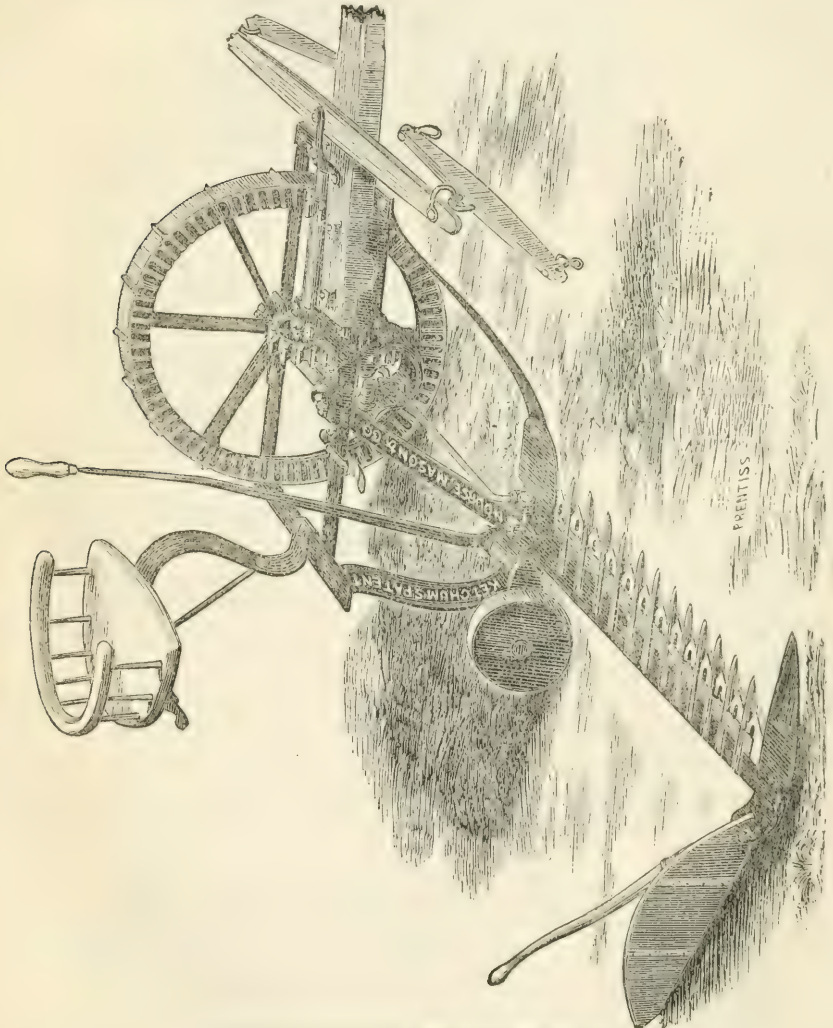
12. There is a wheel on the shoe next the gearing, in front of the cutter bar, thus avoiding all tendency of clogging at the near shoe, in passing over cut grass.

13. The off shoe is only two and a half inches wide, and the last knife cuts no more than any other, therefore leaving no ridge or high stubble at the end of each swath.

14. The cutter bar can be raised or lowered by means of an adjustable steel spring shoe at off end, and adjustable wheel at the inner shoe."

J. F. Anderson, Esq., of South Windham, writes me of this: "I am just as sure that the Buckeye is the best machine as every other successful operator is that the one he owns is the best. I am sure it is the most convenient to move around, from its having two bearing wheels and the folding bar. Mine has been over the road from one end of this district to the other. I did not get it until half through

the past haying season, yet it earned me \$60, reckoning my own at the price paid by the others, viz: (75 cents per hour.) I worked it the first day with oxen, and could stop and then start, cutting at once with so slow a team. The grass dries a third quicker from its being so evenly spread. I believe, too, there may be obtained a greater amount of hay per acre, with less injury to the roots, from its cutting so evenly."



Ketchum's Improved Mowing Machine.

The circular of Nourse, Mason & Co., reads as follows :

WORCESTER, MASS, JUNE 1st, 1859.

“After four years’ experience in the manufacture, sale and use of Mowing and Mowing and Reaping Machines, we are convinced of the practical utility of cutting grass, even on most of the lands in the New England States, by the application of machinery, worked by horses or oxen. From recent improvements added to Ketchum’s Mower, enumerated below, we believe that it is now the most perfect mower in use, and better adapted to uneven surfaces than any other machine manufactured. We can recommend it without any fear or misgiving, and do honestly believe that it is *the machine* above all others, to cut grass or grain with the *least draught*, the *greatest economy* and the *greatest success*. We invite your particular attention to the *lever* and *wheel* which have been added to Ketchum’s machine, as having advantages over all other machines; and the ease with which the driver can, while sitting in his seat, raise the finger bar instantly, to pass over stones, or any obstructions, or moving to and from the field. The following are among the many points of excellence of Ketchum’s Machine, as manufactured by us.

1. *Easy Draught* is attained, without any loss of momentum and power, which are essential in order to cut grass under all circumstances.

2. *The Machinery and Gearing* is so simple that any person can understand and manage the machine.

3. *Great Strength* is attained in every part, a feature which is indispensable in machinery to be used in rough field work.

4. *Durability* is an important feature, as none but cast and wrought iron of the very best quality is used.

5. *All Side Draught* is obviated by placing the pole in the centre of draught as near as possible.

6. *The Open Knife or Hole in the Knife Sections*, is one of the most valuable patents to prevent clogging, and belongs exclusively to the Ketchum Machine.

7. *The Location of the Finger Bar*, below the frame, and on a line with the shaft of the main wheel, secures a uniform cut, and causes the finger bar to follow the tread of the wheel over uneven ground.

8. *The Open Space* between the heel of the cutters and the main wheel, secured by an arrangement which is patented, prevents the clogging of the machinery by the cut grass on the return swaths.

Other machines have a dead point here, shoving and piling up the grass in front, or riding over it and raising up the finger bar, and some, infringing Ketchum's Patent, secure this same space, so important, by locating the finger bar before or behind the main wheel, although it is apparent that a location on the line of the shaft secures many advantages not otherwise attained.

9. *The Shield Plate*, or extension of the shoe upward and forward from the heel of the finger bar, is important to equalize the draught and prevent the cut grass from piling up in front of, and clogging the machine. This is patented by Mr. Ketchum, and belongs exclusively to the Ketchum Machine.

10. *The Hinged Track-Clearer* upon the outer end of the finger bar, also patented by Mr. Ketchum, is of great importance in cutting heavy grass, to separate the cut from the uncut grass, and to prevent clogging.

11. *The Wheel and Lever* attached to the inner shoe, ingeniously arranged, so that the driver can, while sitting in his seat, instantly raise the finger bar for the purpose of passing over obstructions, backing, &c. This has been very much needed.

12. A very important improvement in this machine is, that it can be instantly thrown *out of or into gear*, by means of a short lever, which can be operated with ease by the driver on the seat.

13. *The Finger Bar* is made of wrought iron, of the proper width to prevent the cut grass from lodging thereon, and the grass is ALWAYS EVENLY SPREAD.

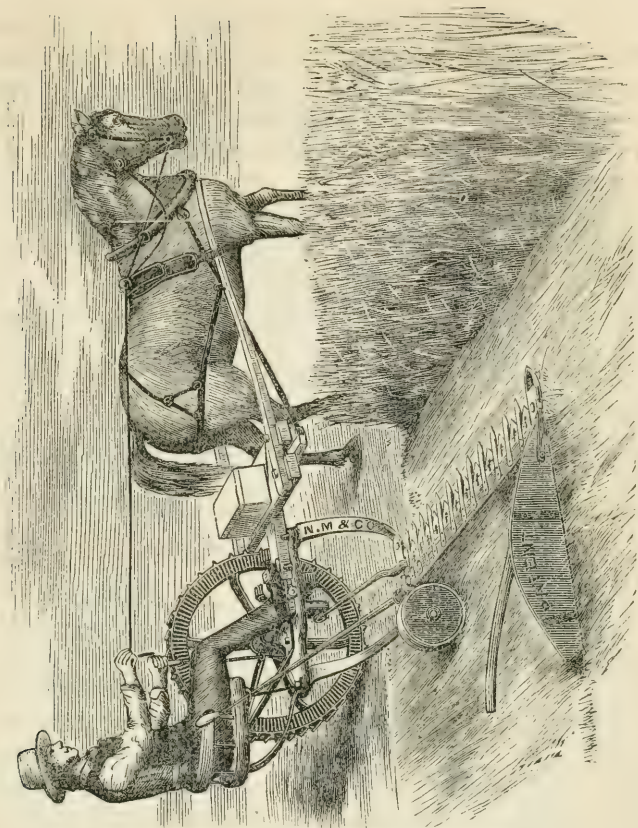
14. *The Height of the Cut* is readily adjusted by means of the pole bolts.

15. *An equal Balance* of the machine is always maintained by means of the seat and other arrangements, so that the machine will not tip over, and will always bear lightly upon the team.

16. One person, and even a boy, can easily manage Ketchum's Machine. Many others, particularly in heavy grass, require two persons.

17. *The Speed of Team Required*, is an ordinary walk of common farm horses.

After repeated and long continued experiments, in the field and manufactory, the proprietors have succeeded in producing a one horse mowing machine, which for simplicity of construction, lightness of draft, ease of operation, and the low price at which it is sold, must recommend itself to every New England farmer.



Ketchum's One-Horse Mowing Machine.

The machine is so constructed as to combine great strength and durability with the smallest possible weight; the cutters are so formed as to prevent entirely the liability to clog, so troublesome in some machines; it may be stopped and started in wet or lodged grass, without backing; the seat is conveniently placed, so that the operator can ride with perfect ease to himself and the horse; it has a wheel and lever attached, by which the operator can instantly raise the cutter-bar six or eight inches, to pass over a stone or other obstruction, and while raised, the machine may be drawn to and from the field, &c. The cutter-bar being always on a line with the axis of the driving wheel, this machine operates well on rough or uneven ground, where other machines cannot mow. A very important improvement in this machine is, that it can be instantly

thrown *out of or into* gear, by means of a short lever, which can be operated with ease by the driver on the seat. The machine is constructed entirely of iron, and its parts so adjusted and guarded against accidents, that it requires but little more attention to keep it in working order than the common scythe.

Prices of Machines.

One Horse Mowing Machine, 3½ ft. Bar, weight 450 lbs.	\$75.00.
Light Two Horse " 4 " " " 475 "	\$80.00.
" " " " 4½ " " " 480 "	\$85.00.
Heavy " " " 4 " " " 630 "	\$90.00.
" " " " 4¾ " " " 650 "	\$95.00.
" " " " 6 " " " 660 "	\$100.00.
Reaper attachment, extra,	\$20.00.

Extras to each Machine—1 Scythe, 2 Knives, 2 Fingers, and Wrench.

Machines delivered at Boston and Worcester.

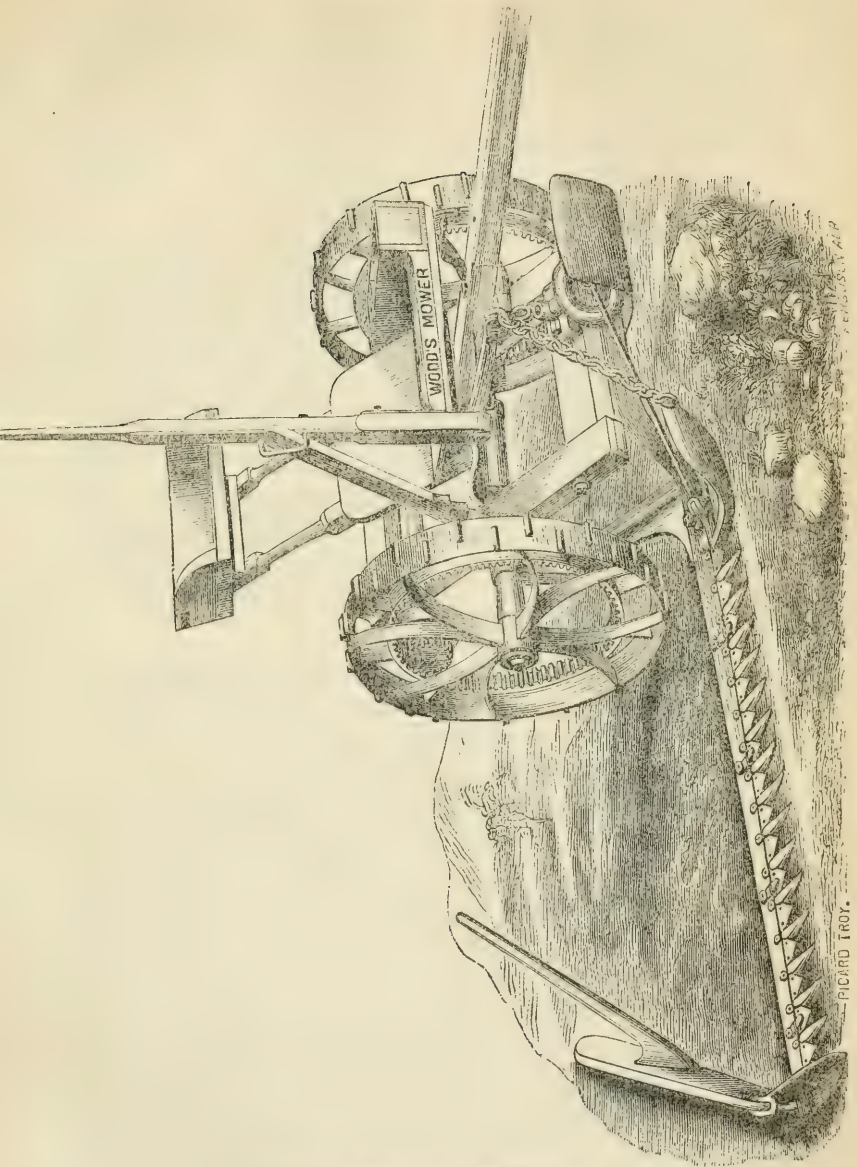
NOURSE, MASON & Co.

Worcester, Mass., 1859.

Woods' Mower.

Of this the proprietor says :

The success of this machine during the past harvest, the first it has been in use, is without a parallel in the history of mowing machines. Five hundred and eighty-eight of these machines have been made and sold by me this year. Farmers from all the grass-growing states of the Union have written me enthusiastically of their light draft and perfect cutting. I ventured to put so large a number into market the first year, from a full faith that I had, after many thorough experiments, attained the true mechanical and practical principles in constructing a mowing machine. My aim was to produce a mower of lighter draft that could be afforded to the farmer at a less price than any heretofore in use, and at the same time be light, durable, and do perfect work. It has performed all, and more than I claimed for it in the outset; and I now repeat, what I announced in my first circular, that my machine will cut a more perfect swath than any other mower made, and do it with one-quarter less power, as the report of tests herewith submitted will show. This is the first successful attempt to cheapen the price, and lessen the draft of mowing machines. The reduction in both is equal to twenty-five per cent. When my machine, weighing only four hundred and twenty-five pounds, was first placed on



WOOD'S MOWING MACHINE.

Patented February, 1859.

exhibition at the beginning of the harvest, farmers looked incredulous, and would hardly believe that so light and small machine

would mow heavy grass. But wise heads that shook ominously at the outset, looked a second time, wondered, and then believed. I adopted the principle that a mowing machine might be light, and at the same time strong; and that to be capable of doing heavy work, it need not itself be heavy.

I have added such improvements to the mower for 1860, as the experience of the past harvest has suggested to me; the most important of which is a lever arrangement for raising the cutter bar, and strengthening some of its parts. The mower is now complete and perfect in all its details. The usual number of knives furnished with a machine is two; the necessity for keeping the knives sharp, I think, requires that there should be three; this will enable the farmer to work through the forenoon without stopping to sharpen his knives, and after sharpening at noon to finish the day's work without interruption.

The price of the machine, the same as last year, \$80, delivered on the cars at Hoosick Falls, including three scythes, four guards, four sections, one wrench and oil can. One horse machine, \$70.

WALTER A. WOOD.

Hoosick Falls, September 1, 1859.

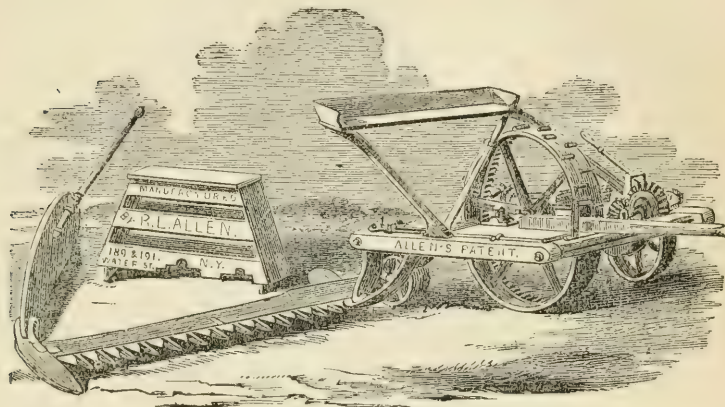
From a report of the judges, at a trial of mowers, instituted by the Duchess County Agricultural Society, New York, in June last, the following is quoted:

“WOOD'S TWO-HORSE MOWER.—A new machine, and much the smallest, lightest and cheapest, exhibited points well worthy the attention of all builders of mowing machines. The workmanship is excellent. It has two small driving wheels, has internal gearing, thereby giving additional strength—backs out of gear, is easily turned. The knives vibrate very rapidly, giving them a perfect cut. The fingers are very close together, making the knives less liable to dull. The finger bar is elastic and follows the surface well, whether rough or smooth, but does not fold like the Buckeye. The driver's seat is safe and comfortable, being back of the knives. Its draft is evidently very light.

Wood's one-horse machine is very similar to the above in construction, only lighter, and has a shorter cutter bar. It did its work to the satisfaction of all.”

Mr. Hiram Russ of Farmington, writes me under date of August 1st. “This year I bought one of Wood's one horse mowers, and it

does the business up to a charm. I consider it the best machine out to my knowledge. Some years ago Manny's and Ketchum's machines were used for a while, but were abandoned on account of heavy draft and not cutting our fine intervale grass close enough. Wood's mower cuts snugger than any man I can hire."



Allen's Mowing Machine.

Of this machine, no detailed description has been received from the proprietor, R. L. Allen, New York, and I can simply say that it is claimed for it, that it is strong, simple in construction, not liable to get out of order, compact, light, easy of draft, safe for the driver, and may be worked at a slow gait, by either oxen or horses; works well on rough ground, side hills, fresh or salt grass meadows, and will cut lodged grass or clover.

In a reply to my circular of last spring, Mr. E. R. French of Chesterville, writes me:—"Last season I took one of Allen's two horse mowers on trial, and liked it so well that I purchased it. It is simple, strong and durable, not likely to get out of repair, and of as light draft as any machine yet introduced. I examined quite a number, including Wood's, Buckeye, and Manny's, in order to get the best, and am satisfied that taking into account its convenience and adaptability to all kinds of work, this excels all others, which have yet been introduced among us. Two horses of one thousand pounds weight, each, are sufficient for the heaviest work. Mine weigh less than nine hundred each. I think it pays me twenty-five per cent. yearly, on the cost."

Other machines have been introduced into this State to a greater or less extent, as Hallenback's, Manny's, &c. Of the latter, Mr. Joseph Frost of Elliot, writes: "We have used Manny's mowing machine for two years; have worked it with horses and oxen; and with one man and a good span of horses, it will in heavy grass do more work and do it better than four of the best men we can hire can do with scythes in the same time. With Manny's mower, the revolver and drag-rake, we estimate our expenses in harvesting hay at fifty per cent. less than it was before we went into the use of these tools."

Manny's machine is also referred to in the following communication from Samuel F. Perley, Esq., of Naples, late President of the Maine State Agricultural Society, and one of the most intelligent and thoroughly practical farmers in the State. It was written me in reply to a request for a leaf from his experience in the use of mowers, and is commended to the attention of any who are yet sceptical as to the utility and economy of these machines:

"My experience with mowers has been in this wise. June 30th, 1854, I purchased a Ketchum's mower, No. 4042, at a cost of one hundred thirty-four dollars (\$134.) This machine performed its work well; left the stubble even, about the right length, and the grass well spread. But it was an ungainly thing to handle; wouldn't start without coaxing, wouldn't go without dragging, wouldn't back without lifting, would clog occasionally, especially if the wind blew fresh, and was a sad waster of horse-flesh, making no mention of galled withers. Still, with all its faults I used it three seasons, and found a profit in so doing.

July 28th, 1857, after a trial, I purchased a Manny's mower, No. 875, at a cost of one hundred and fifteen dollars. This machine has given almost perfect satisfaction. Two horses, weighing ten hundred pounds each, have run it in the hottest weather, at a speed of one acre per hour, without undue fatigue.

I find by six years experience that, in actual service, one man, two horses and a machine are, in an average of chances, in heavy and light grass, equal to five men with hand scythes, and one spreader, say six men. The work is better performed by the machine than by the most skillful hand mowers: the stubble being left even, none too high, none too low: and the spreading is more perfect than anybody's boy, or man, even, can do it.

By using the machine the crop can be harvested in less time, thereby enabling me to cut most of my grass when it is in the best condition. It diminishes the necessity for extra labor in the haying season; a season when, from the great demand, labor commands a high price, thus reducing the cost of the hay harvest. It is a relief to the most laborious part of haying, changing the burden from human to brute force, the change being rendered still more effective by the aid of machinery. And last, though not least, it is a great relief to the in-door department of the farm. It costs much less to board and lodge a mower constructed of wood, iron and steel, than its equivalent made up of blood, bones and muscles. The former is always "on hand" when wanted, the latter must sometimes be sought for.

I wish to disclaim, expressly, any intention, in the foregoing remarks, of "sounding a trumpet" for any particular machine, or patent. I found Manny's mower of 1857 better than Ketchum's of 1854; and I should expect *any* machine of 1859 to possess marked improvements over those of 1857. It is not to be supposed that mowing machines are yet perfect. Inventors, and manufacturers have done much, but farmers are expecting still more. A wider swath, without increase of draft is wanted. Also a practical one-horse mower for the farmer of ten to thirty acres of mowing.

A horse mower may be worked on land quite uneven and stony, so also may hand scythes, but it will be at the cost of extra wear of the implements, in either case, and is bad economy. Ground smoothly laid and freed from stones and other obstructions, is very desirable, though not absolutely indispensable, in the use of a mower as in many other tools.

Can mowers be employed upon the uneven, stony hay-fields of Maine? is no longer an unsolved problem. The only question now is, can they be used with a profit? I answer without hesitation, I believe they can. Every farmer in Maine who has thirty, or more, acres, mostly cleared of stumps and rocks, would, in my opinion, act wisely in procuring, at once, a mower. The rattle of fifty machines should greet the ear in many towns in the State, during the hay season of 1860, where only a solitary one was heard in 1859. Undoubtedly manufacturers are realizing large profits from their machines at the present high prices, and those prices must soon be reduced, but farmers cannot afford to wait for this. Purchase mowers now, wear them out, and be prepared then to purchase

other *cheaper* and *better* ones, should be the policy of farmers in Maine."

Another machine known as the "Tedder," or haymaker, has been used in England to lighten the labors of haying, and last year two of them were imported by the Massachusetts Society for the Promotion of Agriculture. It is understood that Messrs. Nourse, Mason & Co. of Boston, propose to manufacture them for sale next season. The principal information I have been able to obtain in regard to their working is contained in two letters published in the Transactions of the Massachusetts Society for last year, (1858,) and which are subjoined:

WALTHAM, Sept. 1, 1858.

MY DEAR SIR:—I have the pleasure to report to you about the working of the Tedding Machine imported by the Trustees of the Massachusetts Society for Promoting Agriculture.

The machine has been used with great advantage, and has given satisfaction to the haymakers. No part of it has broken, or yielded to the hard work done by it. It has been applied to the swaths laid by the mowing machine when they were dry enough to be turned and in the direction of the mower. If grass is cut by the scythe it works best by being driven across the swaths.

The machine has two motions, communicated by gears in the hubs of the wheels—one forward, which lifts the grass and throws it above, over, and behind the machine. The other motion is a reverse one, lifting the grass and throwing it behind. Both motions lift, open and spread the grass, more perfectly than can be done by a man and fork, and the machine does its work as fast as a horse carries it forward. It is heavy, does much work very quickly, and requires one good horse to draw it. I have been away from my farm much of the time of haymaking, but I may safely say that the men who have used it commend it highly as a labor-saving machine, doing its work without any delay.

The machine weighs 1090 pounds. Wheels, axle and framework, are iron.

Very respectfully, your obed't serv't,

GEORGE W. LYMAN.

To R. S. Fay, Esq., *Secretary of the Trustees of
the Massachusetts Society for Promoting Agriculture.*

SALEM, Aug. 21, 1858.

MY DEAR SIR:—I desire to express to you the satisfaction I have derived from the use of the Tedder imported by you for the Massachusetts Society for Promoting Agriculture. It was sent to me by Mr. Motley, after he had used it, and I only regret that I could not obtain it sooner. The difficulties we have all met with in making hay during the uncertain weather of this season, have given us peculiar opportunities for testing the value of any machine intended to facilitate the process of drying. And I was surprised to find with how much greater ease I could overcome these difficulties after I obtained the Tedder than before. With diligent use of the machine, I found one good drying day sufficient. Hay, which under the ordinary treatment would have been raked and cocked as unfit to go to the barn until the next day, was thoroughly made by applying the Tedder twice in the afternoon. And every farmer knows the value of this in a season when every “next day” was almost sure to rain.

The machine works with great rapidity and ease in almost all places. I tried it on rough land and smooth with equal success. I used it on hay lying in swath and in windrow opened by the fork, and it worked equally well in both instances. I found that it would thoroughly spread an acre of grass in fifteen minutes, without extra exertion—and the work when done was really done as no man with a fork could have done it, in any length of time. Not a particle of the grass had escaped exposure to the sun and air.

The construction of the machine is simple, strong, and entirely appropriate to the work. I found it better in heavy grass to use two horses, tandem, as the weight was rather more than I liked to put upon one—although this was choice, and not necessity. It required no repairs during my use of it.

I can safely say, that I have found no labor-saving machine more perfect. It enables us to make our hay easily, rapidly, and thoroughly, and makes us entirely independent of that kind of manual labor which requires constant watching, especially in the process of spreading and turning hay, and which is all that can be obtained in these modern days. It seems to me almost indispensable on large farms. After I obtained it, I set apart a field of about five acres for experiment in machinery. It was cut with the simple and admirable grass-cutter, Danforth's patent, sent to me by Mr. Thompson of Greenfield,—it was spread with the Tedder,—it was raked with the horse-rake in common use—and was ready for the

barn, without having had any manual labor applied to it, except to open the windrows, the morning after it was cut. I can only say that no five acres of my grass this season have been made into hay with half the economy and expedition that I was able to apply to these, by means of machinery.

I would express my obligations to you for bringing the machine into my notice, and I really trust our farmers will, ere long, be enabled to obtain them at reasonable prices, and of American manufacture.

Truly, your friend and serv't,

Geo. B. LORING.

R. S. Fay, Esq., *Secretary.*

The horse pitchfork is an implement which might be introduced to advantage upon many of our large hay farms. Pitching hay by hand labor is very fatiguing work, but by the use of this, brute force may be substituted; and as the effective force of a horse is estimated to be equal to that of five men, it should take only a fifth as long to pitch a load of hay by this mode as in the usual manner; and such is said to be the result of actual trial.

Several forks have been introduced for pitching by horse power, of which one recently constructed by C. E. Gladding of Troy, Pa., has some decided advantages over previous ones. It has a hinge-joint at the connexion of the head with the handle, so that by pulling a rope the fork is dropped and the load deposited instantaneously as it is swung to the most favorable spot. It may thus be used under circumstances where the horse fork without the hinge, would be of no use, as under a low roof, beyond purlin beams, or when the mow is nearly filled; nor is there the danger or inconvenience which might arise from the upward sweep and falling back of the handle of a fork without such joint. It is understood that Mr. Gladding proposes to furnish this fork with the necessary ropes, pulleys, &c., for twelve dollars.

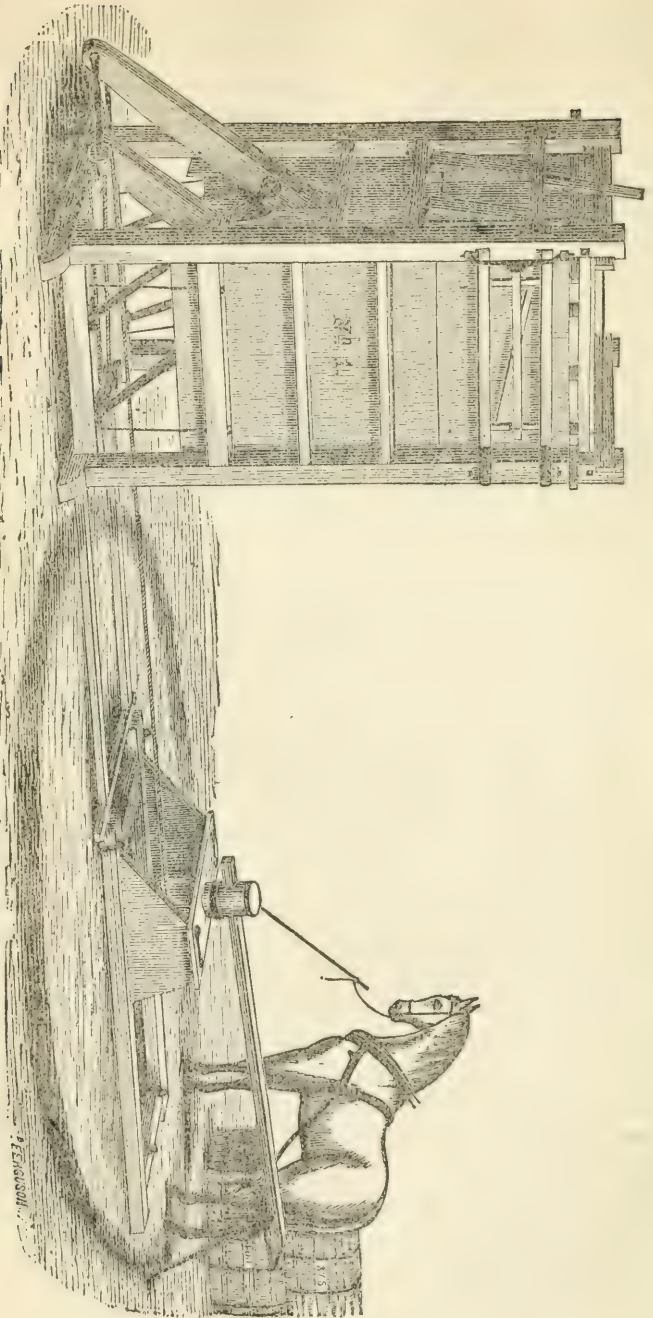
Caps made of cotton cloth for the purpose of protecting hay while in cock from dews, showers and storms, are an introduction into farm practice of comparatively recent date, yet have they so commended themselves by good works as to have come into general and almost universal favor. A few yet oppose their use, but rarely, if ever, is a farmer found to depreciate their usefulness and economy who has once fairly tried them. In the replies received to the ques-

tion of my circular on this point, no doubt is expressed by any one of their value; but some who have not used them express their intention to do so. Of those who have used them, a single reply will serve as a sample of the evidence received: "We use hay caps and find the advantage from them to be great. For instance: last season we cocked up a lot of hay on Saturday afternoon and capped it. Sunday forenoon it began to rain, and it continued wet and lowery for five days. On the return of fair weather we found the capped hay bright. Other cocks in the vicinity uncapped were soaked through and blackened, so that it was not worth half price. Good hay was worth here last spring eighty cents per hundred. If an expenditure of twenty-five cents for a cap saved forty cents worth of hay in that one storm, it must be apparent to the most obtuse that it *paid well*."

They are usually made of a square of cloth a yard and a half wide, with an eyelet hole in each corner in which a string is tied and fastened by wooden pins.

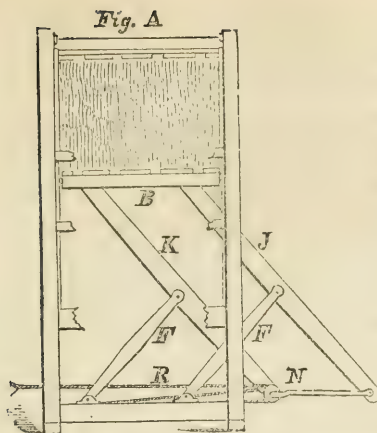
It is no part of my intent to recommend the present sale of hay from the farms of Maine, believing as I do, that as a general and almost universal rule, it is needful for some time to come, that the crops of our farms be consumed at home in order to bring up the productive power of our lands to a point where we may sell hay or grain, or both, and yet obtain maximum crops.

Wherever this is attained, and it is believed that no obstacle exists which need prevent its attainment upon a great majority of the farms of the State, or where the facilities for obtaining fertilizers from other than home resources are such as to admit of its sale *without detriment*, hay may be sold, if a remunerating price is offered, as well as potatoes or any other farm product. In the hope that rapid progress may be made towards an exportation which may not impoverish our lands and thus cripple our productive power, and, as for some markets, and particularly for shipment from the ports on our extended seaboard, it is needful to put it in more portable form than as it lies in the mow, or is pitched from it, I give below an engraving of a hay press exhibited at the last exhibition of the State Society at Augusta, and which has been received with great favor, having proved expeditious and efficient in accomplishing its work, and has received numerous premiums.



VERTICAL PARALLEL LEVER HAY PRESS,

Patented and manufactured by LEVI DEDRICKS, Albany, N. Y.



The plan of this hay press and the arrangement and operation of the parts will be readily understood by the annexed engraving, in which B is the follower, J K the main levers, F F the fulcrum levers, and N the connection rods. The power being applied at the rope R the levers and each end of the follower must move simultaneously, a mechanical perfection which the patentee avers cannot be attained by any other arrangement; and which is deemed necessary in order to obviate the friction and consequent loss of power experienced in other presses.

Mr. Dederick's prices are as follows :

		Bales from	Height of Press.	
No. 1,	(Stationary,)	375 to 425 lbs.	14 ft.	\$165 00
" 2,	(Portable,)	275 to 325 "	12 ft.	\$150 00
" 3,	(Hand Press,)	200 to 250 "	9 ft.	\$110 00

In my report for 1857, some pages were devoted to the preparation of lands for grass, methods of seeding, and to top-dressing and other means of increasing the hay crop. Numerous statements were also given from practical cultivators showing their modes of operation and success; so that it is not deemed so necessary now to treat these points at length as it otherwise might be. Since then, increased observation and experience have but impressed me more strongly with the importance and economical value of top-dressing. If, as often is the case, barn-yard manure can with difficulty be spared from hoed crops, or purchased for the purpose, it is recommended that muck, sand, clay, ashes, seaweed, or whatever can be procured, be applied, having a care to adapt the dressing to the character of the meadow, (as putting sand upon clay, clay upon sand, &c.) The best results have been by no means confined to the application of barn-yard manure alone. Composts made by carting muck, loam, sods, road and ditch scrapings, and the like, into the barn-yard, yarding the cattle upon it, and afterwards mixing thoroughly once or twice and applied in autumn at the rate of five to eight cords per acre, have produced a surprising degree of benefit.

Applications of stable manure to light soils have frequently proved of less benefit than composts containing clay, loam and vegetable matter. When stable manure is applied alone, it should be in autumn, and upon heavy loams. Unfermented stable manure directly from the barn-yard, applied in spring, is often unsatisfactory in its effects, besides which, it is apt to be left in lumps, which become dry and are liable to be raked up with the next crop of hay.

In every instance which has come to my knowledge where top-dressing has been judiciously and fairly tried, satisfactory results have followed, and I cannot but urge its more general adoption in practice.

Perhaps upon no subject connected with grass culture have we more to learn, or in connection with which there seems room for greater improvement, than with regard to the mixtures of seed to be sown. The almost universal practice is to sow only timothy, red-top and clover, and while it is readily admitted that these are the best if we are to be confined to three, it is equally certain that a judicious mixture of more kinds would result in greater productiveness. We may profit by the teachings of nature in respect of this. Let the turf of a rich old pasture be carefully examined, and we almost invariably find a far greater number of species than in lands recently laid down to grass. When we reflect that each species has its own peculiar requirements and abstracts its constituents from the soil in different proportions from any other, and some perhaps requiring what is not wanted at all by others, we can easily understand how with a larger number we may obtain a larger product, and this too with no greater practical exhaustion of the soil.

And another advantage accrues which is worth bearing in mind, namely, the greater variety of food thus furnished. All feeding experiments show that animals thrive better on a given amount of nutritive matter furnished in a variety of foods, than if given in a single form, as in hay, roots or grain alone; and for the same reason, hay of equal quality in other respects, is better if made from mixed grasses.

Again, mixtures should undoubtedly vary according to the purpose in view, whether for mowing, for pasturage, for soiling, or for an alternate crop. If for mowing, we should aim to have as thick a bottom as possible, and the grasses of various heights, and in this way each may be well developed, according to its kind, and the ag-

gregate crop be materially greater than if only one or two species be employed. For permanent pasture we would desire the most durable and nutritive grasses, affording food both early and late, and capable of resisting drought and bearing the closest cropping without injury. For soiling we might even employ annuals, like Millet, (Hungarian grass,) or Indian corn, which would be utterly unfit for pasture. For alternate husbandry, we would have an eye to amelioration of soil and the amount of vegetable matter to be furnished by and by in the decay of the roots.

Again, mixtures should vary according to the character of the soil upon which they are to be sown. We know perfectly well that some do better on heavy soils and some on light, some on moist and some on dry. There may be special cases where one would be as good, or better, than two, or ten, and there are many cases where five or ten would be better than one or two. All the above and a great many other considerations should be taken into account in deciding on the mixture to be used in any given case. It would be the height of presumption to attempt to give directions for mixtures best adapted to the different purposes and soils of the Maine farmer, for the simple reason that the knowledge is not yet acquired, nor can it be learned except by numerous, careful and protracted experiments, and these have not been made. They should be made, and the results published for the benefit of others. It is only by experiment that progress in any branch of practical agriculture can be accomplished. Von Thaer very justly remarks: "*Experiments, it is true, are not easy; still they are in the power of every thinking husbandman. He who accomplishes but one, of however limited application, and takes care to report it faithfully, advances the science, and consequently the practice of agriculture, and acquires thereby a right to the gratitude of his fellows and of those who come after.*"

A far greater degree of attention has been bestowed upon this subject in England than in this country; and although what would be good practice there, might be unfit here, we may yet obtain from it some useful hints, and I accordingly subjoin a few of the numerous mixtures which are recommended in foreign works, selecting such as seem nearest to our needs. They are intended to be sown with a grain crop:

For alternate Husbandry.

	For one year's hay.	Hay one year and pasture one year.	Hay one year, pasture two years.
	lbs.	lbs.	lbs.
Italian Grass,	9	9	9
Perennial Rye Grass,	18	18	18
Orchard Grass,	—	2	2
Timothy,	1	2	2
Yellow Clover,	—	1	1
Alsike Clover,	1	2	2
Red Clover,	8	4	2
Perennial Clover,	—	2	4
White Clover,	2	4	4

For our use, this would doubtless be greatly improved by substituting at least a peck (say eleven pounds) of Timothy at the expense of the rye grasses; and a similar change could advantageously be made with nearly all of them.

For Permanent Pasture.

	lbs.		lbs.
Italian Rye Grass,	6	Red Top,	3
Perennial Rye Grass,	8	June Grass,	4
Timothy,	3	Rough Meadow Grass,	2
Orchard Grass,	6	Alsike Clover,	2
Meadow Foxtail,	2	Perennial Clover,	2
Hard Fescue,	2	White Clover,	3
Meadow Fescue,	2		—
Tall Fescue,	2		47 lbs.

For Hay and Pasture in shady places, Orchards, &c.

	lbs.		lbs.
Orchard Grass,	6	Red Top,	2
Italian Rye Grass,	6	June Grass,	3
Perennial Rye Grass,	6	Lotus Major,*	2
Sweet Vernal Grass,	1	Perennial Clover,	3
Hard Fescue,	2	White Clover,	4
Tall Fescue,	2		—
Timothy,	3		40 lbs.

* This plant, of which I know scarce any thing, beyond its botanical name, was once

For dry sandy or gravelly soils.

Red Top,	3 lbs.	Italian Rye Grass,	4 lbs.
Tall Oat Grass,	3	Perennial Rye Grass,	6
Red Fescue Grass,	4	Yellow Clover,	4
June Grass,	4	White Clover,	4
Meadow Soft Grass,	3		—
Timothy,	3		38 lbs.

For reclaimed bogs of peaty or mucky soil.

Tall Oat Grass,	2 lbs.	Perennial Rye Grass,	5 lbs.
Orchard Grass,	3	Italian Rye Grass,	10
Rough Stalked Meadow		Yellow Clover,	2
Grass,	3	Perennial Clover,	2
Meadow Foxtail,	2	White Clover,	3
Hard Fescue,	6		—
Timothy,	5		43 lbs.

Upon peaty soils with us, Timothy usually succeeds remarkably well, and should form a large proportion of the seed.

The above examples are sufficient to convey an idea of the necessity which exists in the opinion of those most conversant with the subject, of employing a greater number of species of grass in seeding down than is customary among us. It is in fact deemed indispensable to the best success.

My report for 1857 embraced statements from a number of practical farmers as to the amount of seed required per acre. In this connexion it is believed that the following table compiled from Lawson's *Treatise on the Grasses*, and a prize essay of J. D. Sterling's, will be found of value :

COLUMN 1.—Contains name of the grass.

“ 2.—The average weight of the seeds per bushel, in pounds.

“ 3.—The average number of seeds in one ounce.

“ 4.—Shows in inches, the depth of cover, at which the greatest number of seeds germinated.

“ 5.—Shows, in inches, the depth of cover at which only about half the number shot into growth.

“ 6.—Shows, in inches, the least depth of cover at which none of the seeds shot into growth.

mentioned to me by a foreigner of great attainments in agriculture, as an exceedingly nutritive one, and probably well adapted for cultivation upon our clayey loams. I have not known of its being tried in this country.

1	2	3	4	5	6
Meadow Foxtail,	5	76,000	0 to $\frac{1}{2}$	1 to $1\frac{1}{4}$	$2\frac{1}{2}$
Sweet Scented Vernal Grass,	6	71,000	0 to $\frac{3}{4}$	1 to $1\frac{1}{4}$	2
Tall Oat Grass,	7	21,000	$\frac{1}{2}$ to $\frac{3}{4}$	$1\frac{1}{2}$ to $1\frac{3}{4}$	4
Orchard Grass,	12	40,000	0 to $\frac{3}{4}$	$\frac{3}{4}$ to 1	$2\frac{1}{4}$
Hard Fescue,	10	39,000	0 to $\frac{3}{4}$	$\frac{3}{4}$ to 1	$2\frac{1}{4}$
Perennial Rye Grass,	18 to 30	15,000	$\frac{1}{2}$ to $\frac{1}{2}$	$1\frac{1}{2}$ to $1\frac{3}{4}$	$3\frac{1}{2}$
Italian Rye Grass,	15	27,000	0 to $\frac{1}{4}$	1 to $1\frac{1}{4}$	$3\frac{1}{2}$
Timothy,	44	74,000	0 to $\frac{3}{4}$	$\frac{3}{4}$ to 1	2
June Grass—(Poa Pratensis,)	13	243,000	—	—	—
Rough Stalked Meadow Grass,	15	217,000	0 to $\frac{1}{4}$	$\frac{1}{2}$ to $\frac{3}{4}$	$1\frac{1}{2}$
ARTIFICIAL GRASSES.					
Red Clover,	64	16,000	0 to $\frac{1}{2}$	$1\frac{1}{4}$ to $1\frac{1}{2}$	2
Perennial Clover,	64	16,000	0 to $\frac{1}{2}$	$1\frac{1}{4}$ to $1\frac{1}{2}$	2
White Clover,	65	32,000	0 to $\frac{1}{4}$	$\frac{1}{2}$ to $\frac{3}{4}$	$1\frac{1}{2}$
Alsike Clover,	63	45,000	0 to $\frac{1}{3}$	$\frac{1}{2}$ to $\frac{3}{4}$	$1\frac{1}{2}$

The results in the last three columns were obtained by sowing the seed in finely sifted dark loam, which was kept moist throughout the process of germination, to which is attributable the circumstance of so many of the sorts vegetating best, as shown in column fourth, without covering, and under full exposure to the light. The combination of such favorable circumstances of soil and moisture can, however, be rarely or never calculated upon in field sowing. It would therefore seem the policy of the farmer to cover seeds, but as slightly as possible. The table is suggestive and instructive as to the quantity of seed to be sown, as well as regarding the proper depth of covering, for a little calculation will show that the amount commonly sown where a mixture of Timothy, redtop and clover is used, would suffice to give from one thousand to two thousand seeds to the square foot. Now as a sod can rarely be found containing a half or a quarter of that number of plants, it would seem that much seed fails, either from bad quality, too deep covering, or some other cause, and should suggest caution as to all the points on which success or failure may depend.

The practice of fall feeding, or pasturing meadow lands, is generally practiced by our farmers, and almost as generally condemned as injurious. The inquiry is an interesting one, whether the opinion, or the practice, is more correct, and an inquiry into their merits would likely show that much depends upon the manner and extent in which it is done. Upon mowing fields in good condition, (and

there ought to be none others,) there is usually a tolerable second growth which may in many cases be used as pasturage to quite as good advantage as to cut and store, or if not sufficient for a crop to be harvested, to be left unfed with the view to enriching the land by its decay or to protecting the roots during winter. The manure left by the feeding animals will increase the future product more than would the decay of the grass, and as for protection, if not fed too close, our usual winter's snow is quite sufficient. Turning in cattle upon poor meadows, or those yielding less than a ton per acre, and this as soon as the crop is removed, cannot fail to be injurious.

As indicating the opinions of some practical farmers, I append the following replies to a question on this topic :

FROM HIRAM RUSS, FARMINGTON.

"Feeding mowing lands in the fall, I consider the greatest injury imaginable, in this cold climate. It leaves the ground bare, and cold winters kill the roots."

FROM SAMUEL BUTMAN, PLYMOUTH.

"I feed off the after growth of my mowing lands partially, where there is much of it, in preference to cutting a second crop. Am not in favor of cutting a second crop, except on locations particularly adapted to the growth of grass. I consider close feeding on grass lands generally, as destructive to subsequent crops."

FROM JOSEPH FROST, ELLIOT.

"We do not consider it any injury to put cattle to eat off the after growth of grass, if put on at the middle of October, and not fed too close. Consider it very injurious to put cattle on as soon as the hay crop is taken off."

FROM GEORGE H. ANDREWS, MONMOUTH.

"When there is a burden of second crop, it will do to feed it off partially, but nothing is more injurious than to feed off in the fall what may have sprung up after haying. Our best farmers are well satisfied on this point and are abandoning the practice."

FROM E. R. FRENCH, CHESTERTVILLE.

"With regard to feeding meadows in the fall, I am not fully settled in my own opinion. It has always been our practice to feed

moderately after the late frosts commence, and am not aware that the practice has been detrimental to the hay crop. While I believe that too early and too close feeding is highly injurious, I think moderate feeding after autumn frosts may be profitable, as it causes the grass to thicken up at the roots, and secures a better under growth the following season."

FROM CALEB HODSDON, STANDISH.

. "The feeding of mowing fields in the fall, I think one of the great errors that farmers fall into. In 1853, I purchased a field of twelve acres, that had been feed snug in the fall, for twenty years, and as it was three-fourths of a mile from home, I concluded to fence it up and not feed it, and there has been a steady increase of hay, and I now cut double that I did six years ago, when I made the purchase. I think if farmers would have less field and feed less in the fall, and consequently more pasture, they would find it to their advantage. Ten years ago I turned half my field into pasture, and I cut more hay now than I did before."

Few, if any, of the States of the Union are better adapted by nature to grazing than Maine, yet no portion of her lands are more neglected than her pastures.

Necessity compels us to cultivate winter stores of forage in order to preserve the lives, and in a good degree the condition, of our animals; good policy would dictate, that after being preserved with such pains, they should when turned to pasture find feed in amount and nutrition amply sufficient to insure a *full* flow of milk, or a *rapid* increase in growth or weight. If we reckon the money value of the milk, meat and wool obtained from pasturage, we find it very far exceed that obtained from the consumption of all the hay, roots and grains which have been cultivated and harvested for their use at great cost, while the care and expense bestowed upon those pastures to render them fertile bears a small proportion to that given to the harvested crops. This, it is true, would still be the case under an improved husbandry; but that the disproportion at present existing between them is quite too great, and that true policy dictates that far more attention should be given to pastures, is a proposition so palpably true that no intelligent farmer would for a moment think of disputing it. In fact, our pastures to a considerable extent consist of lands formerly in meadow, and which have been cropped for

hay with no returns of fertilizing materials being made, until the product would little more than pay for gathering it, and have been turned out to pasture with a view to improvement under a neglect more wholesome than their previous treatment.

So general is the neglect of pastures in this State, that if my own observation be not at fault, where one acre can be found, upon which labor and expense have been bestowed for the express purpose of improving its condition as pasture ground, there are several which have been so hardly treated that they are confidently expected to improve simply by being thus used.

This naturally brings us to the consideration of the fact, of which it is difficult to say whether it is better known and more universally acknowledged in theory, or more ignored and neglected in practice, viz: that farmers generally strive to occupy too much land. An enlightened policy would dictate the reduction of what is subjected to the plow to the amount which can be properly manured and cultivated—to bring up so much of the pasturage as is not under the plow to a fair degree of productiveness, and so much as cannot thus be improved, be used to grow a good crop of wood or timber, instead of a worthless crop of bushes, brakes and weeds.

Wherever a rotation of crops can be adopted, let this be done, and let it include a definite term of pasturage. To such extent, if the rotation be judiciously carried out will good pasturage be secured. For the rest, let the means used be adapted to the nature of the case. In many instances where a rotation may not be practicable, the land may be plowed, harrowed and re-seeded.* This alone will often pay a large profit, and larger still, if at the same time an application of compost or leached ashes be made. If this cannot be done, as with a great deal of land in Maine, where from too steep

* I am aware that an opinion prevails among many farmers that the sward obtained by re-seeding plowed pasture, is greatly deficient, both in permanency and in the sweetness of its yield. That such has often proved to be the case, is readily admitted; and that such will continue to be the case so long as the seeding is confined to Red Clover and Timothy, we ought confidently to expect; as the former is only a biennial, and the latter (of first excellence though it be as a meadow grass) is unreliable as a pasture grass. We have yet to learn of the first instance where a sufficient re-seeding with the grasses which chiefly prevail in our best pastures has failed to give, within a proper length of time, a sward fully as permanent and yielding quite as abundant and sweet feed as any old one whatever.

elevation, or from the existence of ledges or large boulders, it is out of the question to plow to advantage and which is yet capable of yielding early, nutritive and sweet feed, we can adopt other means. If they be overgrown with running junipers, bushes or weeds, let them be cut clean, and after drying a few days, be burned, together with any decaying logs or stumps, and the ashes spread around. It is said that such cutting is most effective in the month of August, and the burning is of course best done on a pleasant and not very windy day. A liberal supply of seeds, consisting of white and red clover, and of redtop and other pasture grasses, should then be scratched in with a stout iron toothed rake, or a light, sharp harrow, bestowing a double dose of ashes (or manure) and seeds upon any bare knolls. It will be found of decided advantage not to admit cattle until at least the next season and somewhat late in the season, as the pasture grasses generally do not arrive early at such degree of maturity as to bear cropping without injury. Redtop in particular rarely amounts to much before the second and third years, and all are much better for getting a good growth before being fed down for the first time. If the bushes start again, it is needful that they be cut repeatedly until they die out; but for most bushes, rarely will more than a second cutting be requisite. Sweet fern and brakes are the most obstinate, but several cuttings the same season usually destroy even these. Canada thistles are a great pest, and whether in pastures or by roadsides, every farmer should contribute his share towards their eradication. They should be mown when coming into bloom—certainly before any seeds ripen, and repeatedly afterwards the same season. It is averred by some farmers that when mown just before a rain they rarely start again. However this may be, sure it is, that they can be eradicated by repeatedly cutting them during one or two seasons, beginning when they are in the height of their growth and vigor and following at intervals of a fortnight subsequently.

A few hours labor occasionally, may be spent to advantage on pasture grounds, in spreading the droppings of cattle and horses. If these be left as dropped, some plants are killed out, and those adjacent shoot into a rank, coarse growth, which is so unpalatable that cattle will not touch it until very hungry indeed; but when spread, an increased growth of sweet and palatable feed results.

Top dressing may be resorted to upon pasture lands, with equal benefit as upon meadow lands, and the same rules apply in regard to the fertilizers to be spread—gypsum, marl, ashes, leached or unleached, bone dust, pond, river, peat, salt marsh, or dock mud, marine manures generally, where these may be obtained, and even road scrapings, may all be used to very decided advantage, and often produce an improvement even more immediate, marked and durable than stable manure. Upon lands long cropped by milch cows and young stock, and which have thus yielded a large proportion of their phosphates to the milk, and bone carried from them, probably no application is equal to crushed bones, and it is sometimes necessary to resort to this dressing upon old pastures, not merely to produce increased fertility, but to obviate the effects of what is called *bone disease* in cows, and which is caused by a deficient supply of phosphates in their food. Whenever a cow is found eagerly nibbling or chewing a stray bone, as is not unfrequently the case, we may be sure she is suffering from a deficiency of the bone producing material in the food, and the remedy is obvious. If crushed bone cannot be obtained, leached ashes will serve this purpose, as they usually contain enough phosphate of lime alone to repay the cost. Liebig states that leached ashes from the wood of the common beech tree, yield about five times as much phosphate as is contained in rich animal manure.

Another point with regard to pastures should not be forgotten. It is impossible to secure a good growth of valuable nutritious grasses upon land which is encumbered with stagnant water either upon or near the surface. Under-draining is as useful upon pasture ground as upon meadow land, and if carried out would contribute greatly to the health of cattle, and particularly so in the case of sheep. Open drains, however, if suitably cared for and kept open, serve a valuable purpose; but unless drainage in some form be secured, wet, marshy, swampy lands, however well prepared in other respects, will soon become occupied with rushes, flags or water grasses, to the exclusion of nutritious feed, and to the detriment of the stock feeding upon them, besides being badly poached up by the tread of the cattle. Division of pastures, so that the stock may be removed from one portion to another, is in many instances, attended with advantages outweighing the drawback of increased cost for

fencing. Upon this point, Thaer* very justly remarks—"the division of pasture land into separate portions, whether these portions are close together or situated at considerable distances from each other, and the practice of successively turning the different kinds of cattle on to these divisions and then leaving the herbage to recover itself, is a system which possesses decided advantages over the practice of suffering the cattle to wander over the whole extent of the pasture ground. Cattle which are always confined in small spaces, do not spoil so great a portion of the herbage with their feet, as if they had more space to graze over. The grass is consequently uniformly eaten off from the whole of the ground and then left to recover itself. But when the cattle are allowed to roam over a large extent of pasturage, some parts remain untouched, and then the grass grows old and hard, while from others the herbage is cropped so close that it can scarcely shoot up again. Cattle are more quiet in confined pastures, and quietness is highly advantageous to them.

In using pasture ground, it is moreover necessary not to crowd it with a greater number of cattle than it can properly and advantageously support. When too great a number of cattle are turned upon the pasture, vegetation is checked; the plants have not time to attain their full growth; the cattle bite off the tops of them and then tear them up by the roots. On the other hand, it is equally injurious to a pasture for too small a number of cattle to be turned on it to graze. The effect of this is not only to diminish the utility of the pasture and the return that it yields, but tends to impoverish it. Under such circumstances the herbage shoots up in great luxuriance, and many plants appear, which the cattle will not eat after they have attained any height. These plants become strong and multiply, while the finer kinds of herbage, those best adapted for pasturage, disappear."

The plan of stocking partially exhausted lands with sheep, with a view to assist in their renovation, was alluded to in an article on that subject in my report for 1857, and I venture now to repeat a single paragraph in connection with the present remarks upon pastures. The peculiar advantages which they afford for this purpose are thus stated: The sheep of all domestic animals is the least dainty

* Principles of Agriculture.

in its tastes and the easiest fed, eating freely it is said of a hundred different species of plants which are refused by the horse and the ox. They are thus of great utility in cleansing foul lands by the extirpation of troublesome bushes and briars and noxious weeds. Nothing comes amiss to sheep; they feed upon all such with avidity and fairly destroy them. Their digestion of what they eat is so complete and thorough that no weed seeds after passing this ordeal retain any germinating power. Besides this, it is the animal which derives the greatest benefit from the food which it consumes and at the same time gives the most active and enriching manure to fertilize the land, and this when at pasture, it scatters not only copiously, but with remarkable evenness, over the land, thus aiding the introduction of choice and delicate grasses, while horses and neat cattle on the contrary, drop their excrements in large deposits, which tend to the destruction of the more delicate sorts of feed and the growth of such as is rank and coarse."

In Massachusetts much attention has been given to this method of improving pastures. I saw it recently stated that in Lynn some land was bought and enclosed about eight years ago, "a hundred acres of which would not afford a cow a living." Only as many sheep were first pastured upon it as it could carry, and the number increased by degrees so that the third year three hundred sheep were well kept upon two hundred acres. Mr. Sanford Howard who visited it then said it presented a striking contrast to its previous appearance. "On the parts most closely fed, the wild roses, whortleberries and blackberry bushes and wood wax were almost entirely killed, and there was a very good sward of blue grass, redtop and white clover." The editor of the New England Farmer writing lately from Hingham, says: "Some of the finest examples are afforded here of the effects of feeding sheep upon pastures that have become exhausted of nutritious grasses and grown up to briars, bushes, brakes and moss. I have seen pastures to-day that had become almost worthless, but now green and smiling as a lawn, with every inch among the rocks covered with the richest pasture grasses, and not a blackberry vine, wild rose bush, mullen or other worthless plant in sight. The sward does not seem compact and sound, but loose and porous, and filled with the most healthy and vigorous roots. The sheep grazing upon these pastures afford ample evidence of the

richness and luxuriance of the grasses upon which they feed. These examples, with similar ones that I have met in other places widely remote, would seem to shed light upon the perplexing question so often asked, 'How shall I reclaim my old pasture?' All over New England there are thousands of acres producing little or nothing, that might be renovated by the introduction of sheep upon them, while the profits from the sheep themselves I believe would be larger than from the same amount of money invested in cows. I have been told of an instance where a hundred acre pasture fed scantily only twelve sheep and six cows the first year, but on the second summer fed well twenty sheep and twelve cows, and continued to increase in fertility until more than double this number were well fed upon it."

Appended, are extracts from the statements of cultivators in various parts of the State, giving their opinions on grass culture and hay harvesting, in reply to a circular of inquiry sent out last spring. To have inserted all which has been received, would involve much of repetition and make the report more voluminous than is deemed desirable. Care has been taken to report all opinions at variance with the methods of practice advocated in the preceeding pages.

By E. B. RANDALL, LIMINGTON.

"Spring, and as early as the land can be worked to advantage, is the best time for seeding down with grass; then the grass has time to get well rooted before dry hot weather, which frequently kills late sowed. Spring sowing is more likely to live through the winter than fall sowing. Clover sowed in the fall is almost certain to winter kill. When land is well worked in the spring it is light, and grass roots will grow with grain roots soon enough to hold it from falling.

I think it best to sow with grain, and choose barley or wheat. By sowing grass seed with grain, they form a sward in a few days, sufficient to keep the land from falling heavy, which is a great benefit to grass in after years, and by sowing grain and grass together we get a crop of grain (or straw) the first year, and grass has the benefit of the straw stubble and the lightness which it has maintained during its growth.

My mode of curing herdsgrass or fine hay, is to mow it in the forenoon and spread it when the dew is off, and rake and cock it in the afternoon, if it gets dry enough; but if not, we turn it up, if

the weather is good ; the next day succeeding, the cocks are opened and turned up and stored, when it is as dry as can be handled without crumbling, (a stage that requires particular attention,) for more drying than that is injurious.

We let our clover lay in swath until the upper side is wilted, then turn it over ; next day cock it up with forks and hand rakes, and let it stand over night ; then re-cock it once a day until dry enough, never spreading the cocks after once made. Clover cut in full bloom and cured without the bloom fading, will retain its leaf and be worth as much per ton as other hay, but it takes a larger pile for a ton than it does of fine hay.

I prefer to cut clover in bloom, and other grass before the seed is full, when it contains the most nutriment ; it cuts easier then than it does after that period, which is a saving of labor, and all grasses that I am acquainted with, as their seeds ripen, their leaves ripen also, and fall or wither away.

Early cutting with good curing, secures good hay well filled with sugar, starch, gum and oil, just what is required to make flesh, fat, &c. ; but late cut hay only contains woody fibrous substance, with a little seed, the rest being shaken out before the cattle get it. Early cutting gives the roots a chance to sprout up and send forth a second crop before they are exhausted ; but late cutting serves to kill the roots, by taking all the sap from them and leaving them in their weakest state and their stalks open to hold water to kill or sicken all below.

Great loss is sustained by late cutting. Most farmers *begin to cut about one week too late*. I reckon labor worth one-third more in early haying than in late. Herdsgrass is more apt to rust than it used to be, and the old rule of letting it ripen its seed, endangers it for hay.

I have used top dressing some, in order to test the worth of it, or in other words, to know if it would do any good, for many of the farmers here said it would not ; but it will do good and may be made and applied to *pay well*. If manure cannot be made and applied to the land so as to pay something I am a ruined man."

BY HARRY HAMMOND, SANFORD.

"It is best to seed down grass land in the spring, because the roots get larger and will stand the winter better. Again, you can sow clover with safety, and have better hay by its being mixed

(clover, timothy and redtop.) When it is seeded in fall, nothing but timothy is usually sown.

It is better to sow grass seed with grain. It should be sown after the grain is harrowed in, and then be covered by brushing, as harrowing covers too deep: the grain being of more vigorous growth, protects the grass seeds from the scorching rays of the sun till the grain is taken off, which give seeds all a chance to germinate and become rooted. Wheat give us the best stubble.

I cultivate timothy and clover only. Redtop comes in naturally in sufficient quantities. I cut in the morning, open the swaths soon as the dew is off, let it lie till towards night, then am sure to put in cock before it is dampened any by the dews; next morning, when the ground has become dry and warm I spread it, and about eleven o'clock turn it over, and have it put in the barn by four o'clock while it is warm by the sun.

Clover I treat nearly the same, not dry it quite so much, and sometimes let it stand in cock the second day and get in the third. I consider clover worth some more for cows and young stock than other hay, but not so much for oxen that work.

I prefer to cut grass soon as the blossom begins to fall or change, as cattle will eat it as readily cut at that stage as any other, and it contains more nutriment, is better for fattening than if cut either earlier or later.

The effect of early cutting is, the hay is not worth so much on account of its not getting to maturity; cattle will eat it with as much avidity as later cut, but it is very apt to give them the scours; and if late cut, cattle will eat it only by compulsion through fear of starving, having lost the qualities which made it palatable; besides which, late cutting is destructive to the roots and permanence of the grasses, while early cut does not injure their permanence as the seed does not come to maturity.

I use no salt or lime in storing my hay except in cases of extreme necessity, I use a little salt, say two or three quarts to the ton.

Do not use a mowing machine, but think it a profitable investment under proper circumstances.

I use the wire spring tooth horse rake; think that the best unless the ground is perfectly smooth, when perhaps some other rake might be preferred, only by its being easier to manage. I can rake as much with my horse and rake as five men can in the same time with small rakes, and do it as well.

Do not use hay caps, but consider them a very useful article."

BY JOSEPH FROST, ELLIOT.

"I have plowed low meadow land in the fall, laying it in beds two to three rods wide, harrowed thoroughly, and seeded in March, with good results. Also, I have re-seeded land, the stubble or grass being killed out by the drouth, when sowed late in spring; re-seeded the following March, and received a fair crop of clover, the same year. I prefer March when grain is not connected. We have not sowed grass seed without grain on our high land, and always received a good catch of seed when sowed early in spring, or by 15th of May, except in years of severe drouth.

The best mode, in our opinion, of curing herdsgrass and redtop, is to cut it when the seed is fully formed, in the fore part of the day (the weather being favorable) put up at night, re-opened and frequently turned until dry. Clover to be cut and wilted; then put up and stand twenty-four hours; then opened and turned frequently, with a bright sun, until three-fourths made, and then mowed. We do not consider clover hay worth so much as herdsgrass and redtop by twenty-five per cent.

We prefer cutting herdsgrass and redtop when the seeds are about full, and before the grass changes its color. Clover may be cut when the blow is about half changed; better to cut earlier than later. Hay cut at the time above stated is worth twenty per cent. more than hay cut late, from grasses considered equal at the proper time. Early cut grass gives the roots a chance to recover and the frost does not have such effect as on the late cut, and the land will continue to hold out longer than by late cutting.

We consider very close cutting to be injurious to the next crop, unless the soil is wet and in high cultivation. I have not used salt for many years; we used it some years, at about one peck to the ton; do not consider it any advantage to hay, except in wet seasons.

Manny's mower is in use in Elliot, Kittery and Portsmouth, and neighboring towns, and in my acquaintance it has given general satisfaction.

I have been in the use of hay caps some years, made of cotton cloth. I obtained the widest cloth that could be found at the time, used a square with four stones, one* in each corner; they are not

* Stones, one to one and a half pounds, each.

so large as it is necessary, but have done me good service. I should advise to have cloth not less than one and half yards wide, and a square will make a good cap.

We do not consider it any injury to put cattle to eat off the after growth of grass, if put on at the middle of October, and not fed too close. I consider it very injurious to grass land to put cattle on as soon as the hay crop is taken off.

I have not top dressed grass land extensively. What I have, the result was good. Have done nothing in under draining; but have drained our low meadows with satisfactory results. We have done a large amount of ditching on salt marsh, and it has increased our crops of hay one-third, and the hay is of a better quality. Ditches on salt marsh ought to be made three feet deep and width sufficient to get out the mud."

BY CALEB HODGDON, GORHAM.

"Unless grass seed can be sown by the first of May it is best in four years out of five to sow in the fall or winter. The best catch I ever had I sowed in the winter on the crust. But for a number of years I have sowed my grass seed alone without any kind of grain, and am satisfied it is the better way; and if farmers would try it I think they would come to the same conclusion. There are many reasons for it; first the grain, no matter what kind, has a tendency to kill the grass. A few years ago I sowed a piece of winter wheat, about one quarter of which was winter killed in spots, and for three years I cut double the hay on those spots that I did in any other part of the piece; and this agrees with my observation since. I sow no other grass seed but herdsgrass and clover—formerly I sowed a mixture of redtop, &c., but it never amounted to much on my land. All the grass I cut in forenoon I spread out and wilt as well as I can, then in the afternoon I rake and bunch up in as small bunches on the ground as I can, but do not care how high the bunches are, and do not meddle with it until the third day unless it be in the latter part of the season when I am sure it will make fit to go in. My clover I never open until the third day. The present year I had two acres of clover, where I had five tons, I cut and wilted as above, and did not open until the third day at ten o'clock, when the ground was dry and warm, and at two that afternoon I commenced hauling in, and never had any made better. One of my neighbors cut a similar piece at the

same time, and opened his the second day and put it up again—his is now musty and mine entirely free from must. I consider my clover (cured in this way) nearly equal to any hay in my barn. I have tried the different kinds of horse rakes and think the revolving rake much the best. I think it saves me one quarter the labor in raking. I am aware that many say hay should not be cut until it is ripe, but my oxen and cows tell me a different story; they thrive and give the most milk on the early cut hay; and I think it spends equally well; and I find those same men that argue for ripe cutting when they come to purchase want my first cut hay. I commence haying the first of July, (this year the last day of June,) and I regretted this year that I did not put on more help the first of the season."

By D. W. DOLE, SOUTH WINDHAM.

"I prepare my ground, for grass, by planting first year with potatoes, with plaster in the hill; second year to corn, manuring well; the spring following, plow the ground as deep as it was broken up, thus mixing the soil and manure well together, and harrowing until it is mellow. In seeding down, people are apt to think too much of the grain crop, and put on too much seed, thereby preventing the grass seed from growing. In seeding down with grain, one and one-half bushels of oats, or other grain in proportion, is sufficient for *an acre*, to insure a good catch of the grass seed. I have found one peck of herdsgrass and six pounds of clover seed sufficient for an acre. Sowing too large quantities of grass seed has not a good effect. It swards the ground so thick that the herdsgrass and clover die out for want of room. Herdsgrass having a bulbous root, with numerous small fibrous roots that spread from two to six inches, thereby drawing nourishment for the stalk, requires room. Clover, too, has a large tap root that don't like to be crowded, but they grow admirably together, for the clover is short lived, and when it dies makes the herdsgrass heir to all its estate, land, roots and all.

Redtop and fowl meadow grow best on low land, where they cover the ground with a thick sward that kills out other grasses, and therefore should not be sown with herdsgrass or clover. They seem to be natural with us on lowish lands and give good crops of hay for many years in succession, without any cultivation. I prefer to sow the seed after the grain is harrowed in, and then brush it in with a brush harrow which will cover it sufficiently. I think

rolling land is not a good plan as it leaves the top hard and liable to bake, especially clayey soils, and leaves the ground so smooth that we are apt to cut the grain so close that there is nothing to protect the young grass from the sun and drouth. If the ground is a little rough, and you can't mow quite so smooth, you will leave a protection for the roots that will repay you in a few years. In getting hay I like to cut the grass when it has attained its full growth, as it then makes the most weight of hay and gives the most nourishment to animals. Make in the field until it will keep in the mow without heating; hauled in as near the middle of the day as convenient, for at that time there is the least moisture in the air, and I shall be pretty sure of good hay in winter. Some people drive into haying with no other motive than to get done first, and drive blindly on without discretion. Such, have poor, musty hay, for their cattle. "There is a time and a season for every purpose," and it is just as bad to be before as after it.

Mowing machines are used with good success here; all kinds of rakes, from the two legged one, that goes of itself, but is of no use in the field, to the independent tooth rake, are in use, but the revolver is most used; in fact all kinds of improved haying tools are used here."

BY E. G. WAGG, YARMOUTH.

"Sowing grass seed is best done during the months of April and May, with wheat or barley—wheat is preferable.

Some farmers seed their grass lands in August or September, and sometimes it works well, but is not so sure, as it is liable to be thrown out of the ground during the following winter or spring. Others prepare the ground by plowing and harrowing in the fall, and sow without grain, as soon as the snow leaves it in the spring. This method sometimes works excellently well, but as far as my observation extends the grass does not hold out so long as when sown on a well prepared soil with grain.

The quantity of seed varies with different cultivators; when no redtop is sown, one-half bushel of herdsgrass and four pounds of clover seed is the quantity usually sown on one acre.

The method of curing is to cut in good weather, and spread evenly over the ground; before the dew falls rake and put it into bunches of about one hundred pounds. The next morning if the weather is fair these should be opened; carefully turned over about noon, and if sufficiently dry carted into the barn.

As to the state of dryness, haymakers differ considerably. My rule is this: take up a handful of hay and twist it as hard as I can with both hands, if it breaks off I consider it too dry, if no moisture exudes from it, I think it dry enough to mow down.

Clover should receive different treatment. My method is this: as soon as it is fairly wilted, it is thrown into cocks of fifty or sixty pounds each; the next day, if the weather is fair, it is all carefully cocked over and, the same, each succeeding fair day, until it is dry enough for the barn.

It is best to cut grass when full in the blossom, and from that time till the seed is formed, as we thus secure it when in its greatest perfection.

I think early cut hay is much the best; but grass should not be cut before it blossoms. Not only do we lose in the quality of the hay by cutting late, but its effects are injurious to the permanence of the grass roots.

Farmers that cut their hay too late are great losers. I think early cut hay is worth twenty per cent. more than late cut, if fed without provender. As far as my observation extends, those who delay their haying till late usually obtain small crops, and stock fed on such hay show evidence of its poor quality."

BY DAVID ALLEN, UPPER GLOUCESTER.

"I consider the best time to seed timothy and redtop, early in autumn, if the season is not too dry, for the reason that it has the advantage of autumn rains, as also those of the spring, which saves it from being killed by the drouth, if there should be one, early the next season, and the clover seed to be sowed in April, following. I have never sowed grass seed alone in the spring. I prefer seeding to grass in the spring, with wheat or barley, because they will tend to prevent the weeds from growing and overpowering the grass.

I cut my herdsgrass and redtop and spread it to sun until two-thirds dry, then cock it and again spread, until so dry that it will not sweat much in the mow. I cut clover and let it remain in the swath one day; towards night it is pitched into small cocks and there stands, until nearly dry, when it is turned over and spread a little if necessary. There is more loss by late than by early cutting. Experience has taught me that two inches above the ground is as close as grass should be cut. If it is cut closer than that, the hot sun has a bad effect on the roots.

I have used salt on my hay for many years, and observation has taught me that four quarts to the ton is as much as the cattle need, for they would not eat more if they had access to it every day while eating a ton of hay.

I have used a horse rake for twenty years: for the last eight years I have used Delano's wheel rake, which I consider superior to all others. One man and a horse will rake more hay in a given time than six men.

I have practiced top-dressing four years: I cart loam or muck into my barn yard when done planting, and yard my cattle on it during the summer and early autumn months, turning and mixing it once or twice with the droppings of the cattle, and that which was made during the winter. I spread about seven cords per acre, in the month of October, with very satisfactory results."

By G. C. WATERMAN, BRUNSWICK.

"My method of curing clover, is as follows:—If my grass does not lodge, I prefer to cut when in full bloom. When the wet is well dried off, shake out well, leaving it as light as possible. When it is wilted (perhaps two or three o'clock same day) pitch into heaps of about seventy-five pounds, as snug and compact as possible, without rolling or pressing in any manner; rake up scatterings, if any, and complete the whole before the dew begins, as early as five o'clock. Let it remain thus, two or three days. Before carting to the barn, spread out and warm in the sun, three hours; finish getting in as early as five o'clock, to avoid all damp from fog or dew. I cut no hay, upon which cattle will thrive as well, as on clover cured in this manner. Herdsgrass and redtop, rake into winrows and *pitch* into heaps (*never roll up my hay*) with caps, may remain out, through a long storm. Dry it as I do clover, until carting, which is to be done before *five o'clock*, and no drier than is essential to the preservation of the hay. Such are the result of forty-five years experience in hay making."

By AUGUSTUS SPRAGUE, GREENE.

"I think it better to sow grass seed in spring and with grain, as the grain will shade it when young and weak, and will keep the ground moist. On my land, (a clayey loam,) I have no trouble in getting a good "catch" with any kind of grain.

My mode of curing hay of all kinds is to cut and let it wilt, then rake and put it in cock and let it stand over night, open the next

fair day, and with a little stirring it is fit to go in unless it is very heavy grass, in which case I think it better to let it stand in cocks two nights.

I don't think there is any danger of getting hay in too dry, if kept in cock most of the time and not parched up by being spread in the sun.

I prefer to cut grass when it is in bloom, because, if there is not more nutriment in it, cattle *relish* it better, and I think will grow and thrive better upon it.

I use a horse rake, and think I save fifty per cent. in the work of raking. Have used the spring tooth, but now use Delano's, called by some the wheel rake, and like it better."

BY G. H. ANDREWS, MONMOUTH.

"Farming is not my business; yet I live in the midst of a farming community, and having more or less to do with that branch of business, I am interested in whatever tends to promote the cause of agriculture. I shall therefore submit for your perusal some of my observations and experience.

The best time for seeding grass land is spring, because becoming more firmly rooted, it is better able to withstand the frosts of winter. Our winters, or rather I might say springs, are very hard upon the grass crops, hence the necessity of being well rooted. Some however, have sown as late as September, and succeeded well; but I would advise none to put it off till fall, but to sow as early as possible in the spring.

I am satisfied when seed could be sown early, it will do better sown alone, but our farmers are not conditioned to do so; therefore, it is usually sown with grain, and with wheat or barley does quite well. We consider wheat or barley decidedly the best of all grains with which to sow grass seed, as they do not cover the ground, so but that the sun and air, which are necessary for the growth of all plants, can reach the young shoots. Farmers cannot take too much pains in this particular, to secure a good *catch* of grass, as it is the most important crop of the farmers of Maine. Few of our farmers have made much money by the raising of grain, but many of them have acquired an independence by the raising of stock.

We grow no other grasses than herdsgrass, redtop and clover, or at least I might say no other seeds are sown. Bog and meadow grasses are grown somewhat with us, but I esteem such hay but

lightly, especially to feed out to stock; it does very well for litter, to throw into our hog and cow yards, but no farmer will feed out much to his stock if he is mindful of their growth. I am aware there are those who differ from me in this matter, but I base my decision upon not only observation, but experience.

The method adopted for curing herdsgrass and redtop, is to cut down in the morning, of a fine day. When dry from dew, spread evenly; stir often where it is thick; put into cock at night; next day open and spread to the air. The hay having sweat a little during the night, will make very rapidly when opened, and with proper care will be in a fine condition for the barn in the afternoon, and will need no salt to save it. Hay never should be burned up in a hot sun, so as to be brittle; it should be cured, not baked. Clover is usually treated differently. Cutting in the morning and lying in the swath until afternoon, it is put into small bunches, where it lies until ready for the barn. When the weather has been good, hay got in this manner is much more valuable. I consider clover hay to be very valuable. It will require more of it, but for young stock and milch cows it is decidedly preferable to all others, in my judgment.

When the seed is full in the milk, or perhaps a little turned, is in my opinion the proper time to cut grass. The stalk has at this period arrived at maturity and contains all the nutritious elements that it ever will.

Early cut grass does not contain the amount of nutriment in grass of a more mature age. In late cut grass the roots retain their vigor and thereby are more tenacious of life, and will not run out (as it is termed) so readily.

More loss is sustained in a succession of years by early cutting for reasons stated above.

If the season be wet it will do to cut close, but if dry, you cannot cut close without injury to the roots. There is nothing lost in leaving sufficient to protect the roots against a scorching sun.

I use neither salt or lime; do not consider it a good practice. Stock, in my estimation, do not do as well upon it as upon fresh hay.

There are but two machines for cutting grass in our town. Those are liked well; they are of one horse power.

Caps are coming into general use; are liked well; they are made of common sheeting, and are square, with pins at each corner to run into the hay for security against wind.

Top-dressing has been practiced as yet, but little, yet it is *the* way of dressing. Our farmers are beginning to adopt this method. Thus far it has been done with manure from the yard or heap, spread on in the spring. As for the quantity I do not know of any definite quantity; it has not become general yet, and therefore no standard has been fixed. They, however, cover the ground pretty well. The effect has been a marked one, and the only reason of its not coming into general use is the want of manure. Most of our farmers have scarcely enough for their cultivated crops; in fact, I might say they have not half enough, for they could put on double and not over-dress.

Although manure is no doubt the best article for top-dressing, yet, sand, loam, gravel or clay even, spread evenly upon our grass land, would pay three times over for all costs. Probably August and September would be as good a time for dressing with sand or loam; the ground is then dry; it would not cut up the fields as in spring. The loam would be dry and finely pulverized; would spread evenly without difficulty. It would also cover up what seeds might have dropped through haying. Also a little seed might be scattered about, under such circumstances, with good advantage."

BY JABEZ D. HILL, MOSCOW.

"I have never sown grass seed except in spring; therefore cannot say there is any better season. Have seeded to grass in conjunction with wheat, rye, barley and oats, and am not aware that one kind of grain is preferable to another for this purpose, unless it is sown thinner, so as to afford the young grass a better chance to escape smothering. You ask, what varieties besides herdsgrass, redtop and clover do you cultivate, and what their value compared with the above-named? If by this, you mean the kind of grasses which I *encourage* and *improve* by manuring and loosening the soil, I shall add "witch grass" to the catalogue. Its value for dry forage I consider equal if not superior to either of the others on the list. It is true, I do not sow the seed—as is the case with the others—because it is not necessary; being endowed with the rare faculty of re-seeding itself, or maintaining its existence in suitable soils, in defiance of very rough usage, when it has once been introduced, which was the case on my farm when I purchased it. Had it not been pretty well stocked with witch grass, I do not

hesitate to declare that with my present knowledge of its value, I should labor diligently to promote its introduction. I might dilate to some extent upon the merits of this grass, did I suppose it would be to any good purpose; but knowing the prevailing prejudices against it, I will forbear, content to let the world wag as it pleases.

The way of curing herdsgrass and redtop which I have followed for many years, is to mow in the forenoon and shake out before dinner. Between two and five o'clock, rake and cock, (the interval between dinner and the time we commence raking being spent in carting what hay was cut the previous day.) The cocks are then capped and thus remain till the next day after the dew has evaporated, when we shake out and let it sun till after dinner, when it is carted to the barn. This is the *slow* method, compared with that in which the grass is cut down and allowed to lie unraked till dry enough to put into the barn. As to the "state of dryness in which it is in best condition for the barn," it is impossible to speak absolutely, though a man of experience can readily tell by "handling" when it is right. Hay should be dried no more than enough to prevent its overheating in the mow, and under some circumstances this end is obtained with less drying than in others. If the hay is to be placed on a scaffold, where its depth is slight, it will save in good condition with much less sun-drying than if it is mowed down in a thick mass. I will here mention, that I have at times, in an emergency upon the approach of a storm, got in a load of partially dried hay and placed it upon a scaffold; and that in feeding it out, it emitted a peculiarly sweet, honey-comb fragrance, which I never found in sun-dried hay.

I am not in the habit of sowing clear clover on account of the greater difficulty of curing it, and because I think it lighter, more "chaffy" and occupying a greater amount of barn-room—according to substance—than herdsgrass, redtop or witch grass.

We *prefer* to cut grass when the seed is pretty well formed, but still soft; about the time when in the "second blow"—when the juices of the grass "gum" up the scythe the most,—because the fibre has acquired a degree of firmness but little liable to shrinkage, yet not so far matured as to be tough and woody, and the juices have thickened and attained a consistency which they possess at no other period, and are therefore less liable to evaporate in sun-drying, or to sour in the mow. But with a good deal of hay to cut, we have to *begin* a little before this period, and *end* a

little later. So far as my observation extends, there is more loss from cutting hay too late than too early, owing to the destruction caused by rust, rather than natural ripeness, in some cases; and in others by the early decay of certain forage plants often mixed with grass.

The best hight to cut hay is, to shave as snug to the ground as possible, because we get more; though I think that herdsgrass roots will endure *longer*, if we leave a high stubble.

I have used different horse rakes in former years; like the "independent" the best; but latterly make less use of one where grass is light, because they scratch up considerable "dirt," leave some of the finest particles of hay behind, and considerable time is necessarily consumed in getting the horse from the pasture at a busy season of the day. We now use the hand drag rake on light grass if we are not particularly hurried. If we operated with a mowing machine or a great gang of mowers, we should use the independent horse rake altogether.

You ask if we use hay caps. We do; and find the advantage great. For instance: last season, we cocked up a lot of hay on Saturday night and capped it. Sunday forenoon it began to rain, and it continued wet and lowery for five days. On the return of fair weather we found the capped hay bright. Other cocks in the vicinity uncapped, were soaked through and blackened, so that it was not worth half price. Good hay was worth here last spring, eighty cents per hundred. If an expenditure of twenty-five cents for a hay cap, saved forty cents worth of hay in that one storm, it must be apparent to the most obtuse, that it *paid*. The cap is simply a square of cotton cloth (fifty-four inches) with a stone in each corner. I have used salt, but am not satisfied that it is advantageous in saving the hay. In former years, while living in the vicinity of salt marshes, I have noticed that hay cut thereon, though much salter than I wish to make my fodder, needed *drying* to preserve it. But my experiments on this point have not been very minute.

Perhaps the farmer who has a good deal of hay to cut, loses little or nothing by beginning a *little* before grass has attained its "best estate;" because such fodder is "loosening" and acts medicinally upon stock; and if fed out during our long winters, judiciously, proves as valuable as if all the fodder was more matured. And if a portion of his grass has pretty well ripened its heads before he

can cut it, in many cases the growth of the "bottom," with the provender in the seed, will nearly compensate for the loss on the stalks which have ripened."

BY E. K. FRENCH, CHESTERVILLE.

"With regard to *hay-making*, I will give my own practice. In curing herdsgrass or redtop, I cut and spread out evenly in the forenoon, rake up and cock in the afternoon, open the next forenoon sufficiently to finish drying by noon, and then get in. Late in the season we not unfrequently cut and get in the same day. This kind of hay should be sufficiently dry to keep perfectly sweet without salt or lime, a point too often neglected by farmers when they begin haying. Clover, let remain in the swath till about sunset, then turn over, exposing the green side to the dew—rake and cock the next day and let it remain in cock till it requires little, *or better*, no drying to prepare it for getting into the barn. For *neat stock*, there should be sufficient moisture left in the hay to cause it to mat together well; the cattle seem to relish it better than when dry.

If I could have *all* my grass cut when I wanted it, it would be immediately after the bulk of the grass was out of blossom—when the seed is said to be "full in the milk." Then the plant has perfected itself—the juices of the stalk are matured, and, as the seed is developed, these will be consumed to the detriment of the former. Hay that is cured too early is wanting in substance. Cattle cannot perform so much labor, or keep in so good heart, as when fed upon the hay from fully matured grasses.

If grass be cut before the second crop starts, the roots are much more likely to be sunburnt than when a vigorous undergrowth has commenced. We have had some pieces of "new ground" nearly destroyed by cutting too early, and I may here remark that the second crop starts up about the time the first goes into blossom. I give it as my opinion that double the loss is sustained by cutting grass too early than by cutting too late, for in the late cutting we always have the benefit of the undergrowth which at the time of early cutting has not appeared.

From observation of the effect produced, I am of the opinion that grass should not be cut off below the lower joint, say two inches in height. When cut close to the root, the heat of the sun parches it up, and in a measure kills them out. I have seen instances of this

repeatedly on our own farm, and am satisfied close cutting was the cause.

Clover hay, cured as before described, requires about four quarts of salt to the ton, but other kinds when properly dried are better without the salt than with it. It was formerly our practice to use salt with all kinds of hay, but latterly we prefer to mix clean, dry straw, if we have it, with hay that is not sufficiently made to pack down by itself.

We have not top-dressed either our grass or pasture lands to any extent, but intend to do so as soon as my arrangements for that can be carried into effect. I have graded my barn-yard of a gradual slope from the back side of it to the bottom of the manure vaults, so that all the wash is carried directly to them, and by means of a drain leading to the side-hill I can irrigate two or three acres in this manner, or by closing the mouth of it, allowing only the surplus to escape; and by means of a pump placed in each vault, I intend to pump the water up into sprinklers to be carried out and distributed over the grass land. I think that pastures are not cared for enough, but are allowed to be overrun with bushes, briars and thistles. They should be kept clean as a mowing field."

BY J. O. KYES, NORTH JAY.

"In curing herdsgrass and redtop, I mow in the forenoon and in the afternoon rake it and put in bunches of seventy-five pounds—put caps on and let them stand until the next forenoon after the dew is off, then open and as soon as it is dry enough get it in. Clover I let stand in bunches one or two days before I open it; prefer to cut my grass when it is full in bloom; cut four or five inches from the ground, or high enough to keep the sun from drying the roots so as to kill them. Early cut hay is worth from two to four dollars per ton more than late cut. For hay caps I get common cotton cloth, one and a half yards wide, and take a square of it, make eyelet holes, in each corner put a string six inches long, fasten to them a stick eighteen inches in length, and my caps are made. I think hay caps pay for themselves on an average, as often as once in two years."

BY JAMES WALKER, FRYEBURG.

"If grass is the only object, I would sow grass seed alone; but to prepare the land for a good crop of hay, it is necessary to man-

ure and cultivate, and the quickest return for this is by a grain crop: for we put on a very moderate quantity of seed. Wheat is the best for spring sowing, and winter rye for autumn sowing.

We have on the Saco river, large tracts of low meadows and intervalles, which yield various grasses both wild and cultivated, the hay from which is from a third to three fourths the value of English hay, and affords a pretty good security against short crops of that. On these natural meadows, where permanency is required, too early cutting is very injurious, especially in dry seasons, by exposing the surface of the ground to the scorching sun. As a general rule, four inches is the best height at which to cut, because the stubble protects the roots from the hot sun by day, and retains the moisture at night.

When I can have hay well dried, salt should not be used. Too much salt is injurious to cattle in winter, and I prefer salting cattle in some other way.

Horse rakes of various kinds are used in this vicinity; the revolver for smooth lands, is best; spring tooth for rough ground. A good horse rake well managed, is equal to six or seven men with common hand rakes. I furnished a partial supply of hay caps this year, four feet square, which answered a good purpose, at an expense of twenty cents each, but have had very little use for them, this season, unless to prevent the hay from drying *too much*.

I have made two under drains, thirty five or forty rods each, in length, with decided advantage every way. It took up a quantity of worthless stones with which I made the drain which carried off the surplus water admirably. Wet meadows are very much benefited by ditching. If proper attention was given to ditching and underdraining, I venture to say that West Oxford would be as good a hay country as any other of the same extent of territory, within the State. I see no reason why the raising of sheep in this region, would not be as profitable as any where else in Maine. If rightly attended to, they can be kept wholly on what we call *meadow hay* in winter, and on our hill-side pastures in summer. I have come to the conclusion, after actual and careful observation, that corn fodder is worth more for the winter food of sheep, than for any other cattle. Give me low meadow hay of the right sort, with corn fodder for a change, and I can keep sheep, in large or small flocks, in good condition, without other feed."

BY CYRUS R. MORTON, UNION.

“At a meeting of the Farmers' Club of this place, to consider some of the questions of your circular, it was decided, that it was better to seed grass lands in spring, and as early as possible, sowing grain also, (wheat the best.)

Two methods of curing Timothy and Redtop were advocated: first, by spreading out the first day and cocking up at night; open the next day and make just enough to keep in the barn. The other, to make it in the cock—a small majority in favor of the first mode.

Two methods of curing clover also: first, by letting it remain in the swath the first day, turning it at night; the next day cock it up, and haul it in the third day; and next, to mow one day and haul in the next, putting a peck of salt to the ton—about the same majority in favor of the first method. A minority believed that it is best to cut as soon as the seed is formed—being more hearty and nutritious. The majority were in favor of cutting when in bloom, as cattle like it better, the hay will do them more good and the future crops are better for early cutting, and the grass holds out longer.

Decided unanimously to cut as close as possible—as more hay is obtained, and the roots less liable to die out.

Use Paschal's patent revolving horse rake, with a saving of three fourths of the labor. The Kent's patent spring tooth rake saves a third of the labor.

To top dress with three cords of manure and a bushel of plaster to the acre, will increase the crop one half, on poor mowing.

It is *very injurious* to feed off mowing fields.”

BY SAMUEL BUTMAN, PLYMOUTH.

“From my experience in seeding to grass, I much prefer the spring. I have seeded several times in September, and sometimes with good success; but nearly one half the seasons, it has proved an entire failure. I have seldom, if ever, failed of a fair crop of grass, when seeding down in the spring.

I think it safe to sow grass seed with grain; but I prefer wheat or barley to any other kind. I am unable to state why grass succeeds with me better, when sown with wheat or barley, than with any other kind of grain.

In curing my Herdsgrass and Redtop, I uniformly give it the

best part of two hay days, after it is cut, before I cart it to the barn—always securing it as well as I can, from the weather, the first night, by raking and putting into bundles. The second day, I open, spread, and turn it, before carting it to the barn in the afternoon.

My clover hay, I always make in small bundles in the field—never spread it over the ground—but pitch the bundles over occasionally, by reversing the hay: and when partially made, put two bundles together: and always handle carefully, to save the better part of the hay. And I consider clover hay, if well saved in this way, as valuable as any other kind, unless it is a very coarse, pea-vine kind of clover.

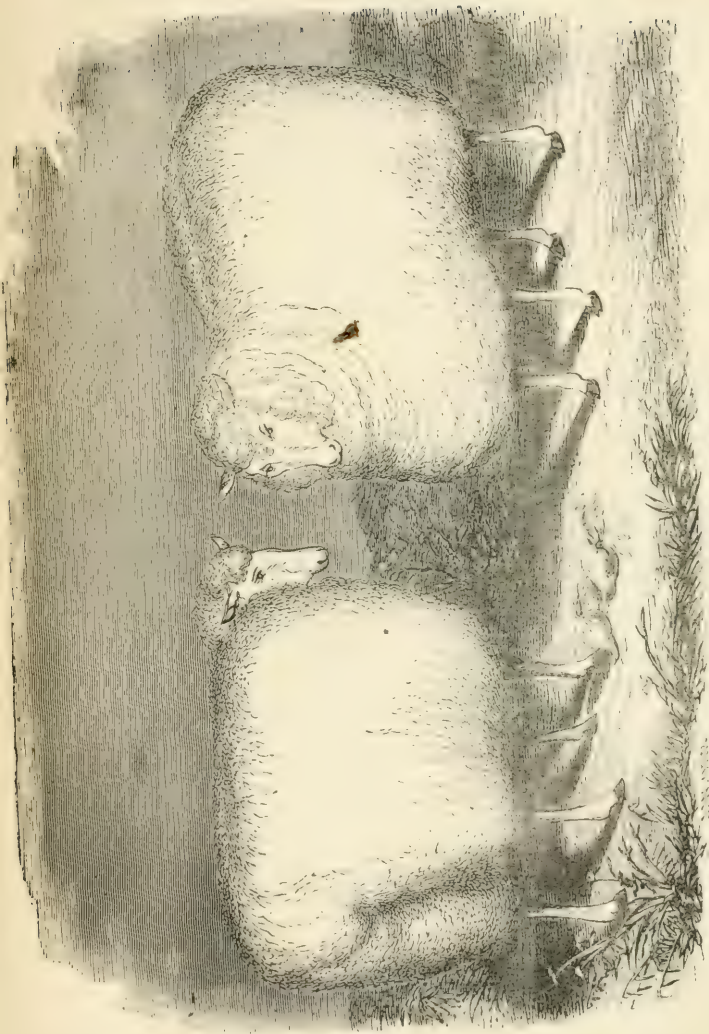
I prefer to cut my herdsgrass when in full blossom, and my clover when the blossoms are turned, one fourth or one third of them.

I prefer to cut my grass early, because I consider such hay much more valuable, and the after crop starts more readily, consequently the roots are better protected. The loss from late cutting, far exceeds the losses from early cutting.

In mowing grass, I cannot fix upon any precise rule, as to cutting it high or low. Good mowers do not cut their grass alike in this respect. I would not however, cut my grass very low, neither would I cut it so high that the field would look slovenly, when the hay is harvested.

I generally use four quarts of salt to the ton, but only on one half of my hay, as I house it; have never used any lime.

I use a revolving horse rake to much advantage, on smooth fields. I prefer them much to any iron spring tooth rake, I have ever seen. I have not used hay caps, but I think so highly of them, that I have resolved not to do without them another year."



COTSWOLD EWES.

Bred by George Fletcher of Shipton Sollars, (Eng.) Imported by and the property of George C. Hitchcock, Ash Grove, New Preston, Conn.

REPORTS.

In accordance with the Resolve passed by the Board, near the close of its late session, (see page 59,) the following papers have been furnished for publication.

ON SHEEP.

By J. F. Anderson, South Windham.

Charged by the Board of Agriculture, with the duty of reporting upon "Sheep," I have diligently sought for knowledge upon the subject; but not having had the large experience of the gentleman who was last year entrusted with this duty, and not possessing sufficiently good opportunities of obtaining reliable information requisite without such experience, I cannot hope that my report will prove more than a passing word upon this important branch of live stock.

Throughout the history of farm improvement we may observe a prominent place accorded to sheep husbandry. All agricultural writers agree in assigning to this agency, the most rapidly marked and surest consequences in advancing the general fertility of farming land. The rank sward of the richest lea is improved, and the hard and innutritious herbage of the almost barren hill top becomes sweet and nourishing after being subjected to this influence.

Says the Swedish proverb, "Sheep have golden feet, and wherever the print of them appears, the soil is turned into gold."

While most of our farmers will, upon reflection, freely admit that live stock breeding ought to receive far more attention than it has hitherto; and while they unhesitatingly allow that, of all, sheep breeding is the most profitable in appropriate places, how few there are in the State, who act upon the thoughts which deliberation thus brings out from their own reason and observation. It seems to pass each one, like a point in his parson's discourse, as so applicable to a neighbor, that it is astonishing *he* should continue to neglect his true interest; but a practical application to his own condition, only enters his mind as a very general proposition, in considering which,—if he dwells upon it at all—he satisfies himself with abundant

reasons of present expediency against changing his practice. Why is it so peculiarly the case with the American farmer, not only in this, but in everything pertaining to his legitimate business, that when he reasons so well, he acts so lamely? Why should not a reasonable, money-promising idea prove the same powerful incentive to action in his own proper pursuit, that it does in another?

Here will be enumerated incontrovertible facts about sheep keeping; every farmer knows them, but comparatively very few test them fairly by practice. Of those who have undertaken the breeding of sheep, a still smaller proportion have had the resolution to hold over a year's depression in the price of wool, notwithstanding the figures of an accurate account might discover a profit from them in the seasons of lowest prices. Having become somewhat accustomed to more than fifty per cent. return, the breeders are unwilling to take up with so little as ten per centum. It may be safely asserted that where an account with the sheep has been fairly kept, there can be shown but two contingencies which have ever brought the per centage of profit so low, in the hardest years, as ten per cent. of the flock's value; and those are *dogs* and *disease*.

There is not a farm or a farmer in the State, away from the city suburb, that would not gain from having more or less of these land improving, food and raiment producing animals; not a pasture which would not be clearer of coarse herbage and bushes, and all the better by their close feeding, and which would not gain from their evenly spread, plant nourishing excrements.

No farm stock, no farm, is complete without them. This is asserted for application to every farm in Maine. But the peculiar position, circumstances and condition of each one must, of course, govern as to the proper number which may be kept upon it. It has been said by one who should know, that "for every cow, *any* pasture can carry a sheep with absolute gain."

This truly may be borne in mind, that it is a result of the most general experience, that sheep can every where be kept to a profitable extent, the limit of which can only be ascertained by a fair trial with gradually increasing numbers. On the farm which proves, from its peculiarly favorable character, well adapted to sheep, the same experience teaches that no branch of husbandry is so richly remunerative, none in which there is so little risk, none where the

capital invested can be so readily increased or diminished according to increased or diminished demand, none where so little labor of body or mind is required, and none where the returns are so frequent and sure.

Wool makes a healthier clothing than cotton, and mutton is a very cheap and wholesome meat. This is a consideration worthy of fixed attention from each inhabitant of every agricultural town in the "Union." The owner of a flock of sheep can have fresh meat, of the best character, throughout the year; he can at any time, kill a lamb or wether, without damage or loss, and have a pelt to sell, with meat that becomes more palatable from keeping, and in quantity sufficient, without his being encumbered by its weight, or annoyed about its disposal, so frequently the case of the farmer who butchers a neat animal. It is believed that this substitution of fresh lamb and mutton for the vast quantities of salt pork now consumed in our farming communities, would be as happy an innovation here, as it proved in England. "The farmer raising wool can have, at his own door, cash at prices not more than from five to ten per cent. lower than at the best markets, and if wool happens to be unusually low, can store it for one per cent. of its value, with an assurance that he loses nothing of weight." By instituting and encouraging the system of "wool depots," which has already gone into successful operation in Vermont and New Hampshire, a still less per centage off the best market price, even, may be obtained, and equal prices, according to quality, might be had throughout the country. Without such institutions, wool raisers must continue to rely upon the integrity and knowledge of the few isolated, woollen factory owners and wool pullers, scattered about the country, who now name their own prices, and frequently evince a want of discrimination which tells against either one or the other of those desirable qualifications.

The design of this report, is not to dictate nor even to recommend in detail, a definite course of action, but in calling thoughtful attention to the subject of sheep breeding, to lend such aid as it may, to farmers looking in this direction; to offer a word of encouragement, and perhaps, to open up some unsettled questions for general discussion among able and experienced men.

The Board of Agriculture has signified its intention, not to be committed to the advocacy of either breed of the several kinds of

live stock. While the writer of this report hopes that nothing here, will warrant a thought on the part of any one, that there is a departure from so judicious a determination, still, it has seemed to him no more than just, that where the whole field of Maine has been allotted to a particular breed upon the mere ipse dixit of one individual, however learned he may be, the action of the Board should open the gate for a fair and free discussion among its members and the farmers of the State, so that if the theory, which militates against the practice of a general experience, be correct, those who have *unfortunately* been making money in so unwarrantable and unscientific a course, may be able to obtain *reasons* for the substitution of a single breed in place of those which, for aught they can see, are every way well suited to their markets, their climate, and their soil.

In an essay upon Sheep breeding, published in the Patent Office Report for the year 1851, P. A. Brown, L. L. D., maintains that there are two distinct *species* of sheep—the woolly and the hairy—each of which has its appropriate place, where the other must not intrude. And to but a dozen or so of all the sheep which there are in Maine, would he accord an abiding place upon the earth, because they have hair mixed with their wool, and by that same token, according to his theory, are hybrids. He says, “There is a place for all natural things. There is a place to breed and raise the hairy sheep; and there is a place to breed and raise the woolly sheep; but for the hybrid sheep, which is not a natural, but an unnatural production of man’s making, there is not any place in the United States; and therefore their propagation ought not to be encouraged. If a line be drawn diagonally through the United States, beginning at the south east corner of New Hampshire, pursuing pretty much the course of the line of tide water, and ending in Texas, it will be found that every where north west of it, the woolly sheep may be bred and will thrive, *provided the blood of his species be kept pure*; and every where south east of this line, the hairy sheep may be bred and will thrive, *provided the blood of his species be kept pure*; but that neither will thrive on the other sides, respectively, of that line, *nor will they if the species are crossed.*”

Dr. Brown illustrates his argument for this distinction of species

by referring to the general similitude of the horse and the ass, the zebra, the quagga, the onagga, the dziggatai, the two species of camel, the two species of rhinoceros, the several species of the deer kind, of monkeys, of sloths, and of lizards; but none of these change in those particulars which causes distinction between them, whereas there exists realiable and abundant authority to prove that the wool and hair of sheep do change from either one to the other, under the influences of climate and cultivation.

Dr. Nichols, in his "Catechism of Natural Theology," page 144, says, "what art does for man, nature has in many instances, done for those animals which are incapable of art. The clothing of its own accord changes with their necessities. This is particularly the case with that large tribe of quadrupeds which are covered with furs. Every dealer in hare skins and rabbit skins, knows, how the fur is thickened by the approach of winter. It seems to be a part of the same constitution and the same design, that wool, in hot countries, degenerates, as it is called, but in truth, (most happily for the animal's ease,) passes into hair; whilst on the contrary, that hair, in the dogs of the polar regions, is turned into wool, or something very like it."

Dr. Blacklock, in his "Treatise upon Sheep," p. 85, says, "in tropical countries we find the fleece approaching more to hair than wool, as in the sheep of Thibet, so celebrated for the silky nature of their coat."

In Saxton's edition of Youatt upon Sheep, p. 11, is the following: "The change from hair to wool, though much influenced by temperature, has been chiefly effected by cultivation."

Prof. Low, in his "Domestic Animals," p. 42, says, "By frequent shearing of the fleece, the hair diminishes in quantity, and the wool is proportionally developed, until at length, under the influence of continued domestication, the essential covering of the animal becomes wool, of greater or less tenuity and softness."

Charles L. Fleischman, Esq., in the Patent Office Report of 1847, p. 308, says, "The wool of the very same sheep, which furnish in Germany an eminently fine and valuable product, on their being transplanted to other countries, can scarcely be recognized, and is hardly worth half its former value."

And D. J. Browne in the Patent Office Report for 1855, p. 2,

says, "If sheep are carried from either of the temperate zones to the burning plains of the tropics, after a few years, material changes take place in their covering."

[Dr. Browne, quoting Prof. Agassiz, (Prin. of Zoology, p. 43,) infers therefrom, "that the hair of the hairy sheep, and the wool of the woolly sheep, according to his (Agassiz') notion, depend upon an immaterial principle, which no external influence can prevent or modify." It is to be regretted, that in a matter of such importance, the opinion of that eminent naturalist was not obtained directly touching the point, so that it need not have been left to an inference which—craving Dr. B's. indulgence—might to some, seem rather "remote."]

Dr. Brown asserts, that "this change of coat never happens to either the pure hairy sheep, or the pure woolly sheep, but is a condition of those hybrids which have already hair and wool."

Fleischman again says, (P. O. R., 1847, p. 275,) "But besides the peculiar wool, all sheep have, in particular places of their bodies, real hairs, some more, some less." And it may be fairly deduced from the teachings of all the essays and treatises to which the writer of this Report has had access, that there are no sheep bearing fleeces composed exclusively of either hair or wool; but that on the shanks and about the heads of the finest woolled sheep of Saxony, there may be found filaments approaching very closely to true hair; and that it is only by the greatest watchfulness and care, even where the climate is the most uniform, that the 'constant and thorough' character of their fleeces is maintained; and that some mature merino sheep, with woolly fleeces of the most perfect integrity, exhibited when they were lambs, very hairy indications; and that wherever neglected, or where the climate is variable and they are exposed to sudden vicissitudes of temperature, they will deteriorate, and occasionally a hairy sheep will appear in the flock. Reliable authority also informs us, that we may sometimes observe one end of the same fibre to be wool, with its spiral form and felting properties, while the other end is true hair; and that clothing and greasing are resorted to with a very evident effect upon the quality of the wool.

To men of ordinary judgment, the case of the South Down sheep, which Dr. Browne, citing, speaks of as an hybrid between the hairy

and the woolly sheep, seems a notable instance *against* his theory; for they not only have become a distinct and self supporting breed, but have been for years improving in form and constitution; an improvement effected within the breed itself, by abstaining from intermixture with or draft from what he calls the pure species. And according to Lyell, (Prin. of Geology, p. 579,) "the celebrated John Hunter has observed, that the true distinction of species must ultimately be gathered from their incapacity of propagating with each other and producing offspring capable of again continuing itself." And Lyell from many eminent authorities and much close reasoning, draws several "inferences in regard to the reality of species in nature;" the following being a part of the fifth: (Ibid p. 589.) "It does not appear that true hybrid races have ever been perpetuated for several generations, even by the assistance of man; for the cases usually cited relate to the crossing of mules with individuals of pure species, and not to the intermixture of hybrid with hybrid."

Again Dr. Browne argues against crossing together different varieties of the same species, and in this connection he asserts, "the Arabian is the finest race (of horses) in the world; in his own country no one ever thinks of crossing the breed; on the contrary, the pure blood has descended, uncontaminated, through successive generations; but in this and other countries, where the practice of amalgamation with other races prevails, they have endless varieties of this noble animal, but no pure Arabian race."

Would it not be pertinent and in accordance with fact, if we should assert that we have none of the pure Arabian race merely because our climate changes the animal here into an Americo Arabian, without the capacity, and every way unfit for the requirements of our people? But has not each section of our country a breed of horses admirably suited to the wants of the respective localities, produced by this very amalgamation of races and breeds? From a conscientious belief in its reliability, this is assumed as fact; and it is proposed to apply the same process to sheep breeding in Maine, with a thorough persuasion of its ultimate success. It cannot be reasonably doubted, that we may obtain equally favorable results from the various breeds of sheep prevailing in different parts of the State, by selecting such as appear to thrive best in each section,

whether long or short, or middle woolled; whether hairy or woolly, or a more even mixture of the two extreme varieties. In plain words, let us take the sheep as we find them, *good*, and build up fitting varieties by nice selections, vigilance and suitable food.

The true question appears to be, not whether Maine, like Saxony, is capable of raising sheep which shall produce wool of a maximum degree of fineness, without regard to the cost; but, what varieties of sheep are by their nature best adapted to our climate and soil, to the general condition and situation of our farms, and which will at the least risk and cost, make the greatest return in federal money.

It may be that Dr. Browne is correct in assigning to Maine, the Merino. They are certainly fast growing into favor in those counties where the most attention is given to large flocks of sheep; while in the immediate vicinity of each great market of the State, the mutton sheep—South Downs, Cotswolds, Oxfordshire Downs, and the hairy Leicester, with its loose and open pile—are each paying large profits to their respective breeders.

Upon due consideration, it is recommended that every farmer in the State qualify himself, by his own practical experience and careful observation for argument upon (as it is assumed to be) the yet unsettled question, "What is the most suitable and best breed of sheep for Maine?" Let each one immediately procure more or less, as good as he can select, of the kind which seems to him fitted to his wants; then with a specimen of each fleece in hand, numbered to correspond to a number upon the sheep from which it came, consult some intelligent wool sorter, and thus learn which ones are of nearly uniform quality; then with the aid of his friend the butcher, choose from the '*select*,' those which develop the fullest proportions, and the most perfect forms, and thus determine upon his breeding ewes; after which he should not hesitate to put himself to still greater trouble, or even to a considerable expense, to procure an active buck of robust health, excelling in that quality of wool towards which he intends to breed. This is particularly urged because all the authorities agree in attributing to the buck the greater effect upon the wool, and many consider his influence paramount in conveying all qualities to the progeny. Let him, in both buck and ewes obtain as thick a fleece as possible, always rejecting one that has the wool thin and open along the back, and the belly bare or imperfectly covered.

By pursuing this course for a few years, he will not only be able to throw light upon a dark question and aid his brother farmers to an important decision, but he will find that he has made a profitable investment pecuniarily, and if it happens that he has bred in the right direction for his locality, *and the neighborhood is not infested with dogs*, his progress to wealth will be opposed only by the extent of his farm.

In sheep keeping it should never be lost sight of, that these ranging animals require a frequent change of pasture, more than any other sort of live stock, and that they never fail to pay handsomely for every such change. Blacklock says, "Nothing will conduce so much to the health of sheep, and to the speedy taking on of fat, as the frequent shifting of the flock. Disease will, doubtless still affect the animals, but illness will be rare, and mortality diminished, if by the care of their rulers, they are enabled to obtain what instinct tells them is the best of medicine." Judge Buel said, "Keep your sheep dry, give them pure air and plenty of food, and carry them to spring grass, by all means, in good flesh. Stint them not in salt, and feed turnips, potatoes and coarse grain occasionally, particularly to such as have to give suck."

The following extract from the Patent Office Report of 1851, p. 97, accredited to the "Wool Grower," was discovered after the above was penned. Identical as it is with much, corroborative of nearly all, that has been here advanced, and adding still more, it is hoped that it may give force, if not dignity, to this paper.

"Everywhere and anywhere the sheep will live and thrive, and, with proper care, pay more for the labor and capital invested, than any other animal or any other system of farming. It is one of the most useful and economical modes which have been given us to convert the vegetation of the farm to money. There is no animal in which there is so little waste or so little loss. For at least seven years of its life, it will give an annual fleece, to the value of the carcass, and the yearly increase will be nearly or quite equal to the cost of keeping, giving as a general thing, a profit of cent per cent. Of all the other animals, the cow comes nearest to the sheep, in the profit it returns to the farmer, if well cared for; it will pay for itself each year, by the milk it yields, and defray also the cost of keeping. We aver, without fear of contradiction in truth, that there

is hardly a locality in the whole Union, where any kind of farm animals can subsist, that the sheep, if properly attended to, will not give a net profit on the investment, of at least fifty per cent., and that with the ordinary management of farms, it will give some twenty to forty per cent. * * * We cannot glut the market, nor will there be any long time that the market will be depressed below a point of profitable production. On the contrary, it is certain that no farm product goes less below that point, than wool." The last position advanced above, brings to mind the statement in a late journal, that while the sheep of Great Britain had doubled in number, during the last one hundred years, the price of wool per pound, had also doubled, and the price of mutton had quadrupled.

A reason has already been given for the reference made in this report to Dr. Browne's essay. It may be thought that too much space has been accorded to that; perhaps there has. But when it is considered that the Patent Office Reports are looked upon, by a great many farmers as almost standard works and text books upon such agricultural matters as they treat of, and that they are, more or less, in the possession of every neighborhood, it does seem to be a duty incumbent upon those publicly entrusted with a regard for these great interests, that they should not suffer to pass unchallenged any new and startling theory, the prevalence of which would very materially change the existing practice: but that all such ought to be fairly investigated upon their own intrinsic merits, and if the new doctrine then appears to be correct, the practice might more reasonably and confidently be adopted, than it could upon a dogmatical assertion of its truth.

MARINE MANURES.

By Samuel Wasson, Franklin.

With neither time or inclination to indulge in doubtful or speculative theories, I can only indite such deductions as have been drawn from experience and observation. Marine manures, in common parlance, are rock-weed, kelp, eel-grass, muscle-bed, and pogy chum. Rock-weed and kelp grow upon the rocks and ledges of an "open" shore. Eel-grass, upon the "flats," left dry at low water. Muscles

are formed in beds, varying in size, from half an acre to ten acres, and in depth, from one foot to five feet. Chum is the remains of the fish called poggy or menhaden, after the oil is pressed out, and somewhat resembles fine chopped hay.

Prof. Johnston says, "sea-weed contains potash, soda, sulphuric acid, salt and magnesia, the predominating constituents being potash, sulphuric acid, and salt;" substances needed by crops. A prime compost, especially for seeding-down, is made of rock-weed and muck, mixed in alternate layers. Fresh rock-weed, spread over newly-sown turnips, is a sure preventive against the ravages of the fly, and the turnip will be smooth and fair as a maiden's brow. As a top-dressing, it is fast going into disuse, an impression prevailing that it "drives" the land. The fairest and best flavored potatoes, grown along shore, are raised upon eel-grass. Complaint is yet to be made of the rot affecting potatoes planted upon it, although the yield is much less than on yard manure. The only objection to eel-grass is, that it takes too long to decompose, but if mixed with lime—which increases its manurial value—it will rot as quick as straw. Some of my thriftiest potatoes are growing upon this mixture, it having been in stack but fourteen days. For wet, heavy, adhesive soil, it is first rate to make it dry, light and friable. With both rock-weed and eel-grass, their "virtues are many, and vices few." Of muscle-bed, our farmers, one and all, acknowledge its merits, yet but few practically appreciate its worth, while it is neglected by many, and mis-applied by others. As a top-dressing for grass on clay soil, among the long list of concentrated manures, it has no compeer; rapid and energetic in its action, and durable in its effects. Land, that for years has only grown wire-grass and white-weed, will, immediately after its application, produce a luxuriant crop of Timothy.

On a field in western Hancock, liberally dressed during the winter of the "Aroostook war," its influence is still perceivable. To spread broadcast, it is preferable to bone, superphosphate or guano. It must, however, be hauled during cold weather, so as to freeze, or it is valueless. Nature seems to have made those deposits especially to renovate worn-out grass lands.

For several years, some few of our maritime farmers have devoted a month or two after haying, to the catching of pogies for the oil,

proving a profitable business. Yankee-like, everybody is into it, saving (oil) at the spigot, but wasting (chum) at the bung. But within a few years, either experiment or accident discovered that the chum—hitherto food for maggots—would furnish an important source of fertility, as it decomposed rapidly, and acted with great energy in hastening the growth of plants. Some of the more knowing ones began to spread it upon their mowing fields, and of the result, “seeing is to believe.” Upon sandy fields, where grass “no-how wouldn’t” grow, a single year’s spreading produced two tons per acre. If applied consecutively, it will after a year or two impart a fishy taste to the hay not relished by cattle.

As the “hite” of fishing is in the heat of summer, when the chum cannot be preserved any length of time, sufficient care is not had in spreading—the spreader, for the time, being more of fisherman than farmer—hence the cause for the complaint.

In the compost heap or elsewhere, above the sea or underneath, it will make its mark. When science shall discover how to preserve it as an article of commerce, pogies will be caught for the chum and not for the oil. Already it is known that if immediately from the press it is packed in good barrels and *salted with lime*, it will keep for several weeks.

That down in the “deep caverns of the briny sea” there are other forms of fertility, there’s no doubt, but ’till those already known are fully appreciated and properly applied, why should Neptune be invoked to “give, give?”

MARINE MANURES.

By B. C. Bailey, Bath.

With regard to these, I will at present merely say, that the kinds used in this vicinity are taken from the bed of Stevens’ or New Meadow’s River, so called, when the tide is out, at low water, and from the inlets and coves, or arms of the sea around and about the sea shore, and from the rocks and islands about the shore at low water.

Stevens’ or New Meadow’s River, is an arm of the sea running inland perhaps eight or ten miles, with no fresh water streams running into it of any note, leaving the bed of the river very much im-

pregnated with salt, and in many places the mud is filled with small clams and muscels. The bed is sand, clay and soil, the deposits of the shores around.

There are localities on these bottoms which apparently are all clay. Some of these spots have been selected to transport from, and spread upon soils adjoining, and have never produced good effect, while mud, clams, and muscels, taken in the vicinity of these clay bottoms, have invariably produced good.

The uses made of these manures, and the effects produced from them, so far as I have been informed, are as follows :

The bottom of these bays, inlets, or rivers, or rather the top of these deposits, when the tide is ebbd out, has been taken in the winter and carried on to the mowing fields, or grass lands, and cultivated grounds, spread in the spring, and the effect is very apparent. If spread upon a worn-out field of clay loam, it invariably produces a crop of clover. If spread upon a sandy or gravelly loam, it produces clover and herds grass. If the land is very much worn out, and covered with white weed, it will very much diminish the white weed, and enlarge the crop of clover; and this without ploughing or sowing any seed.

Rock-weed, as it is called, spread on old worn-out fields, of a gravelly soil, produces a crop of timothy or herds grass. If put on a clay loam, it will produce clover and herds grass.

I have statements from quite a number of individuals giving me this result, besides, I have examined quite a number of localities which showed the effects produced.

I had a piece of old worn out field or pasture, of about one and one-quarter acre, on which, in the winter, I put a quantity of mud taken from our docks, where the water is almost fresh, very slightly brackish, and spread it in the spring. The land last year, presented nothing but white weed and poverty grass, as it is called, and very little of that. This year, it came up with the same, and run quite tall; but now, at the date I am writing, (June 21st,) a very thick coat of clover is coming up, the kind I cannot say, as it is not headed, but I think it the red clover. This fact is so evident, that I have called the attention of an old farmer, who has lived on the spot a number of years. He don't know what to make of it. He thinks I must have sown clover seed in the night-time. I can assure you

there has not been an item of seed put on this ground for the last ten years, and was what is called old worn out land.

In connection with this topic, is added the following, on

SEA WEED.

By S. P. Mayberry, Cape Elizabeth.

We farmers have a great and growing antipathy to the term *weed*, and cannot help coming to the belief that the lexicographers were not following their own nose when they defined weed as an herb "noxious or useless," (another lexicographer better defines a weed to be "a plant out of place," and what are usually termed sea-weeds, would be more properly called Marine plants. ED.) as we apprehend such an anomaly as a weed, in the sense entertained by them, had no place in nature. The farmer comes to a different conclusion, and would define a weed as an agent for gathering, arranging, and storing up matter below the reach of, and intangible to, animal and the higher grades of vegetable life, thus fulfilling a great and mighty end in the scheme of creation—the gathering together of the stray substances which amid nature's varied manufactures has, as it were, slipped through her fingers, and would have run to waste, and converting them, by sure and certain processes, into tangible compounds.

In the article of sea weeds, we are particularly struck with the economy of nature, in singularly adapting the means to the end. The office of these plants is to collect the stray substances held in solution by salt water, particularly the alkalies and phosphates, and as these have to be extracted from the water, not from the earth beneath it, the plants have no roots, properly speaking, but simply processes for clinging to hard and flinty rocks, as points of attachment; while at the same time, in place of a firm and erect stem to keep the branches and leaves expanded, as terrestrial plants, and which would be cumbrous and unhandy for plants which change these mediums as often and as regularly as the tides, they are furnished with innumerable air bags, or vessels for accomplishing this purpose, so that the branches and leaves of the plant may come in contact with the greatest possible quantity of water consistent with

its size—these air vessels, serving the double purpose of furthering the plant in its destined office, and when this is accomplished, floating it to our shores to be applied to useful purposes.

In riding around in the vicinity of our sea coast, one is struck with the immense quantities of it that are carted for the purpose of manuring the fields; and when we think that in this town, which raises as many vegetables, except potatoes, as the rest of the county, for marketing, and the number of people who live upon those vegetables which are raised almost exclusively by this manure, we must come to the conclusion that the *sea weeds* are a tribe of plants of vast importance to a large section of the population of this State, at least, and when taken with the sterile soil around our coast, almost invaluable, as no species of manure reduces itself to a state for use so quickly.

With these views, I need not say that I believe an increase of the use by farmers, in the vicinity of our coast, of this valuable *weed*, would be a very great blessing and advantage, and would form a permanent source to supply us with manure.

ON THE RENOVATION OF WORN OUT LANDS.

By E. L. Hammond, Atkinson.

TO S. L. GOODALE, ESQ. Secretary, &c.

Dear Sir:—Yours of the 25th ult., calling my attention to the fact that the Board of Agriculture at their session last winter, made it my duty to furnish you with a paper on the subject of the renovation of worn out or exhausted soils, is received.

To me this is an interesting subject, and one I believe that is engaging the attention of the farming community to some extent, and I regret that I am not able to do it the justice its importance demands.

From an examination of the reports and documents already published on this subject, I find much valuable information; and it appears to me that all that is immediately necessary, is a wider diffusion of the light already thrown upon it, and corresponding practice. Even a limited consideration of the importance of the subject, embracing as it does, the different properties of soils, so as

to meet the wants of its productions and bring them to perfection, with the least possible human effort, and least detriment by exhausting its plant-sustaining elements, may satisfy any one that the subject is not yet exhausted. And it would be a matter of no surprise, if new and important truths should hereafter be developed, and our theories be entirely superseded by an improved science conducive to new practice.

Yet it is very evident that our only present safe course is to practice upon what light we have, to make the most of the means within our reach, and to advance in the right direction as fast as possible. It appears to me that the question to be considered—to wit, the renovation of worn out lands—embraces directly or indirectly almost every branch of agriculture.

It depends not only upon properly working the soil, but also upon the making and application of manures, keeping stock, rotation of crops, labor saving implements, industry, economy, and such an application of time and talent as is necessary to successful business of any kind, especially to men who start in life with every thing to gain and nothing to lose.

Fortunately the main divisions of this subject, relating to stock, manures, &c., have been committed by the Board to abler hands; a correct knowledge of which I deem to be all that is necessary, with corresponding practice, to restore the exhausted farms to their original capabilities. I presume it will be admitted that where a correct system of farming has been pursued, the farm has not been exhausted; consequently an investigation of the causes of this deterioration may lead (in most, if not in all cases) directly to the remedy.

In a majority of cases, I think it will be found that at the commencement, the farm was too large—that is, it was out of proportion to the means of carrying it on successfully. The low price of land in Maine, has induced many to purchase more land than they could cultivate to advantage, with the means at command, and this has conduced to much bad practice; such as, shallow plowing, a succession of same crops, grazing mowing lands in the spring and fall, selling the crops off the farm, instead of converting them into stock, and disposing of the proceeds of the dairy, pork, beef, &c., and what is of vast importance to the farmer, a neglect of the means within reach of accumulating fertilizers, by the proper use of muck, lime,

plaster, and the saving of the liquids, and all other wastes of the farm, which contain fertilizing properties.

Any mode of farming which does not return to the farm annually, that amount of plant sustaining elements drawn from it by the crops taken off, may be set down as bad management, and will soon show itself in the shape of worn out soil.

From what has come under my own observation, the conviction has been forced upon me, that many farms in Maine have deteriorated or become partially exhausted, not so much from a want of knowledge in farming, as from neglect in consequence of divided attention between farming and other business—especially is this the case in that part of the State contiguous to the timber lands. And here we have abundant evidence that farming is not a mean or small business, from the fact, that in those towns where farming has been the principal business, the people are decidedly the most prosperous and independent. I refer here, particularly to those farming towns in the neighborhood of the timber lands and sea board, in many of which farming has only been a partial business.

It is true that the renovation of an exhausted farm requires time, patience, perseverance and capital; and the larger stock a man has of these on hand, the sooner he may consummate his object; yet patience and perseverance will accomplish much in a short time, if rightly applied. In order to start right, it is well to make a map or plan of such a farm as we desire, or from situation and circumstances we can reasonably expect to make, and then direct our labor and efforts to accomplish our object as soon as possible. In my opinion it is highly important that a man should be a scientific, as well as a practical farmer. Science would render practice easier and more interesting.

It is sometimes found that apparently worn out lands, are not so much exhausted as they appear, and by a right application of means they are comparatively easily reclaimed; and he is thus aided in his operations, and knows how to profitably invest money. I think that a large majority of farms, at least in the northern counties of Maine, are of this class.

For instance, a succession of the same crop may have exhausted the soil of more or less of the elements necessary to sustain and mature such crops, and still retain the necessary elements to grow

some other. Again a variety of crops may have exhausted the surface soil of most of its plant sustaining properties where shoal plowing has been the practice, and the farmer considers his farm worn out, when, if he would deepen the cultivation a few inches, he would probably turn up to the action of air and water, many important elements necessary to sustain vegetation.

It has been contended by some, (I can hardly think they were practical agriculturists,) that the earth contains within itself all the elements of vegetation, and that it only required right practice in tilling the soil, to constantly bring out and mature the productions of the earth, without the aid of fertilizers; that as fast as the surface soil became exhausted, by bringing up a new soil which had lain dormant for a length of time, all the elements necessary to sustain vegetation were alternately reproduced and replaced, and that the process might be continued indefinitely.

In the renovation of worn out lands as well as in general farming, there is, no doubt, much to be gained by deep cultivation, and by frequently bringing to the surface some of the sub soil, or dead earth as it is frequently termed, and thoroughly mixing and pulverizing together; but the farmer who neglects to husband all his means to procure fertilizers, and manages to return to the soil the elements taken therefrom by his crops, however perfect his tillage or cultivation, will sooner or later find himself with a worn out farm; and if he cannot realize from his sales of stock, &c., quite as much ready cash, or make as quick turns as from the sales of produce, yet he can hardly fail to see what the end will be in the course pursued. Too much consequence can hardly be attached to the making, saving and application of manures, by those especially who have exhausted lands to renovate; and while I deem it of the first importance to the cultivator to make the most of his barn yard manure—which may be his chief dependence—yet I think in renovating worn out lands, much advantage may be derived from a right application of calcareous or other artificial manures. Gypsum, lime and wood ashes are cheap dressing, and pay well on most soils—perhaps best on dry loamy and gravelly. Most of the cereals and vegetables, partake largely of these, consequently exhausted soils to a greater or less extent are so, from too large a drain of them without return; and they can hardly be dispensed with in the recovery of soils so

impoverished, unless there is an abundant supply of barn yard manure at hand, which generally answers all purposes of fertility. Lime and salt mixed, in most soils may be used to good advantage on Indian corn, and on most if not all kinds of grain, especially wheat and barley. Ashes and salt make good dressing for potatoes and most other vegetables, and at the same time assist the grass crop for several years, or at least as long as it is profitable to mow land without changing its use, which I think, as a general rule, where farms will admit of it, should not be more than two or three years. I think I have seen good results this season, from the use of lime and salt mixed in proportion of one hundred pounds of salt dissolved in water with which three hundred pounds of quick lime was slaked dry, and mixed with about two bushels of gypsum; about twelve bushels of this mixture was spread on an acre of worn out land, with good success.

An acre of dry loamy land which had been mowed till it yielded less than a half ton of hay to the acre, was plowed two years since, about two inches deeper than before, and eight common cart loads of barn manure plowed in. Last season it yielded about one hundred and sixty bushels of potatoes, which were dressed with wood ashes, salt and gypsum, mixed in proportion of four bushels of ashes, one of gypsum and one of fine Liverpool salt, about one gill to each hill. This season it was twice plowed and once harrowed, and two and a half bushels of two rowed barley sowed upon it; at the same time there was spread upon it about ten bushels of the salt, lime and gypsum mixture, and harrowed twice more; and forty five bushels of barley was the yield, which was one third more than grew on the same kind of land adjoining, which was tolerably well manured last season for corn. It is evident here that the deepening of the cultivation, a more thorough mixture and stirring of the soil, and supplying it with those particular elements of which it had been exhausted, contributed mainly to the crop, which (it will be borne in mind) grew upon *worn out* land. The cost of this mixture did not exceed fifty cents per bushel, including five dollars per ton for freight. Lime and salt mixed in the above proportion, I think will generally be found useful when properly applied in renovating exhausted soils. Although the effects of such manures may not be so durable as barn manure, yet *whatever increases the crop,*

increases the means for supplying the defects of the soil, if the crop (as it should always be) is consumed upon the farm.

Artificial manures, such for instance, as lime, gypsum, wood ashes, salt, &c., are frequently condemned, because they were wrongly appl'd. It must be borne in mind that they do not contain all the elements found in barn manure; consequently their beneficial effects can only be realized on such soils as are deficient in those properties to be supplied by the dressing. If the soil is not deficient in lime, then lime cannot be applied to advantage; and the best way for farmers in general to acquaint themselves with the proper use of them on their own farms, is to experiment on a small scale. And especial regard, in experiments, should be had to *mixture* and *quantity* as well as *kind*. I think I have seen good results from salt and lime, mixed as before stated, applied to corn and potatoes; yet great care should be taken that but a small quantity comes in contact with the seed; and I have never known corn to suffer materially by the worm, where about half a table spoonful of it was carefully sprinkled over the seed *after* dropping; and when it is used as top dressing, it is better to put it around the plant, an inch or two from it. In this manner, a common handful of the salt, lime and plaster mixture, may be used to a hill of corn or potatoes. If the salt and lime mixture only, is used, a less quantity should be applied; two thirds will be sufficient.

I have witnessed apparently exhausted mowing lands materially improved by the application of three bushels of gypsum to the acre, at the same time abandoning the practice of grazing it in the spring and fall. Also lands which were used for pasture till almost useless, being covered with moss, restored to good profit by three years' cultivation, with the use of gypsum only, deepening the cultivation a little each year, and removing the loose rocks, at the same time obtaining a crop of oats and peas, sufficient to pay all the cost of renovation; and this year, which is the fourth since the process commenced, it yielded at least one and a half tons of hay per acre, and by a judicious system of rotation of crops, and at the same time returning in manures what the four years' crops have afforded, I cannot see why a high state of cultivation cannot be attained; at the same time receiving in the crops ample remuneration for all expense of labor and fertilizers. As before stated, the subject of renovating

worn out lands, embraces every department of agriculture, and can hardly be considered without encroaching upon the province of others who have the subject of manures, and so forth, committed to them. I have therefore felt myself at liberty to only make a few random remarks on the general subject of farming, and it may not be altogether inapplicable to the subject to consider its pecuniary importance.

It cannot have escaped general observation, that from some cause or other, many good farms have become more or less exhausted, and the owners have been induced to sell cheap, and emigrate to the western states. And it is still a question with many, whether it is better to renovate the exhausted soil, or emigrate to the new lands. It is evident at a glance, that much here would depend on circumstances. A man with very limited means, a man with a family which he wished to settle around him, or a young man beginning in life that wished to try his fortune in the vicissitudes and speculations incident to the growth of a new country, might find it for his interest to lay a foundation for the future in a new settlement, and wait for the results of time and chance, to increase his means with his necessities. On the other hand, a man somewhat advanced in life, and desirous to spend his remaining days in the enjoyment of privileges attained by society of maturer growth, or a man with but small means, may safely invest in a good soil, although somewhat exhausted, and find it both pleasurable and profitable to renovate and restore it to its original capabilities, and thus at once secure the privileges and pecuniary value which a well regulated society and accumulated and concentrated wealth give to it.

The improvements in the State, in agriculture, the exhibitions and the reports of crops of various kinds which have been raised on an acre of land, must sooner or later force the conviction on every careful observer, that a large class of farms in this State do not now yield one-fourth of their capabilities, and that the same amount of labor and capital now expended on the whole, might be more profitably expended on one-fourth part. I admit the reasoning of many of our farmers, that if a man can profitably farm on twenty-five acres of land, with hired labor, he can realize double the profit on fifty; or, that from circumstances, he might for a short time, realize more clear profit on the fifty acres. I admit that farming is a paying busi-

ness in Maine, and provided it is conducted upon true and correct principles, like every other good business, it is profitable according to its magnitude. I am well aware that to renovate an exhausted farm, and bring it into a desirable state of cultivation, requires time, labor, and capital in proportion to what is to be accomplished, and the size of the farm, in my opinion, should always be in proportion to the means of carrying it on; and the true principles of farming are, to make every acre produce *nearly* if not quite its entire capacity; (there may be an exception in regard to hay,) and although it may take some time to accomplish this, yet well directed efforts will consummate our object sooner or later.

Some years since, I met in Massachusetts, an intelligent gentleman of that State (if I may be allowed to judge of such a character) who appeared to be much interested in farming, and made many inquiries relative to agriculture in Maine. "Ah!" said he, "you run over too much land in Maine; land is too cheap there; the same was true once of Massachusetts, and the defect is not entirely remedied yet." He said his grand-father settled on one hundred and sixty acres of land about forty miles from Boston; he succeeded in his life time in making a valuable farm, kept a good stock, and supposed he was doing all that could be done profitably on a farm of that size. It was subsequently divided between his two sons, each of whom made such improvement that they kept the same amount of stock, and raised as much produce as their father. "And," said he, "my farm consists of forty acres, one-fourth part of the original, and I keep as much stock, and raise as much, as the whole originally did, and I do not believe I have reached its capabilities by considerable, *but I will do it.*"

And in conclusion, I will only add, that in my opinion, a correct system for renovating worn out land, embraces a correct system of general farming; a system which, if correctly followed, will not run out farms. A correct knowledge of the system must be gained by studying what is written, by observing general practice and its effects, and by practising what experience proves to be correct.

The farmer who rejects scientific agriculture, (or what he terms book-farming) altogether, is like a certain class of physicians who value themselves on account of their ignorance of science, and boast of having derived their skill from an unlettered Indian, and usually

get off a tirade against calomel and the faculty. He who trusts book-farming altogether, and is guided only by the written rule, without variation on account of circumstances, resembles another class of physicians, who never deviate from the written directions on account of different constitutions, or different stages of the disease, but administer the regular doses, at the exact mark of the clock, kill or cure.

The farmer, to be successful, should understand the nature and properties of his soil, the constituents and requirements of the plants, the chemical combination and application of such elements as are suited to the growth and maturity of the same. And in order to attain to this, it is, in my opinion, highly necessary to place the profession of agriculture on a level, at least, with the other professions; and the farmers have only to will this, and it must and will succeed. They have the control of these matters, and have contributed liberally to other professions, and ought now to elevate their own standard to that respectable position attained by others. A geological and agricultural survey of the State, an agricultural college, or school of some kind, that would interest and secure to the profession the highest intellectual capacities, is indispensable to success.

I cannot but hope that the farmers of Maine will give this subject of agricultural education a candid consideration.

CLEARING NEW LAND.

By Alfred Cushman, Golden Ridge.

As soon as the leaves attain their full size, which is generally the first week in June, the operation should commence. First, cut every green thing, up to an inch in diameter, with a bush scythe, and everything up to six inches in diameter, with the axe. Then fell the trees as much side the hill as convenient, to ease the rolling of the logs. I think much the best way is, to fell the tops together in winrows about one hundred feet wide. That saves about one-half the labor in limbing, insures a much better burn, burns up much more timber, often a large part of the bodies of the large trees in the middle of the winrows. If they are intended for burning the season they are felled, the limbs and tops should be cut off immedi-

ately; when, if the weather is dry, they will burn well in four or five weeks.

If they are intended for lying over, (which is better than twenty five per cent interest on the outlay,) the limbs may be cut down early the next spring. A very important point in clearing new land, is to secure a good burn, which can be done when well dried, with a good wind. Then different modes are pursued. The one I think best, is to cut all the timber two men can conveniently handle, in pieces fifteen or twenty feet long, and pile them against the large trees, much of which will be consumed in the burning piles. When the piles are burnt down so the brands can be handled, with an old axe or picaroon draw them across the burning logs, wherever it is necessary to cut them off. This is the most cheap and expeditious way the cutting up can be done. If it is intended for piling with oxen or horses, it may be cut long; if by hand, short; and the difference in the two ways, so far as expense is concerned, is small. If there is much hemlock, a team is much more necessary. Land intended for planting may, or may not be cleared clean; the less timber, however, there is left on the land, the better the crops will be. With a good burn on hard wood land, two experienced men will clear an acre per day, so it will do to plant; or clear an acre clean in two days.

Land inclining to moisture, where grew rock maple and birch, should be planted with corn, beans and turnips; and that more dry, where grew hemlock and spruce, should be planted with potatoes. All the ashes of large burnt piles should be spread on the surrounding knolls. On land fully cleared, an average crop would be about thirty bushels of corn, fifteen of beans, three hundred of potatoes or turnips, and on land well hand piled, about two thirds the quantity.

On new land, all kinds of grain flourish abundantly; one, two or three crops may be taken off before sowing grass seed; if three, for the last one the land should be plowed, to smooth the surface and insure a good crop of grass. When properly managed, the yield will be from forty to sixty bushels of oats, buckwheat or barley, or from twenty to thirty five of wheat and rye.

FACILITIES OF NORTHERN MAINE FOR STOCK-GROWING.

By Elbridge Knight, Fort Fairfield.

[This topic was assigned to Hiram Stevens, who writes me that his engagements were such as to prevent his attending to it, but he had secured a paper on the subject from his townsman, Mr. Knight. ED.]

I propose to consider, briefly, some of the advantages for stock-growing in the northern part of Maine, as compared with the middle and southern portions of New England.

Nowhere else can the Eastern States boast of a primitive soil equally fertile, if we except, perhaps, the alluvial flats of the Connecticut River. It generally consists of a deep yellow loam, with a pan of loam, clay, and coarse, gravelly, decomposing fragments of rocks, resting upon a stratum of lime-stone. The pan, or sub-soil, if exposed to the atmosphere for a few months, will produce a crop of hay or oats, without the addition of any fertilizer; hence, we may infer that the soil has every necessary ingredient, to render it enduring and almost inexhaustible. As we go south or west from the Aroostook valley, we find more clay and less loam, until we gradually approach the prevailing granite soil of New England. The few stones that are found here, lie mostly upon the surface, or so near it, that they are thrown out by the plough, without interrupting the furrow. Farms are so level and free from stone, that the pasture, which cannot be conveniently ploughed, is an exception, and not the general rule.

We have, then, in the soil, the important advantage of natural depth, that may be increased by sub-soil ploughing to any desirable extent; and the surface may be easily freed from stone, and fitted for the mowing machine and other labor-saving implements, which will lessen the expense of cultivation far beyond what can be done upon the verdant hill-sides of Vermont, or, upon the rocky lands that join the sandy plains which skirt the mighty ocean.

The porous condition of the soil, owing to its small proportion of clay, permits the roots of grass to extend freely in every direction; hence its natural security against drought; its draft for sustenance reaches a larger portion of the soil; and the roots are seldom or never found matted together near the surface, which is commonly called "binding out," and which lessens the crop to such an extent

that it is scarcely worth harvesting until it has been ploughed and again seeded to grass. Here we can suffer the grass to remain, without deterioration, many years, by giving it the necessary food in the form of top-dressing; and experience has shown that our soil and sub-soil absorb and retain manure, so that it does not

“Waste its sweetness on the desert air.”

I consider this no small desideratum, for a saving of about fifty per cent. in labor and manure is made, by this mode of cultivation, over the one commonly practiced with the plough. Top-dressing may be denominated nature's own method of distributing fertilizers. The hay crop is also protected against the wet weather of fall and spring, by the porous condition of the soil. It is also more secure against injury from insect tribes than in lower latitudes. I consider the hay crop less liable to injury from these causes, and consequently more certain, than in any other portion of the country.

Red clover, herds grass, and most of the other valuable perennial grasses, are well adapted to our soil, and our climate is well adapted to them, for they are seldom winter killed, unless enough of the crop is left upon the ground to smother the red clover.

The porous state of the soil is a preventive against injury from the late and early freezing of the ground; while in the colder months we are secured from this evil by a covering of snow, that almost wholly prevents frost from entering the ground, and producing the deadly effects so often seen in the pastures and mowing lands of the sea-board. The plants of clover and grass are in a healthy, and even vigorous condition, when the snow leaves the ground. I say vigorous, for, if frost was in the ground when the snow fell, it has disappeared, and the plants have already commenced the growth of the season—a growth that is scarcely checked by cold after the snow disappears in spring. Hence the full development of these plants, and the abundance that greets both man and beast.

As I shall have further occasion to remark upon our climate and its effects upon the stock-growing interests of the region, I will briefly describe our winters as commencing upon an average about the middle of November, by the fall of deep snows, which generally leave the earth's fair face about the middle of April. We can hardly be said to have a spring, for it ceases to be winter, and summer with its verdure has already commenced. By this protection from the

cold, our pastures, like our mowing lands, are found verdant when it disappears, and at this period, young cattle and sheep are turned out to shirk for themselves.

The vigorous condition of our pastures in spring, is continued through the season by the dampness of our climate, and the aid of frequent showers. It should also be known that we are not subject to summer droughts as in other portions of the country.

It is not uncommon for cattle to be taken from our pastures to the shambles; and sheep are frequently slaughtered here weighing one hundred pounds after they are dressed, and having from an inch to an inch and a half of fat upon the ribs. It is no small advantage to have cattle become beef in the pasture, or even to make a near approximation to it. Nor would I here omit the remark that, so even a supply of food is favorable to the quality and quantity of dairy products, and also to the health and vigor of the animal. The long winters, during which our cattle do not graze upon the earth, are also favorable, for they retain their appetite until spring, and are generally in good condition when they leave the barn. In many minds, an impression exists, that our long winter is an evil that cannot be counter-balanced by any existing advantages.

I have already enumerated the advantages of a vigorous forage over a weak, puny, and often times, perishing one. I have also remarked upon the better health and condition of the animal, both summer and winter, as a natural consequence; and I am further prepared to express, most confidently, from actual observation in each of the New England States, the opinion that cattle need forage prepared for them, one year with another, as short a time, upon the Aroostook, as in any portion of these States.

Our winters may be colder, as tested by a thermometer, but they are not as uncomfortable as in more mountainous regions. We have fewer driving storms, less frequent tempests, and almost entire freedom from the cold, damp, chilly winds of spring. We have warm, growing weather in May and June, when the Green and the White Mountains are sending forth their chilly blasts from their snow-capped eminences, to the discomfort of thousands who need, at least, one over coat more than is required in the valley of the Aroostook.

All kinds of English grain are very luxuriant here, which sug-

gests three important considerations in reference to stock-growing ; first, an abundant supply of coarse forage to aid in wintering young cattle ; secondly, the grain itself, to be used as occasion may require ; and thirdly, the advantage of these productions to the fertilizers of the farm.

The friable nature of the soil renders the cultivation of roots easy and profitable. Used with coarse forage, they are of much value in wintering many kinds of stock that would otherwise require hay, and perhaps grain, to keep them in a desirable condition. They are also of much value in furnishing a healthful and desirable change of diet in mid winter. Turnips of various kind are grown here with but little trouble or danger of serious injury from insects. Turnips may be successfully used in fattening cattle for the shambles. I have been more successful with ruta bagas, as a principal food, than with corn itself. One year, I fattened three oxen, giving each (after he became accustomed to the feed,) three sheaves of oats per day, and as many turnips as he would eat, but no water. Each ox gained one inch in girth per week, until he was deemed fit for slaughter.

Before closing, let me call attention to the abundant supply of muck in our bogs and cedar swamps. It is composed mostly of decomposed moss, and from the leaves of ever-green trees, and consequently contains a large amount of acid. It may be neutralized and rendered fit for the soil by an alkali, by exposure to the atmosphere for months, or by being placed in barn-yards, or used freely as a litter for cattle or hogs. By the use of this valuable absorbent and fertilizer, fields may be rendered more and more productive from year to year ; and even exhausted lands need not await the slow process of nature to restore their fertility. The cedar swamps are also yielding a sufficiency of fencing timber, so that the farmer may enjoy the advantages of good fences, quiet cattle, and frequent change of pasture.

These advantages are so numerous and prominent, that they have already affected the public mind, and our farmers are rapidly increasing their herds and their flocks, not unmindful of the policy that leads to thrift and wealth. The wealth of New England has been, to a great extent, gathered from her grass-covered hills, by the docile animals that have become subservient to the will of man.

With the success of our fathers as a motive power to urge us forward; with their experience to direct our efforts, and with many superior natural advantages, may we not anticipate, with a confidence bordering upon certainty, a bright future for northern Maine?

THE POTATO AND ITS CULTURE.

By E. B. Stackpole, Kenduskeag.

S. L. GOODALE, Esq., *Secretary, &c.*

Dear Sir:—Near the close of the last session of the Board of Agriculture, "Potatoes and their Culture" was assigned to me, as the subject upon which I should write; I herewith send you my thoughts on the subject.

The potato, when first obtained from its native mountains, was a small watery tuber, and of but little value as food for man. Since then, by cultivation, it has been brought into so improved a state, that most of the civilized nations of the earth took to it, as one of the most important articles of food. I think it will be conceded by all, that no vegetable has so large a claim upon our attention, as farmers and cultivators of the soil. It has become a common dish upon most of our tables, and is well adapted to meet the wants of the people of this country. The potato grows best on green sward; old pasture land plowed up in the fall of the year, and planted early in the spring, is the best for raising potatoes. Such land appears to furnish, as its turf decomposes, the most natural nourishment for them; it preserves moisture in the soil, and forms a loose mass, in which they form and grow to a large size, and generally of good quality. I think it is not advisable to use fermenting manures in the hill; if such manures do not cause the potato rot, they no doubt are auxiliary to it. Ashes, lime, salt, plaster, coal dust, muck and old tanner's bark, or a compost made of most or all of them, may be used with profit and safety. In Penobscot county, the best varieties raised for the table, are the Jacksons and the White Blue Noses; the best for a crop and a market, is the Orono or Reed potato. The seed—about eight bushels to the acre, of medium sized potatoes—should be put into the ground early, in drills three feet apart, one piece of seed in a place, fifteen inches apart in the drills, and cov-

ered about three inches deep; they should be hoed as soon as they are large enough, and never after they begin to blossom, as late hoeing causes new sets of potatoes on the vines, which prevent the first from growing to a large size, and consequently we have a large number of small, and but few large potatoes at the time of harvesting. When harvested, they should be kept in a *dark* cellar, and as much from the light as possible; if kept in the light, the flavor becomes impaired; much more so than when buried in the earth, or kept in a dry, dark cellar.

The rot, for the last fifteen years, has destroyed nearly one half of the crop in this vicinity, and attempts have been made, here and elsewhere, to discover the cause, and to find a remedy. The disease has been investigated in almost every form and shape, but the labor has been lost; for we know no more about it to day, than we did ten years ago. With all the theories respecting potato rot, we are yet as much in the dark as ever. Potatoes deep in the ground do not rot as much as those near the surface; of different varieties planted side by side, some will rot and others will not; some kinds rot one year and others the year after—no two fields of the same kind of potatoes produce the same results.

CORN AND ITS CULTIVATION.

By Hiram Russ, Farmington.

As upon this subject there are various opinions—different soils requiring different treatment—and as there are others who differ from me on the subject, I will confine my remarks to the culture of corn on the intervalles bordering on the Sandy River. Until a few years since, our farmers plowed their green manure in very deep; of late we find this mode of cultivation wrong; by keeping the dressing near the surface, we find our crops to be much better, and our ground holds out for grass equally as long. Our manner of cultivation now is to plow six to seven inches deep, sow to cats the first year, plow in the fall again, in order to kill the witch or twitch grass, so called; haul on the green dressing in the spring; spread it broadcast—some work it in shoal with a light plow, most of the farmers use the cultivator or horse-hoe—then furrow out the rows three feet apart;

chain off the rows three feet the other way, putting one shovelful of old, rotten barnyard, hog or compost dressing in each hill; drop about six kernels in each hill. I find on our back or highlands which are moist or wet, they spread their dressing, turn two furrows together, and plant on top of these furrows.

My own manner of cultivation is, in the first year, to plow five or six inches deep and sow to oats; the next fall plow nine inches, or three or four inches deeper than when broke up—this I call subsoiling; next spring, plow three to four inches—this lightens the soil; then spread on my coarse or green dressing, working it in well with a horse-hoe and harrow; plant my rows three feet each way, with a shovelful of old manure in each hill; use the Dutton corn mostly.

Some plant in ground broke up in the spring, treated in the same way as old ground. I consider this last method the best, if it was not for the worms—they are apt to get more than their share.

SWINE.

By W. M. Palmer, Palmyra.

I enter upon this subject, which has been assigned me, with some diffidence and reluctance, both by reason of its nature as well as by the want of statistics necessary to present it in a proper light to the public. I am very well aware that the subject does not present that field for the display of learning and research, or one that is likely to excite the enthusiasm of the writer of genius, that many other topics might; though we read that ancient Rome was built upon the prophetic site made known to the Trojan hero, by a "sow reclining upon the ground surrounded by a litter of thirty white pigs."

Whatever, then, in general, may be the political influence of swine, whatever connection in the minds of statesmen they may have with government, this is most certain, that they form a large part of the bone and muscle—"the sinews of war" of our country, and especially of the people of Maine. I desire, therefore to call the attention of the public to this department of husbandry, which by reason of its connection with the best interests of the farm, is one of the greatest importance, and yet it is one which seems to be neg-

lected to an extent beyond what a reasonably enterprising spirit among our farmers would seem to warrant.

Our State, which is essentially an agricultural one, annually consumes many thousand dollars' worth of western pork, which it must be conceded by all, is less healthy than that of domestic growth. Now, since we labor under many disadvantages in respect to some agricultural products, we ought to make the best use of our facilities for rearing domestic animals, to which our climate is well adapted.

I know of no difficulties or obstacles in the rearing of swine, that should prevent our supplying at least home consumption, thus annually saving to the State, a large amount of money, which could be successfully employed as capital, in other departments of industry, but which now adds to the wealth of other States. We are able to raise all that is necessary to fatten swine, and there is as little or less risk attending them than other domestic animals. In order to show that the usual prices of pork are sufficiently remunerative to make the raising of it profitable, I will add a statement of facts which came under my own observation, which is far from being as favorable to my object as in ordinary cases it should, since the farmer should raise his own pigs and corn.

A hired sixty dollars; with twenty dollars he purchased eight pigs; the remaining forty dollars he expended in corn. He afterwards disposed of four pigs, and expended the proceeds in corn. The remaining four yielded him one thousand pounds of pork, which he sold for eight cents per pound, thus netting him \$16.46. And in addition to this he made manure sufficient for one acre of corn.

8 pigs, \$2.50 each,	\$20 00	1,000 lbs. pork at 8c.,	\$80 00
Corn,	40 00	Cost,	63 60
Interest on \$60,	3 60		
	<u> </u>	Net profit,	\$16 40
	\$63 60		

In this statement, I have taken it for granted, that the manure would be amply sufficient, to pay for the labor. But the profits are not confined exclusively to the sales of pork. Swine seem to be a natural accompaniment to the dairy; and true economy would demand of the farmer that the number of swine should bear a due proportion to the number of cows; otherwise he cannot

realize the full reward of his labor, nor in any other way so speedily and easily convert into ready money, the coarse products of the soil. Raising swine, in comparison with other animals, as neat stock, and horses, has this advantage. In the case of cattle and horses, it requires five or six years before they will bring their highest price; but in the case of swine only one and a half years are necessary to bring them to maturity. But this is not the only advantage of rearing swine, in comparison with other animals, or the only use they may subserve the farm. It must be admitted that the true policy of the farmer is to increase the richness and fertility of his acres, by restoring to the soil as much or more than he takes from it. It is a well known fact, that farms in many parts of the State are "running out," as it is termed. The soil, without being replenished by proper fertilizers, at last refuses to yield its increase; and it must be reclaimed or be abandoned as useless. In reclaiming these worn out acres, swine are able to perform an important part.

The uneven surface of the soil causes it to be constantly washed by rains and dissolving snows, carrying each year some part of its virtue to lowlands, bogs and swamps; and this process having been going on for ages, the result is that we have vast deposits of muck accessible to almost every farm—the dormant wealth of the soil of our State. What then more natural, than to suppose that these deposits were intended by nature for the renovation of exhausted fields? But this muck needs to be manufactured, as it were, and no animal will perform this duty so effectually as the hog, which, ever living up to his motto, "root hog or die." with grunting contentment, pursues his daily vocation of dissecting and digesting this black vegetable muck. A few days' work of the farmer with his team, each year, would supply his hogs with material sufficient to manufacture many cords of the best manure. With this little amount of labor and enterprise, the farmer in moderate circumstances, in a few years, would behold his renovated fields bending under their harvest loads; joys would fill his heart and gratitude his soul, instead of that sadness and discontent, which the daily sight of unfruitful fields cannot fail to produce. It is in this way only, that the farmer can restore to his land the richness which nature so long has been gradually removing—a work on which his lorship "hog," must "have his nose."

Hoping that what I have so imperfectly written on the subject, may arrest the attention of the reader, and suggest to him the propriety of trying an experiment which can do him no harm, but one which will certainly enrich his farm and put money in his pocket, I have the honor to be, &c.

PLANTING OF ORCHARDS.

By Joseph Avery, Jefferson.

The planting of orchards should claim the attention of every one that intends to cultivate the soil for a living, and it should be his first business to select a suitable piece of ground for that purpose, which should be dry upland soil, as the apple tree seldom thrives much on cold, wet soil. What is known as good corn land will serve well. It should then be made sufficiently rich and mellow, that the trees, when transplanted, may take root and grow. In the selection of trees, let them be from nurseries in this State, of the same kind of soil as that into which they are to be transplanted. They should be taken up in such a manner as not to injure the main roots; then by digging a place sufficiently large, and the earth loosened to a suitable depth, so that the roots of the tree when set may lie in the same position as they grew originally, without being forced, and as nearly as possible to the same depth in the ground. The care taken in setting trees, has much to do with their future growth. The trees should be set from twenty to twenty-five feet apart, in straight lines, for uniform appearance, and the better to cultivate among them. After being planted, they need care and training to give them proper shape. To till the orchard by root-crops is beneficial, also mulching in the fall with chip manure, to retain the frost, and to prevent the sap starting too early in the spring.

On many farms, there is rocky, broken land, not suitable for tillage, but more suitable for pasture, which may be set with apple trees to advantage, care being taken to select those trees whose tops may attain sufficient height to be beyond the reach of cattle, and when they grow to afford shade and fruit; they attract cattle, sheep, and hogs under and around them, which manure them sufficiently. And such trees are found to come forward nearly as fast, and to

bear fruit as well, as those in cultivated orchards. The objection, that the fruit that falls before time to gather is lost, is not of much force, for it is eagerly sought by almost every creature on the farm, and does them good, besides which, this method secures the destruction of the eggs and larvæ of injurious insects (like the apple-worm, which is in many places a great pest,) which may be contained in the premature fruit which falls early, and thus prevents their propagation.

The planting of apple trees by the fences in fields near the roads, is found profitable, on account of the fruit as well as the shade they afford. The increasing demand for apples for export, as well as for home consumption, at the prices paid for them, gives a profit to the grower, and no labor or money invested in farming pays a better profit than that invested in orcharding, if applied in a judicious manner.

ON THE RENOVATION OF OLD ORCHARDS.

By N. T. True, M. D., Bethel.

Their condition in Maine. By an old orchard is usually meant, one that has not been grafted, and which has, in other respects, been neglected for a series of years. It is on this class of trees that I shall more particularly treat in this essay. Such trees are usually sadly in need of manuring, trimming, and grafting. Many, very many such orchards, exist all over the State.

Preparing the soil and Manuring. If an orchard has, in years past, been plowed, it is better to spread on a coat of animal and vegetable manures, and plow them in. These may be used in generous quantities. Be quite as anxious to manure the trees at a distance, as near the trunks. The object is to give a new start to the woody growth. Mineral manures, such as lime, plaster, and ashes, should, as a general thing, be reserved till the trees are ready to bear. Cultivate the land the first year with potatoes, if convenient. By this means, the earth becomes porous, and new roots will extend throughout the soil. Muck, well prepared, coarse straw manure, as well as chip and stable manures, are all excellent for this purpose, and well adapted to the growth of the woody fibre.

Pruning. Much has been written in regard to the season of the year for pruning. I do not regard it of so much consequence *when* it is done, as *how* it is done. Theoretically, the best time is after the trees have commenced to set their fruit in June until October. The wounds are not so likely to bleed, and will heal over and leave the wood sound beneath. The early spring months are usually the most convenient for this purpose, and I never could perceive any injury to the tree; but it is absolutely necessary that the wounds be covered with a coat of paint. Red ochre and linseed oil mixed together quite thick and put on rather liberally with a brush, is as cheap and as good as anything.

Be sparing of your trimming the first year, cut out limbs absolutely dead, and be sure to cut them as near to the trunk as possible, especially on the lower side of the limb. Have an eye constantly to the limbs suitable for grafting the next year. Take out small limbs that cross each other, so as to have your tree shaped nearly like a spread umbrella inverted. Trees that have a sickly look, or whose main branches are dead, or whose bark is dead over half of its body, should, as a general thing, be cut down, and their places supplied with young trees. In ten years you will have a healthy young tree just into bearing, while the old one, with all your care, will be an old, sickly-looking tree still, and non productive. A tree may be hollow, and yet be a suitable tree to graft. Do not trust to a sprout from an old tree. It rarely ever amounts to anything. Dig out the whole tree, and spread on a load of manure, and cultivate one year before you put another tree in its place. Without this, a tree will not succeed well in the place of another. Sometimes an old tree may be delayed for several years before it is grafted. The extremities of the large limbs may be cut off and painted, and new shoots be suffered to spring out, which may be grafted and make a fine tree. In no case trim your trees so as to expose the naked limbs to the hot sun. If you do, the bark will be killed the whole length of the limb, and frequently be the cause of death to the tree.

Trees that are covered with moss should be scraped and washed with a weak solution of lime, potash, or soda, *weak*, I say, because many trees have been killed by too strong an application of these substances.

Grafting. This may be commenced the second year after manuring. I wish to be understood that renovating an orchard, is a work of time. With proper care, it may soon yield a return on the money invested. So grafting should not be commenced till the woody growth of the tree has been revived by the treatment of the previous year. The scions will not then become dwarfed, but will at once commence a healthy and vigorous growth. Do not graft too long limbs. They rarely ever do well. Those from one to one and a half inch in diameter, are large enough for this purpose. Trim as little as possible this year. The habit of docking the whole top of a tree is apt to be fatal. All the limbs in a tree suitable for grafting, may be grafted the first year, provided there is a large number of under-branches and twigs on the limbs. See that you make use of vigorous scions of the last year's growth. Make use of vigorous kinds of trees to graft into those of an unhealthy aspect. The Baldwin is excellent for this purpose. Slow growing varieties should never be grafted into such trees. The earlier in the season you graft an old tree, the more likely it will be to succeed. It only wants a warm day in March or April, even when the snow is on the ground, if the wood is sufficiently warm for the wax to adhere to the bark. If the wood is too cold, or wet, it cracks off and destroys your graft. I practice shouldering my scions, with much success. I obtain a better fit to the cleft than by a wedge. In plum trees I use it altogether. It takes a little more time, but everything about grafting, pays well to have it done in the best possible manner. Be exceedingly careful to press the wax closely to the wood on the end of the stock, and around the scion. Many fail, from a neglect of this precaution. Make your wax a little softer than is usually prescribed in the books. It will be better in this climate. One part linseed oil, two parts bees-wax, and four parts rosin, is a very good proportion. Simmer together in an iron kettle, and pour it into a tub of cold water and work it like shoemaker's wax, or molasses candy. If it is too soft, use more rosin; if too hard, more oil. You can test it by dropping a little into cold water and working it.

After you have finished grafting for the season, go round with your paint pot and cover every wound, large and small, with paint. Sometimes, a very small twig will bleed so as to blacken the whole limb below. This is frequently the case with young trees, and

retards their growth or destroys them. Paint over when necessary the wounds of the preceding year's pruning.

During the summer, it is well to go round and close up the cracks in the wax, occasioned by the expansion of the wood.

See that the ground is well tilled the second year, but be careful not to plough so deep as to cut off large and important roots. This is not necessary. Keep the grass and sprouts away from the trunks, watch carefully for the borer, and you will need to pay but little more attention to your orchard for the second year.

Pruning the second year after grafting. More orchards are killed during this period of their renovation, than at any other. It should be very sparingly done. It is a great temptation after you see the scions well started, to trim off all the under-branches of the limb. But here lies your greatest danger. The leaves are the lungs of trees, and what few there are on the scion cannot take the place of all the branches, and elaborate all the sap in the limb. Congestion takes place, and the limb dies. Cut out such limbs as may interfere with the growth of the scion. Re-graft and fill out such stocks as may not have taken the previous year, observing to wax over all the scions of the last year where it is started off. A limb may often be saved by a little attention to this, especially where but one scion took the year previous. Follow up with your paint pot as on the previous years.

The third year. The operations of this year will be but a repetition of the previous year. Cut out a few more branches. Now and then the scions may have grown so large that the feeblest scion in the stock may be cut out, and the other so shaped as to form the future top of the tree. If two scions are left for several years, they out-grow the stock. When large branches have been cut, and new wood is forming over the wound, you can frequently assist nature by taking a chisel or a gouge, and a mallet, and cut out the old wood so as to give the new wood a better opportunity to turn in and cover the wound.

If you have had tolerable success, you will now begin to enjoy real pleasure in what you have done. Your Baldwins will begin to bear, the third and fourth years after grafting, and continue to bear more or less every year till they become well topped, when they will bear every other year. Your Blue Pearmain will not begin

to bear till several years later. The Hubbardston, Nonsuch, and Yellow Bell Flower, will also come into bearing very early. Your early varieties, and sweet apples, should be grafted near the buildings where they will be less exposed to plunder.

By careful attention a few days each year, an orchard may soon be made very productive and profitable. There are many orchards in this State that might be made as profitable as all the rest of the farm, which are now valueless. The orchardist should not be discouraged if a tree dies. Set another in its place. Change is stamped on everything, and apple trees are no exception.

You can now spread on a coating of lime, plaster and ashes, which will assist in the formation of the fruit.

With a very little attention from year to year, you may have an abundance of fruit, and anticipate an annual return (and a year soon rolls round,) for your investment. We mark a man's thrift quite as readily by the conspicuous appearance of his orchard as by anything else on his farm.

LOSS ARISING FROM A SURPLUS OF HORSES.

By Seward Dill, Phillips.

S. L. GOODALE, Esq., *Secretary, &c.*

Dear Sir:—I have to acknowledge myself tardy in furnishing you, as requested by the Board, a report upon the topic above named. The work has proved itself a larger and more difficult one than I anticipated. Sometime ago, I wrote to the assessors of nearly all the towns and plantations in my county, and made verbal inquiries in the others, in order to obtain the statistics necessary to build upon. Answers have come to hand from four towns only, namely, Phillips, Madrid, Strong and Wilton. In justice to Weld, I will say that her officers were prompt to answer my call; but by a misfortune the answer was lost, so that it could not be brought into the reckoning. From the statistics of these four towns, I could do no better than to draw an estimate for the whole county.

Phillips, according to the inventory of last April, has four hundred and seven horses and colts, taking no account of any under a year old; Madrid has eighty-three horses and colts; Strong has

one hundred and eighty-five; Wilton has three hundred and ninety-four. The number in the four towns is 1,069. There are in the same towns, as shown by the returns of the last State election, one thousand and eleven voters. In the whole county, there are, by the same returns, four thousand two hundred and seventy-nine voters. Then as the voters in the four towns (1011) are to those in the county, (4,279,) so, we may assume, are the horses in the four towns (1069) to the number in the county—making this number about four thousand five hundred.

One half of these, (2,250,) I allow to be required to do the legitimate horse work of the county; one third of the remaining half, (750,) are in my proving, usurpers of the places which would be more adequately filled by oxen. The other two thirds of the remaining half, being one third of the whole, (1,500,) I put down as an absolute surplus—so much amount of dead capital.

These fifteen hundred horses, (nearly two thirds are horses, the other third being colts one year old and upwards,) I price at an average of fifty dollars each, giving a non-producing capital of seventy-five thousand dollars. The loss in interest on this capital, is four thousand five hundred dollars per annum. The yearly cost of keeping one horse, I reckon to be twenty dollars, making the annual loss in keeping, upon the whole number, thirty thousand dollars. The annual loss in shoeing upon the same, (allowing that one half need to be kept shod, and that three dollars will meet the yearly expense of shoeing one horse,) is two thousand two hundred and fifty dollars.

Supposing that only one third of this surplus number (500) are fitted out with their proper traveling gear, including harness, wagon and sleigh, their owners are subjected to an expense of about fifty thousand dollars to furnish the fittings, the fitting of each horse being valued at one hundred dollars, (harness fifteen dollars, wagon sixty dollars, sleigh twenty-five dollars.) These fittings would last not longer than ten years; so that the annual loss in wear and tear of traveling gear, brought upon the county by its surplus of horses, is five thousand dollars. Each of the same five hundred horses, thus geared for travel, will take for its owner, at least two holidays a month—days spent by himself or his “fast young men,” in riding for pleasure, going to the village, &c., &c., which otherwise would

be passed in profitable labor upon the farm. Two holidays a month, would be twenty-four a year for each horse, and twelve thousand a year for the five hundred horses. Reckoning a dollar for each day, the annual loss to the county for time wasted by its surplus number of horses, is twelve thousand dollars. The sum of these items is fifty-three thousand seven hundred and fifty dollars, which is all absolute loss. But there is relative loss as well, two items of which I proceed to indicate.

The capital vested in those fifteen hundred surplus horses, valuing them as above, at fifty dollars apiece, is seventy-five thousand dollars. Let this be laid out in cows at twenty-five dollars each, and we have three thousand in number. Each of these cows will bring to her owner, a net income of eight dollars per annum, making an annual income brought by the whole of twenty-four thousand dollars, and showing the same amount as an annual relative loss to the county from surplus of horses.

The other item comes from the fact, as stated above, that one sixth of all the horses (750) are kept to do the service which would be better done by oxen. Mr. N. Foster of Gardiner, in his essay on the comparative value of horses and oxen for farm labor, (see "Agriculture of Maine," for 1857, page 92,) estimates the difference in value of a pair of oxen against that of a pair of horses, to be for twenty-four years, eleven hundred and eighty-three dollars. This would be about fifty dollars for one year. Then for the seven hundred and fifty horses—being three hundred and seventy-five pairs—the difference in favor of ox labor would be, eighteen thousand seven hundred and fifty dollars, which is the amount of relative loss to the county from surplus of horses.

The two items together, amount to forty-two thousand seven hundred and fifty dollars—relative loss.

Adding to this the sums before obtained, fifty-three thousand seven hundred and fifty dollars—absolute loss; and we have an absolute and relative loss of ninety-six thousand five hundred dollars.

I suppose it to be not exactly an indispensable part of my work, either to go into any general remarks, or to take much pains in citing individual cases bearing upon my topic. Nevertheless, I venture to say, that it might not be very hard to find upon the field of my

survey, instances of extreme hardship and suffering endured by wives and helpless children, fairly chargeable to this mania for keeping useless horses, sufficient to move deeply the sympathies of any philanthropist, and one would think sufficient to reform the practice of any horse worshipper not thoroughly brutalized.

These surplus horses are often very convenient—at any rate easily available—conveyances to take their riders into the haunts of rum and revelry. They frequently, in winter, are forced to stand shivering and starving out of doors, while the riders are burning their lives out within. I will name a single instance of the kind, which came within my knowledge, last winter. It happened in this county, not many miles from this town: Six horses owned by one man or one family—rather, *kept*—for it is quite common for the horses in one man's possession to be mortgaged to another—died from habitual exposure to the chilling winter weather, hard driving, and lack of food, on occasions such as I have alluded to.

THE SOILING SYSTEM.

By Calvin Chamberlain, Foxcroft.

S. L. GOODALE, ESQ., *Secretary, &c.*

Dear Sir:—You having wisely devoted considerable space in your report to the subject of *stock husbandry* as a leading pursuit in the State, and understanding, as I do, that *the grasses* and *the hay crop* is to be the prominent topic of the volume you may now have in hand, it seems to me a proper time to direct the attention of your readers to the important subject of *soiling*.

This is a comprehensive term that comes to us from the old countries of Europe; and means the keeping of cattle in stables and yards, all the year, with only a daily or an occasional liberty to ramble over small enclosures, as circumstances may admit.

This mode of keeping cattle has long been pursued in Germany, France, and other continental countries, and was thence introduced into England, where it has obtained very general adoption, and with profitable results. Many thorough and intelligent farmers of our own country are now practicing it on an extensive scale, with great and decided advantages.

Our farmers and cattle owners may urge that the climate and soil of Maine, the value of lands, and so forth, preclude the adoption of a system so radically differing from our prevailing mode, however plausible it may appear from data drawn from the customs adopted by the force of circumstances, in the densely peopled countries of Europe. It is my purpose to furnish for your use, a few pages, in which I shall aim to present this subject fairly, and as fully as my limited time and the opportunities at hand may allow. The facts and the reasonings of farmers of this country, and in Europe, will be presented in brief, with the hope that they may attract attention, and lead many to adopt this mode, fully or partially, at once.

I have some personal experience in this matter. For the last eight years, I have, as a farmer, occupied but a few acres, unproductive at first,—and have kept two cows and a horse, and for a part of the time, three cows and two horses; and during the whole of this time, my cattle have not for a single week obtained their full living by pasturage; and for the most part of each summer, but a small portion of it.

Having thus partially adopted the *soiling system* in my own practice, I have been led to examine and inquire into its practical workings elsewhere. What I have here accomplished, on the soil, and under the climate of Maine, is to me reliable data for future operations, and has enabled me to draw just conclusions, touching the theory and practice of those whose operations have been laid open to the public.

The system, like the progress of abiding truth, has, almost silently, for a long time, been working its way into favor in many localities over our extended country. In the valley of the Connecticut, and some other rivers, it is much practiced, from the circumstance that the broad intervalles are annually denuded of all fences by the floods.

The advocates of soiling, claim to have established the truth of these six propositions :

- 1st. The saving of land.
- 2d. The saving of fencing.
- 3d. The economising of food.
- 4th. The better condition and greater comfort of the cattle.
- 5th. The greater product of milk.
- 6th. The attainment of manure.

To offset these advantages, we have the labor of raising and cutting the food, and the feeding and care of the stock.*

1st. *The saving of land.* This is a fact established by concurrent testimony everywhere. To what extent this saving has been carried, we will show by introducing a few witnesses. Quincy says: "European writers assert that the saving which results, is as one to three; others say, as one to seven. Others still, that the saving is yet greater; that is, one acre kept for soiling, will go as far as three or seven, or more, kept for pasture, in the support of stock. On farms where the whole soil is capable of being plowed, the economy of soiling is great.

It may be, however, useful to observe that the reason for the diversity of statement, in relation to the degree of saving, results from the different ways in which the land used for soiling is cultivated for the purpose of raising food. Some satisfy themselves with enriching the former pasture, and cutting the grass it produces, for the soiling use. Others plow up the pasture; raise cabbages, or other succulent food, on which they support their stock. Now it is plain, the result of a comparison of saving of land made between an acre of enriched pasture, and an acre appropriated to the latter of these modes of husbandry, must be very different. In either case, the economy is sufficiently great."

The maximum product of an acre of land has nowhere yet been determined. The amounts obtained, often surprise us.

From the reports of a committee of the British Parliament, showing the condition of small farmers, we find much of interest in the results from exact and high cultivation, and much that bears directly on the above proposition.

In one case, of a man who held an allotment of four acres: in one year, he obtained forty-two bushels of wheat, two hundred and fifty bushels of potatoes, and ten bushels of barley; and kept two cows

*In my search for reading, I found a small volume of Essays from the pen of the Hon. Josiah Quincy, of Boston, published the present year, in which he has clearly summed up the principal facts and reasonings of European farmers, and detailed his own experience in a practice of the system for twenty years; keeping, a part of the time, from thirty to thirty-five milk cows. I am under great obligation to the venerable author, in behalf of the farmers of Maine, for such extracts from his Essays as I have adopted, as being better adapted to our condition and wants than anything I have found written elsewhere.

and four pigs. The cows were kept entirely on the products of the four acres. A portion of this was not arable, as some trees were growing upon it.

An inquiry was made of the occupant of a small allotment, "how t was possible to keep two cows, and maintain a family of five persons, on only three acres of land." He answered, "The statement you saw was very true: half an acre of pasture, half an acre and eight rods in wheat, and one quarter of an acre in oats; the other part was green food for the cows; such as rye, tares, cabbages, clover, mangolds, turnips and Italian ryegrass." Then follows in minute detail, the mode of culture; and he then says, "I hope it now appears how the cows are maintained in winter as well as in summer. During last winter, I had no hay; only turnips, mangolds, and straw; and they did very well."

This is a pretty strong case; where it is shown that two cows were kept the whole year on the produce of eight rods less than one and three fourths acres of land, with only the addition of a half acre of pasture, and the straw from four fifths of an acre of grain, abating the vegetables consumed from the same land, by a family of five persons.

In a communication to the British Board of Agriculture, it is stated that thirty cows, one bull, four calves and five horses, were fed through the summer, from fifteen acres of clover, sown the preceding year. The labor of four persons was sufficient to tend them; and the net produce of the season, in butter, from June to October, was £19.10s.—over ninety-five dollars per cow. Forty animals to fifteen acres, gives sixty square rods (three eighths of an acre) to each. Sixty square rods in clover producing a net income of over ninety-five dollars!

On this point, Quincy writes, "It is now six years since I commenced the soiling system; and no consideration would induce me to abandon it. Every year brings new convictions of its facility and its productiveness. If farmers would be persuaded to commence the system upon a small scale, with one or two head of cattle, they would gradually become acquainted with it; success would inspire confidence, until, enlarging the number of cattle soiled, they might, in time, easily keep one head per year, for every acre of land they possess. Greater than this would be the ultimate result of the system, if wisely conducted."

After twelve years experience with the system, Mr Quincy writes, "From my own experience, I do not hesitate to state that three cows may be kept during the summer season, in full milk and in high condition, on a single acre."

From an account of the inspection of farms by the St. Quivox Club, Ayrshire, Scotland, we read: "About fourteen years ago, Mr. Ralston sowed a five acre field with a variety of meadow grasses, and laid down the land in the proper form for irrigation with the liquid manure of the farm-yard diluted with water, of which he has a sufficient supply. It has been done at a small cost, and has paid extremely well. In good years, he has taken as much as sixty tons of grass from an acre of land; and during the present season, the field has kept thirty cattle and sixteen horses since the third of May." This account was dated August 7th. This field may have been reckoned as Scotch acres, which are somewhat larger than ours.

Adam Anthony of North Providence, R. I., entered upon a farm in 1826, of the extent of seventy-two acres, suitable for tillage. The land was very sandy; and the crops of that year were five tons of hay, two tons of oats, two hundred bushels of potatoes, two hundred of turnips, some fruit and garden vegetables; worth, including pasture feed, three hundred eighty-five dollars. He adopted the soiling system. In 1847, he reports the produce of the farm as two hundred tons, by estimate, of green fodder for soiling, one hundred tons of hay, twenty-five tons of millet, seventeen tons of dry corn fodder, six hundred forty bushels of potatoes, seven hundred fifty bushels of Indian corn, fruit and garden vegetables, the value of which, is three thousand five hundred seventy-five dollars; nearly ten fold increase in the products of the farm. The stock consists of about forty head, of which thirty-six are usually cows.

Similar testimony might be very much extended, but it is unnecessary. My own experience corroborates the usual statements to be met with on this point.

2d. *The saving of fencing.* The present American system of farming involves a prodigious expenditure of human energy for fencing. I have seen it estimated that the cost of fences in these United States is more than six hundred millions of dollars, (600,000,000.) Whether more or less than this enormous sum, it is so much invested in human toil, a large portion of which might have been saved and

applied to better and more ennobling purposes, had our early system of customs and laws been what they ultimately must be.

It has been estimated from well considered data, that the labor involved in fencing in some of the States, is greater than that in the erection of all the buildings, including all the cities and towns.

Having worked as boy and man, in helping clear and fence a farm, till the aggregate of its fences of wood and stone, extended to six or seven miles, I may be allowed to speak *feelingly* regarding this incubus on the farmer's prosperity.

One-half of all farm fences are *interior*; and aside from an occasional necessity for making a permanent distinction between arable land and a piece that nature designed for a pasture, they are worse than useless.

Adopt a single principle, that no beast shall be permitted to range on lands adapted to the plow and the scythe, and you are prepared to wipe off from the face of our fair country, much that disfigures it, and abolish, at once and forever, a vast item in your annual taxation.

The most false of anything that assumes the name of *economy*, is the practice of pasturing mowing-lands. Interior fences, that were erected, and are maintained for the sole purpose of enabling the proprietor to pasture his mowing-lands, have cost the farmers of Maine a very large sum. To call in the aid of arithmetic, it will read in this wise: The improved lands in the State may now be set down at two and a half millions of acres, (2,500,000.) Taking the estimate by very good authority,* of ten rods of fence, at one dollar per rod, for each acre of improved land, gives us for fences in the State, the sum of twenty-five millions of dollars (\$25,000,000.) Half of this sum, \$12,500,000, we will set down for interior fences on farms. It may be fair to assume for annual erections, while the present system continues, for changes and repairs, ten per cent of this sum, or one million two hundred and fifty thousand dollars, (\$1,250,000) which the farmers of the State are annually paying as a direct tax on their resources, and on which very few have heretofore had the courage to raise their voices in complaint. Impressed with the truthfulness of such estimates, who can for another year remain

* Cumberland Co. Agl. Society. Committee on Farms.

quiet, and see a system of husbandry continued, so blighting to the general prosperity?

By the last census, we find that the whole number of our domestic animals of all ages, reducing the number of sheep by a fair standard of comparison, to neat stock and horses, is to the improved land in the State, as one animal to *four and three-fourths acres*.

No wonder it is hard to devise ways and means to discharge public and private indebtedness. No wonder that our taxes are felt to be onerous. No wonder we have no agricultural schools. No wonder at all that farms are cheap in Maine! Besides the direct expense of erecting and supporting interior fences, they offend by harboring all sorts of vermin. They protect a rare assemblage of brush and noxious weeds, or cost the farmer much labor to have it otherwise. They occupy, with the necessary head-lands left in plowing, much space on the farm, and it is all worse than lost.

Then the loss, in time, in the extra turnings of the team in small enclosures, in using the plow, the harrow, cultivator, roller, mowing-machine, and horse-rake, is no inconsiderable item in the season's operations. I really believe that the plowing done in this State, with our heavy teams and prodigious plows, will show an average length of furrows not exceeding twenty-five rods. In this country of deep snows, our fences often cause immense drifts, which remain late in the spring, keeping the ground wet, and greatly retarding our operations. But we will hasten to leave so unpleasant a theme, for proposition

3d. *The economy of food.* This implies but little more than the first. The differences in areas required by the two systems, arise in part from superior culture in the one case, and in the other, from the fact that much food is destroyed by being trampled under foot, by being dunged upon by the cattle lying upon it and breathing upon it so as to cause it to be rejected. Another reason for these great differences, is, that the conditions of growth, with all the grasses, do not fully exist on soils continuously compressed by the tread of animals. Who has not observed the vast difference in the thickness of sod between lands long depastured, and those mown?

Grasses, as well as other crops of the farm, have their growth in an accelerating ratio. As the size of the plant increases, presenting itself more to atmospheric influence, the faster it draws from that

inexhaustible store-house, in carbonic acid and other gases that contribute to build up its structure; the growth of the roots keeping pace with that of the stalk and leaves. Cattle will eat without waste in the stall, grasses of luxuriant growth that they would reject in the pasture.

4th. *The better condition and greater comfort of the cattle.* Quincy says, "The condition of cattle will always depend chiefly upon the quantity and the quality of the food, and regularity of their supply. In all these respects, feeding in the stall has the advantage of pasturing, because, in stall-feeding, all are under the guidance of intelligence and discretion, and nothing is left to accident; whereas, in pasturing, the beasts are left to their own care. When the pastures are good, and there is a great surplus of food upon them, the difference is not, in this respect, great; but as soon as the pastures become affected by drought, the difference is always perceptible. Farmers who pasture their cattle, seldom, if ever, provide a supply of succulent food, to be in readiness in case of any accidental deficiency of pasture. Now, as every farmer, where he is able, does and ought to stock his pastures up to their full pasture-power, it follows that even a small drought will affect the condition of the animal something, and a severe one very sensibly; a fact of which every man may convince himself by observing cattle at pasture in dry seasons. Now, one great benefit resulting from stall-feeding is, that it makes the condition of cattle, in as great a degree as possible, independent of variations of the season; and although an absolute independence is impossible, yet it is always much greater in stall-feeding than it can be in any mode of pasturing.

Their greater comfort in this mode of keeping, is one of the essential causes of their better condition. During the heat of the day, they are kept under cover in the shade, secure from flies, from being worried by dogs or one another, from eating any noxious vegetables, and from bad water."

It should also be observed, that they are then removed from the ill effects of sudden changes of weather.

In Europe, large numbers of cattle, bred expressly for beef, are kept wholly by soiling. I have before me, some prize essays, published in the transactions of the Highland and Agricultural Society of Scotland; giving in minute detail, the course of procedure to de-

termine the relative advantages of growing beef, by soiling, and by pasturage. These essays are of considerable length, and hardly admissible here for that reason; and they are too minute, perhaps, for a region where men run as they read, and conduct an experiment by guessing. The results of several experiments, show in each case, a marked advantage in favor of the cattle confined to the stall or yards, in superior growth and fatness. It is remarked in this country, that cows long soiled, are in condition to be easily and cheaply converted to good beef. One of my cows, by reason of age, was slaughtered in December last, two weeks after being dried, yielding seventy pounds of tallow; and the beef passed in the market as a very nice article.

5th. *Greater product of milk.* There has been a prevailing impression among farmers, that, although the condition of the animal may be better, yet that the tendency of the food to milk is not so great as when they are permitted to range in pastures. Such an impression has no facts for a basis.

A gentleman in Ulster County, N. Y., well known as an extensive and successful farmer,—R. L. Pell—has practiced soiling his large stock of cows, oxen, horses and hogs. In relation to the quantity of milk, he writes, “I have found, by actual experiment, that cows, when fed in the yard at regular periods, with a change of food, not allowing them at any time to be over-fed, and supplied at all times with an abundance of water, have doubled their milk; that is to say, the same cows that were one year depastured gave, when confined, twice the quantity of milk, and of a much richer quality.”

Mr. Anthony, of R. I., says, “Ordinary keeping is not calculated to develop the milking properties of cows. Those that I have purchased, have rarely given more than two-thirds the quantity of milk the first, as in subsequent seasons, the feed in both cases being the same.”

In England, two cows, kept on a small allotment of land, in nine and a half months made four hundred pounds of butter. One cow was stall-fed all the year, and yielded a third more than the other, which had the grazing of half an acre.

I have before me a multitude of opinions, based on trial and observation, but will only add here, briefly, my own experience. The cows that I have partially soiled, beginning with the summer of

1852, were of the common breed of this part of the State; one three years old—of rather small size, short legs, and compactly built; the other five years old—tall, gaunt, high mettled, not easily approached by a stranger, ready charged to kick over the pail and the milker; brought a large calf each year, but would go dry four or five months to do it. This was just the cow that I should not have selected to retain when selling off my former herd. She was left on my hands by a mere accident.

Neither of these animals possessed any points of excellence, that I could discover, to distinguish them from the ordinary cows of the neighborhood. Under the treatment they have received, the amount and quality of their milk has been so satisfactory, that I have occasionally, contrary to general habit, taken note of the product. The daily yield of milk by each cow, has at times reached forty pounds, and sometimes exceeded that weight. This quantity of milk has yielded butter fully up to two pounds per day to each cow. The quality of the milk of the two cows did not perceptibly differ. By a trial during the last week in October, 1858, the smaller cow made eleven pounds of butter. She dropped her calf in May preceding that trial, and again in May following it. I raised this cow's calf of 1857. She is now larger than the mother, and brought a calf in July last, at the age of twenty-six months. The calf was taken away at the end of five weeks—after which, I have found by occasional trial, her milk weighed very uniformly during August, September and October, twenty pounds per day.

We will here dismiss the cream of our subject, for the richer theme of,

6th. *The attainment of manure.* What is manure? It is the stuff out of which plants are made.

It has been said, "The chief business of farming, is bringing manure on to the land, and carrying produce and cattle off of it"—connecting together the manure and produce as *cause* and *effect*. The late Rev. Henry Colman wrote for our instruction, "The success of farming must mainly depend upon such a conduct of the farm as shall not exhaust its productive powers; or rather, that it shall, from its own resources, furnish the means, not only of recruiting its strength, but of actually increasing its capabilities of production. There is no more obvious way of doing this, than by consuming the

produce of the farm, mainly, in feeding animals, through whom the riches of its vegetation may be returned in a form to furnish other and better crops."

However advantageous it may prove in many cases, to use various artificial manures, we should not rely on them to any great extent. Enormous adulterations of these articles of commerce are practiced. No man purchasing a valuable manure one year, is certain of finding it the same the next. There is a disagreeable side to the picture of *the morals of trade*. In the interior of the State, we must rely almost wholly on our home resources, for manure.

We have been abundantly and ably lectured on the importance of saving manure, liquid as well as solid; but in connexion with soiling, the subject may be again presented, from a consideration of its magnitude, without an apology for the space it may occupy.

Mr Quincy says, "Taking into consideration the advantages resulting from the urine saved by means of loam, sand or some imbibing recipient prepared to absorb it, it remains to show that the cost of raising food, cutting it, and distributing it to the cattle, is compensated by these savings. Upon this point, my own experience has satisfied me, that the value of the manure alone is an ample compensation for all this expense; leaving the saving of land, of food, and of fencing, as well as the better condition of the cattle, as a clear gain, from the system. As an evidence of this, I state my expenses for labor in conducting the soiling process.

During the month of June, I hired a man to do every thing appertaining to the soiling process; that is, cutting the food, delivering it, taking care of the cattle (twenty cows) in the day time, for fifteen dollars the month, he finding himself. In this arrangement, it was estimated that I availed myself of half of his labor. At the end of the month, I had the manure measured; and I found that the manure collected in my barn cellar, amounted to fifteen loads—this did not include that which was made in the yard during the four hours each day—a quantity of manure which I could not have placed on my farm for thirty dollars.

During the remaining five months of the soiling season, I added another man, because I found that a great economy in vegetable food would result from cutting it into pieces, and mixing with it about one third of cut salt hay or straw. This was done; and I

kept an accurate account of all the labor of cutting the food in the field, bringing it into the barn, cutting it up there, cutting salt hay or straw to mix with it, mixing this food and delivering it to the cattle; and found that it amounted to one hundred and forty eight days' labor. This estimated at a dollar the day, adding fifteen dollars paid in the month of June, makes the whole expense one hundred and sixty-three dollars. The manure at the end of the soiling season, certainly equalled one hundred and twenty loads; and could not have been bought and brought there, for three hundred dollars."

Adam Anthony says, "The cows go to pasture for a slight picking, for water and exercise, morning and evening. Their summer feed at the barn, is rye from early in May, succeeded by clover, millet and corn. By supplying the stables with peat and muck, three hundred cords of excellent manure are annually made by the stock." In a former quotation from this gentleman, it will be seen that his stock is given as about forty head.

Soiling is practiced by the Shakers at New Lebanon, N. Y., and they claim that the superior quantity and quality of the manure is sufficient to defray all the extra expense of cutting and feeding. It is all saved, and being preserved under cover, is of great strength and energy.

I find abundance of testimony to the effect, that by soiling, the quantity of manure is more than doubled, upon the same stock.

Quincy says, "It may be adopted as a general axiom, that soiling is the cheapest of all modes of obtaining manures. In this point of view, the saving of fence, the economy of land, of food, the increase of milk, and the better condition of cattle, may be considered as incidental to the system, as an offset for the labor requisite; giving the manure made as a clear gain; and what is more, without the loss and trouble and expense of carting from a distance."

From the benefits reasonably expected to accrue through the adoption of the soiling system, by reason of the vast increase of manure, I urge its claims upon the farmers of Maine, as a practicable process, at once cheap and easy, within the resources of every one, sure to supply the great and universal want, (manure,) and leading directly to a higher and more satisfactory condition of husbandry.

I urge the claims of the system, through the conviction, based on my own experience, that our soil and climate are as well adapted to

secure its benefits, as that of any other country. No climate is better than ours, for the growth of clover and corn. We need not look to Europe with the view to adopt their crops of tares, vetches, lucerne, peas, and so forth, neither shall we find it necessary to grow rye, oats, buck-wheat, and so forth.

Grass, corn and cabbages, with the tops of our carrots and mangolds, will furnish us with as sure a succession of feed, as if we were to embrace a dozen other crops. Any succulent vegetable relished by cattle, may be used; and these may be adopted at the discretion of every farmer. The best rules that could be drawn from past experience, I would not offer you to-day for your guidance in this matter, with any expectation that they would hold good for coming years. Italian rye-grass, of which more than one variety has appeared in England, and in this country, is highly recommended as a soiling crop. Mr. Kennedy, of Ayrshire, Scotland, sowed twelve and one-half English acres, and during three months, after it had grown to a size for cutting, it afforded feeding to eighty head of fattening cattle, and twenty horses. The horses had oats, and the cattle four pounds of oil-cake daily. Twenty of these cattle gave a profit of \$12,50 a head for six weeks' keep.

I have not time now to extend this communication so as to embrace all that should be said in this connection. The system I here advocate has reference to arable land; to every man's land which admits the plow and the scythe. Its full or partial adoption will improve the condition of every farmer who wants manure at a cheap and easy rate. It should be adopted at once in nearly every case of that great number to be found in and around our cities, towns and villages, who keep one or two cows. It should be adopted by our ten, fifteen, or twenty-acre men; as upon it, they may build up a most prosperous husbandry, with little capital or risk.

The nature of many farms in the State will not admit the system in full. With rocky land, enclosed with substantial fences, yielding good pasturage, and not easily and quickly restored to wood, soiling has nothing to do. The system once fairly introduced, would vastly benefit the State by causing many a rocky plain and hill-side to be returned to grow valuable wood and timber.*

* An American gentleman of considerable celebrity, once said in an Agricultural address, "One of these days I mean to take time to write a much needed essay on 'the art of letting land alone.'" I hope this promised *essay* may soon appear. The

In regard to the present condition and future prospects of Maine agriculture, we have much to commend and much to hope. *Mind* is active—inquiring; and the inquiring mind is subject to the universal law of *progress*. I have but a single remark to make on existing habit and practice. I am satisfied that the prevailing habit and practice in farming, (it is not well to call it system or method,) is continuously working a deterioration in the acreable hay crop.

I have for many years been in the practice, in early summer, of asking every farmer I met, "How is the grass looking in your neighborhood?" "Is your hay crop coming in heavy?" "This seasonable rain ensures an abundant hay crop." "This fine weather, with frequent rains, is the best that could be ordered to secure a heavy crop of hay." With such questions and remarks, I would draw out the opinion and impressions of each on this important crop. The result of this course shows that nobody is satisfied with the weather. About nine in every ten will reply in these words: "Well grass is light; particularly on old fields." Even the last season—such an one as is rarely witnessed in a life-time—which, from its opening, seemed specially designed to produce a most luxuriant forage crop, could not silence the croakers. All would admit that "newly seeded fields were excellent," "but ——."

Now such a succession of unfavorable seasons is very disquieting to an agricultural population, to say the least; and should lead us to inquire, if we may not in some good degree, secure an immunity from such natural evils.

Too much cannot be said in favor of corn as a forage crop, to be used for soiling, as an adjunct to pasturage, or as winter food. Six tons per acre of dry fodder, is easily obtained; and it is generally rated as of equal value with good hay. In some of the States, it is claimed to have been produced at an expenditure not exceeding one dollar and a half per ton, when hay was worth from seven to eight dollars per ton.

In my practice, I have usually grown more than I have fed in its green state. In one case, I had about one half a winter supply of fodder for my cows from this source. It is usually recommended to

profits of many productive acres are absorbed in ruinous half tillage of fields which were better left entirely alone. It is bad enough to pay taxes on unproductive lands; it is too bad to spend labor upon them.

sow corn at successive times, so as to have the fodder in a tender state through the latter part of the season. I have seen no occasion for this course, particularly when the larger varieties are grown. I never found my corn fodder too large or too mature. When the cows begin to reject the stalks, I practice running the whole through a cutter, and it is then eaten without waste. So for winter food; the more mature the stalk, the more nutriment it contains, and the easier it is dried.

I hoped in the outset, to present in this communication, some general rules for practice, as initiatory to "sciling," as a system to be adopted in our state; but through a want of time I am obliged to omit very much that is relevant to the subject, and must leave it in this unfinished condition. I have no higher ambition than to be identified with the ennobling science and art of earth's culture, and to stand in the working ranks and speak an occasional word, as circumstances may seem to require. With an earnest desire to do good, and with a hope that the present effort will not be wholly in vain, I remain, &c.

FARM ARCHITECTURE.

By Wm. D. Dana, Perry.

Several years ago, I had the privilege of submitting to the Board of Agriculture, a rough outline of what was designed to be an institution to carry out the system of common schools, viz: a free university of the highest grade, where every child of the State could obtain the most thorough educational training, as free of cost as he now can obtain the rudiments in the free common schools. This plan was thought to be too Utopian for practice, yet I hope the day is not distant, when the principle will be embodied in some such form.

The subject has been recently presented to my mind, as showing the need of such an institution, in one, and that a humble direction, by observing throughout the State, the want of knowledge and want of taste exhibited in the location and construction of buildings, particularly of farm buildings.

When any considerable number of our farmers' boys, from all parts of the State, shall have had the advantage of such training and illustrations as such a "Model Farm," "Farm School," "University," (or whatever other name may be given to the institution) is intended to give, we shall see a change in agricultural architecture. The inconveniences and discomforts now existing, will, in new erections, be avoided, time and labor be economized, and beauty, convenience, comfort and profit, take the place of ugliness, inconvenience, discomfort and loss.

In order to do something to promote so desirable an end, I propose in this paper, to discuss the necessity of reform, the causes of this necessity, the importance of a reform, and the means.

The manufacturer so arranges his buildings, that every operation is performed with the least possible expenditure of labor. He well knows that this forms a large part of the cost of his fabrics, and failing to save here, he fails of success. With the farmer, more than with any other class, does labor enter into the cost of his productions. The raw material, and the forms into which he molds it, whether food or clothing, animal or vegetable, are all the product of labor; yet look where we will, throughout the State, and in almost every instance we find farm buildings built without any reference to the wants of the farmer, the economy of labor, or the comfort of man or beast.

How rare the instances where a farmer has, before commencing his buildings, made or procured any general plan, or even had one in his own mind, and how still more rare the cases, where beauty of design, and architectural appearance, had any place in that plan. Very few farmers would think of the extravagance of paying a few dollars to an architect for a plan of farm buildings; yet by so doing he would, in the end, save hundreds; and by the substitution of beauty for deformity, add to the money value of his estate.

"All men have their prejudices," and none more than the farmer; and on this last topic, these prejudices would be saying, "give me the useful; let those who have money to spend, study the beautiful." Let us lay aside, if we can, our prejudices, and we shall see that the useful and the beautiful are not incompatible; and that a house and barn, built in good taste, well proportioned, and well situated, with respect to each other and to the natural features of the

landscape, need cost no more than such a structure as we often see, not possessing these elements of beauty.

I have said that we find farm buildings built without reference to the wants of the farmer. How common it is to see a house with several unoccupied rooms, and the arrangements such as to require a large amount of unnecessary travel to do the daily labor. How still more common to see the house so small and inconvenient as to sacrifice comfort, and sometimes, health and morality; and how rare to find the barn and out buildings arranged, as to plan and location, so as to give comfort to the inmates, and suitable facilities to their attendants. How common to see them open underneath, and open at the sides; the light being admitted only through the open doors or windows, or through the open cracks of the loose boarding.

There is an unfounded prejudice, that hay will not keep well in a tight barn; hence they are left without shingles upon the walls. If the theory of Leibig be true, that animal heat is kept up by the consumption of a portion of the food as fuel, which would otherwise go to form fat or flesh, it becomes an interesting and practical problem, to learn how much of this costly fuel may be saved by keeping our barns warm; how much, for instance, would be required to keep the carcass of an ox, or say his equal weight of water, up to the point of animal heat, for twenty-four hours, in a boiler, exposing the same amount of surface to an atmosphere at zero.

Go where we will throughout our State, and everywhere the proof meets us, of the necessity of a reform in our farm architecture. The causes of this necessity may be traced, in a great degree, to want of proper education. Our boys at the common schools, learn to read, write and cypher, but they don't learn to observe and think. Living at home upon the farm, and in general, having but small means, they have not the opportunity to go abroad and see what others have done. Having little time and less inclination to read and study, (I speak of the mass) they do not seek for information in books and papers, and even if they sought it, it would be hard to find. Having no knowledge of architecture; nine out of ten not knowing the meaning of the word; many never having heard it, and few imagining that men make a business of designing and drawing plans of buildings, they do not seek its guidance. But beyond and above all, being in haste to marry and settle in life, they do not

wait till judgment has matured and means accumulated, but begin, in most instances without money, to put up something to live in, and something to shelter the hay and the steers from the weather; copying perhaps from the best models within their knowledge, and always designing, when they get able, to build a better house or barn; or to finish and improve the structures already erected. No wonder, under such circumstances, that improvement goes on slowly, and that houses and barns are without beauty, convenience or comfort.

The importance of reform in rural architecture, arises from two considerations, viz: its material and its moral influence; its effect on the pocket, and its effect on the character and habits of a people.

Where a man's time and labor constitute almost his whole available capital, it requires no argument, to show that every unnecessary expenditure of it is a loss; and yet many would be surprised to see how much labor they perform, which might as well, with suitable arrangements, have been saved. The man who travels two hundred rods daily, to do what might be done by traveling one hundred rods, walks, in a year, more than one hundred miles, uselessly; and many do this. The woman, in house-work, who, by a better arrangement of rooms, can save the same amount of travel—and it might be done in many large farm houses—would have an additional half hour each day, for reading or for rest. The putting of hay into the barn, and putting the manure out; the feeding and watering of cattle; the tending of hogs; and supplying the house with wood and water, are all susceptible of being done with much less labor than they now require, in a great majority of cases. Each half day spent by a farmer, in driving his cattle through snow drifts or over icy roads, fifty rods or more, to the watering place, is so much taken out of his income, as a half day of labor would earn. Many a farmer can understand what are the trials and vexations of this operation, in a driving storm, or a day like many in our winters, and his cattle, shivering and trembling, say plainly enough, how terrible to them is the process, by turning and making a rush for the barn, at every opportunity; choosing rather the sufferings of thirst, than the terrors of the weather or the ice. How much loss of beef and tallow results from such a course, it is not easy to estimate.

How many give up the culture of root crops for cattle, from an experience of the labor of feeding them out; where for want of a

barn cellar, they have to be carried some ten rods or more from the house to the barn. Here also is a loss of labor or a loss of beef, or both. The farmer's profits are small under the best arrangements, and will not bear to be lessened by small leaks. Like some large manufacturing establishments, the difference of a small fraction of a day or of a dollar, in the production of results, is just the difference between success and failure.

In the house, every extra door or window, every unnecessary foot of floor, are to be kept painted and cleaned; every unused or useless room is to be taken care of—to say nothing of furniture; and the extra labor for these things deducts so much from the wife's productive labor or necessary recreation; or more usually, incurs the expense of hiring help.

I have spoken principally of the loss of *labor*, by inconvenient arrangements; but there are other serious losses sustained by nine tenths of our farmers, which properly built barns would prevent. The loss of hay, wasted under the feet of cattle; the loss of flesh, from exposure of cattle to cold and discomfort; and more than all, the loss of all the liquid and a large part of the value of the solid manure, the house slops, the night soil and the domestic guano.

Too much time has, perhaps, been taken up with these details; yet if one farmer who is about erecting buildings shall hereby be induced to look more thoroughly into his wants, and to build accordingly, this will not have been written in vain.

As to the *moral* influence of our rural architecture, it would, perhaps, be going too far, to say, that it causes vice or tends to bad habits, directly; or that in the cases of the better kinds, it leads to virtue or restrains from sin, directly; yet that the house we live in, has an influence upon the mind and character, is I think, self-evident, or susceptible of proof. I have somewhere read of an artist who would never allow himself to look at an object of deformity. Things of beauty he would contemplate, and thus have his mind filled with none but beautiful images, lest the deformity should manifest itself in his creations. His idea was a correct one, and may be applied to our subject. Let a child live in a house, which, with its surroundings possesses no element of beauty; let him be accustomed to see only such in his daily walks, and will not the mind in some degree, partake of this want of attractiveness? Do not the images

which are constantly presented by the senses, become a part of the mind itself? But this branch of the subject, I must leave to abler pens. The mind and influences by which it is moulded, is too vast a subject for my humble efforts, and yet I think I can see how a better rural architecture would tend in some small degree, to a better state of morals in the community.

Great results sometimes arise from very little causes. The statistics of crime in Massachusetts, show that it has increased threefold in fourteen years; and that this increase of crime is, in large measure, not among the foreign, but the native population. Every well wisher of his country must say, What are the causes? What the cure? Some will see one thing and some another. I will suggest that by some means or other, the life of a farmer is made unattractive to farmers' sons. The cause of this may be in the nature of the occupation itself; its severe labor; its little pay; or, it may be in its unattractive accompaniments, of which the rural architecture forms no insignificant part. The *result* is, that farmers' sons leave their country homes and become inhabitants of cities, where the honest avenues to wealth are not sufficient for the multitudes there seeking her, and many, in consequence, turn into forbidden paths. If this be, even in small degree, the cause—and perhaps every one can call to mind one instance of a fall from virtue, in a young man, on leaving a virtuous home—it plainly enough says, make home more attractive. I leave this suggestion here, for every one can see the possible connection of an unpleasant home, with the vice of the country or the city; and every thoughtful man can follow out the details, and so far as in him lies, second this feeble attempt to make our country homes more pleasant.

Having, as I think, pointed out the necessity of a reform in our rural architecture, it remains, to endeavor to show how such reform may be brought about.

If I have rightly considered the causes of this necessity, the means are already suggested. Knowledge of the necessity and knowledge of its causes, will lead any sensible man who intends to erect buildings, to aim for the best plan, and will suggest the mode of obtaining it. I would place, then, at the head of the means of improvement, a more enlarged and liberal system of common school education, and I would have it so broad as to embrace the whole range of science.

This would enable farmers' sons to take broader views, and, as applied to the particular subject under consideration, lead them to think and to see what the necessities of their business would require. Let those who intend to make farming their business, have the opportunity of obtaining a liberal education—I don't by this, mean such an education only, as our colleges afford. Let them when they have learned to read, write and cypher, learn the more important lesson, that there is something more to learn; and when the primary schools shall have done their part, give them the opportunity, from which they are now cut off by lack of means, to step from them into a free university, there to go through a thorough course of training of both body and mind.

Among the various knowledge there obtained, would be, perhaps the least, yet not unimportant one, of which I am endeavoring to treat. The buildings there, would of course be such as to teach by illustration, the best methods; the teachings such as to keep the mind awake to the concerns of every day life, as well as to the mysteries of science. Architecture there would have a place, and improvements would be constantly suggested and adopted.

The influence of such an institution could not fail to tell upon the appearance of the country. Farmers' sons who might decide to follow the occupation of their fathers, would bring from it cultivated minds and a correct taste, and in erecting their buildings, would unite the beautiful with the useful.

A correct public opinion is another instrumentality to bring about this or any other improvement; this, indeed, is only a consequence of a correct education; but there are other educators than the schools. The press is the most powerful; and when it shall exert its power to beautify and make attractive the country, to lessen the toils and increase the comforts of the husbandman, to turn back or stay the tide of emigration from the farms to the cities; it will have less occasion to deplore the increase of vice and crime. Let each of the three hundred and eighty-six towns of Maine retain at home, the five or ten young men, annually sent out to swell the cities' population; its own power would be increased, and the crime consequent on the rush of so many extra gold hunters, meeting the certain disappointment which, in many cases must result, would not have to be mourned over. Make farm labor less onerous, and the pay in con-

sequence greater, and one inducement to leave home is removed. Make that home attractive by its physical, intellectual and moral beauty, and many inducements to remain, are held out.

Plans and descriptions of farm buildings, published in agricultural journals, and in such other papers as have large country circulation, would tend also to the same end. If farmers themselves, who have good and convenient buildings, would furnish plans and cost of construction, with description, showing the advantages or disadvantages of particular arrangements, it might save some young farmer from error and loss, and consequent disappointment and disgust with his business.

Agricultural societies, by the offer of premiums for the best plans, models or essays, may bring the subject before the people in an instructive form.

Farmers' clubs may do much, by making rural architecture a frequent subject of discussion. Let a plan or model be submitted, with estimate of cost; let it be examined, discussed, and its advantages or disadvantages pointed out. Let each member produce a plan of his own buildings, and point out the actual results of such an arrangement, and show how much saving of labor may be made by a different one.

Lastly, let every one who feels that the true wealth of a country is in her soil, and in the ability of her citizens to develop its resources, do what he can to make the business of the farmer remunerative and desirable. Let him do what he can to remove inducements to leave home, by making the labor less and the pay greater, through more convenient arrangements, and by rendering the country attractive through her appeals to the love of the beautiful.

NEW LANDS OF NORTHERN MAINE.

About the end of August last, a party met at Phillips, in Franklin county, for the purpose of exploring a track for the continuation of the road leading northward from Farmington, (the present termination of the Androscoggin Railroad,) through Phillips to the Rangely lakes, onward, through unsettled territory to the boundary of Canada. Deeming this a good opportunity to examine

a portion of the new lands of the State, little known, but reported to present strong inducements for settling, I purposed to accompany this party, and proceeded as far as Rangely, but was prevented from going through, by reason of sickness in my family, which required my return home.

Rangely is now the farthest settlement on this route. The scenery about these lakes is beautiful, and the land fertile. One farmer, Mr. Abner Toothaker, informed me that, including pasturage, he had about four hundred acres cleared, one hundred and seventy-five of which had been under the plow. His crop of grain varies from one thousand four hundred to one thousand seven hundred bushels, of which three-fourths are oats, the average yield of which is fifty bushels per acre. Barley produces usually forty to fifty bushels, and sometimes, though rarely, sixty bushels, potatoes, one hundred and fifty to four hundred bushels per acre. Wheat has not been extensively cultivated, owing in part to weevil and rust. Indian corn cannot be depended upon to ripen well, but excepting this, good crops of all the various kinds usually grown in the State, are obtained. Mr. T. cuts about two hundred and fifty tons of hay, a portion of which is sold to lumbermen at from seven to ten dollars per ton, and the residue fed to stock, of which he usually has seventy-five head, and sometimes more. The capabilities of the soil of this vicinity were sufficiently attested by the aspect of abundance upon the farms generally, as well as by the appearance of the soil itself.

I am happy to give below, a letter from Seward Dill, Esq., of Phillips, who was one of the party, regarding the character of the country explored on this occasion, and I may add that his views correspond exactly with those of Mr. Millett, who also was one of the party, and from whom I have received a briefer communication on the same subject.

A consideration of no small moment, in estimating the advantages of these lands for settlement, is the facilities for intercommunication now existing, so different from what they were when the first settlers at Rangely came in. At that time, the nearest market town was Hallowell, and that approachable only by the rough roads incident to a far off settlement in the wilderness,—now, by going half as far, they may reach a rail road station, and this by a carriage road, which, although a portion of the country passed over is hilly, (pre-

senting, too, many views of exceeding beauty, and even grandeur,) will compare favorably with the better class of roads throughout the State. The larger portion of the road is, however, comparatively level, and following as it does the Sandy River, the fertility of whose intervalles have well nigh passed into a proverb, the whole route is one highly attractive to the traveller who delights in varied scenery and agricultural beauty.

PHILLIPS, Oct. 12, 1859.

Dear Sir: In compliance with your request, I will furnish a brief description of the land over which we passed in our tramp to Canada line.

Immediately after leaving you at Rangely, we entered the woods on the land of Joseph H. Ellis. For the first five miles, we followed an old log road leading across a tract of tolerably good farming land, the growth consisting of maple, beech, birch and a mixture of spruce. The soil is of a brown color, deep and rich, although portions of it are somewhat rocky. In traveling the next five miles, we passed over a variety of soils; the first consisting of upland well adapted to tillage purposes; next, a small tract of swamp or wet meadow, well covered with spruce and cedar timber. From this meadow, we passed a gradual rise for a mile and a half, over a tract of as good land for *farming*, as can be found in Franklin county. This land slopes gradually towards the south—growth hard wood—soil rich and deep, and nearly free from stones. On the north side of this hill, sloping towards the Kennebago Lake, the land is not so good, it being somewhat broken and rocky.

Here, being warned by approaching darkness, and feeling somewhat weary, we caught some fine trout from the lake, served our evening meal, and camped for the night on the shore of the Kennebago.

The following morning we constructed a raft, on which we crossed the foot of the Lake, and came upon some of the finest interval land I have ever seen. Thence we traveled in a northerly direction along this interval until we struck the Lake of the Hills; we crossed the foot of this Lake and traveled along its shore about two miles. All the land bordering on these lakes and streams is of the very best quality—the soil black and rich—and we could easily thrust a cane

into it to the depth of two feet. From the Lake of the Hills, we pursued a due north course, until we reached the height of land between this State and Canada, a distance of some ten or twelve miles. We found the land over which we passed somewhat broken, consisting of hills and valleys. In all these valleys we found some good interval land, and much good timber, consisting mostly of spruce, but occasionally a pine.

The hills over which we passed, present a very singular appearance; the sides being rocky, while a large space on the tops of each is almost entirely free from stones. Some portions of these hills would make good farming lands, especially for pastures. The point on the high lands, where we struck the Canada line, commands one of the finest views I ever beheld. To the east and north-east, we look down upon a valley some six miles wide, and extending east to Dead River, a distance of twelve or fifteen miles. A large portion of this valley is covered with spruce. Our company pronounced it the handsomest they had ever seen. From the point above mentioned, we could see a large number of lakes, Dead River settlement, the town of Rangely, and a part of the beautiful valley of the Capsuptup, in the county of Oxford; also Arnold's River in Canada.

In the valley above described, there are seven beautiful little lakes, all tributaries of the Kennebago. Near the head of the northernmost lake, is a natural *pass* for a road through the high lands into the town of Woburn, in Canada.

After making what observations we could, and camping one night on British soil, we descended into the valley, and followed the stream down to Kennebago Lake. On both sides of the Kennebago stream, from its head waters to Rangely, nearly all the land is of the first quality; much of it being interval and meadows, from one-quarter of a mile to a mile in width, where we find upland equally as desirable. The soil, (as before stated) black, rich, and deep; and its fertility is indicated by the unusually heavy growth it bears, consisting of maple, birch, spruce, and fir, as large and handsome as one would wish to see. Some of the pines will measure from two to two and a half feet in diameter, and are very tall and well proportioned. Many of the spruces our company judged to be from eighty to ninety feet, and some judged them one hundred feet high.

On the streams that we crossed, there are several fine mill sites, commanding good water power, which will become valuable whenever the adjoining lands are settled.

In conclusion, I will say, I am fully convinced that if the State *should encourage the settlement* of these lands by constructing, or aiding liberally in the construction of a road that would render them easy of access, and afford a way of transport for their produce to some of our commercial towns, she would soon reap a rich reward from their bountiful contributions to her agricultural wealth. As soon as a road shall have been constructed, scores of our enterprising young men will there make for themselves comfortable and happy homes, instead of seeking their fortunes in the distant west. When our State does her duty to her young men, they will not be unmindful of their obligations to her.

Respectfully Yours,

SEWARD DILL.

To S. L. GOODALE, Esq.

P. S. While coming down the Kennebago Stream, our guide informed us that we were passing at the south-west, a tract of land of about three thousand acres, covered almost entirely with sugar maple growth. I would further add, as a fact worthy of consideration, when speaking of settling these lands, that the southern terminus of the road proposed to be opened, is within forty miles of a railroad station, (at Farmington,) which is more than can be said of any other such tract of land in the State of Maine.

S. D.

It is a source of deep regret, that I am unable here to present a communication which was confidently expected, from the late Dr. Cuming of New Brunswick, upon a subject of great importance to the agriculturists of Maine, and which no person within the circle of my acquaintance, could have treated in so able a manner as he, but which he was prevented from preparing, by sudden death.

I have thought that a brief notice of this remarkable man might not be out of place here, as illustrating what may be accomplished by a poor farmer's boy, by dint of determined energy, industry and perseverance. If such an one under the disadvantages incident to a system of greater social inequality than ours, could rise from the position of a herd boy to marked eminence in a scientific profession, how great encouragement have the young men of our own country to aim at high attainments in science.

Mari A. Cuming was born August 12, 1813, at Myers, in the county of Banff, Scotland, where his father rented a small croft or farm. His parents being poor, Mari was sent from home at the age of nine or ten, to serve as herd boy, on a neighboring farm. Several summers were thus occupied, and during the winters he attended school. His whole school education during his minority did not exceed nine or ten months. Even at this early age, his active and ingenious mind busied itself during leisure hours, in the construction of various mechanical contrivances and philosophical toys, many of which are well remembered. From being herd boy, he was in due time promoted to the post of plowman, in which capacity he served, partly at home and partly upon other farms in the vicinity, until at the age of twenty, he was by his father's death, left tenant of the few paternal acres. His father's affairs were left in a very embarrassed condition, and it cost some years of toil to cancel the indebtedness thus inherited.

Although his school education was very meagre, he was all the while, like his illustrious countryman, Miller, acquiring a rich and varied education. Nature was his teacher, and well did he heed her

lessons. From a mere boy he was a great reader, and never neglected any opportunity for acquiring knowledge. His memory was singularly retentive, and whatever he learned was well digested, and arranged in so orderly a manner that it never failed to be available when wanted. He early joined a mutual instruction club in his native village, of which he became an active and efficient member, often contributing essays, and sometimes lecturing upon various scientific subjects which had occupied his attention.

At the age of twenty-two, he married, and the demands of a rapidly increasing family furnished active employment during subsequent years; but nothing could quench his thirst for knowledge, nor weaken his courage in attempting its acquisition. About this time he became acquainted with Dr. John Sheir, then lecturer on Agricultural Chemistry and Botany, at the University of Aberdeen, from whom he received much aid, both by personal instruction and by the loan of books. In return, Mr. Cuning reciprocated the favor, by conducting upon his farm series of experiments suggested by the Professor, and designed to elucidate doubtful points in Agricultural Chemistry. The very first season following the announcement by the celebrated German chemist, Leibig, of his peculiar views on mineral manures, and particularly of the use of bones dissolved in sulphuric acid, (superphosphate of lime,) a series of experiments were instituted by them, designed to test the practical value of these theories. The papers, now lying by me, show a lengthened correspondence on this subject—the minute directions of the one as to the proportions to be used, and the methods of preparation and application on the part of Dr. Sheir, and the careful and systematic carrying out of these directions, and the weight of the products upon the several plots by the other, possess much interest, but the limits of this notice forbid any details of these or other experimental researches.

Suffice it to say, that as he kept steadily on, the desire of devoting himself wholly to scientific pursuits grew stronger and stronger, until at the age of thirty-three, his wealth consisting chiefly of a wife and five children, he entered the Royal Veterinary College, at Edinburgh, as a student. Under such circumstances, it may readily be imagined that his labors were unremitting, and of his success, we can judge from the fact that at the examination at the end of his first year, he took a medal for chemistry, it being one of four

annually awarded for greatest proficiency in the several branches taught; no instance having previously occurred in the history of the college, where a medal had been awarded to any student except in his senior year. At his last examination, before graduating, he received *three* out of the *four*, awarded that year to the class, a circumstance equally unprecedented.

The writer has before him the schedule of one of these nearly perfect examinations, and on only two of the six pages of closely written matter, can be found any corrections by the examining professors, and these evidently attach to accidental omissions by haste, and not to mistakes of ignorance.

About this time he got no small reputation for an essay on "Typhus in Cattle," but the conclusions of his paper did not satisfy himself so well as they did others, and he continued his investigations until he ascertained beyond doubt, that the mysterious disease so fatally prevalent, and which he had deemed epizootic typhus, was in fact, the effect of poisoning by lead. He showed also, that loss from this cause was common in the vicinity of large towns—that cattle often obtained it from the street manure spread upon the pastures, and which contained tea-chest lead, scrapings of paint pots, &c., all of which he repeatedly identified among the contents of their stomachs after death.

After graduating with high honors, Dr. Cuming established himself in a successful practice, at Ellon in Aberdeenshire, and during the years of his residence there, repeatedly obtained the large gold medal of the Highland and Agricultural Society for essays which were published in their transactions. He was also connected with the "Scottish Farmer," at that time published at Aberdeen, for which he wrote many of the leading editorials.

His removal to New Brunswick was in 1852, upon the invitation of the St. John County Agricultural Society, and in the hope of finding a competent support, and a broader field of usefulness where veterinary science was almost unknown. Pecuniarily, he was unsuccessful; nor did pupils present themselves for instruction as he had been led to expect. Although he bore testimonials of the highest character, the people generally among whom his lot was cast, failed to see advantage by availing themselves of scientific skill, instead of employing quack "horse doctors" whose ignorance was

equalled only by their pretensions. To eke out the scanty income from professional services, he resorted to the pen, and became connected with the newspaper press at St. John. At one time he started "The Farmer," a magazine devoted to agriculture, but it failed for want of support.

Not long before his death, he removed to Kennebecasis, near St. John, where he hoped to find leisure to prepare a popular work on the applications of veterinary science to the wants of horse owners in this country. This he had long designed, and had he been permitted to complete the work, it would doubtless have placed his name high on the list of benefactors to American agriculture. His death occurring on the twenty-first of July last, was as sudden as it was unexpected, being caused by the rupture of a blood vessel while in the apparent enjoyment of usual good health. It deprived his family of a much loved husband and father, a large circle of friends of a true-hearted companion and judicious adviser, and veterinary and agricultural science of a staunch supporter and advocate.

Being by this afflictive dispensation, deprived of the pleasure of submitting the expected communication from his pen, I insert in its place a paper left by him, and which was evidently intended as introductory to the work on horse management above alluded to; and this because of the conviction that the lack of veterinary science which exists among us, must be more extensively and deeply felt, before measures will be taken to supply the need, and in the hope that his remarks may serve a useful purpose to this end. It is barely possible, also, that indicating as they do, the main features of a work which is exceedingly needed, their publication may, in some way, prove instrumental towards supplying this great desideratum in our agricultural literature.

"The horse, viewing him merely as one of the most beautiful and perfect of nature's creations, presents many points of pleasing and instructive study for the inquiring mind; but when considered in relation to the profits to be made from rearing him, his value as an article of commerce, and the many important services he performs for us, everything connected with his existence, his welfare and his usefulness, assumes a double interest, and yields advantage as well as pleasure by being known. In all intelligent communities, therefore, and among almost every class of men, the quality and value of horses, their performances, ailments, and management, are popular topics of conversation, and things about

which there are few indeed, who do not wish to be thought well informed.

But such knowledge is neither hereditary nor intuitive, nor to be acquired by mere outside acquaintance with the animal in health, or casual external observation of his diseases. That it may be reliable, and of use to us in our daily treatment of him, everything connected with his physical structure, his wants and uses, must be scanned and studied, first in its individual aspect, and then in its various relations. His natural history needs to be known, that we may understand his habits and constitution, and how to develop his qualities to the best advantage, in the artificial condition we consign him to. His form and anatomy must be examined, that we may judge rightly of his motions and proportions, and be able to detect with certainty the seat and nature of the injuries he is exposed to in our service. The physiology and uses of the different organs and structures of his body must be investigated, that we may be prepared to find out and comprehend the diseases and changes of condition, consequent on his domestication and usage. Chemistry, dietetics and hygiene, must be consulted, to show us how to feed and keep him, as best suited to promote his health and powers of endurance. Mechanics must be studied to make his labor give the best results, with the least amount of vital expenditure; and pathology and therapeutics known, to enable us to restore him to usefulness, when lamed or diseased.

Such are but the more important of the points of inquiry, that must be studied, before we can tell with any thing like certainty, what is right or what is wrong in our treatment of the horse: their investigation, arrangement and application being comprised in the less common and more scholastic term, veterinary science. And the bare recital of them is enough to show that more is required of those who would aspire to a proficiency in this kind of knowledge, than the mere practice of stable duties, horse shoeing or jockeyship.

As a proof of the advantages believed to arise from the special study of a subject of so great importance, the civilized nations of Europe have long ago devoted a portion of their attention to the cultivation of veterinary science. Colleges for teaching it have been established in almost every eminent seat of learning. Governments have aided its extension by patronage, employment, and pecuniary support. Men of talent and liberal education have become its practitioners and teachers. And some of the proudest names in human surgery the world ever produced, have helped it forward.

In these countries, therefore, and under such advantages, not only is every thing connected with the horse investigated by the light of science, and ascertained with all its accuracy, but the popular notions upon the subject among those classes of the community that are far beyond the immediate influence of study, are also generally true to nature, and practically useful, if not always strictly scientific. How different it was before veterinary science was cultivated, and how different it is still, where it has not been introduced, it is scarcely necessary to say. On these points, the absurd

and barbarous practices of the old English farriers, believed in then as well by the peer as the peasant, and the scarcely less hurtful, and certainly more expensive quackery, at present current in the United States, and upheld there alike by the public and the press, give the best evidence. It is not meant by this, that sound and trustworthy information about horse-matters, cannot be popularized without individual veterinary study; but it is maintained, that unless the popular ideas current on the subject, are derived from the inductions of science, and confirmed by enlightened practice and experience, they can neither be reliable in themselves, nor useful in their application.

From a practitioner of this science, therefore, no apology is needed for becoming its voluntary exponent, and advocating its diffusion, where not before introduced; neither does argument seem requisite to enforce the importance of the subject, or illustration to show the various ways in which it is interesting to every one in the community. When the author came to New Brunswick, some years ago, he did so, on the invitation of a few intelligent and spirited individuals, composing the board of directors of the St. John County Agricultural Society. These gentlemen had heard of the progress of veterinary science in other countries, and of the advantages arising from a knowledge of the structure and nature of the horse, in the treatment of his diseases; and they judged that one who had made this his study, where every facility for learning it existed, and who gave his whole time and attention to following it out, was the most likely to give sound advice, whether on the ailments of the animal, or for his general management. It was in this belief, no doubt, that they invited the writer to their shores, and it was assuredly in the hope of making himself useful in this way, that he came.

Veterinary science being thus, as it were, a new thing in the Province, at his arrival, it was to be expected that difficulties would be to contend with, and obstacles to overcome, before its claims come to be recognized, or its true position established in the public estimation; and such has been the case. Some of this discouragement which the author has met with has arisen, no doubt, from prejudice, and the opposition of parties interested in the continuance of empiricism and quackery in horse medicine; but the greater part, from a want of reliable popular information, about horses and their ailments generally, among the horse owning part of the community.

This deficiency of such knowledge about horse management, as is current in countries where veterinary science has not been some time established, has shown itself to the author in various forms. In the case of some (from previous entertainment of over sanguine expectations) disappointment has arisen, because impossibilities could not be accomplished, by curing disease without the use of time and means, or prescribing for cases without first seeing them, or having them sufficiently described. Others again, have erred on the opposite extreme, and because they could not comprehend the why and wherefore, and the rationale of the means prescribed, have disbelieved in the results that could be produced, even when these

were both practicable and useful. While a third and still larger section, judging, no doubt, of what science can accomplish, from what they have seen quackery and empiricism do, seem to hold that one man's notion about a horse is just as good as another's, provided it be asserted with sufficient force. It is needless to say, how inconsistent all such ideas are, and while their prevalence affords proof of the want of that intelligence in the community, concerning the nature and treatment of the horse, which veterinary science alone can supply, it presents at the same time, the greatest obstacles to its introduction. Nor is this all the evil it occasions. From the same cause, any one giving his attention to the subject, will daily see or hear of valuable animals being ill past chance of relief, before they are suspected to be suffering, or if deemed amiss, will find that they have been either neglected and uncared for, or subjected to a still worse fate from the hap-hazard doctoring of ignorant empirics, who are only thought wiser than their neighbors because they pretend more; while all the time there flourishes and fattens a system of impudent, advertising quackery in horse medicine, with its liniments and nostrums, acting like a charm in every disease, that destroys ten for one it benefits, and picks the public pocket while laughing at its simplicity.

That such a state of things cries loudly for remedy, no one will deny; and as opportunity has offered, it has been the author's object, since he came to the Province, to diffuse sounder notions among all with whom he has had professional intercourse. It is but little, however, that one individual, acting only occasionally, and in isolated cases, can accomplish, in comparison with what is here needed to be done; and as the press affords the means of instructing a thousand, as easily as one, he now adopts that method of address, hoping thereby to reach a number, whom distance otherwise puts beyond the limit of his influence, and also to benefit some, who, from prejudice, or want of better information, keep aloof from the aid they could have, often till it is too late to be of use, sometimes altogether.

When the author was first corresponded with about coming to New Brunswick, it was held out to him as highly probable, that young men from different parts of the Province would take advantage of the opportunity, for acquiring better instruction: and he had much hope of this as a means of making known the value of the science. This hope he is grieved to say, has as yet proved an illusion: and as the next best way that occurs to him, for attaining the same end, he offers a portion of that science to the public in such a form, as may be taken home to the farm or the stable, however remote they be, and there either used for private study and improvement, or kept for daily reference. In doing this, he thinks he is but carrying out in a liberal spirit the views of those who induced him to come here, and who have since so kindly patronized him: and hopes that both the object and the endeavor, will be deemed worthy of public favor, however imperfectly the end may be accomplished.

It is not, however, because there are not already plenty of vete-

rinary books in print, that he feels himself called upon to publish another; neither is it because he has any new discovery to state or principle to expound, not hitherto known. Indeed, so thoroughly investigated, and ably written on, has every department of this science been, on the European side of the Atlantic, during the last thirty years, that to propose anything in it as a novelty, sounds to those familiar with the subject, as near akin to an attempt at imposition; and is only to be done after mature thought, and by those who have exhausted all previous ascertained knowledge on the point in question. But while this is expressive of the accuracy and fullness of English veterinary literature generally; there are but few works in it, of that popular and compendious kind, that suits the ordinary reader, and are at the same time, strictly true to science and nature, so far as they go. The reason of this, perhaps, is that where the science is best known, professional advice on matters connected with it, is so easily obtained, that literary information is but little asked for, people preferring in all difficulties, to consult a living and present authority; and consequently there is but little encouragement for the honester and abler class of veterinary surgeons, to write for the popular taste. Whether this be the reason or not, such is the fact, that nearly all our late veterinary works in which confidence can be placed, are either too voluminous and strictly scientific, or too limited in their range of subjects, to suit the general reader; while the few that have attempted popularity under such names as "modern farriers" and "improved horse-doctors" are but hashed up revivals of such things published perhaps fifty or a hundred years ago, when men fancied they could charm disease by spells and incantations; and consulted the signs and planets on the gathering of an herb, or the performance of an operation.

Of the few reliable English books of a popular kind, that have been published about the horse since veterinary surgery has been recognized as a science, none are suitable in their details to the conditions of American horse management. The difference of breeds, climate, feeding, and general treatment, between the two countries is such, that although the principles may be sound, and their application pertinent in the circumstances for which they were written, their aptness ceases, on bringing them across the Atlantic; and a reference to them for the treatment of disease, unless guided by a knowledge of the first principles of the science, is more likely to bewilder, than enlighten.

While this applies to even the best veterinary books written and published in England, it does so still more, to those that have been issued in America. Were it not a fact patent to observation, it would hardly be credited, that an intelligent and literary people like that of the United States, and loving horses as they do, have yet the first step to take, for placing veterinary surgery in the position of an art and science in their country. But so it is, and a veterinary literature adapted to the wants and circumstances of the western continent, has yet to be written. This is said in no disparaging spirit, but is simply expressive of the little that has yet

been attempted, in comparison to the greatness of the work to do; and if any one doubts its truth, let him point out the publications that exist to disprove it. In all of them, that the author has seen, the descriptions of diseases are too palpably English to be applicable to American circumstances: while the modes of treatment prescribed, wherever originality has been attempted, are too American to be of use in any but the slightest cases, or those that would do better if left by themselves.

By thus pointing out the poverty of the information furnished by the American press, on the subjects in question, the author does not wish it to be inferred, that he considers the present volume equivalent to filling up the void indicated. To do so satisfactorily, many subordinate inquiries will first have to be made and replied to. Known diseases will have to be investigated, and new ones peculiar to the country, identified and examined. Symptoms will have to be noted, terminations compared, and the action of remedies experimented on and established. Lameness, also, with its different situations, natures and causes will have to be reviewed, and even anatomical action and conformation verified, before a complete body of veterinary science, such as England possesses, and suitable to American circumstances, can be collated and put together. But this must be the work of many well trained minds, through a long succession of years, and in every variety of circumstances; and can only be effected when the country is able to educate veterinary surgeons for its own wants, the same as it does the members of the other professions.

The present work, therefore, has no such ambitious aim as that above alluded to: neither, as already mentioned, does it pretend to novelty in the pathological facts or ideas it contains: these being only such as have long stood the test of trial and experience in other times and countries. All that the author claims for it is, that he has adapted the veterinary science of Europe, as taught by the ablest British authorities, to the circumstances of the horse, as he has found them in America, so far as his observation has yet extended; and offers that adaptation as a means towards improving the general management of the animal, and a guide for his better treatment when attacked by disease, lameness or accident; that may be of use to those who have not the first principles or practical application of the science themselves, nor professional aid within their reach. His object, in short, has been to furnish a book for the *stable*, the *farm* and the *road*, that so far as it goes, shall be found true both to nature and science, (which is only experience arranged and systematized,) and at the same time so simple and concise as to be plain to the ordinary class of horse owners.

In carrying out this object, he has been guided in the way of doing it by the same common sense principles, that makes a traveler throw a stepping stone into the middle of a stream, when he finds it cannot otherwise be conveniently crossed. Science having heretofore, been but little recognized in this country, in regard to horse-matters, to have introduced it at once in a technical or abstruse form would have been much the same to the general reader

as placing the barrier of an impassible stream across the path of a traveler; the effect would be to make him turn back and go another way. For this reason, therefore, the author, in giving information on *matters* not generally known, has endeavored to adopt, as a stepping-stone for the reader, such a *manner* as could be most easily understood. And in stating scientific facts and explaining natural laws, and the deductions resulting from them, has selected the simplest possible language, so that those the least informed on the subject before, by reading may understand, and the difficulties of veterinary science be hardly recognizable under the simpler dress of "Outlines of Horse Management."

With regard to the *kind* of information the reader may expect in the following pages, a word or two of introduction will be enough. It is now a rule with those best versed in the art of conveying information to others, that to make it useful to the recipient, the judgment must be supplied with material for reasoning, as well as the memory stored with facts for recollection. In popular works on the diseases and treatment of the domestic animals, this idea has as yet been too little attended to. In such it is common to find rules for horse management, and directions for curing the diseases and injuries to which they are subject, laid down with as much precision as if the end to be effected were the measuring of a piece of joiner work, or the solving of a sum in arithmetic. The disease is named—the symptoms supposed to identify it stated—and then the cure—do so and so—give such and such—just as though the ailment were a positive entity, and every thing connected with it, matter of abstract certainty, and mathematical calculation.

Now although this style of writing makes a very plausible book to read, and seems to the uninformed when perusing it, to afford information of the highest value, it has this draw-back, that when it comes to be applied to the things spoken of as they present themselves in actual practice, there is often but little resemblance or coherency between them. Among the various diseased conditions that come under veterinary investigation, there are but few that when practically examined are susceptible of such precise definitions as those alluded to. Nor do the results which many of the particular modes of treatment are wished to produce, follow them in the generality of cases, with any thing like the certainty that one would anticipate, from the dogmatic manner in which they are prescribed. In the book of nature—at least in that page of it which the veterinarian has to read—unless when viewed through the light of first principles, there is much apparent confusion, and many causes of uncertainty exist; and the student who would rest the proficiency of his acquaintance with it, on the recollection of detached facts, and the possession of arbitrary rules of treatment, without the aid of scientific arrangement, and without understanding the why and wherefore of what he is about, will often find that the more he studies the farther he gets bewildered, and the longer he practices, the less successful he becomes.

Deeming it of advantage to his readers, therefore, to be possessed of sound general principles, that they can apply by the aid of their

own judgment, to every variety of case that may occur, rather than to be dependent in cases of difficulty on mere verbal knowledge and ready-made rules of treatment, often more likely to be astray than to the point, the author has studied in the following pages to avoid as far as practicable, the hackneyed though time honored style of many of those that have gone before him on the same subject.

In treating of diseases, and the means of curing them, he has studied more to explain the character of the deranged conditions existing, to elucidate the physiological proceedings by which recovery is effected, and to point out the most likely means of aiding nature in her endeavors for the restoration of disordered structures or functions, than to provide separate definitions and formula for every variety of disease likely to occur.

The author's aim has been in short, as regards the kind of information he has tried to impart, rather to enable his readers to judge correctly for themselves what they should do in any particular case, than to supply them with rules of practice for which they could give no reason. Being convinced that where the first principles of treatment are understood, and a moderate amount of common sense exists to direct their application, there is a much better chance of success, both in the prevention and cure of disease, than there is without such knowledge, though possessed of all the "valuable receipts" and "infallible remedies" that the impudence or avarice of designing charlatans have ever puffed into notoriety."

AGRICULTURAL EDUCATION.

By education, in its largest acceptance, is understood the development or drawing forth of the powers of the mind,—strengthening it by exercise, bestowing upon it the habit of learning, and the power of acquiring knowledge. This is of infinitely greater importance than any amount of information which may be obtained. Knowledge is of greater or less value as the case may be, but teachableness, or that attitude of mind needful for the ready reception of knowledge, is beyond all price.

Education should commence in youth, while the mind is disengaged, impressive and supple, and that course of mental discipline is the best, let the particular studies pursued be what they may, which in incidental and necessary connexion with learning what may prove useful in later life, shall best develop the powers of the mind and secure the ability to learn.

When we speak of education in reference to any particular business or pursuit in life, it is used in a secondary and more limited sense; and by agricultural education is understood the special training needful for the skillful and profitable performance of the duties and labors of a farmer. And in considering this, it naturally divides itself into two parts, unlike in themselves, but equally necessary, and both indispensable. And the first is the acquirement of skill in the practical performance of the multifarious labors of the farm: such as the plowing of land, the sowing of seed, the harvesting of crops &c, &c. This is to be gained only upon the farm, by seeing the labors performed, and by the actual performance of them. No more may a man expect to be a successful farmer in this country, without practical dexterity and handicraft experience, than he might expect to be a successful shoemaker without practice in making shoes. But this alone is far from constituting agricultural education; even in the loose language of common conversation, we do not speak of a man as having been educated to be a carpenter, or a blacksmith, but rather as having served an appren-

ticeship, or learned a trade; and training to the practice of any art, is essentially apprenticeship, and not education; and this brings me to the second point.

To be educated for any profession or pursuit, a man must not only be familiar with the execution of its details, but he must understand its theory, and be familiar with its guiding principles. We frequently hear agriculture spoken of as a science of itself; but to me it seems that this is not an accurate mode of expressing the idea intended, and I would rather consider it as an *art* depending upon, or closely related to, very many branches of physical science, and which need to be understood in order to secure the most successful practice. Some of these we will notice, and the first is, the Science of MECHANICS. So far as cultivation is concerned, and this is a most important part of agriculture, it is chiefly mechanical. The pulverization of the soil, the deposition of seed, the gathering of the ripened harvest, are bodily labors, requiring only a low degree of intellectual effort; but the science of mechanics teaches us regarding the laws of motion, and the application of power, obedience to which secures easy accomplishment of labor, while the violation of its principles, inflicts unnecessary and exhausting fatigue upon man and beast.

In a country like ours, of cheap land and dear wages, there is nothing of more vital importance to successful agriculture, than economy of labor. We can see that the introduction of steam and machinery have wrought a complete revolution in many branches of business; we see already some saving upon the farm, by the introduction of the cast iron plow, the cultivator, the horse-rake, mowing machine, threshing machine, and other improved implements, and we know that there is scope for vast improvement, both in the machinery now in use, and the farther substitution of brute or other force in place of human labor.

The value or efficiency of any implement, or machine, depends upon its conformity to the laws of mechanical philosophy; and without an understanding of these laws, the farmer would fail to comprehend the principles which govern the draft of a plow, or the action of any implement in use upon the farm; he would be unable to choose a good from a bad one, and ill prepared to use a good one to best advantage, or to correct any accidental hitch in its working.

When we look at our clay soils, richer than most others in the materials of which plants are made, but in a good degree locked up from use by their cohesiveness, and needing only mechanical treatment and weathering—thorough pulverization and mellowing, to become highly productive, who will say that mechanical science may not yet do as much for these, as chemistry may do to fertilize sand barrens?

Soils having been originally formed by the exposure of rocks to atmospheric influences, and their fertility being increased much in proportion to their farther exposure to the same influences, these having the effect to render soluble, and therefore available, their mineral constituents, who will say that some economical application of power may not yet be discovered, which, in the manner indicated, shall add materially to the fertility of all soils, and accomplish as much or more for agriculture, than chemistry can do?

The relation of GEOLOGY to agriculture, grows out of the fact that soils which cover the earth are the broken down or disintegrated particles of the rocks of which the whole originally consisted. There is a great diversity between soils originating in the primary, secondary, tertiary, diluvial and alluvial formations, and a knowledge of the nature of these formations will assist very considerably in forming an intelligent estimate of the character and value of soils derived therefrom, but alone, it is insufficient, and CHEMISTRY offers her aid, not only in estimating the general character of a soil, but in revealing its elementary constituents and inherent properties. It is the province of this science, also, to analyze plants and ascertain their elements; to determine the sources whence they derive their food; to tell us of what that food consists, and in a word, to reveal the laws which determine the fertilization or sterilization of the soil. Chemistry has already accomplished much for the farmer, and beyond all doubt, it is destined to do vastly more in time to come. Its present imperfect condition is not to be wondered at, considering its very recent date. The first actual contact of chemistry with agriculture is said to have taken place within the memory of many living, when the question was submitted to Sir Humphry Davy, whether it were better to employ the dung of animals for manure in a fermented or unfermented state. The experimental researches of this eminent father in chemistry, which were instituted with a view of solving

the problem, are believed to be the first contribution to agricultural chemistry which were deserving the name. Chemical affinities are constantly in play, and combinations of curious interest are everywhere and all the time going on around us. Whether we kindle a fire on the hearth, or burn a coal pit, or get up a gentler warmth to forward tomato plants in a hot bed; whether we bake bread, brew beer, make soap, pile a heap of compost, or cock up hay, we bring into play laws of chemical action, and *he who best understands these laws, can best control their results to a profitable issue.*

Important and invaluable as are the services which chemistry has already rendered, and may be expected to render in the future, to agriculture, in common with other arts, it is much to be regretted that such extravagant and unwarranted expectations have been indulged in regarding it. To hear some over sanguine people talk of the influence of chemistry upon agriculture, one is tempted to believe that it has but to utter a magic word and the desert would forthwith blossom as the rose. The truth is, that many of the questions asked of chemistry by agriculture, are of a far more difficult and complicated nature than those asked by most other arts. The elementary substances of which plants are composed are not only numerous, but they exist in them under many different forms and under many varying combinations; nor is this the only source of embarrassment, for their relations to one another, to the soil whence the plant springs, and to the atmosphere with which it is enveloped, are farther complicated by the action of—a something—of which we know absolutely nothing at all, except that it possesses wonderful activity and potency, and which we call *life* or the *vital principle*. So true is this, that of numerous problems in agriculture, it is impossible to say whether chemistry or physiology might be more properly interrogated for their solution.

Let me here quote from Prof. Anderson of Scotland, who as an agricultural chemist, is universally admitted to have achieved a position in the foremost ranks of science :

“The application of science to agriculture is a subject on which so much has been said and written, during the last few years, and which has occupied so much of the attention of the agricultural public, that it may seem almost superfluous to add to what has already been penned. It has always appeared to me, however, that there are still many points of great importance for the practical

man to consider, which have either never been sufficiently prominently presented to his view, or which from their being less striking, or perhaps less enticing, have been allowed to fall into the back ground, and have hence led to a certain amount of misapprehension in regard to the exact position of science and its relations to practice. Such misapprehension it is highly desirable to dispel. The farmer and the chemist should come to a distinct understanding with regard to the mutual bearings of scientific and practical agriculture—the manner in which they may be made to assist one another—and, what is of all others the most important point, how they can be made to co-operate, so as to establish on a firm basis the general principles of agricultural science, which must necessarily be the first step towards the development of a scientific practice. Under these circumstances, I have thought that I might advantageously refer very shortly to some of these matters, and point out what we are in future to expect from the application of chemistry to agriculture, the more especially as it is not very difficult to perceive that the interest which attached to it has somewhat abated with the general public, though I believe it to be undiminished with our most active and intelligent practical men.

This very diminution in the interest attaching to chemical agriculture, I believe to be mainly founded on one of the most serious misapprehensions—serious alike to agriculture and to chemistry—with which we have now to contend; and that is the erroneous and altogether extravagant expectations which some persons entertain, regarding the extent and rapidity of the influence which chemistry is likely to exert upon agriculture. To hear them talk of it, one might almost imagine that chemistry, as by the wand of a magician, is at once to spread fertility over our barren moors and raise abundant crops where nothing ever grew before; and that the chemist can by a few simple experiments, determine with absolute precision, the circumstances under which the farmer must go to work so as to produce an abundant crop. It needs not to be mentioned that such views are the exception, not the rule; but between this extreme case and those likely to be fulfilled, there are many expectations which, with less apparent extravagance, are equally beyond the powers of chemistry in its present imperfect state, and involve questions which, if they ever can be answered, must await the advance of pure science to a point much beyond that to which it has yet attained. Nor is it, perhaps, matter of much surprise that such expectations should have been entertained, as it must be admitted that the general public is not in a position to estimate correctly the extent of the benefits which it is likely to derive from the application of science to any art; and unfortunately in the present instance, it has been misled by the far too laudatory terms in which the application of chemistry to agriculture were talked of some years ago. Hopes were then excited, which to those intimately acquainted with chemistry, it was very evident could not be sustained, but which the enthusiastic embraced at once; only, however, when they were disappointed, to abandon as worthless, the whole science itself, along with the unobtrusive modicum

of real progress, which was altogether lost sight of amidst the ruins of their lofty expectations. Even those who take a more cautious and sober view of the progress of agricultural chemistry, are apt to be led into expectations greater than facts justify, by the extraordinary progress which the application of chemistry has effected in some other arts: such for instance, as the art of bleaching and the manufacture of soda, which chemistry, by one great stride, raised from the state of primitive rudeness in which they had existed almost from time immemorial, to one at least of comparative perfection. Such facts may lead us at first sight, to expect that the application of chemistry to agriculture should be followed by equally rapid results: but a little further consideration seems to point out a very material difference between such arts and the cultivation of the soil. In such a case as the manufacture of soda, for instance, and indeed in all those in which the application of science has produced the most marked results, the chemist has presented to him for solution a definite and circumscribed problem, involving the mutual relations of some three or four different substances; and he is able to trace the changes which the coal, common salt and lime employed, undergo, from the commencement of the process through each successive step, until the soda is obtained in the perfect state; but in the art of agriculture each question frequently involves, not one, but many problems, connected with the highest and most abstruse doctrines of the science, in which not merely chemical forces, but the far more recondite phenomena of life come into play, and in which the investigations of the chemist are carried on, and his conclusions tested under the influences of weather, climate and many other perturbing causes.

The extreme complexity of the problems with which agricultural chemistry has to deal may be conceived from the fact, that most plants contain from twelve to fifteen different substances, all essential to their existence, the relations of which must be investigated before definite views can be obtained regarding the changes which go on in the organism of the plant. These relations, moreover, are far more complicated than even the number of the elements alone would lead us to suppose: the single element of sulphur, for instance, which does not constitute more than two or three parts in the thousand of most plants, exists there in not less than three different forms of combination, in each of which it is as essential to the plant as those which form the great proportion of its bulk. Now, it must be sufficiently manifest, that questions involving elements of such complexity are not to be solved as rapidly or easily as the far simpler problems of mineral chemistry: and that not merely on account of their superior complexity alone, but because, in the one case, theoretical chemistry sets us far on our way towards the solution, while in the other there is still a great gap to be filled up, a whole mine of scientific facts to be worked out, before we are in the condition to approach sufficiently near the comprehension of these more complicated phenomena. In fact, the latter are not questions of *pure* chemistry, but, are intimately interwoven with vegetable physiology—so much so, indeed, that in many instances

it is scarcely possible to decide to which of these two sciences they ought strictly to belong. And it is just herein that their great difficulty consists, for there is nothing more certain than that those questions which lie, so to speak, on the confines of two sciences, require for their successful investigation a high degree of development of both the sciences on which they depend. Now, chemistry is still far from having attained all that development of which it is capable, as the time during which it has been cultivated has not been sufficiently long to admit of much progress, except in special departments. Few of those who are not themselves chemists, are aware that the facts and doctrines of modern chemistry have been determined during the last sixty or seventy years; and that, with few exceptions, all the laborious investigations of the older chemists, and, without exception, all their general doctrines, were then swept away, to be replaced by the science as it now exists; while organic chemistry, with which agriculture is more intimately connected, has been successfully prosecuted for not more than half that period. To expect any *rapid* advances, in the practical applications of agriculture, of chemistry in its present state, is manifestly unreasonable. The progress must necessarily be slow, in some instances almost imperceptible; and much must be done which at first sight the practical agriculturist may be inclined to consider altogether foreign to his object. Extended researches will frequently be requisite which do not directly lead to practical results—that is to say, which are not immediately convertible into an equivalent of current coin, but which are the foundation of such results, and form the starting point of perhaps a very different series of experiments, having an immediate bearing upon practice. It is of great importance that this should be distinctly understood and borne in mind; for it is by no means uncommon to suppose that nothing more is necessary than at once to convert scientific facts to practical purposes; while, so far from this being the case, the agricultural chemist has a two-fold duty to perform—he must both determine the scientific facts of agriculture, and eliminate from them the practical conclusions to which they lead. It may, perhaps, be said that the establishment of these facts falls within the province of the pure chemist, and that their practical application only ought to be the province of the agricultural chemist. But if this principle were to be acted upon, the progress of chemical agriculture would be slow indeed: for the investigations of the pure chemist lead him now, and are likely for a long period to lead him, in directions very remote from those most likely to afford the materials which the agricultural chemist requires to work upon. The latter would, therefore, require to sit idly waiting till the former supplied him with facts, which his own exertions would have enabled him to ascertain. Nay, the agricultural chemist may even do a better service to agriculture, by pursuing the investigation of those apparently theoretical subjects, than by directing himself to those which seem to have the most immediate practical bearings.

There is another point on which there has been a good deal of misunderstanding between the chemist and the agriculturist, which

is intimately connected with the erroneous estimate of the extent and perfection of chemistry. It is not uncommonly supposed that the chemist is in the condition at once to solve, by the investigations of the laboratory, all such questions in practical agriculture as may happen to be submitted to him—that he can determine, when nothing else can, why certain methods of cultivation are successful, others unsuccessful. It is just possible that he may in some instances be able to do this, but far more frequently his researches enable him not to state positively what is or what is not the case, but rather to draw a probable conclusion—to form, in fact, a hypothesis, which is not in itself a truth, but which must be further tested by experiment in the field, whereby it may be either confirmed or entirely refuted. Now, very unfortunately, this hypothesis is often taken for a positive statement; and when it turns out to be erroneous, it is immediately held up as an instance of the fallacy of science by those who, not being themselves acquainted with the method of investigation by experiment, are unaware that all scientific facts are developed in such a manner. No one ever thinks of going fortuitously to work, when he proposes to determine a scientific fact. He first weighs all facts of a similar character, or having a bearing on the subject which he desires to elucidate, and then founds upon these a hypothesis, the truth or fallacy of which is to be tested by experiment.

Now, without any explanation, it has frequently happened that such hypotheses have been handed over to the practical man, whose field experiments having refuted them, he has forthwith abandoned the science which seemed to him to give erroneous results, not knowing that these results were only in progress of being arrived at by those very experiments which he was engaged in performing. The very same process has been employed in the applications of science to every other art; but the difference between them and agriculture is, that with the former, the hypothesis is formed and the experiments executed by the same person; in agriculture the hypothesis must in many instances be handed over for experimental elucidation to the practical man. The many failures which are made in other arts remain unknown to all but those by whom they have been made, while in agriculture they become known to all and sundry, and by them it is not understood that though these results are negative, they still serve to bring us all the nearer to the truth.

And this leads me to observe, that the true manner in which chemical agriculture is to be advanced, is not merely by the exertions of the chemist or the labors of the laboratory alone. It must be by the simultaneous efforts of science and practice, each endeavoring to develop with care, steadiness and accuracy, the facts which fall within its province. Nor must each pursue its own course irrespective of the other. They must go hand in hand, and taking advantage of each other's experience, and avoiding all sorts of antagonism, they must endeavor to co-operate for the elucidation of truth. The chemist and the practical man are, in fact, in the position to give each other most important assistance. The one may point out the conclusions to which his science, so far as it has

gone, enables him to come; while the other may test these conclusions by experiment, or may be able, from his experience, at once to refute or confirm them. But it will not do to imagine that there is here either a triumph or a defeat. Such a spirit cannot be any thing but injurious. It is rather to be looked upon as a fortunate state of matters, which admitting of the examination of our conclusions from two different points of view, directs us with the greater certainty in the path of truth."

It is undeniable that chemistry is as needful to the successful investigation of the principles which underlie agriculture, as an alphabet is needful to the study of language; and this, because it is only by its aid that we can understand the elementary constitution of matter and its affinities; and it is just as true, that alone, it is insufficient to teach a great deal which we need to know in agriculture, and this, because, (not to mention other deficiencies) chemistry proper teaches nothing at all in regard to living, organized matter. What is called *organic chemistry*, full of interest and importance as it most certainly is, is merely the chemistry of substances once organized and living, but alive no longer—the mere remains of organization. Chemistry cannot so much as put her finger upon living tissues, for they die ere it reaches them. No examination whatever of these by chemistry is possible, from the very nature of the case. A skillful chemist might be able to determine the proximate constituents and the ultimate elements of which seeds are composed, but all the chemistry in the world could not enable him to determine of two seeds that one would produce an apple and the other a cabbage, nor to pronounce upon the conditions necessary to their successful development and growth.

It is the province of **PHYSIOLOGY** to teach the laws in accordance with which are determined and regulated the production and development, the maintenance and decay of organic bodies; under which head are included all the members of two of the great divisions in nature, viz: the vegetable kingdom and the animal kingdom. If we understand and obey these laws, we may secure abundance, symmetry, health and profit. If we disobey them, either through ignorance, carelessness or design, our wages are disease, decay, deformity and poverty.

The science of **BOTANY** is of use to the farmer, inasmuch as it enables him to recognize or identify plants, both those worthy of cultivation and the weeds which are troublesome or pernicious. Even

the scientific classification of plants is not without value to him, as it shows the natural relation which one species bears to another, the limits within which a certain class of experiments must necessarily be confined, and the probable fitness of food and treatment for new plants which may be introduced to his notice.

Botany, in its broader sense, is understood to include vegetable physiology, already alluded to, and the importance of which can hardly be over-estimated. Says Prof. Lindley:

“ There is scarcely an operation in the art of agriculture which does not depend upon the knowledge of the phenomena which are explained by vegetable physiology; and no man can understand the principles on which he acts, unless he has made himself master of its fundamental laws. All the great improvements in the preparation of land for cropping were proposed in the first instance by vegetable physiologists; or depend essentially upon the operation of laws which they have explained. Applied, in the first instance, to gardening, and tested there, they have gradually extended themselves to the field, where their true origin has been forgotten, and men no longer remember how their improved practice came to be thought of. Draining is an example of this: its beneficial effects depend upon circumstances with which vegetable physiologists have long been familiar. The improvement of the races of plants, the preservation of purity in their propagation, the mode of manuring them, the effect of it when well or ill applied, and a thousand other things of like nature, are wholly influenced by laws which it is impossible to understand correctly in the absence of a familiarity with the principles of vegetable physiology independent of chemistry.

A person desirous of studying agriculture upon scientific principles, the only principles that are safe, requires to know the circumstances which effect the germination of seeds: why in some seasons they will not grow, while in others their success is perfect. His attention must be drawn to the conditions most favorable or unfavorable to the progress of the seedling plant, to the gradual consolidation of its parts, to the development of the wondrous organs which the Creator has given it to feed with and multiply. The circumstances most favorable to the perfect action of these organs, to the formation of the flower, the fertilization of the seed, the preservation or deterioration of the peculiar properties which skill has fixed in those artificial forms of vegetation which constitute the majority of cultivated plants, are other matters of fundamental importance, the ignorance of which degrades cultivation to the level of empiricism, and deprives agriculture of those noble attributes which have placed it, by common consent, at the head of all human occupations. They are all most important subjects of consideration with those who would study agriculture philosophically, or who expect to introduce improvements of moment into ordinary practice: for although it may be true that accident has

led to more discoveries than science, yet there can be no doubt that such discoveries would have been long anticipated, had science been consulted; and that many of the most valuable improvements in modern agriculture have either been exclusively suggested or materially assisted by physiological science."

The other branch of Physiology, viz., that relating to animals, perhaps connected somewhat with Zoology, (for what we speak of as distinct branches of science are frequently so related to, or blended with one another, that it is impossible clearly to define their dividing lines,) will do for the farmer in the case of his flocks and herds, just what vegetable physiology has been shown to be able to do in the case of plants and crops; guides him to economical practice and enables him to avoid expensive errors.

VETERINARY SCIENCE, which regards the diseases of domestic animals, is near of kin to animal physiology, and is of the very first importance wherever healthy action gives place to disease.

I might go on to mention other branches of science which it concerns the farmer to know, as, for instance, that of ENTOMOLOGY, the branch of natural history which treats of insects, and so may give us a clue to the ways and means of controlling the ravages of such as are noxious. These at times, are of the most serious character. To name but one: the apparently insignificant creature called the midge, has destroyed wheat enough in the United States, in years past, to endow perpetually, an institution of learning in every State of the Union, which should be to the agriculturist what West Point is for the soldier—or perhaps several such—for its ravages have destroyed property to the amount of scores, if not of hundreds of millions of dollars. To man, at the Creation, was given dominion over "every living creature that moveth upon the face of the earth." Man has more signally failed to assert that dominion over the insect tribes, than over any other, and he will never approach success in asserting it, until thoroughly conversant with their natural history and habits. But enough has already been brought to view, to show that the complete mastery of all the principles by which agricultural practice should be guided and directed, is a most herculean task, and fitter for the work of a life-time, than for a few brief years of preparation for active employment upon a farm; and the question naturally arises, cannot a man be a good farmer, without such extensive knowledge? If he cannot, agriculture would

seem to be the most hopeless of all human callings; whereas we know it was not only the first occupation of man, but that millions of men, during many centuries before these sciences had so much as a name, sowed and reaped and gathered into barns, and were fed from the fruit of their labors. It may also be asked, if any special education in particular branches of science would be of real benefit to the farmer, why has not the demand produced the supply? Why a system of agricultural education has not long ago grown up to supply the necessity? It may help us here, to consider the history and position of agriculture compared with other arts. The *art* of agriculture is a great deal older than its own philosophy, and during very many centuries, practice was gradually improving, very slowly indeed, and perhaps scarcely perceptible from one generation to another, but still on the whole, gaining something from experience and observation, until at last, when science was born, she had an immense labor to perform before she could catch up with the then existing condition of the art, and explain fully the why and the wherefore of what was already known of successful practice. On some points science has not only done this, but has shot far ahead of practice, and can in these respects, teach improved methods. Upon others, it is doubtful if such is yet the case, but no doubt exists that she can and will do so.

With many other pursuits with which agriculture has had to compete in these latter times, the case is far different: instead of beginning with centuries of practice, during which men's wits were sharpened by the necessity of having food to eat, these were born of science itself, and the same science which gave them birth, has steadily nurtured and watched over and strengthened them. Men engaged in these occupations, sit down at the very outset to study the principles involved; while with agriculture, its practice to this day, with the great mass of farmers, is so thoroughly empirical that science is scarcely yet recognized as having any legitimate connexion with it, and it is manifestly unreasonable to expect that a system of agricultural education would grow up until the necessity for it was felt.

On the other point, viz., the hopelessness of acquiring complete scientific knowledge, it may suffice to say, that no one contends that the farmer must obtain a perfect mastery of all the sciences which

have been named before he may venture upon the practice of agriculture. What we argue for, is, that he should obtain such a degree of elementary acquaintance with the sciences related to his calling as will enable him to avoid gross errors, to detect plausible humbugs, to improve upon what is merely traditional and empirical in practice, and, more than all, to qualify himself for prosecuting inquiries and investigations as opportunity may arise, to put himself into a teachable attitude, and to profit by the researches and discoveries of the men who devote their whole lives to the prosecution of the several branches of science; and this, it is believed, is something which is practicable; and whenever the necessity for it is generally felt, the means of securing it will be provided as soon as methods shown to be feasible are presented.

Regarding the preferable method by which agricultural education may be secured among us, I do not feel prepared to speak with positiveness. Agricultural Schools are numerous in Europe and they include great variety both as to the courses of study and the methods of instruction employed, but none of them seem exactly adapted to the wants and genius of our people. Institutions have also been established in this country from which the happiest results may be confidently anticipated, but they are of too recent a date to be cited as absolute proof. Until more fully advised regarding a distinct institution for teaching agriculture, I would incline to favor the introduction of the study of natural science into all schools now existing of a grade high enough to warrant such an introduction;—the extent and thoroughness of the instruction to vary according to the grade of the school. To the more advanced classes in our district schools enough might be imparted to draw attention to its importance, and to awaken an interest regarding the wonderful objects and operations of nature by which the pupils are daily surrounded, and to excite the desire for further knowledge. The introduction of these studies into our common schools would be a recognition of their value and importance, and a generation would soon grow up, imbued with new and enlarged views and realizing the necessity of such education as their fathers never did.

But it is to our high schools, academies and other seminaries of learning, whence the instruction is to be looked for, which is more fully to meet this great want; and these, with qualified instructors and suitable apparatus might accomplish great good.

The movement now making in connection with the Maine State Seminary at Lewiston is of the character indicated. Its aim is to enlarge very materially the facilities already secured for imparting to young men who may desire it, such a scientific training as shall best prepare them for the successful pursuit of agriculture, and it is hoped, that not only may this be carried into effect, but that all similar institutions may do likewise.

With regard to our Colleges, it is believed that however well they may have met the requirements of the times when they were instituted, few of them, if any, have *sufficiently* modified their course of instruction to retain *equal* adaptation to present educational wants, now that so great changes have since passed upon men and things.

The time was, when there were abundant and satisfactory reasons why classical studies should occupy the prominent position and demand the large proportion of the term of study which was accorded to them. In a word, experience had proved their utility and so it was fitting and proper;—and it would be as erroneous as it would be illjudged and unnecessary, to depreciate the benefits which may accrue to the scholar from their pursuit at the present day, some of which can hardly be secured by any other method. But at the same time it is to be remembered, that changes of great magnitude have taken place; great enlargements of the boundaries of knowledge have been made; new interests have arisen, and these, as well as pursuits formerly carried on in a purely empirical manner, like agriculture for example, now see the importance of scientific research, and demand both the further prosecution of its investigations and the diffusion of so much scientific knowledge as has been already acquired and possesses a practical bearing on their business. Science now asks for the prominence formerly given to the classics, and for the same reason, to wit—experience has proved its utility and its adaptation to the wants of the age. The day has passed when the dead languages may hold undisputed supremacy in College halls. In due proportion with other subjects, according to the relative importance of each, long may they hold the place they justly merit. We would not discard the old to introduce the new. The aim is not to supercede but to re-arrange; and if possible to enlarge the sphere of education. Without interfering with other fields, Natural Science presents a peculiar field of its own; new, rich and varied,

which cannot be cultivated even imperfectly without yielding valuable fruit.

The assistance which the State at present renders towards the advancement of agriculture is essentially of an educational character. She encourages Agricultural Societies which draw forth and exhibit improved breeds of animals, improved implements of husbandry and hold them up for imitation and for instruction. They also encourage improved methods of cultivation by offering inducements of honor and profit, in the premiums awarded therefor. By these means knowledge is diffused as well as emulation excited.

The sessions of the Board of Agriculture are intended to subserve the same end, by bringing together a body of men supposed to be most deeply interested in its progress, by their discussions of the ways and means of securing advance and by the interchange of views and experience. The power of the press is also enlisted, and contributes by scattering abroad over the State its annual reports.

These means, although they are intended and adapted to operate chiefly upon adults already actively engaged in agricultural pursuits, and include no direct instrumentalities for imparting instruction to the young, are not without considerable efficacy, and they may serve a preliminary and necessary purpose by the introduction among all classes, of such enlarged and enlightened views regarding methods or institutions for promoting agricultural education, as shall, in due time, lead to their adoption or establishment. One is sometimes tempted to wonder that its necessity has not been sooner felt, and the want supplied. Even an old Roman writer, amid the martial condition of a proud and heathenish empire, had the sagacity to perceive its paramount importance and the honesty to utter his astonishment at its neglect.—“Nothing equals my surprise,” says he “when I consider that while those who desire to learn to speak well, select an orator whose eloquence may serve them as a model; while those who are anxious to dance or to become good musicians employ a dancing or music master; in short that while every one looks for the best master in order to make the best progress under his instructions, the most important pursuit next to that of wisdom, has neither pupils nor teachers. I have seen schools established for teaching rhetoric, geometry, music, dancing, &c., but I have never seen a master to teach agriculture nor a pupil to learn it.”

To the question, which in one form or other, has so often been propounded for solution at the sessions of our Board, viz: "What further means can be adopted for the promotion of agriculture?" a very brief and comprehensive answer might be given. Educate the farmer. His education it is true, may never be *finished* at any school of man's making, but the youth may, at least, be taught to appreciate the value and to feel the necessity of a knowledge of the principles which alone can safely guide his practice. He may be taught *how to commence study*, so that, afterwards, while his bodily powers are engaged in daily toil in the great laboratory of nature whence his support is derived, he may, with only the aid of his own trained and developed faculties, mentally prosecute scientific investigations which will yield both profit and satisfaction.

The diffusion of knowledge is the only practicable method of securing progress; says the celebrated Robert Hall, "all attempts to urge men forward, even in the right path, beyond the measure of their light, are impracticable if they were lawful, and unlawful if they were practicable. Augment their light, conciliate their affections and they will follow of their own accord."

It is hopeless to attempt the extension of improved methods of practice in agriculture until farmers either feel their necessity, or in some good degree apprehend the grounds upon which they are presented and the reasons which exist why beneficial results may be anticipated. It is safe to predict that agriculture will advance just in proportion to the intelligence of those engaged in it.

S. L. GOODALE,

Secretary of the Board of Agriculture.

JANUARY, 4th, 1860.

APPENDIX.

COMPILED FROM RETURNS OF AGRICULTURAL SOCIETIES,

For the year ending first Wednesday in December, 1859.

Societies.	Received from the State.	Am't received from members and donations.	Am't received from all other sources.	Whole amount of receipts for the year.	Am't of premiums and gratuities offered.	Am't of premiums, &c., awarded.	Current expenses of the Society.	Whole amount of disbursements.	Value of real estate.	Value of other property.	Liabilities.
Androscoggin County,	300 00	702 00	540 00	1542 00	755 00	580 00	325 00	905 00	9000 00	680 59	6300 00
Cumberland County,	300 00	150 50	326 17	883 67	729 00	462 75	589 15	1051 90	—	—	—
East Somerset,	150 00	161 00	120 20	431 20	240 00	205 25	93 60	299 44	1200 00	—	712 69
Franklin County,	200 00	26 00	532 89	758 89	466 00	293 00	220 00	758 00	1100 00	—	700 00
Hancock County,	300 00	229 00	1469 00	1998 00	539 00	375 00	200 00	1998 00	1400 00	—	—
Kennebec County,	150 00	100 00	356 00	606 00	360 00	310 00	209 00	647 00	—	350 00	130 00
Lincoln County,	272 65	159 00	210 15	641 80	325 00	297 00	350 00	647 00	—	50 00	5 00
North Aroostook,	200 00	30 00	175 00	405 00	161 00	137 70	25 50	173 20	—	25 00	—
North Franklin,	200 00	—	170 55	370 55	490 00	286 00	339 54	466 24	2500 00	100 00	1000 00
North Kennebec,	150 00	288 00	258 44	696 44	370 00	394 00	150 00	—	—	—	—
North Penobscot,	88 55	57 65	71 72	217 93	150 00	127 30	70 30	197 60	—	—	—
North Somerset,	150 00	16 00	135 00	301 00	210 00	175 00	243 00	—	1080 00	220 00	617 00
Oxford County,	200 00	5 00	605 81	810 81	360 00	319 00	84 00	503 00	—	—	—
Penobscot and Aroostook Union,	99 50	82 00	78 50	260 00	200 00	172 00	79 00	241 00	—	—	—
Piscataquis County,	123 74	80 00	20 00	223 74	155 18	155 18	87 23	242 41	—	—	—
Sagadahoc County,	300 00	425 00	556 00	1312 00	516 00	425 00	175 00	1154 00	3800 00	62 00	2882 00
Somerset Central,	150 00	—	496 00	616 00	700 00	435 00	97 50	797 50	2500 00	50 00	1000 00
Waldo County,	236 11	144 00	111 69	491 80	274 00	215 92	352 28	631 93	—	—	38 00
Washington County,	300 00	23 00	319 89	642 89	524 00	326 87	25 00	229 00	1200 00	25 00	225 00
West Oxford,	200 00	26 00	465 40	691 40	295 00	249 00	30 00	275 00	—	—	—
West Penobscot,	150 00	29 04	174 00	353 04	384 00	245 00	40 92	194 00	—	—	—
West Somerset,	150 00	57 00	103 25	310 25	159 25	166 00	40 00	128 40	—	—	—
West Washington,	—	160 60	50 40	211 00	143 00	88 40	40 00	643 00	—	—	—
York County,	300 00	101 00	504 00	905 00	550 00	443 00	200 00	128 40	2000 00	25 00	1500 00

COMPILED FROM RETURNS OF AGRICULTURAL SOCIETIES. 1859.

Societies.	Amt awarded for bulls.	Amt awarded for working oxen.	Amt awarded for milch cows.	Amt awarded for heifers and calves.	Amt awarded for fat cattle.	Amt awarded for horses.	Amt awarded for swine.	Amt awarded for sheep.	Amt awarded for poultry.	Amt awarded for all other live stock.	Total amount offered for live stock.	Total amount awarded for live stock.
Androscoggin County,	45 50	75 00	20 00	24 00	3 00	24 00	6 50	2 50	—	38 00	354 00	236 00
Cumberland County,	39 00	35 00	35 00	15 00	7 00	58 00	23 00	15 00	5 00	49 00	305 00	281 00
East Somerset,	12 25	17 25	6 25	21 00	—	45 25	4 50	7 50	—	21 00	134 00	135 50
Franklin County,	16 50	61 00	8 00	16 75	4 00	59 50	1 50	13 75	2 50	—	274 25	183 50
Hancock County,	10 50	30 00	7 50	11 90	—	20 50	4 00	13 00	6 00	11 50	123 00	114 00
Kennebec County,	23 00	83 00	16 00	14 50	6 00	73 25	11 25	8 00	—	17 00	255 00	235 00
Lincoln County,	11 50	21 25	11 00	6 50	7 00	31 75	11 00	6 50	2 00	5 50	147 00	125 00
North Aroostook,	6 25	27 50	25 00	4 00	—	13 75	4 00	2 50	—	5 50	92 00	88 00
North Franklin,	14 50	7 00	7 50	6 50	7 00	23 00	2 00	15 75	3 85	11 95	200 00	138 00
North Kennebec,	9 50	45 00	11 00	5 00	1 50	137 00	4 50	14 00	3 00	4 00	264 00	234 00
North Penobscot,	9 50	14 00	6 00	8 00	—	20 50	—	4 00	—	11 00	76 00	76 00
North Somerset,	7 20	32 00	7 50	7 85	—	23 95	3 25	5 50	—	15 00	140 00	102 00
Oxford County,	19 00	25 00	12 00	7 50	—	57 00	11 00	6 00	—	31 00	162 00	168 00
Penobscot and Aroostook Union,	4 75	4 50	4 50	4 00	—	17 00	5 00	3 00	—	—	93 25	77 50
Piscataquis County,	28 00	27 00	6 00	2 00	—	17 00	2 00	10 00	—	5 00	149 00	99 00
Sagadahoc County,	12 00	10 00	32 00	23 75	12 00	22 50	10 50	5 50	5 00	48 25	240 00	181 50
Somerset Central,	21 25	55 00	10 50	11 00	5 00	110 25	11 50	6 50	3 00	18 00	400 00	254 00
Waldo County,	9 00	37 00	8 00	8 00	5 00	22 00	10 00	5 00	—	4 00	152 00	108 00
Washington County,	12 50	17 00	—	32 00	—	26 00	—	—	—	15 00	162 00	103 00
West Oxford,	11 00	6 00	3 00	5 00	8 00	61 00	—	6 00	—	—	134 00	129 00
West Penobscot,	25 00	9 50	5 25	12 00	—	46 75	11 00	12 50	—	19 25	220 00	141 00
West Somerset,	11 25	16 00	12 00	9 50	—	15 75	7 50	13 25	—	50 25	153 75	138 50
West Washington,	7 00	3 00	1 50	—	—	16 00	4 50	5 00	—	12 00	66 00	52 50
York County,	14 00	16 00	8 00	9 00	10 00	17 00	15 00	8 00	9 00	29 00	—	—

NOTE.—To the Schedule of Exports from Franklin County as given on pages 9–10, Mr. Dill desires the following to be added, which were accidentally omitted:

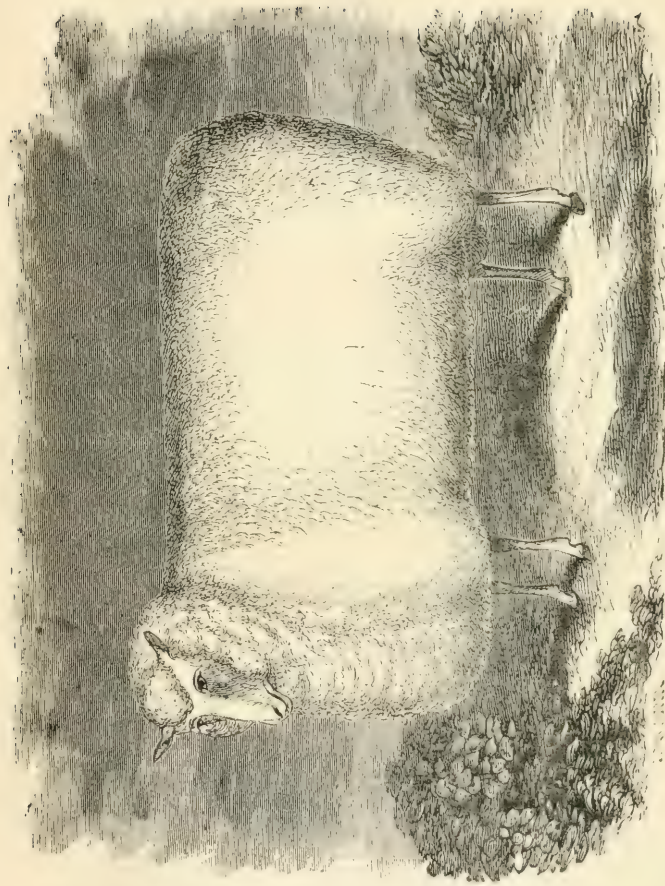
10,000 Straw Hats at 15 cts ,	-	-	-	\$1,500 00
(Many of these are fine, and sell at 25 to 50 cts. each.)				
Scythes, manufactured at East Wilton,	-	-	-	15,000 00
Iron Bars, " " "	-	-	-	2,000 00
Drawing Knives and Hay Knives,	-	-	-	1,000 00
Woolen Yarn, at Wilton,	-	-	-	15,000 00
Which added to the amount stated on p. 10, makes,				\$562,850 00

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COTSWOLD BUCK. -- "CEDRIC."

Bred by William Garne, of Aldsworth, near North Leach, Gloucester, England. Imported by and the property of George C. Hitchcock, Ash Grove, New Preston, Conn.

ABSTRACT OF RETURNS

FROM THE

AGRICULTURAL SOCIETIES

OF

MAINE,

1859.

EDITED BY

STEPHEN L. GOODALE.

SECRETARY OF BOARD OF AGRICULTURE.

AUGUSTA:

STEVENS & SAYWARD, PRINTERS TO THE STATE.

1860.

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ABSTRACT OF RETURNS

FROM THE

AGRICULTURAL SOCIETIES,

FOR

1859.

MAINE STATE SOCIETY.

The Secretary, Dr. E. Holmes, writes me as follows :

The annual "Cattle Show and Fair" of the Maine State Society for 1859, took place in Augusta on the 21st of September, and continued through the week.

It was a decided *success*, and a decided *failure*. At no previous show were there brought out so many splendid cattle, sheep and horses; and the halls were filled to overflowing with articles of manufacture of all kinds; and the products of the dairy exhibited have never been equalled for quality or quantity. The Trustees in their official report state that "the arrival of horses, cattle, sheep and swine upon the grounds exceeded their most sanguine expectations, not only in the increased number of entries—amounting to over 1,000—but also in the evidence of great improvement in the quality of the stock presented.

The increased premiums offered on sheep met with gratifying results. A great impetus has thus been given to renewed exertions in sheep raising—a branch of husbandry of great importance to Maine.

By Tuesday, at 3 o'clock, every stall and pen upon the ground were full, and many waiting places, which were constructed as fast as possible for their accommodation."

Tuesday was a splendid day, and every thing went happily and harmoniously,

"Merry as a marriage bell,"

but by Wednesday, a powerful rain, so "genial to growing crops" but *wilting* to a cattle show, began to fall, and all outdoor operations were suspended. For this reason, the show, which, as it regards numbers and excellence of cattle and other farm stock, and articles in the various halls, was a great success, as it regards *pecuniary* matters was a *failure*.

The Editor of the *New England Farmer*, whose presence we regarded as a cheerful acquisition to the company assembled, thus facetiously describes the unfavorable turn of the weather :

“The exhibition was to have continued through four days, but the threatening aspect of the weather on Tuesday resolved itself into a decided storm on Wednesday, and arrested its further progress. There was no ‘make-believe’ about it, for the rains descended, the winds blew, and the floods came, and every living thing ‘caught the dumps’ at once. The cattle would not low, the cocks would not crow, nor the horses go—it was an effectual damper all round. The auctioneers grew hoarse while the icy rain drizzled down their necks, and soon began to pack up their traps; the jockeys lost all their grit, and the boldest of them didn’t believe there was a horse on the ground that could trot a mile in ten minutes; the men suddenly came to the conclusion that ‘discretion is the better part of valor,’ and departed to get up a flame within themselves, or find one at their hotels. There was a regular stampede among the women, and the fields, so lately sparkling with feminine beauty and grace, became damp, dull and despondent, and the winds and rain had it pretty much to themselves. But the exhibition was not a failure after all, for the interruption which it experienced showed how much the people regard and cherish the festival. It was not a failure, either, because what goes to make up an exhibition *was there*, although the people were prevented from seeing it. Some 1,000 cattle, 500 horses, 400 sheep, swine, poultry, bees and honey, grains and vegetables, fruits and flowers, household manufactures, paintings and pictures, and a respectable collection of farm implements and machines, were presented to be examined. Then there were the usual arrangements for plowing, drawing, and the exhibition of horses.”

The Trustees in their annual report to the Secretary, referring to the exhibition and its effect on the agricultural interests of the State, say :

“It may not be out of place for us to say that the experience of the past year has proved, in a marked degree, the value to agriculture of the efforts of this Society. The intrinsic importance of these efforts are not by any means to be summed up in the various inducements held out by the premiums offered to competitors, for these

are of insignificant value, when viewed with the advantages afforded to compare the stock and productions of one section of our State with another, thereby stimulating our farmers to a laudable emulation to excel in the various departments of agriculture.

And while we have the most cheering evidence of the rapid diffusion of general and scientific intelligence, applicable to all departments of agriculture and mechanics, we feel fully satisfied of the necessity of continuing our annual exhibition as heretofore, where agriculturists, who are making earnest efforts to improve, may compare with each other, and receive the just appreciation of the public eye.

We feel warranted in saying to you that the beneficial effects of this society are each year better appreciated by the intelligent farmers of Maine.

And while the labors of the Board of Agriculture are directly felt and acknowledged as of incalculable value, wherever their comprehensive and able reports have been circulated—while our farmers have with much readiness and an earnest spirit of enquiry adopted many new methods of culture, improvements in stock and implements—yet they look to the exhibitions of this society to illustrate the practical value of their operations, compared with old methods.

Herein, gentlemen, it is cheering to believe that in establishing this society, you have created a most powerful agent for the diffusion of agricultural intelligence and improvement. Your *shows* and *fairs* become wide spread *advertisements* of the best fruits of the farmers' labor, at the same time furnishing to the unsuccessful competitor, the method by which these results have been attained.

Is there any gentleman, member of this association, who can look back to the commencement of the last *decade* and not be surprised at the great improvement visible in the present condition of the farming interests of Maine? Compare the marketable products of the farmers' industry of that date and the present. The increase of cattle, sheep, horses, swine and crops—the remarkable improvement in the qualifications and value of every class of animals, and the increased variety of the products of the soil, the facility of their production under the promptings of science and the careful experiments of intelligent men, which it is your mission to encourage in their labors and publish their experiences.

When you make these comparisons, and trace the results to the combined efforts of this Society, and the *Board of Agriculture*, to which this Society is an important and necessary auxiliary, are you ready to say that these associations have failed of their mission in the least degree? We think not.

Looking then, to the future, you have every thing to encourage renewed effort. You may feel sure from the experience even of the few years of the existence of these sister organizations that the agricultural prosperity of Maine is not problematical. Although Maine is the most northerly State of the confederation—although her climate is rigorous—yet her physical advantages are such, that with the aid of science applied to her agricultural interests, with the hearty and combined efforts of those of her sons engaged in these pursuits, by the efforts of the many County Societies, most valuable auxiliaries to this Society, you may in comparatively few years, see Maine taking rank with the first in agricultural prosperity.”

Premiums were awarded as follows :

LIVE STOCK.

STOCK HORSES. For best stallion, six years old, to S. J. Smith of Auburn, for a Morgan and Messenger.

Second best, to James Allen of Farmingdale, for Morgan Eaton.

For best four to six years old, to T. S. Lang of North Vassalborough, for “Black Hawk Telegraph.” He has been offered for him \$5,200.

Second best, to T. S. Lang, for “General Knox.” Cost \$1,000.

For best three years old, to Charles Kidder, for an Eaton horse.

Second best, to John Shaw, for a Mack and Messenger.

For best two years old, to Lyman M. Greaton, for Messenger and Witherell.

For best one year old, to T. S. Lang, for a son of Ethan Allen, for which he paid \$1,000 at four months old.

BREEDING MARES AND FOALS. For best mare, to Sumner Hayford of Hartford, for Morgan and Messenger.

Second best, to Nathaniel T. Robinson of Mt. Vernon, for English and Morgan.

Third best, to John Fifield of Augusta; the mare a Messenger—colt sired by Eaton horse.

TROTting HORSES. For best stallion, five years of age and upwards, for speed in trotting, to Samuel J. Smith of Auburn.

Second best, to George M. Robinson of Augusta.

For best stallion, three or four years of age, to Thos. S. Lang of North Vassalborough.

Second best, to same.

For best mare, five years of age and upwards, for speed in trotting, to J. B. Pompelly of Auburn.

Second best, to C. G. Jackson of Winthrop.

For best mare, three or four years of age, to B. F. Holmes of Auburn.

Second best, to Otis Holt of Turner.

For best trotting gelding, five years of age and upwards, to George F. Gilman of Waterville.

Second best, to J. E. Morrill of Veazie.

For best trotting gelding, three or four years of age, to W. S. Gilbert of Kingfield.

Second best, to L. H. Snell of Winthrop.

MATCHED HORSES. For best span of carriage horses, to Moses Bailey of East Winthrop.

Second best, to George F. Gilman of Waterville.

Third best, to Abner Toothaker of Rangely.

SADDLE HORSES. For best saddle horse, to John L. Seavey of Waterville.

GELDINGS AND MARES, FOR GENERAL USE AS ROADSTERS AND CARRIAGE HORSES. For best gelding, five years old and upwards, to G. F. Gilman of Waterville.

Second best, to R. Harville of Madison.

For best gelding, four years old, to J. C. Gifford of Vassalborough.

Second best, to John Hussey of China.

For best mare, five years old and upwards, to C. G. Jackson of Winthrop.

Second best, to C. E. Savage of Augusta.

For best mare, four years old, to J. Kezar & Son of Winthrop.

Second best, to O. A. Lawrence of Wayne.

For best colt, either filly or gelding, three years old, to W. A. Bartlett of Unity.

Second best, to J. M. Savage of Anson.

For best colt, two years old, to Daniel Hopkins of Newcastle.

Second best, to John E. Coleman of Windsor.

For best yearling, to Benj. R. Stephens of Unity.

Second best, to Solon Lombard of Belgrade.

NEAT STOCK. For best full blood Devon bull, two years old or over, to John F. Anderson of South Windham.

Second best, to Isaiah Wentworth of Poland.

For best yearling Devon bull, to Thomas Minot of Brunswick.

Second best, to John F. Anderson of South Windham.

For best Devon bull calf, to Isaiah Jordan of Brunswick.

Second best, to Isaiah Wentworth of Poland.

For best full blood Devon cow, three years old or over, to Isaiah Wentworth of Poland.

Second best, to same.

Third best, to John F. Anderson of South Windham.

For best two years old Devon heifer, to Isaiah Wentworth of Poland.

Second best, to John F. Anderson of South Windham.

For best full blood Devon heifer, one year old, to Isaiah Wentworth of Poland.

Second best, to same.

For best full blood Devon heifer calf, to John F. Anderson of South Windham.

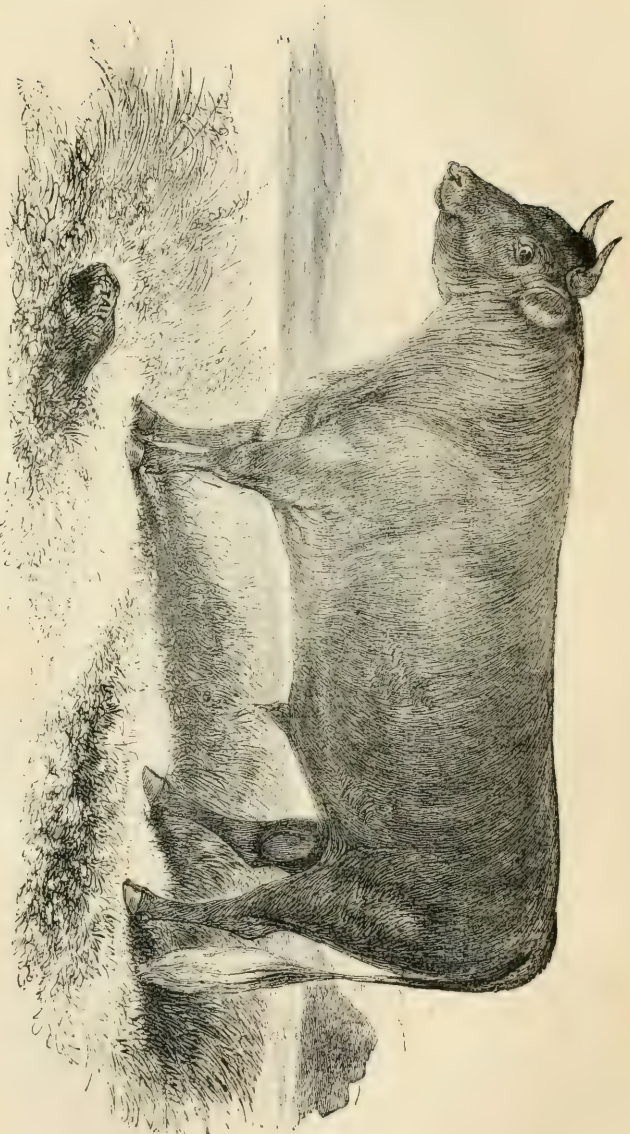
For best full blood Hereford bull, two years old or over, to Joseph H. Underwood of Fayette.

Second best, to same.

For best full blood Hereford cow, three years old or more, to Joseph H. Underwood of Fayette.

For best two years old, to same.

The committee remark :—“The Herefords, when *kindly treated*, make superior working oxen; and the grade cows are fair milkers. They are hearty but not *great* eaters; and are possessed of that



DEVON BILL. -- TEENUSEH. (567) HOWARD, (535) DAVY.

Bred by Edward G. Faile, West Farms, Westchester Co., N. Y. Teenuseh took the first premium as a calf at the Show of the N. Y. State Agricultural Society in 1854; the first as a yearling at the Show of the same Society in 1855; the first at the Show of the U. S. Agricultural Society in 1855; the first as a two year old at the Show of the same Society in 1856; and the first at the Show of the American Institute in 1855. He was sold to Juan Emmanuel Macias, Esq., and taken to the Island of Cuba, in 1857.

intelligence which will not allow them to starve when but a poor fence prevents them from *enjoying* good feed.

The Devons, as a race, are active and hardy, and will thrive on coarse and scanty feed, but like all others will do much better on fine and plenty. They are peaceable in disposition, and are easily kept within bound. They are good in the yoke, at the pail, and, like the Herefords, first rate for the butcher." They recommend that increased attention be paid to these breeds suited to our soil and climate.

For best thorough bred Durham short horn bull, two years old or over, to Obediah Whittier of North Vienna.

Second best, to William Houghton of Anson.

For best bull calf, to William Houghton of Anson.

Second best, to Warren Percival of Vassalborough.

For best Durham cow, to Charles Hunnewell of South Windham.

Second best, to William Houghton of Anson.

Third best, to Warren Percival of Vassalborough.

For best yearling, to Warren Percival of Vassalborough.

For best full blood Ayrshire bull, two years old and over, to O. W. Straw of Orrington.

Second best, to S. L. Goodale of Saco.

For best full blood Ayrshire cow, three years old or more, to S. L. Goodale of Saco.

Second best, to O. W. Straw of Orrington.

For best full blood Jersey bull, two years old and over, to W. S. Grant of Farmingdale.

Second best, to George W. Hammond of Westbrook.

For best one year old Jersey bull, to O. W. Straw of Orrington.

Second best, to E. & P. H. Holmes of Winthrop.

For best Jersey bull calf, to Samuel Guild of Augusta.

For best full blood Jersey cow, three years old and over, to George W. Hammond of Westbrook.

Second best, "Jessie," to E. & P. H. Holmes of Winthrop.

Third best, to S. F. Dike of Bath.

Fourth best, to W. S. Grant of Farmingdale.

For best full blood Jersey heifer, two years old, to W. S. Grant of Farmingdale.

Second best, to E. & P. H. Holmes of Winthrop.

For best full blood Jersey yearling heifer, "Little Bell," to Samuel Wood of Winthrop.

Second best, to W. S. Grant of Farmingdale.

Third best, "Minnie," to E. & P. H. Holmes of Winthrop.

For best full blood Jersey heifer calf, to W. S. Grant of Farmingdale.

Second best, to E. & P. H. Holmes of Winthrop.

The committee remark:—"These classes of cattle are of recent introduction into the State. They are looked upon with favor by a few, who more trustful and enterprising than many, have taken the pains and incurred the expense of giving them a trial, with a view of obtaining for themselves directly, and for the State indirectly, the particular benefits and advantages which each class naturally afford.

It is proper here to speak in high commendation of the liberal, and we think, very wise and judicious policy of the managers of the State Society, in making their schedule of premiums open to all the different breeds and races of farm stock, and inviting competition in them all.

This course is virtually saying to the farmers of Maine, we wish to make no invidious distinctions in your varied pursuits.

Be persuaded in your own mind which class of cattle or stock will best meet your wants, and strive for preeminent excellence therein, and to stimulate and encourage your labors we appropriate a share of the Society's means to be awarded to you as testimonials of your skill and faithful industry in your special department. This liberal policy has had a wonderful effect in bringing out to our shows, for the last two years, a greater variety of excellent stock than is usually met with in exhibitions of the kind. In looking over the returns of the several State exhibitions, we find but very few of them where all the breeds and races of cattle are represented.

The Ayrshires are a breed of comparatively recent origin, brought about by the labors of breeders in the county of Ayr in Scotland. Their speciality is for dairy purposes, and they have become somewhat celebrated for their property or characteristic of giving a large flow of milk; at the same time are claimed for them beautiful symmetry of form, hardiness of constitution, and good feeding capacity. That the breeders of Scotland have obtained in combination these

properties in a remarkable degree cannot be denied. Whether the breeders of New England who have obtained this breed, will keep up these characteristics, or whether our peculiarities of climate will be favorable for them, remains to be shown as the results of further careful trial.

There were but few specimens of the pure breed presented, but those were very good, especially the cows of S. L. Goodale and O. W. Straw.

The next class of cattle which came under our review was the Jerseys. This is beyond question a race, rather than a breed, possessing very peculiar and well defined characteristics.

The Jerseys have been imported, from an island of the same name in the British Channel, near the coast of France. They were introduced over thirty years ago, from the Channel islands, viz: Alderney, Guernsey and Jersey.

Their speciality is the property of giving a fair quantity of exceedingly rich milk. This renders them valuable in the butter dairies, and for this purpose, notwithstanding the profusion of sneers and taunts which are thrown upon them to an unlimited amount, they are highly prized by those whose wants require rich stores of cream. For this purpose your committee have no doubt they are very superior. They are, therefore, as a dairy breed, worthy of attention.

There were many very fine specimens of the Jerseys presented for the premiums and also for exhibition only. Some of them, however, gave evidence of the severity of the drouth in the early fall.

On farms where the making of butter is an object of pursuit and profit, your committee have no doubt, that, an infusion of Jersey blood will be likely to secure richness of milk, and high-flavored, delicious butter.

Your committee have seen with regret, and long heard the lamentations of lovers of good butter, that, just in proportion as the native cow has been improved by the infusion of Durham blood, the butter has depreciated in quality, for the last twenty years; and they feel that they can congratulate your Society and the farmers of the State, that, in the Jersey race, you have the means, not only of bringing the butter back to its original goodness, but to a far superior excellence.

Objection has been made that they do not make much beef. Their feeding properties are charged against them, as a fault in so small an animal. Their fattening properties, when not giving milk, we believe, have been admitted; and a Jersey cow, who gives milk that makes 3,000 pounds of butter, when in old age is killed, what matter is it whether she weighs 600 or 900 pounds?

A majority of farmers who have but little heavy ox work to do, may find them profitable as working oxen, as they are hardy, intelligent and active; and, in the opinion of your committee, will do more common farm work than the slow-moulded, lymphatic, big oxen. And those farmers who raise great steers to look at and brag over, and who keep another yoke of oxen to do the work, may find the Jersey ox very useful for that purpose."

WORKING OXEN. For best ten yokes of oxen from any one county, to Somerset.

Second best, to Kennebec.

For best five yokes from any one town, to town of Sidney.

Second best, to town of Manchester.

For best single yoke of oxen, (size symmetry and discipline considered,) to A. H. Woodman of Poland, for grade Devons—girth, seven feet five inches—four years old.

Second best, to George Ladd of Starks—grade Durham.

Third best, to Daniel Craig of Readfield—grade Durham, four years old, seven feet two inches.

For best yoke three years old steers, to Hezekiah Cross of Vassalborough—grade Durham, seven feet two inches.

Second best, to W. A. P. Dillingham of Sidney—grade Durham, six feet ten inches.

For best yoke two years old steers, to G. A. Hilton of Starks—grade Durham, six feet six inches.

Second best, to Samuel Warren of Scarborough—grade Durham, six feet five inches.

For best milch cow of any breed, to E. M. Sawtelle of Sidney.

Second best, to — Rollins of Belgrade.

Third best, to H. Norcross of Augusta.

FARM STOCK. For best farm stock from any one farm, to Isaiah Wentworth of Poland.

Second best, to John Kezar & Son of Winthrop.

SHEEP. For best flock of any breed, not less than fifty from any one farm, to Joseph M. Smith of Anson.

Second best, to Edgar Hilton of Anson.

Third best, to Wm. S. Grant of Farmingdale.

For best flock of lambs of any breed, not less than fifteen in number from any one farm, to Obediah Whittier of North Vienna.

Second best, to S. W. Smith of Anson.

For best Spanish Merino buck, one or more years old, to Benj. F. Hilton of Starks.

Second best, to S. W. Smith of Anson.

For best Silesian Merino buck, one or more years old, to S. W. Smith of Anson.

For best French Merino buck, one or more years old, to S. W. Smith of Anson.

For best French Merino ewe, one or more years old, to Joseph M. Smith of Anson.

Second best, to S. W. Smith of Anson.

For best Leicester buck, one year old or more, to Warren Percival of Vassalborough.

For best South Down buck, one year old or more, to Wm. S. Grant of Farmingdale.

For best South Down ewe, one year old or more, to Wm. S. Grant of Farmingdale.

For best Cotswold buck, to Isaac Gage of Augusta.

For best Cotswold ewe, to Wm. S. Grant of Farmingdale.

For best Cheviot buck, to E. N. Sawtelle of Sidney.

SWINE. For best boar, over two years old, to W. Hamlin of Sidney.

For best sow, to L. G. Hurlburt of West Gardiner.

For best boar, under two years, to Samuel Jackson of East Winthrop, for Chester breed.

Second best, to W. A. P. Dillingham of Sidney.

POULTRY. For best flock of hens exhibited, to William Miller.

For best flock of turkeys, to Samuel Guild.

Second best, to John O'Donnell.

For best flock of geese, to Elisha Barrows.

For best flock of ducks, to George W. Haley.

Second best, to John Ham.

Among the statements of exhibitors are the following opinions of the merits of several breeds.

J. H. Underwood says of the Herefords :

“ I think they combine more good qualities than any other breed with which I am acquainted. They do better on the same food, and so are more cheaply kept. The cows give a fair quantity of rich milk. Grade oxen of this breed will perform much labor, and are easily fattened. They are easily mated. The beef and veal is the best I have seen.”

Wm. S. Grant says of a Jersey heifer :

“ She is very gentle and easily kept. When two years old she gave ten quarts per day ; and her milk is of the best quality. She had no calf this year, and still gives eight quarts per day.”

J. F. Anderson, in his statements on Devons, says :

“ As a grazing stock I believe the Devon race surpasses all others for Maine. Active and hearty, they will thrive upon coarse and scanty herbage. Gentle and peaceable in disposition, they are easily kept within bounds by even a shaky board and stake fence.

Satisfied with the poorer quality of food, they are never found with their heads forced through fences, or reaching far over walls for the more luxuriant growth of the adjoining fields.

Requiring a less quantity to fill their stomachs, and being remarkably quick feeders, they contentedly dispose themselves to ruminate, and to lay on flesh, while under the same circumstances the Durham would be uneasily roaming about to find a chance at something better than has been furnished him.

Being provided by nature with a dense, thick pile of hair, they withstand the intense cold of our winters with less expenditure of food than other breeds.

Their integrity of color and similarity of form, and general uniformity, render them easily matched as steers and oxen.

The richness of their milk makes them peculiarly valuable for butter dairies ; and when the attention of the breeder has been carefully and judiciously turned that way, they have, as a breed, proved good milkers ; and their milk is said to abound in caseine or cheesy matter beyond others.

As I have said before, I believe the Devons are all we need for neat stock in Maine, and what is more in their favor than any thing else, (or than what can be shown of any other breed, in my opinion, except perhaps the Ayrshires,) they are most admirably adapted to our climate and soil.”

DAIRY PRODUCTS.

S. E. Holmes, who obtained first premium on best twenty pounds of butter, submits the following statement:

"My dairy consists of three cows, Jerseys and Grade Jerseys. The quality of their milk is such, that six quarts will make a pound of butter. I set the milk in a cool, dark place, from twenty-four to thirty-six hours, when I skim it, putting it into a butter or cream pot, stirring all together, when any new cream is added. I then set the cream pot in an ice house, until I churn. I churn twice a week. The churn I make use of, is 'Tyler's Butter Working Churn.' I have the cream made warm, to the temperature of 64 degrees. If warmer than this, I put in ice; if colder, I set the cream pot into warm water. I use a thermometer to ascertain the heat. After being churned, I work in about an ounce of salt to a pound of butter, and set aside in a cool place, for twenty-four hours, when I give it a final working, and put it into balls and pack it into stone pots. I then keep the butter covered from air, and the pots in a cool place."

From the statements of competitors, for largest amount made in three months, we gather the following:—B. C. Paine of Winslow, from a Grade Durham cow, 11 years old, kept at pasture, and fed during the dryest of the season with corn fodder, cut grass, and a pint of meal per day, made in June, July and August, 186½ pounds. Last year made 284½ pounds, reserving 622 quarts of milk. In June, 48 quarts made 6 pounds butter. In November, 36 quarts made 6 pounds.

Sold the calf for	\$9 00
284½ pounds butter,	63 60
622 quarts milk,	18 66
Skim milk, worth for pigs,	6 00
	<hr/>
Yield of the cow for the year,	\$97 26

E. M. Sawtelle of Sidney, from a Grade Hereford cow, (age not given,) at pasture, and fed with mowed grass in the drouth, made 151¾ pounds.

E. Holmes, from two full blood Jersey cows, kept at short pasture, and for ten days in August, having a little corn fodder, made in three months, 204½ pounds butter.

Samuel Guild of Augusta, from four cows, Grade Durham and Hereford, at pasture and corn fodder, made 405 pounds butter.

Cheese. Stephen Steward of Newport, obtained premium for greatest quantity per cow, on evidence, showing that he had made 343 $\frac{3}{4}$ pounds from two cows in two months, from June 20th to August 20th.

C. J. Grinnell of Exeter, second premium, on evidence showing that from five cows, "during the past season," he had made 900 pounds.

CROPS.

The committee say that a large proportion of the statements required by law were too imperfect to be admissable, and some which were better were not properly authenticated. Had it been otherwise, the awards would probably have been, in some cases, made to others.

Indian Corn. First premium to William Grinnell of Exeter, for 60 bushels per acre. [The corn crop was very light, generally, this year. In many places, seriously injured by frost, in June.] Mr. G. says of his crop:

"The soil upon which it grew was a gravelly loam, eighteen inches deep, of a yellowish color; subsoil a coarse gravel; was planted with potatoes last year. Plowed in the fall, eight inches deep, and again in the spring; then harrowed and furrowed rows three and a half feet apart, in a southerly direction; hills two and a half feet apart. Spread on ten cords of green manure, from barn cellar, before I plowed in the spring, and put ten cords in the hill, from hog yard, where I put muck, horse manure, &c. Planted the 15th of May, with a corn planter, hoed twice and cultivated twice; topped the stalks on two-thirds of it, the other cut up at the roots, the 15th of September. The corn was the soundest and best where the stalks were cut."

Thomas J. Twycross of Dresden, second premium, for 45 bushels per acre. Mr. T. says:

"The soil upon which it grew was a light clayey loam, free from stones, and about eighteen inches deep. Had been sown to grass a few years previous. When last cultivated, had been sown to winter wheat and the manure spread on in autumn. The soil fine and friable. I had a good crop of wheat, 25 bushels. When broken up it cut over a ton of hay. The land was plowed about eight inches deep, in October, 1858. Put on four cords of hog manure and two cords of old manure, from the barn yard, the ensuing spring.

Harrowed and furrowed it, and manured in the hill. Planted 17th and 18th of May, with the Dutton corn, no previous preparation; about two bushels of plaster for top dressing. Ninth of September, cut up about one-third at the bottom. The remainder stood in the field without cutting at all, till gathered. Harvested October 4th. Hoed once, and cultivated twice. Planted three feet apart, each way."

Barley. First premium on barley, to Thomas J. Trask of Jefferson, on 47 bushels per acre, on a dark sandy loam, underlaid with clay, plowed in fall of 1857, ten inches deep. In 1858, planted with corn, with six cords long manure harrowed in, and six cords compost in the hill, plowed late in fall of 1858; cross plowed and harrowed in May, 1859; sowed two bushels seed May 14th; harvested middle of August.

William Grinnell, Exeter, second premium, 37 bushels per acre. The land has been in corn, the year past.

A statement from E. F. Crane of Kenduskeag, is returned, not authenticated, of 51 bushels per acre.

Rye. First premium to D. C. Williams of Readfield, on 28 $\frac{1}{4}$ bushels winter rye, per acre. Mr. W.'s statement is as follows:

"The soil upon which it grew was deep sandy loam, no rocks or clay, of dark yellow color, and about two feet in depth, fine and easy to be worked. The land was cleared twenty years ago, and planted to corn on the burn, and in the September or October following, was sown to winter rye, both crops being excellent. It was laid down to grass with the rye crop and mowed for sixteen years, successively, [afterwards] without any dressing. In 1858, this acre was broken and planted, without dressing, producing 150 bushels of French white potatoes, harvested the first of September, 1858. The ground was then plowed eight or nine inches deep, with a team of one yoke of oxen and one of steers, occupying one and one-fourth days. It was harrowed 13th of September, and sown the same day. Harrowed once before sowing and twice afterwards—no dressing of any kind was used. The amount of seed used was one and three-fourths bushels of white winter rye, sown dry. This being more than the usual quantity of seed, the grain did not branch but grew very tall, with long heads well filled. It was harvested the last days of July, being reaped and shocked in the field, where it stood from two to three weeks, then housed until the last of September, when it was threshed with a flail. The items of expense are the plowing and harrowing of land, seed and sowing same. Harvesting

and threshing, as per schedule following, and the value of the grain at my residence is seven shillings per bushel :

DR.	<i>Crop of Winter Rye.</i>		CR.
To plowing once, 1½ days, . . .	\$5 00	By 28½ bushels at 7s., . . .	\$33 05
Harrowing and sowing, . . .	2 00	2500 lbs. straw from scythe reaping, . . .	7 50
Harvesting and housing, . . .	4 00		
Threshing and cleaning, . . .	5 00		\$40 55
1½ bushels seed, . . .	2 05	Deduct cost, . . .	19 25
Interest on land, . . .	1 20		
	\$19 25	Profit, . . .	\$21 30

Oats. First premium to Benjamin R. Stevens of Unity, for 82 bushels on an acre. His statement is as follows :

“My crop consisting of 246 bushels, was grown on three acres, being at the rate of 82 bushels to the acre. The soil upon which it grew was light and stony; planted to corn last year; manured at the rate of twenty-five loads to the acre—one-half spread, the other half in the hill. The ground was seeded down this year to herdsgrass and clover. There were sowed three bushels seed per acre. The oats grew very stout; some were measured at the length of five feet eleven inches. There was one acre threshed out, it being exactly measured, and yielded 82½ bushels of measured oats, as we had not time to thresh the rest.”

Second premium to Thos. J. Twycross, for 50 bushels per acre.

No premium was offered on wheat. One statement is found from John Titcomb, Jr. of Farmington, of a crop of Canada club wheat, on a deep loam of 24½ bushels per acre.

Forage. Statements are found of 6,800 pounds herdsgrass and clover on one acre; of 3 tons interval hay on an acre, and of 4 tons and 400 pounds clover upon an acre, by E. F. Crane of Kenduskeag.

Also, one of John C. Clements, of 4 tons of clover upon one acre, of clayey loam; plowed and planted to potatoes, without manure; plowed in spring of '58, eight inches deep, and sown with barley and eight pounds Vermont clover, and eight quarts herdsgrass and two pounds white clover per acre. No manure except the wash from the highway which passes for twenty-seven rods on one side of the field.

ROOT CROPS.

The Committee on Root Crops report:—That there were but nine entries for the Society's premiums in this class, and in but two cases

have the applicants complied fully with the conditions requisite to authorize the award of premiums.

Imperfect statements are in most cases submitted, but in no instance does the amount of crop obtained, or the process of cultivation, as stated by the applicant, seem to your committee to merit very high encomiums as serving to demonstrate the productiveness of our soil, the perfection of our mode of culture, or the adaptation of our climate to this class of crops.

The indifference of the farmers of Maine to this all-important branch of agriculture, can, in the judgment of your committee, be attributed to no other cause than the neglect of the agricultural societies in the State to offer premiums for the successful and extensive cultivation of root crops for winter feed for stock, commensurate with its importance.

No farmer can keep neat stock, or sheep, in good condition through our long and severe winters, on dry fodder alone; and it is susceptible of demonstration, that all kinds of stock may be carried through the winter in better condition, and at *much less* expense, with a generous daily supply of roots, than upon hay and grain only; while, at the same time, both the quantity and fertilizing qualities of the manure are increased.

It is an old axiom, "No cattle, no farm." The importation of guano, and the manufacture of superphosphates, can never do for the farmer what a full stock of well-fed and carefully-attended neat cattle, sheep and swine, will do.

Neither Professor Mapes, nor any or all other professors, can supersede Professor Nature in the production of fertilizers; and the more we encourage the *natural* production of stercoraceous substances, the better farmers we shall be, and the better farms we shall cultivate.

First premium to Nathan Redlon of China, for his crop of 418 bushels Jackson potatoes grown on two acres. His statement is as follows:

"My crop consisting of 418 bushels of 60 pounds to the bushel, was grown on two acres, being at the rate of 209 bushels to the acre. The soil upon which it grew was sandy loam; light color; depth of plowing eight inches; soil fine and light; subsoil sandy; about eight inches to the subsoil; taken up from pasture, broke up the 3d and 4th of May, 1859; about four cords of barnyard manure

put in the hills. Planted from the 7th to the 10th of May; planted nine bushels of small Jackson potatoes, cut once. June 22d, put on two bushels plaster; hoed June 27th, 28th and 29th; harvested in September."

Second premium to William Grinnell of Exeter, for 417½ bushels on two acres. Mr. Grinnell's statement was as follows:

"My crop consisting of 417½ bushels of 60 pounds to the bushel, was grown on two acres, being at the rate of 208¾ bushels to the acre. The soil upon which it grew was a gravelly loam, part of yellowish color and part of a brownish color; soil deep; subsoil full of small stones. The soil was in poor condition, yielding about five hundred of hay the previous season; not much sward on it; broke up the fore part of May; once harrowed, once cultivated with an ox cultivator; furrowed rows 2½ feet apart, hills 1½ feet apart; planted the 10th of May; eight bushels seed per acre; seed known on the Penobscot as the Orono or Reed potato; plaster was sprinkled on the seed when it was cut, and one bushel per acre put on the tops at hoeing time."

REPORT OF COMMITTEE ON TRIAL OF PLOWS.

The number of plows entered for this trial was very large, numbering about forty, and embracing a fine display of mechanical skill, some of them being implements of great excellence.

The following had been previously adopted and published by the Trustees:

"The following premiums will be awarded on plows, open to competitors out of the State:

For best plow for all work,	.	.	.	.	Medal.
“ sod plow for stiff soils,	.	.	.	.	“
“ sod plow for light soils,	.	.	.	.	“
“ plow for fallows,	.	.	.	.	“
“ reversible plow,	.	.	.	.	“
“ combined sod and subsoil plow,	.	.	.	.	“
“ subsoil plow,	.	.	.	.	“
“ implement for deep and thorough pulverization of the soil, that shall successfully compete with the plow,	.	.	.	.	“

All plows competing for the above premiums, will be required to carry a furrow not less than seven inches deep.

Excellence in plows *for all work* and *for fallows*, will be adjudged to consist: 1st, in easy draft; 2d, thorough pulverization of the soil; 3d, complete inversion and burying of all vegetable matter. Due consideration will be given to the quality of materials, durability and price of the implement, its susceptibility of accurate adjustment to the required work, and the facility with which its use is acquired by the plowman.

For *stiff soils*, excellence of work shall consist in thoroughly disposing of the sod and all vegetable matter, and at the same time leaving the furrow slice light and pulverulent.

For *light soils*, excellence shall consist in the ground being left generally level, and the vegetable matter thoroughly buried.

The reversible, or side-hill plow, will be required to do good work on level land, as well as on side hill.

The Society will make complete preliminary preparations and arrangements, and be provided with an accurate dynamometer for testing the draft; and such other implements, fixtures and appliances, and such teams, as will ensure accurate conclusions by the committee, who will patiently multiply and sufficiently diversify their experiments.”

In order successfully to carry out these regulations, the Trustees made ample efforts to procure the best dynamometers. They succeeded in obtaining the one of Cottam & Hallen's manufacture, of London, which was employed by the committee of the New York State Agricultural Society in their celebrated trial at Albany, in 1850; and also one of Emery's oil-piston dynamometers, similar to the one which was adopted so successfully by the committee of the United States Agricultural Society at the trial of reapers at Syracuse. Both of these were carefully submitted to a previous test by suspending heavy weights upon them. Cottam & Hallen's being carefully repaired and put in order by A. B. Barnard, of Worcester, its owner, was found to indicate draught with considerable accuracy up to 800 pounds; and Emery's, after being subjected to a stress of over 700 pounds, yielded to the pressure at the sides of the cylinder, causing a more rapid escape of the oil, and consequently proved unreliable beyond that pressure.

The dynamometers, although answering the purpose intended in the trials above mentioned, entirely failed when applied to the large

plows of this State. Here, nearly all the heavy plowing is performed by oxen, which are usually of large size and considerable strength, two yokes being commonly used for each plow, and not unfrequently three or four in very heavy breaking up. The large and broad furrows thus turned, compensate in some measure for the slowness of motion. The soil being mostly more or less gravelly, farmers do not favor the practice of lapping furrows (which is effected by narrow and deep slices) but prefer to lay the sod flat, by cutting a width at least twice the depth. When Cottam & Hallen's dynamometer was attached to Kendall & Whitney's "Lion Plow" No. 10, cutting a furrow through a dry and tough sod, seven and a half inches deep and fifteen and a half inches wide, the instrument was found incapable of indicating the amount of draught, which exceeded the highest mark on the graduated scale, and of course it was still less capable of measuring the force required to move larger implements, such, for example, as Kendall & Whitney's "Lion" No. 61, which in the hands of the committee cut a slice 18 inches wide and $9\frac{1}{2}$ inches deep. In both these instances two yokes of oxen were attached to the plow. Emery's dynamometer, which indicated the draught approximately when used on the smaller plows, proved of no value on these larger ones, for the reason already assigned. The committee are however, satisfied that carefully constructed, the cylinder bored with great accuracy, and the thickness such that no pressure ever applied will cause it to spring or yield, Emery's would prove a valuable force measurer for the heaviest plows.

These imperfections, and the impossibility, after great exertions on the part of the Trustees, to find any dynamometer now manufactured that would obviate these difficulties, have compelled the Committee with much regret to forego the use of this important and essential test of the relative value of plows—ease of draught, other things being equal, being a quality of high value. For the farmer who can with a good and easy-running plow, invert ten acres of sod, with the same amount of labor or force that with another plow he could invert eight acres, would in a short time save the entire cost of the implement, to say nothing of other considerations.

By a comparison of the dimensions of the plows tried at Albany in 1850, with those which were subjected to the trial here, a striking

average difference in size will be observed, fully accounting for the greater force of draught indicated for the plows of Maine.

Being thus unable to carry out properly the intentions of the Trustees in this trial, which if it could have been perfected, would have conferred most important benefits upon the whole farming community, by assisting in the selection of the best implements in market, the committee have not felt authorized to make any awards of premiums at present; but have confined themselves to a careful trial, side by side, of the different plows presented for experiment, with a view to the commendation of those which have more particularly made excellent work—but of course without any accurate knowledge of the amount of force required for their draught.

In the trial that was made, it is believed that some of the plows of largest size, cutting sod slices over ten inches deep and twenty inches wide, exerted a force not less than fifteen hundred pounds—requiring a size of dynamometer entirely different from any the committee had met with. All the plows were used with two yokes of oxen or with four horses, except the largest plow, which had three yokes of oxen.

Some of the plows did not exhibit their best work, in consequence of the anxiety of the owners to cut a larger furrow than the implement was capable of doing in the most perfect manner.

The furrow slices, wherever their dimensions are given, were carefully and accurately measured by the committee, and the measurements given are sometimes considerably less than those claimed by the owners or applicants.

With scarcely an exception, all the plows tried, although defective on some points, would be regarded as well made and excellent implements, and a credit to the manufacturers.

Description of Plows.

CHANDLER, BROWN & Co., Foxcroft—*Foxcroft Plow*, Nos. 3½ and 4.

The mold-board of this plow is medium in form, neither convex nor concave, and rather straight; it holds easily and does good work; the larger one cuts a slice in plowing sod about 7½ inches deep and 15 inches wide, sometimes 8 by 16 inches; the smaller nearly the same dimensions. From the straightness of the mold-board, these

plows do not break nor crumble the soil much, and may hence be best adapted to light soils, rather than stiff clays.

J. W. HANSON, Portland—No. 2½, 3½, 4 and 9.

These plows, in common with nearly all the others, are of good material and well made. No. 4 cut a slice in sod ground, when quite dry, 9½ inches deep and 19 inches wide—after the sod was softened by rain, the slice was 9¾ inches by 20. The sod was not always handsomely laid; the mold-board is too concave, and the plow is quite hard to hold, and apparently hard to draw. No. 3½ cuts a slice 9¾ by 20 inches. The earth is more pulverized than by most of the others.

JUSTIN S. DOE, Boston—*Union Plow*.

This plow shows great ingenuity in construction, being intended for both hill-side and level land. It carries two mold-boards, which come alternately into use, as the implement passes and repasses. The point and forward part are reversed as in the common side-hill plow, and by a quick movement of a single second or two, one mold-board is thrown up out of the way, and replaced by the other. This change enables the plow to do better work than could be accomplished by the same mold-board for both sides, and it performed far better than any other side-hill plow on the ground, doing very fair work on level sod, cutting a slice about 6½ by 13 inches, and laying it over well and quite flat. On a side-hill of moderate slope, it cut 7¾ inches deep and 14 inches wide, doing good work. Its arrangement admits of the application of stubble furrow-boards to the same beam and skeleton, as used for sod-boards; also, by the removal of one bolt, and the left hand furrow-board, a subsoil furrow-board can be applied in its place, which makes it a tolerably good subsoil plow. It leaves no centre or dead furrow. It holds very easily. The only objection to this plow is its complexity, and consequent cost—cost of original purchase, and greater cost to keep all parts in repair. Price, including all extras, \$22.50.

KENDALL & WHITNEY, Portland—*Lion Plow*, Nos. 60, 61 and 10.

These plows were distinguished for their rather convex mold-boards. They did not bury the grass perfectly at the corner of the sod—otherwise they performed fair work. No. 61 cut a furrow



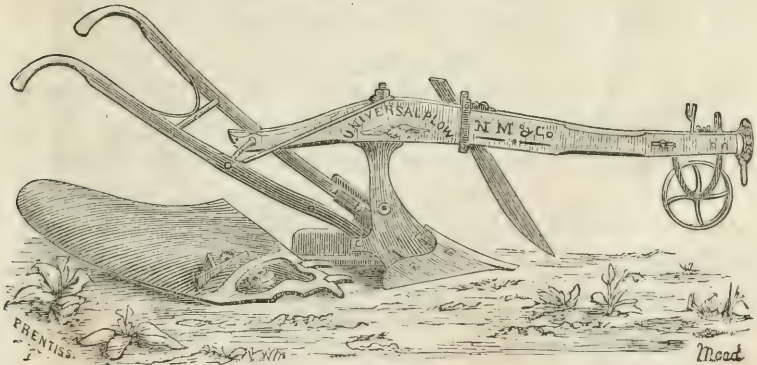
THE HOLBROOK UNIVERSAL PLOW, With its several Mold Boards adapted to its various sizes and styles of plowing.

slice 8 inches deep and $16\frac{1}{2}$ inches wide. The handles were unusually short and upright; if longer and more nearly horizontal, the plow would hold somewhat more easily. No. 10 cut a slice 9 inches by 18, and did good work, but was rather hard to hold.

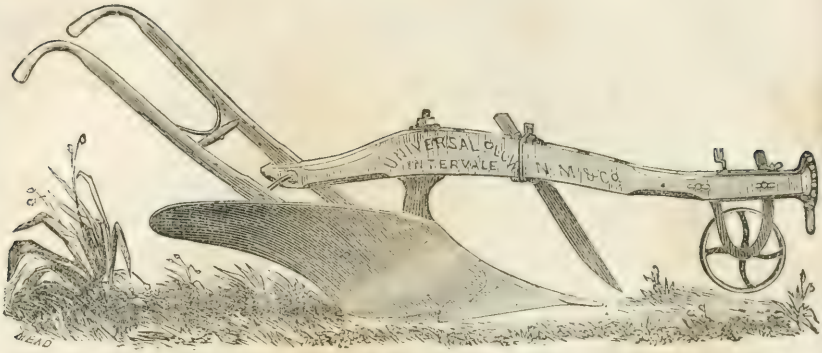
J. MEANS & SON, Augusta, Nos. $2\frac{1}{2}$ and 3—I. VAN KURAN & Co., makers, Boston.

Rather convex mold-boards, with scour equally. No. $2\frac{1}{2}$ differs only from No. 3 in having a wooden beam instead of one of iron. The iron beam is too short, preventing the steady motion of the plow, and tending to throw it by an irregular motion on the point. The wing forming the rear end of the mold-board spreads too wide, pressing against the sod unnecessarily, and hence, by throwing the plow to the left, rendering it hard to hold. With these exceptions, it appears to be a very good plow, and did good work—the form of the mold-board, aside from the spreading wing, being excellent.

HOLBROOK'S *Universal Plow.*



Framework of the Universal Plow, with mold-board detached.



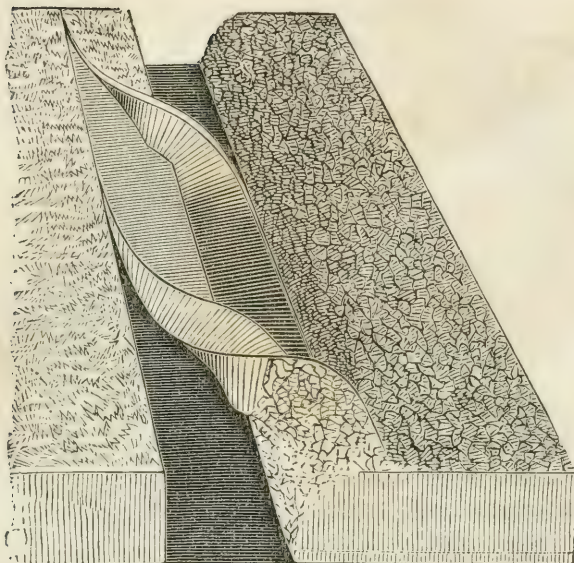
Universal Plow, with interval mold-board for plowing flat furrows in smooth grass lands.

This is furnished with a number of different mold-boards, for different purposes. It was tried only on greensward. It had a concave mold-board, like that of Prouty & Mears', turned the sod handsomely, pulverized the earth, covered the grass well, and laid the furrows flat, but was rather hard to hold, from the side pressure of the mold-board against the turning sod. It was afterwards fitted with a small second mold-board in front, constituting it a Double Michigan or sod and subsoil plow, and did excellent work. As a single sod plow, it cuts a slice 7 inches by 14, and $7\frac{1}{2}$ by 15; as a Double Michigan, it cut a foot wide, and ten inches deep, measuring from the surface of the unplowed sod to the bottom of the furrow.

The price, with the necessary parts to make it a Double Michigan, is \$18.50; besides for this purpose, the cost of a common sward mold-board is \$3.50—stubble mold-board or for "upland sod," \$3—extra cutter, \$1.50—the whole \$26.50.



Holbrook's Universal Plow as a "Michigan" or sod and subsoil plow.



View of the movement of two furrow slices as turned by the "Michigan" or sod and subsoil plow.

KENDALL & WHITNEY'S No. 3, *Side-hill*, and NOURSE, MASON & Co.'s *Side-hill*, No. 83, resembled each other in general construction, and being tried on slightly sloping sod, did poor work.

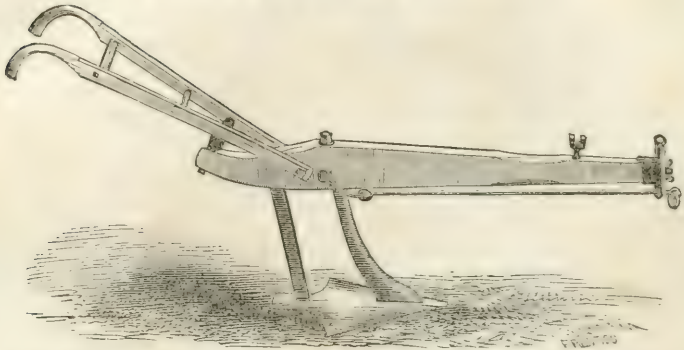
ISAIAH FRY, North Berwick, No. 4.

This, the Foxcroft plows, and those of J. W. Hanson, were quite similar in general appearance and form. It cut a slice $7\frac{1}{2}$ by 15 inches, and did good work—appeared to be well made.

L. WHITMAN, Winthrop, Nos. 21 and 22.

The mold-board is medium, neither convex nor concave, the plows are easy to hold, and did fair work; but the cutting being perpendicular, the grass was not perfectly covered. The point is somewhat faulty—in other respects the plows are very like those of T. Varney & Son, described below.

NOURSE, MASON & Co., Boston, *Subsoil Plow.*

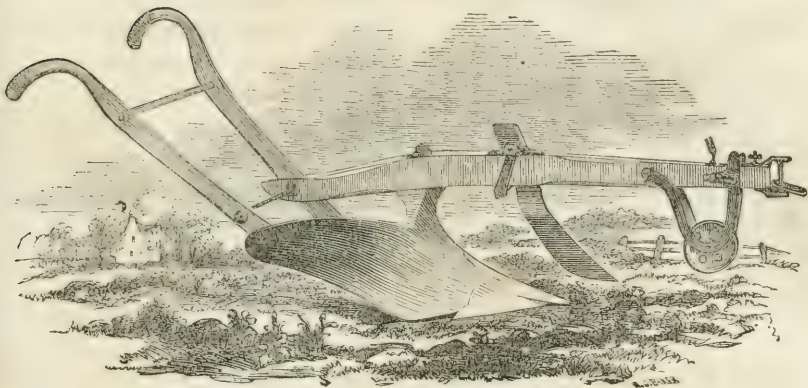


It lacked a wheel under the beam, which would be essential in irregular, adhesive, clayey soil. It was tried in a light soil and performed well, running easily for its depth, cutting down to a depth of 16 inches from the top of the unplowed sod.

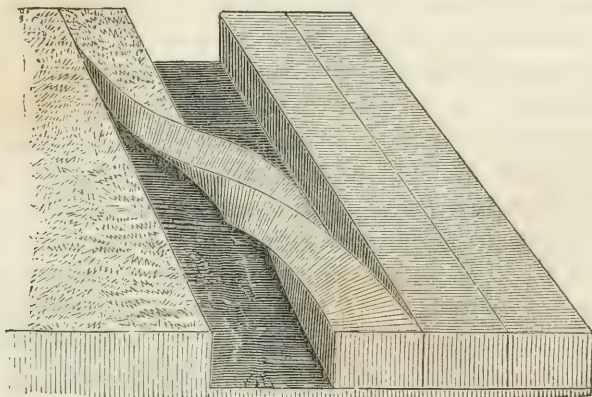
J. B. WIGGIN, Portsmouth, N. H., "*Clipper*," Nos. 7 and 9.

The former cut a furrow slice 8 by 16 inches, doing good work and laying the furrow flat and neatly. It is full under the beam, raising at once the left side of the sod, and turning it over without rising high on the mold-board, and consequently rendering the plow quite easy to hold. The form of the mold-board is rather convex than otherwise. The beam and handles are rather too short. The plow is strong and well made. Number 9 was the largest plow in the field, as will be perceived by examining the table of dimensions, appended to these descriptions. It required three yokes of oxen to move it freely, and cut a sod $10\frac{1}{2}$ inches deep and 21 wide. The mold-board appeared to be rather too short for its breadth, or to form not a sufficiently acute angle to run easily, and the handles were rather short. It was quite easy to hold for its great size, and is a good plow. *Clipper* No. 4, was not tried.

PROUTY & MEARS, Boston, No. 155, *Greensward Plow*.



This plow has many excellent qualities, but the mold-board is rather too concave, and pressing hard against the sod in inverting it, is hard to hold. The plow cuts under the edge of the sod, so as to leave the cut edge of the unplowed land inclining or leaning toward the furrow at an angle of about 15 degrees from the perpendicular. Consequently when this sod is next turned over, it wedges down closely against the previous sod, lies flat and the line of grass is completely covered. The slice cut by this plow was 8 by 16 inches.



View of the movement of the furrow slice.

KENDALL & WHITNEY'S *Double Michigan*, No. 85.

This appeared to be a good implement of this construction—it cut with four horses 9½ inches deep and 13 wide—

the depth of the heaped or made soil was about 16 inches. The perfect manner in which the sod was turned deeply under and covered with a bed of mellow soil from below, was much admired by those among the spectators who were not familiar with the Michigan plow.

T. VARNEY & SON, Windham, Nos. 5 and 6.

These two plows were precisely similar, except in size—the smaller cut a furrow slice 8 by 16 inches, and the larger 8½ by 17 inches. The sod was laid flat, and the work well done. The mold-board is rather simple in form, neither convex nor concave. The plows are stout and well made; they are easy to hold and appear to be very good implements, but do not sufficiently pulverize the sod nor cover the line of grass.

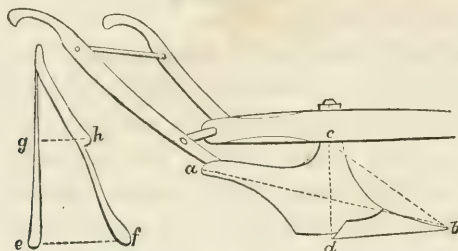
GRUBBER.

Besides the plows presented, there was upon the ground a "*Scotch Grubber*," made to order for John F. Anderson, Esq., of South Windham, by Messrs. Cuming & Rose, of Portland. Mr. Rose, it is understood, served an apprenticeship to implement making in Scotland, and is evidently well versed in the construction of such an instrument. It was not understood to be entered in competition for the premium offered for an "implement for deep and thorough pulverization of the soil, that shall successfully compete with the plow," inasmuch as it was not intended to supersede the plow, but rather as an assistant to it in deep and thorough pulverization of the soil. To those not familiar with the grubber, it may be described as somewhat similar in construction and principle to the cultivators in ordinary use, except that it is wholly of iron, and is supported on three wheels, so arranged with leverage as to allow working its long coulter-like tines or teeth to any depth up to sixteen inches. Its length through the centre was five feet. Width inside the hind wheels four feet. The tines arranged so as to cut (from centre of one to another) eight inches apart. The diameter of the forward

wheel nine inches, and of the two hinder wheels eighteen inches each. Cost, \$35.

The committee very much regret that they had no land at command in proper condition to test its qualities fully, as they have little doubt it would have shown itself a most valuable implement. Mr. Anderson is understood to have used it upon his farm with marked success, and it is known to have been long and highly esteemed in England and Scotland as an economical and efficient aid in deep, clean and thorough cultivation, and it is hoped that it may attract, among our farmers, the attention which its merits deserve.

Measurements.



Measurement of Plows—In inches.

	ab.	cb.	cd.	ef.	gh.	ei.	Hight.	Weight.	Price.
Foxcroft, No. 4,	42½	21½	18	12½	12½	26½	—	143 lbs.	\$12 00
“ No. 3½,	41	21	17½	12	11½	24	—	114 “	11 00
J. W. Hanson, No. 2½,	38	20	16	10	10	22	14	102 “	—
“ No. 3½,	40½	21	18½	12	11½	25	14	112 “	11 00
“ No. 4,	43	23	19	12	12	26	15	139 “	12 00
“ No. 9,	48	24	21	13	13	33	—	160 “	14 00
J. S. Doe’s Union,	45	22	18	12	11	27	16	195 “ max.	20 00
Lion, No. 60,	42	24	17½	11	11½	30	14½	130 “	13 50
“ 61,	43	25	18	11	11½	30	14½	135 “	13 00
“ 10,	48	27	20	14	14	38	16	180 “	15 00
Kendall & Whitney, No. 3, side-hill,	36	22	17½	11½	11	27	15	134 “	—
J. Means & Son, No. 2½,	43	26	18	11	11	30	16	122 “	14 50
“ No. 3,	43	26	20	11	11	30	16½	142 “	15 00
Holbrook’s Universal, (for sod,)	46	25	19½	12	11½	29	17	124 “ 154 max.	—
J. B. Wiggins, Clipper, No. 7,	40	20	18	12	12	32	15½	152 “	13 00
“ No. 9,	49	30	24	14	14	42	19½	200 “	15 00
“ No. 4,	36	22	16	10	10	31	14	108 “	10 00
Isaiah Fry, No. 4,	43	22	19	12	12	27	15	131 “	12 00
L. Whitman, No. 21,	36	22	17	10½	10½	26	14	107 “	10 50
“ No. 22,	45	25	18	11½	11½	31	16	138 “	11 00
Prouty & Mears, No. 155,	42	26	18	11½	11	31	16	119 “	14 00
Nourse, Mason & Co., side-hill, Eagle, No. 83,	41	32	18	11½	9½	27	15½	133 “	13 50
Michigan, (Kendall & Whitney,) No. 85,	38	25	19	9½	10	27	17	161 “	13 00
Small mold-board,	25	—	—	6½	6½	11	—	—	—
T. Varney & Son, No. 5,	43	22	17	11½	11	28	13½	134 “	11 50
“ No. 6,	44	23½	19	12	12	26	15	146 “	12 50
Nourse, Mason & Co., subsoil, cuts 6½ wide,	—	—	—	—	—	—	16½	—	14 00

General Remarks on the Form of Plows.

The form of the mold-board, according to the generally received rule, must be such, that while it tends, like a screw, to invert gradually the sod, as it passes onward, it must be neither convex nor concave, when measured by a straight-edge, placed upon it at right angles to the motion of the sod over its surface. When the straight-edge, while fitting the face of the mold-board, inclines backward at the top, the form assumes the appearance of being *convex*; when it inclines forward, the mold-board appears *concave*. It is better to approach a little towards convexity, as in that case the sod slides more easily over the surface, and the plow is less apt to become clogged with soft and wet earth.

But independently of the quality just described, there are various others belonging to the form of mold-boards. The cutting part of the plow may be improperly almost like the square end of a chisel, and the sod may slide backward on a rise, with very slight turn, until elevated to a considerable height before inversion; this must require more force of the team, and make the plow hard to hold, by nothing to resist the pressure of the sod on the left side. The character of this kind of plow may be quickly perceived by simply examining the mold-board after use; the scratches, instead of passing around horizontally as they should do, are seen to shoot upward across the face and disappear at the top.

Instead of this form, the point should be long and acute, and the form such as to begin to raise the left side of the sod the moment it is cut, and before the right side is yet reached by the cutting edge. This turning motion being continued by the mold-board, the sod is inverted without being lifted from its bed; and the pressure which turns it being opposite to the pressure of the land-side against the unplowed land, an equilibrium of these two pressures is maintained, and the plowman is not compelled to bear constantly to the right to keep the plow in its place.

S. L. GOODALE,
J. J. THOMAS,
J. P. PERLEY,
J. D. LANG,
W. C. HAMMATT.

P. S. The committee wish it distinctly understood, that the failure of this trial was not owing to any deficiency in the preparations made which could have been anticipated as at all probable. Mr. Calvin Chamberlain, the member of the Board of Trustees charged with this department, labored unremittingly for many weeks to secure all desirable facilities, and when the trial commenced, everything was in readiness. Two dynamometers, the best the country could then afford, had been procured, and it was only the larger size of the plows, requiring motive power beyond their capacity to indicate, which prevented the measurement of their draft and the award of the premiums offered.

YORK COUNTY SOCIETY.

The Annual Exhibition was held at Saco, on the 11th, 12th and 13th of October. The weather was fine and the attendance large. The show of cattle larger than for some years previously, and the exhibition at the hall full and attractive.

LIVE STOCK.

Horses. First premium on stallion, to H. B. Knight, Hollis, for a Morgan horse, 4 years old.

Second premium to Elias Milliken, Saco, for one 4 years old, sired by Morgan horse, Paragon.

First premium for matched horses, to M. S. Milliken, Biddeford.

Second premium to Philip Libbey, Dayton, for pair 4 years old twin colts.

First premium for brood mare, with colt by her side, to E. B. Randall, Limington.

Second premium for brood mare, to Lewis Roberts, Saco.

First premium for 3 years old colt, to Frank Milliken.

Second premium to James Andrews, Biddeford.

Working Oxen. First premium to H. Hill, Saco.

Second premium to Thomas Carle, Hollis.

Town Teams. First premium to Saco.

Second premium to Biddeford.

Fat Cattle. First premium to Loren Foss, Saco.

Second premium to J. Q. Dennett, Biddeford.

Cows. Pure bred Ayrshires were exhibited by Thos. M. Hayes and S. L. Goodale, Saco, of much excellence; and Devons, by Wm. Seamman, Saco.

First premium on Native cow, to E. M. Vinton.

Second premium to S. H. Milliken.

Sheep. First premium for flock of sheep, to John Edgcomb.
Second premium to Hiram Hill.

Swine. First premium to H. T. Wentworth, for Newbury white boar.

First premium on sow and pigs, to John Hanscom.

Second premium to Andrew Desmond.

For best fatted swine to Ira C. Dole.

Poultry. First premium on geese to Thomas Underwood.

First premium on hens and chickens, George Milliken.

First premium on ducks, Fred. Beach.

DAIRY PRODUCTS.

Twenty-nine parcels of butter shown, of superior quality. First premium for greatest amount, to Charles H. Milliken, Biddeford.

For best June butter, S. T. Milliken, Buxton.

For best September butter, David Tuxbury, Saco.

First premium on cheese to Daniel Dennett, Buxton.

FRUITS.

E. B. Randall of Limington, who presented specimens of thirty-three varieties, the first premium for the best grown and greatest variety of apples.

Charles Brooks of Alfred, the second premium.

Best grown and greatest variety of pears, the first premium to Mr. Clark of Biddeford.

Charles E. Storer, Saco, the second premium.

Best dish of pears to Daniel Smith, Jr., Saco, the first premium.

For the dish of pears next in quality, to George A. Deering, Saco, the second premium.

Best dish of apples to Rufus McIntire, Parsonsfield, the first premium.

Best bushel of autumn apples to J. M. Hopkinson, Limington, first premium.

Best bushel winter apples to E. B. Randall, Limington, the first premium.

Best Native grapes, raised in the open air, Henry J. Rice, Saco, first premium.

For next in excellence, to Charles Twombly, Saco, the second premium.

Best Foreign grapes, Stephen L. Goodale, Saco, first premium.

For next in excellence, to S. W. Luques, Biddeford, the second premium.

The committee state that in regard to apples, they had no difficulty in making the awards, although all presented were excellent, yet they were so few that a decision was easily made. They are glad, however, to say that in regard to pears and grapes, the case was different. So many excellent varieties were offered, so nearly equal in all respects, that the task was difficult. They hope to have done "substantial justice." They would also take this occasion to speak with high commendation of a specimen of the "Delaware" grapes presented by Mr. Goodale, which seem destined to take a high rank, and to be particularly worthy the attention of growers.

They would also urge upon the attention of all who own land, however small a portion, the desirableness of cultivating fruit. With a soil unequalled for the production of fruit, our State is far from supplying its own demand. It might be far different. The same care and study which gives success in other pursuits, will ensure it in raising fruit. And those who embark in it with energy, will be sure, by and bye, to find their reward.

GRAINS, ROOTS, ETC.

The specimens shown were numerous and fine. The committee say:

"The number and variety of articles entered for premiums in this department this season, far surpassed the expectations of the most sanguine, almost every article being above mediocrity, and superior to anything your committee had anticipated. The season was supposed to be inauspicious for most things that come under our jurisdiction, and hence it was presumed that the show would be meagre

when compared with that of other years; but in this we have been happily disappointed. Indeed, it was remarked by many that this department had never been so well represented as on this occasion. Had we been commissioned to collect together a quantity of vegetables of equal excellence, on such a season as this, we should not have sought for them until we had traversed many degrees of latitude, south of $43\frac{1}{2}$. If farmers can raise such mammoth beets, carrots, &c., in such a summer as this, what might they not do when the season favored their efforts?

It may be well to remark to competitors that this committee is entrusted with no discretionary power, and we deem it our duty to confine ourselves strictly to the rules of the society; so that many articles for which we would gladly award premiums can only receive a passing notice."

Competition for crops was not large. Among the statements we find that E. B. Randall of Limington, raised 49 bushels oats on 150 square rods; $31\frac{1}{2}$ bushels barley on 135 square rods.

M. S. Milliken's statement on a premium corn crop, is as follows:

"In the spring of 1858, I plowed a lot of land 35 rods long and 7 wide, making 1 acre and 85 rods of new land and planted to potatoes, with a very little manure. Then in the spring of 1859 cross plowed and harrowed the same, then carted on 8 cords manure and spread broadcast, then plowed and harrowed again, then furrowed about $3\frac{1}{2}$ feet apart, then carted $7\frac{1}{2}$ cords more manure on and manured in the hill. The manure was one part horse, one muck, two sawdust from the beach. I planted it to corn and beans, then hoed twice. This fall I harvested 8 bushels and 6 quarts beans, and 161 bushels of sound corn and 8 bushels green corn.

DR.	<i>Crop of Corn, &c.</i>	CR.	
To 3 days plowing and harrowing, 3 horses and 3 men 1 day carting manure,	\$9 00	Sold corn fodder in the field for 8 bushels and 6 quarts of beans, \$1.50 per bushel,	\$10 00 12 30
Weeding and hoeing corn,	9 50	75 bushels corn, \$1.12 per bushel,	84 00
Harvesting corn, 2 men, 1 horse, 1 day,	3 00	2 cartloads pumpkins,	4 00
Husking corn,	3 00		
Harvesting beans,	2 50		\$110 30
Worth of manure \$2.50 per cord,	38 75		71 75
	\$71 75	Net gain,	\$38 55

CUMBERLAND COUNTY SOCIETY.

The twenty-ninth Annual Exhibition of the Cumberland County Agricultural and Horticultural Society was held in Gorham, on Wednesday, Thursday and Friday, the 19th, 20th and 21st of Oct., 1859.

The Secretary says: The show of cattle, horses, sheep and swine, was on Wednesday, and was the largest in extent and in variety of the different kinds ever got up in the county, embracing many pure blooded animals of the Devon, Durham, Hereford and Jersey breeds; the number of heads of neat stock, was 412, entered by one hundred and twelve competitors. Of horses, there were 84 entered for premium. The sheep and swine were more numerous than on former occasions. The show, both as to numbers and quality, showed a marked improvement over last year.

The exhibition of manufactured articles, farm produce, &c., was in the town hall; it was opened to the public, Wednesday afternoon and continued open until Friday evening. The large hall was well filled. The show of fruit was quite large—that of grapes, was the best ever shown at our annual fair. The whole number of entries was 401—a larger number than before.

The Annual Address was delivered by JOHN NEAL, Esq., of Portland, Wednesday evening, to a very large audience.

Some of the premiums were as follows:

LIVE STOCK.

Stallions. Nicholas Rideout, New Gloucester, for "Young Paragon," weight 1250 pounds, 5 years old, first premium.

William Lawrence, for "Boston Morgan," second premium.

Several young horses were very fine in appearance. One was presented by G. and L. P. Warren; and one by William Lawrence, the "Fire Fly Morgan;" and another, by E. Moses, the "Gray

Paragon"—a fine made up colt, but deficient in size. None of the stock, however, of these young horses were presented.

Mares and Colts. E. Huston, Gray, for best breeding mare.

James Phinney, Gorham, for second best breeding mare.

Stephen Hinkley, Gorham, for best 4 years old colt.

G. and L. P. Warren, Westbrook, for second best four years old colt.

J. Sanborn, Standish, for best 3 years old colt.

Bulls. R. C. Webster, Portland, best Durham, 3 years old.

Charles Hunnewell, Windham, second best do.

Joseph Creasey, Gorham, best bull calf.

J. F. Anderson, Windham, best Devon, 3 years old; also 2 years old, and calf.

Cows. J. Sturdivant, Cumberland, for best Durham cow.

Robert Barbour, Gorham, second best.

J. F. Anderson, Windham, for best Devon cow; also, for second

G. W. Hammond, for a nice Alderney cow.

Sheep and Swine. Otis Varney, Windham, for best Native buck.

B. R. Sturgis, Gorham, for best buck of improved blood, Leicester.

Lendall B. Lowell, Gorham, for second best, do. do., Southdown.

James Phinney, Jr., Gorham, for best ewes not less than five in number.

J. F. Anderson, Windham, second best, do. do. do.

F. O. Henley, Saccarappa, for best boar, Suffolk.

A. McLellan, Gorham, for best fat hog, and the second premium on boars.

Reform School, for best breeding sow, a superior grade Suffolk and Berkshire, having a litter of ten pigs by her side, and in the same cart a sow from one of her previous litters which had eight pigs, all remarkably good.

Charles Hunnewell, Windham, for second best breeding sow.

John Reed, Westbrook, for most satisfactory statement in feeding swine.

Dominicus Frost, Gorham, second, do.

Having thus awarded the premiums, your committee feel it to be incumbent upon them to admonish exhibitors against the prevailing practice of claiming for their animals an infusion of blood which, if in them, does not appear to an observer. We would, for example, instance a fine flock of sheep entered, at this show, as grade South Downs, which throughout presented perfectly white legs, white and smooth faces, and the buck having horns: whereas it is well established, that South Downs are entirely destitute of horns; that their faces and legs are of a dusky gray, sometimes very dark; that their bodies are closely covered with quite short and curly wool, which comes well forward in a tuft upon the head; and besides these differences, their bodies are broad, symmetrical, and have remarkably *full development of the hind quarters.*

Again. In the swine department, there were three entries this year, of grade Berkshire; one being from the Reform School, about the blood of which, there could be no question, as they evidenced the truth of the statement made in regard to them; but the other two exhibited no such evidence, being entirely white in color; while the Berkshire varies from reddish brown to almost black, sometimes brown, black; and white, spotted, and sometimes black broken with white, but never pure white.

Your committee do not deny that there may have been some South Down blood in the sheep referred to above, and Berkshire in the swine. But it was not apparent, and they consider it their duty to suggest, that exhibitors at all future shows, shall only name such animals "grades" as show in themselves signs of relationship to the blood claimed. Prompted by the desire of correcting an abuse of terms productive of unnecessary confusion with regard to two classes of animals which are second to none in value and importance, these remarks are offered in a spirit of kindness. It is hoped they will not be deemed impertinent.

In conclusion. We desire to repeat advice often given unheeded, "that farmers keep fewer dogs and more sheep and hogs," and propose a question for the earnest thought of those who regard the general good. Would it not be better for the State, if every farmer was allowed a certain number of sheep exempt from taxation,—rather than, as now, the sheep-killing dogs? which infest the country, and in all the State devour and destroy, annually, more than

\$100,000 worth of property, and within our households deal out fleas continually, and hydrophobia occasionally. In all seriousness we ask our brother farmers, ought not the man who keeps a dog, to pay a tax upon him, rather than upon a sheep, or twenty of them? Would not such a change in the assessment of taxes be the means of increasing greatly the number of sheep, and result in a great increase to the wealth of our State?

GRAIN AND VEGETABLES.

The Committee on Grain and Vegetables submit the following report:

Indian Corn. Although the present season has not been favorable to the growth of corn, June having been wet and cold, retarding its early growth and making it late upon wet land; a pretty sharp drought having occurred in the latter days of July and up to the 25th of August, very nearly ruining that growing upon sandy, dry soil; and a severe frost having put a termination to the corn season in most localities on the 15th of September; yet some favored places, aided by skillful cultivation, have produced crops of which the cultivators themselves, our county and State, need not feel ashamed. The quality of the samples on exhibition were all good, and some of them were excellent, full and well ripened. They were mostly of the eight-rowed varieties; and we would here remark, that, in a climate like our own, where the seasons are so short, it is very desirable to select for cultivation early ripening varieties, having small cobs which will have lost their succulency by the time the kernel has acquired that hardness which fits it for the crib; as there is danger of loss by mold if the cob is not well dried before cribbing.

There were seven entries made, only four of which were accompanied with the necessary statements of cost, method of cultivation, &c., as *required by Statute*; and one of these, viz: that of Mr. Shaw of Standish, though very full and satisfactory, lacked the *certificate of oath*, which is *required by the rules* of the Society.

The competition, therefore, was between Amos Boulter of Standish, to whom we award the first premium; Coleman Harding of

Gorham, to whom we award the second premium; and Ithiel Blake of Gorham, to whom we award the third premium.

We recommend the publication, as a part of this report, of the statements, and the account current with the several crops, of the successful competitors, and also those of Leonard Shaw of Standish; all of these documents being worthy a careful examination by the farmers. It will be perceived that the value placed upon the corn fodder, and upon the manure left in the soil for future crops is estimated very differently; the latter varying from twenty-five to eighty-two per cent. of the value at first applied. We do not presume to decide who is nearest right, but call attention to the differences of opinion, hoping that farmers may be induced to make some carefully conducted experiments tending to settle these uncertain points.

Amos Boulter's Statement.

My crop consisted of $44\frac{3}{4}$ bushels of 56 pounds to the bushel, and was grown upon one half of an acre, being at the rate of $89\frac{1}{2}$ bushels to the acre. The soil on which it was grown, was interval or sandy loam, free from stones and clay, of light color and very fine. The subsoil is also sandy,—the distance to subsoil is about one foot,—planted last year to corn; broke up the year previous. I put on the land last year about two cords of manure in the hill.

The present year I have spread upon the ground two cords of manure and plowed it in, after which I applied two cords in the hill. Corn planted on the 21st of May; distance between rows, four feet, and between hills three feet; used about four quarts of seed, which was used without any previous preparation. The corn was cut up and shocked September 15th, and harvested October 15th.

DR.	<i>Crop of Indian Corn.</i>		CR.
Plowing $1\frac{1}{2}$ days,	\$1 16	| $44\frac{3}{4}$ bushels at \$1.16 per bushel,	\$51 91
2 cords barnyard manure,	5 00	| 2 tons fodder,	4 00
2 cords other old manure,	5 00	| Manure left in soil for future	
Carting and applying same,	2 00	| crops—estimated,	2 50
Harrowing,	75		
Furrowing and planting,	1 00		
Cultivating twice,	50		
Hoeing twice, three days,	3 00		
Cutting stalks, harvesting, housing			
and stacking,	3 00		
Husking,	4 00		
4 quarts of seed,	13		
Manure left in soil from former			
crop,	—		\$58 41
Interest on land,	1 50	| Deduct cost,	27 24
Total,	\$27 24	| Profit,	\$31 17

Colman Harding's Statement.

My crop, consisting of $63\frac{3}{4}$ bushels of 60 pounds to the bushel, was grown on 129 rods of land, being at the rate of 79 3-43 bushels to the acre. The soil on which it grew, was high land, loamy, dry, dark soil, fine and easily worked; ledge at a short distance from surface; land broken up in 1858, and lightly manured and planted with corn—crop light. Last spring, spread a light dressing of new barnyard manure and plowed it in—well harrowed. Planted about $2\frac{1}{2}$ by 3 feet apart. Planted about 20th of May with eight-rowed corn, without soaking and used no top dressing. Hoed once. Harvested about 10th October.

DR.	<i>Crop of Corn.</i>	CR.	
Plowing once— $\frac{1}{4}$ day, . . .	\$2 25	63 $\frac{3}{4}$ bushels, at \$1.10, . . .	\$70 13
3 $\frac{1}{2}$ cords barnyard manure, . . .	10 50	2 tons fodder, . . .	10 00
3 $\frac{1}{2}$ cords other manure, . . .	14 00	Manure left in soil for future crops, . . .	
Carting and applying same, . . .	6 00	estimated at . . .	20 00
Harrowing, . . .	50		
Furrowing and planting, . . .	3 50		100 13
Cultivating, . . .	50	Deduct cost, . . .	54 75
Hoeing once—2 days, . . .	3 00		
Cutting and harvesting, . . .	1 50	Profit, . . .	\$45 38
Husking, threshing and cleaning, . . .	5 00	<i>Raised on same land among the corn.</i>	
6 quarts seed, . . .	60	2 cartloads of pumpkins, . . .	10 00
Manure left in soil from former crop, . . .	5 00	500 pounds of squash, . . .	5 00
Interest on land, . . .	2 40	$\frac{1}{2}$ bushels of beans, . . .	1 50
	<hr/>		<hr/>
	\$54 75		\$16 50

Making the profit on the 129 rods, of produce, \$61.88.

Ithiel Blake's Statement.

My crop, consisting of 63 bushels of sound corn of 56 pounds to the bushel, was grow on 139 square rods, being at the rate of $72\frac{1}{2}$ bushels to the acre. The soil upon which it grew was dark clayey loam, free from stone—about twelve inches deep to the subsoil—which is clay of a light color, dry and hard. The soil is fine and mellow. Land broken up in May, 1858, and a crop of about one hundred and seventy-five bushels of potatoes raised from it, without any manure or dressing, excepting about three bushels plaster applied in the hill. About the first of last May I hauled on about four cords of stable manure, spread it on, and plowed about eleven inches deep. Planted corn (common eight to twelve rowed variety) putting about one cord of old stable manure, finely rotted, in the hill. I also put 100 pounds of superphosphate of lime in the hills, mixing it well with the manure, and covering it with earth about one inch before dropping the seed. The hills were about even with the surface of the ground when planted—used about four quarts of seed, four kernels in a hill, without any previous preparation; hoed twice without any hilling up. Cut stalks Sept. 10. Harvested corn about Oct. 10.

DR.	<i>Crop of Corn.</i>		CR.
Plowing 1 day,	\$2 00	63 bushels at \$1,	\$63 00
5 cords barnyard manure, at \$4,	20 00	2½ bushels at 50c.,	1 25
100 lbs. superphosphate of lime,	3 12	Fodder,	16 00
Carting and applying same,	3 00	Manure left in soil for future crops,	
Harrowing,	1 00	estimated,	15 00
Planting,	2 00		
Cultivating twice,	75		95 25
Hoeing twice,	2 00	Deduct cost,	39 24
Cutting stalks, and harvesting,	1 50		
Housing, stacking, and husking,	1 75		
4 quarts seed,	12		
Manure left in soil from former crop,	-		
Interest on land,	2 00		
	<hr/>		<hr/>
	\$39 24	Profit,	\$56 01

Leonard Shaw's Statement.

My crop of corn, consisting of 37½ bushels of 60 pounds to the bushel, was grown on one half of an acre, being at the rate of 75 bushels to the acre. The soil on which it grew, was a moist gravelly loam, considerably stony, of a redish color, fine and mellow, plowed to about nine inches deep. The subsoil is rather a coarse gravel and from fifteen to eighteen inches from the surface.

Two-thirds of the land was broken up in the fall of 1857,—planted to potatoes without manure in 1858; the other third was broken up in the fall of 1858.

In May last I put on three cords of green barnyard manure and plowed it in; furrowed the rows three and one half feet apart, putting the hills the same distance. I put 1½ cords of compost manure in the hills—composed of muck and old yard manure; also, one bushel of plaster and the same amount of ashes put in the hills at the time of planting. Planted the 16th of May with a kind of corn that has been usually planted on this farm for fifty years; has no particular name; the ears are from eight to sixteen rows each. The seed had not been soaked. I cut the top stalks about the middle of September. Hauled in the corn and husked it the first of October.

DR.	<i>Crop of Corn.</i>		CR.
Plowing once—2 days,	\$2 00	37½ bushels at \$1.15,	\$43 12
3 cords barnyard manure,	9 00	2 bushels unsound,	1 00
1½ cords other manure,	3 00	Fodder,	2 00
Carting and applying the same,	2 00	Manure left in soil for future crop,	
Harrowing,	50	estimated at	5 00
Furrowing and planting,	75		
Cultivating twice,	75		51 12
Hoeing twice—2 days,	2 00	Deduct cost,	26 17
Dressing and applying the same;			
plaster and ashes,	50		
Cutting and harvesting,	1 50		
Husking,	3 00		
4 quarts of seed,	17		
Interest on land,	1 00		
	<hr/>		<hr/>
Total,	\$26 17	Profit,	\$24 95

Winter Wheat. One entry only was made for the premiums on winter wheat. This was by Hubbard Wilson of Gorham, who has given evidence of having grown a very good crop, and his statements below tells how it was done. He had, however, forgotten to make *oath* to his statements. We cannot, therefore, award a *premium*, but recommend a *gratuity*.

Mr. Wilson's estimate of the value of manure left in the soil for future crops is *rather large*; more than one hundred per cent. of the value first applied. The sample exhibited was excellent—clean, full and white.

We are glad to see this evidence that winter wheat can be grown in our county, and hope other farmers will be encouraged by Mr. W.'s success to give it a trial.

Hubbard Wilson's Statement.

My crop of wheat, consisting of 24 bushels, of 64 pounds to the bushel, was grown upon one acre and 20 rods, being at the rate of $21\frac{1}{2}$ bushels to the acre. The soil upon which it grew was clay loam, upon a slight ridge falling to the south. The soil previous to plowing was green sward—cutting one ton of hay to the acre. Used about $2\frac{1}{2}$ cords of manure—spread previous to sowing. Six bushels unleached ashes and four bushels plaster were sown first of May. Sowed $1\frac{1}{4}$ bushels of white wheat soaked in strong brine, and mixed with six quarts lime, September 15, 1858.

DR.	<i>Crop of Winter Wheat.</i>		CR.
Plowing 1 day, team and hands,	\$4 00	24 bushels at \$2.00,	\$48 00
$2\frac{1}{2}$ cords barn manure,	12 50	Tons straw,	3 00
10 bushels ashes and plaster,	2 00	Manure left in soil for future crops,	15 33
Carting and applying same,	2 00	estimated,	15 33
Harrowing and rolling,	2 50		
Haryesting,	3 00		\$66 33
Threshing and cleaning,	4 00	Deduct cost,	35 50
$1\frac{1}{4}$ bushels seed,	2 50		
Interest of land,	3 00		
	<hr/>	Profit,	<hr/>
	\$35 50		\$30 83

Summer Wheat. We award the Society's first premium on summer wheat, to William Marean of Standish, he being the only applicant. Mr. Marean's statements, herewith submitted, are good; but the farmers of the county would have been pleased to know the date of sowing, as it is very evident that neither midge or rust injured the crop essentially, and is said that both may be avoided by sowing at the *right time*; query, when is that time?

The berry of the sample exhibited was good; but it was considerably mixed with oats and barley.

William Marean's Statement.

My crop of wheat, consisting of 22 $\frac{1}{4}$ bushels, was grown on one acre. The soil on which it grew, was dry, yellowish loam, about a foot deep to the subsoil, which is dry, yellow and hard; soil, mellow and stony. It was broken up in 1858, after about ten cartloads of old manure had been spread on and harrowed in, planted to corn; had a good crop. Last spring it was spread with ten loads of old barnyard manure, plowed and harrowed. Sowed common summer wheat—used dry seed. Crop harvested about August 15th, and threshed about one month later.

DR.	<i>Crop of Wheat.</i>	CR.	
Plowing once, $\frac{2}{3}$ day,	\$2 00	22 $\frac{1}{4}$ bushels, at \$2.00,	\$44 50
2 $\frac{1}{4}$ cords barn yard manure,	10 00	2 $\frac{1}{2}$ tons straw,	12 50
Carting and applying same,	1 50	Manure left in the soil for future	
Harrowing,	1 50	crops, estimated at	8 00
Sowing,	25		
Harvesting and housing,	1 00		\$65 00
Threshing and cleaning,	4 00	Deduct cost,	28 25
1 bushel of seed,	2 00		
Manure left in soil from former crop,	4 00		
Interest on land,	2 00		
	\$28 25	Profit,	\$36 75

Barley. Two lots of barley were exhibited; one by Charles Thompson of Standish, the other by Ebenezer Hawkes of Windham. The berry of the former—six rowed variety—was good; the latter—two rowed variety—was *very good*.

Mr. Thompson's statements, as appears below, are explicit, and we award to him the first premium.

Mr. Hawkes has failed to give us the cost of his crop, and we cannot, therefore, well judge of the profit of his experiment, but recommend a gratuity.

Charles Thompson's Statement.

My crop of barley, consisting of 34 bushels of 45 pounds to the bushel, was grown on 97 square rods, being at the rate of 56 $\frac{1}{2}$ bushels to the acre. The soil upon which it grew was a dark mellow loam, about ten inches deep over the subsoil and not very stony—many of the stones having been removed from the soil. The subsoil is yellow, fine and generally dry.

The land was broken up in the fall of 1856, planted with corn and potatoes in 1857, and in 1858 with a crop of corn. About two

cords of manure was plowed in 1857, and the same quantity put in the hill in 1858. About a quarter of the land was manured the present season with half a cord of new stable manure spread and plowed in; the rest not at all, but plowed. The barley was sown about the first of June, without any preparation, harrowed in and a drag drawn over it—upon which the stones were also drawn off at the same time. The quantity of seed sown was five pecks. The crop was mowed the 12th of August—got in within the week following, and thrashed a few days after by machine. The kind of seed was the six rowed barley.

DR.	<i>Crop of Barley.</i>		CR.
Plowing half day,	\$1 00	34 bushels,	\$27 20
Half cord barnyard manure,	2 00	1 ton of straw,	5 00
Carting and applying same,	1 00	Manure left in soil for future crop,	
Harrowing, dray work and sowing,	1 00	estimated at	5 00
Harvesting, thrashing and cleaning,	5 00		
1½ bushels seed,	1 00		\$37 20
Manure left in soil from former crops,	8 00	Deduct cost,	21 00
Interest on land,	2 00		
	\$21 00	Profit,	\$16 20

The subscriber hereby applies for premium offered by the Society for a crop of two rowed barley grown on one acre of light, loamy soil, on which corn was raised the year before. Manured 25 loads from barn cellar, plowed in three or four inches deep. Sowed broadcast two bushels per acre. Yield, 38 bushels, weighing 56 pounds per bushel.

EBENEZER HAWKES.

Oats. William Marean and Benjamin Meserve, both of Standish, were the only competitors for the premium offered on experiments in growing oats. Of the samples presented for examination, the committee judged those by Mr. Marean a trifle best, though both were good. We award the first premium to Benjamin Meserve; the second to William Marean, and refer to their statements herewith submitted, for the details of their experiments.

Benjamin Meserve's Statement.

My crop of oats, consisting of 56 bushels, of 31 pounds to the bushel, was grown on 141 square rods, being at the rate of 62½ bushels to the acre. The soil on which it grew, was a yellowish loam, somewhat stony, although most of the stones have been removed; its depth to the subsoil, about ten inches, and its condition fine and friable. The subsoil is hard, yellow and dry. The ground was broken up in May, 1858, about eight cords of winter barnyard manure having been spread on it before plowing. It was planted

with corn, and produced about 50 or 60 bushels, about ten loads of old barnyard manure having been put into the hills. This year plowed and harrowed it in May; sowed $1\frac{1}{2}$ bushels of oats and rolled it, and produced the above crop. No manure of any kind was applied last spring. Common oats were used for seed without any previous preparation. They were mowed about the 10th of August, raked and bunched at night, and got in on the afternoon of the next day, and were threshed by machine.

DR.	<i>Crop of Oats.</i>		CR.
Plowing once, 1 day, . . .	\$2 00	50 bushels,	\$28 00
Harrowing and rolling, . . .	1 00	$1\frac{1}{2}$ tons straw,	7 50
Sowing,	12	Manure left in soil for future crops,	
Harvesting,	1 25	estimated at	16 00
Threshing and cleaning, . . .	3 75		
$1\frac{1}{2}$ bushels seed,	75.		\$51 50
Manure left in soil from former crop, 24 00		Deduct cost,	35 77
Interest on land,	3 00		
	<u>\$35 87</u>	Profit,	<u>\$15 63</u>

William Marean's Statement.

My crop of oats, consisting of 50 bushels of 33 pounds to the bushel, was grown on one acre of land. The soil on which it grew, was deep yellow loam, about twelve inches deep to subsoil, which is yellow, dry and hard, and rocky, as well as the soil which is friable.

In the spring of 1858, I spread on eight loads of old barnyard manure, and broke it up, and had a good crop of corn. In 1859, used eight loads of manure—spread on. Sowed in May, about three bushels of common oats. Harvested middle of August.

DR.	<i>Crop of Oats.</i>		CR.
Plowing once, 1 day,	\$3 00	50 bushels,	\$25 00
$2\frac{1}{2}$ cords barnyard manure, . . .	10 00	3 tons straw,	15 00
Carting and applying same, . . .	1 50	Manure left in soil for future crops,	
Harrowing,	1 00	estimated at	8 00
Sowing,	25		
Harvesting and housing,	2 00		\$48 00
Husking, threshing and cleaning, . . .	4 00	Deduct cost,	28 75
3 bushels seed,	1 50		
Manure left in soil from former crop, 4 00			
Interest on land,	1 50		
	<u>\$28 75</u>	Profit,	<u>\$19 25</u>

Peas. Peas were presented by Samuel Swett, J. A. Waterman, S. L. Stephenson and E. T. Smith, all of Gorham. No statements of methods, or cost of cultivation, or profits of crop were presented by either of the competitors, except a partial one by Mr. Smith, as appears below. And this failing in several particulars to comply with the rules of the Society, to wit: breadth of land, items of cost, and certificate of oath, we cannot award the premium, but recom-

mend a gratuity. Mr. Smith's experiment shows that, with liberal manuring, peas may be grown upon the same spot of ground for a series of years, and still produce good crops. We regret that Mr. S. did not give the items of cost, and account of sales from his fifteen rods of land, as his profits must have been large.

E. T. Smith's Statement.

My crop of Prince Albert peas, consisting of $25\frac{1}{2}$ bushels green and $1\frac{3}{4}$ of dry, was grown on 5 square rods of land, being at the rate 272 bushels of green, and $18\frac{1}{2}$ bushels of dry peas to the acre.

The soil upon which they grew was sandy loam, in good condition. Peas had been sown on the same ground for eight years. One cord of manure was applied the present season; 8 quarts of seed planted in drills, April 7. Commenced picking July 3.

Potatoes. On taking a survey of the potatoes on exhibition, the committee were forcibly reminded of scenes in former days. Boxes, baskets, and bags, filled with large beautiful potatoes, similar in size and quantity to what used to be seen at our shows years ago; but, differing in names, or varieties. Instead of the old Yellow, Red, Kidney, Chenango, &c. &c. &c., there now appears the California, the Strawberry, the White and Yellow Pink-eyes, Davis' Seedling, Jackson, Carter, White Mountain, and a large number of seedlings yet waiting for names. There were twelve exhibitors, yet but three made an effort, other than an entry upon the book of the Secretary, to obtain the premium; and of these three, Amos Boulter of Standish, alone, has fulfilled all the requirements requisite to obtaining the premium. This neglect, on the part of exhibitors, may be accounted for in part, perhaps, as follows:—Probably not one farmer in fifty in the county, keeps a journal of his farm labor; or can tell, after harvest, with any degree of accuracy, what has been the cost of any one of his crops; unless perchance, he has planted or sown with a view to obtaining a premium. And no one, in these days of potato degeneracy, would think of planting for a premium crop of potatoes; consequently, no one with a single exception, has kept a true account with his potato crop; and, of course, no one could render such an account to the Society. In this connection, the Committee cannot but urge upon farmers the importance of keeping a debt and credit account with *all* their crops. It is

probable that some of our farm products, which are now highly esteemed, and generally cultivated, would be found utterly profitless; while others, less prized, would, after deducting cost, be found to give a fair per cent. of profit. But who can tell what crop is profitable, and what is not, unless the figures are kept? And why should farmers alone, of all the business men in the community, thus blunder on in this hap-hazard way, utterly ignorant of their gains or losses?

The exhibitors were as follows:—Amos Boulter, Daniel Chase, Paul Knight and E. Blake of Standish; C. H. Cressey, Moses Fogg, W. P. Hersey, M. W. Moshier, O. L. Hamlin and C. H. F. Smith of Gorham; G. W. Hammond, Cumberland Mills; and G. W. Waters. To A. Boulter we award the premium. Two lots of seedlings were shown, consisting of many new varieties; one by E. H. F. Smith, a lad of fourteen years of age; to him we recommend a gratuity; and hope he will continue, as in times past, to aid in making the show of the Cumberland County Agricultural and Horticultural Society interesting. To the other exhibitors, we express the thanks of the Society for the very full representation made in this department.

Amos Boulter's Statement.

My crop of potatoes, consisting of 108 bushels, was grown on one-half acre, being at the rate of 216 bushels to the acre. The soil upon which they grew was dark heavy moist loam, about one foot deep to subsoil, which is about the same, but harder.

It was broken up last May; harrowed once, and planted the last of the month with Yellow and Pink Eyes, without any manure; used about one spoonful of plaster to a hill; hoed once, and dug first of October. No manure used on the land for seven years.

DR.	<i>Crop of Potatoes.</i>		CR.
Plowing half day, . . .	\$1 00	108 bushels at 40 cents, . . .	\$43 20
Harrowing, . . .	33	Manure left in soil for future crops, estimated . . .	—
Planting, . . .	2 00		
Hoing 1½ days, . . .	1 50		
3 bushels plaster, . . .	75		\$43 20
Harvesting, . . .	5 00	Deduct cost, . . .	14 75
8 bushels seed, . . .	2 67		
Interest on land, . . .	1 50		
	\$14 75	Profit, . . .	\$28 45

Carrots. There were six lots of carrots presented, all excellent, and pleasing to the eye of the farmer, as a certain other yellow

product of the earth, sometimes found in strong boxes, is to the eye of the banker or miser. It is not to be supposed that the farmers all get a glimpse of the latter article. The statements accompanying these entries are all deficient; we cannot, therefore, award the premium, but recommend a gratuity to each of the following parties:—To Benj. Libby, residence Gorham, whose crop, as per certificate, was at the rate of 1,425 bushels per acre; to Geo. Chadbourne of Gorham, 869½ bushels per acre; to Wm. F. Fessenden of Bridgton, 930 bushels per acre, and to the Oriental Powder Company of South Windham, 605 bushels per acre.

It is believed that carrots are a most valuable winter food for all kinds of stock, particularly for milch cows, and the statements below show that they can be easily and cheaply grown. Mr. Fessenden's carrots cost less than seven cents per bushel, and Mr. Chadbourne's less than eight. The net profit on Mr. Chadbourne's 46 rods, as estimated by him, is \$45.00; equal to \$156.52 per acre.

Mr. Chadbourne's Statement.

My crop consisting of 250 bushels, of — to the bushel, was grown on 46 square rods, being at the rate of 869½ bushels to the acre. The soil upon which it grew was sandy loam; earth brown; subsoil light sand, about one foot below the surface. Ground has been used for a garden several years; lightly manured with barnyard manure, and plowed in; top dressing lightly of bone dust. Planted last of April, and harvested October 19, 1859.

DR.	<i>Crop of Carrots.</i>	CR.	
Plowing,	\$1 50	250 bushels,	\$62 50
Barnyard manure,	3 50	Manure left in soil for future crops,	
Harrowing, rolling, ridging,	1 00	estimated	2 00
Sowing,	1 00		<hr/>
Weeding,	5 00		\$64 50
Harvesting,	2 00	Deduct cost,	19 50
Seed,	1 00		
Manure left in soil from former crop,	2 00		
Interest on land,	3 00		
	<hr/>		
	\$19 50	Profit,	\$45 00

William F. Fessenden's Statement.

The carrots grew on land where they have been raised for the last eleven years. Soil, loamy, rather rocky; the average of manure put on said land during ten of the years, was half a cord per year.

The present season I spread on one cord of old barnyard manure; plowed the land twice and harrowed it smooth; then sowed in rows seventeen inches apart. Expense of raising, \$5.25.

This certifies that, by request of Mr. William F. Fessenden of South Bridgton, I have this day measured the land on which he raised his crop of carrots this year.

The plat of ground is 90 feet in length by 41 feet in width, making 3,690 square feet—equal to 14 rods $3\frac{3}{4}$ feet.

I also measured the crop from three rows; one taken from near each end, and one from the middle of said plat—the produce was $3\frac{3}{4}$ bushels from the three rows.

There were 63 rows, as near alike “as two peas,” which would give $78\frac{3}{4}$ bushels, if the remaining rows produced in proportion to the three dug and measured, as I have no doubt they will.

WM. H. POWERS.

South Bridgton, Oct. 17, 1859.

The Oriental Powder Company of South Windham, presented very fine specimens of Ruta Baga turnips, Mangel Wurtzel beets, and carrots; yielding, as appears by their statements, very good crops. Their method of cultivation is also given; yet it is whispered, in outside circles, that the refuse of the powder mills finds its way to their fields. Now if sulphur, saltpetre and charcoal, can be turned to a better purpose, profitably, than for making that mischievous belligerent compound, gunpowder, farmers wish to know it; for they are eminently men of peace. Will our “Oriental” friends please report? We recommend a gratuity.

Statement of Wm. Buxton, for Oriental Powder Company.

The crop of 64 pounds to the bushel was grown on one acre each. The soil upon which it grew was sandy loam, fine and free from stones.

Product of one square rod each.

Ruta Baga,	351	pounds equal to	$871\frac{1}{2}$	bushels per acre.
Mangel Wurtzel,	286	“ “	715	“ “
Carrots,	242	“ “	605	“ “

The soil previously had been much infested with witch grass. Carrots have grown on the same ground for three years in succession. Corn three years previous on Ruta Baga and Mangel Wurtzel ground. Used about $2\frac{1}{2}$ cords barnyard manure per acre on carrots, spread broadcast. Used about 100 pounds guano per acre.

JOHN SAWYER, *for the Committee.*

FARM IMPROVEMENTS.

The Committee on General Farm Improvements, for the second term, present the following as a first report, and submit it to your action :

“A vacancy having occurred in the Committee by the resignation of Mr. Edward G. Buxton, it was filled on the 21st of June by the appointment of John F. Anderson of South Windham. The members then immediately came together to arrange their course of action.

After a careful review of the reported outline, labor, and results of the former committee, it was determined to adopt, as the only proper basis for the awards of 1861, the same rule which governed the action of that committee, and which was published in their report of 1858, namely:—“The improvement must have been wise in its inception; thoroughly and economically performed, and productive of palpably good results in its completion—an improvement which others in like circumstances may safely follow.”

But while adopting the same groundwork, at the same time, freely and heartily according to that committee the first place in ability, and acknowledging their greater experience, we, in the legitimate exercise of our own discretion and judgment, having given to their decision upon a contested point the thoughtful attention due, not less to the question itself than to the deliberate act of those whose intention was fair, have arrived at a different conclusion.

In the award of premiums last year, advancement in live stock, although it was admitted to be one of the essential parts of farm improvements, received no consideration. The first committee say (report of 1858, p. 37) that they “believe no class of improvement is more worthy the careful attention of farmers, or will pay better on the cost than this”—still, it was argued, these premiums being “*additional* to those which had been already offered by the Society * * * the committee have decided to admit *all those* improvements, and only those which from the necessity of the case cannot be exhibited at the Annual Fairs of the Society; such as are enumerated in the circular, and those of a kindred character; and for which premiums are not elsewhere offered.”

The members of the present committee cannot perceive that it is possible for *improvement* in live stock to be recognized at the

Annual Fairs except by a committee which, like this one, shall hold over two or more years; nor do they perceive that any premiums, for a progressive movement in live stock, from good to better; or from a lower to a higher point, have been offered by the Society, except such as may be awarded by this committee. Special prizes are indeed annually declared for individual domestic animals of the several classes; and, last year, there was one *named* for the best farm stock. But it is obvious that a competitor may carry off all such prizes, for several successive years, and yet have made no improvement at all in his herd, or in a single animal even. While at the same time one, who, starting low on the scale, has steadily improved his live stock, and increased its value a hundred per cent., may have each year gone from the exhibition without encouragement from the Society—perhaps, without notice.

To illustrate this point,—the Society offering, as heretofore, only its special premiums on each class of horses, neat stock, swine, &c., and on the entire farm stock. Suppose A., an excellent off-hand judge of live stock, a trading man, constantly purchasing to sell, *holds and buys the best he can find for the Show*; taken as a whole, they prove to be the best on the ground, and he receives the premium on farm stock. B.'s entry of stock, (*perhaps the contribution of a whole neighborhood*), although not altogether equal, includes some superior to any individuals of A.'s stock, on which he obtains premiums. C. takes premiums upon one or two animals *which he also borrowed for the occasion*. And so through all the different classes, D, E, F, and G, take, each, premiums upon certain animals, *either bought, borrowed, or taken without the consent or knowledge of the owner, for the two days' Show*, and the prize list is exhausted. The premiums advertised are all properly awarded to the respective animals, *according to rule*, yet none are bestowed upon the man who actually bred them. This is repeated for three consecutive exhibitions. During all these *years* S. has been improving live stock of his own breeding, and each year, when he exhibits them at the fair, they have manifestly doubled in value, so that the third year his stock is four times as good, in all respects, as it was the first. And, even yet, it falls short of A.'s. Nor does any individual obtain a premium in its class. What encouragement does S. receive from this Society?

On the other hand, if you offer a premium for *improvement* in live stock, far inferior to their's as his might appear, would not S. be justly entitled to that premium?

It is the true policy of this Society, and all like it, to excite among farmers strong motives for individual exertions. The actual condition of the stock and farms is not what is to be decided. The amount of progress made in a series of years determines the award of the premiums. Consequently among a number of competitors the successful one may often be the possessor of property, by no means the best exhibited; and may be indebted, for his triumph over his rivals, to the fact that while he has equaled them in other things he has not neglected to improve his stock.

The members of this committee cannot perceive any more reason for rejecting improvement in live stock than for rejecting improvement in orchards; for there is a special premium, offered by the Society, on the fruit of each, and while, in the late circular from the Executive Board, the one is mentioned, we say the other is understood.

Reasoning thus, and believing that, on very many farms in the county, there can be no *general* farm improvement which does not include, and, in some cases, depend upon that of live stock, it has been determined by the committee to admit and duly consider such improvement whenever offered.

As there appears to be some misapprehension in the minds of competitors respecting the proper mode of operating, it seems requisite to state further that premiums are to be awarded not for the best orchard; not for the best stock; not for the best, nor even for the greatest improvement of any one or two things, but for "the greatest *general* improvement" of the whole farm. The committee understand the offer of the Society to be intended as an inducement for the farmers of the county to take a broad and intelligent look over the whole, with a determination to better the general condition of their farms; to grasp all in a comprehensive and scrutinizing inspection, and having thus ascertained what they most need, judiciously apply their money, labor and time to accomplish "the *greatest general* improvement." In the minds of the committee a sensible, well digested plan, which shall embrace all the required labor in one scheme is, by no means, an unimportant part of the

exhibit, and it is among our private rules that if there chance to appear two competitors whose design and execution of meritorious labor is so evenly balanced as to cause hesitancy in a decision between them, the one who shows his to be but part of a well devised system of husbandry shall have the preference.

The committee respectfully ask all competitors on farms to re-peruse carefully the very interesting and suggestive reports of the former committee published by the Society, with the transactions of 1857 and 1858; to ponder upon the thoughts conveyed in the latter half of the first report, and especially to dwell upon the matter of pages 8 and 21, in that of last year. And the request is here repeated that an exact account of time be rendered, with a written report, so that accurate knowledge of the cost of each one's work may be obtained, and nothing lost sight of from any inadvertance or forgetfulness on our part.

In conformity with the thoughtful act of the former committee, Mr. S. L. Goodale, Secretary of the Board of Agriculture, was invited to join in this examination of farms, but his home engagements held him for the first three days, which were spent by your committee in Naples, Bridgton and Gray, accompanied by Samuel F. Perley, Esq., who, from his store of agricultural knowledge and experience in the two preceding years, as chairman of the first committee, was able to impart many valuable hints and suggestions.

On the 23d of June your committee met at Church's, in Naples, and, agreeably to invitation, spent a right pleasant hour before dinner, viewing Mr. Wm. B. Windsor's carefully tended garden, nursery and fields, situated on the east bank of the strait connecting Long and Brandy ponds. Mr. W.'s farm is quite small, yet he was named to the committee as the best farmer in Naples, and without a thought of passing judgment upon any farm not properly presented, the feeling that obtained among us was that shame could attach to that farmer only who was a very long way behind Farmer Windsor.

After noon the farm of Mr. Jarey Green, in Naples, was examined. Mr. G. was one of the competitors in the last term, and came very close upon the second premium, as we were informed by Mr. Perley. Now he proposes to clear rough land of trees and stones; to build stone wall; to improve his pastures and buildings. His soil is a gravelly loam, with stones, varying in size from a pebble

to a boulder, scattered about in great profusion. His farm requires, and he has laid out for himself, labor enough to discourage a man of ordinary will and energy, but he satisfied us that, if he lives, he will perform it.

The farm of Mr. John G. Cannell, in Naples, was next examined—he also being a competitor in the last trial. As he was absent from home his son shewed the condition of the old house, and the site of the proposed new one; pointed out the absence of a well; the condition of the barn; a gap in a wall to be filled up; a young maple orchard to be thinned out and trimmed; and where his father intends to build many more rods of wall. Then, after a somewhat critical exploration of an unstable bog, the reclaiming of which was designed, we accepted a friendly invitation to the farm of Mr. Samuel F. Perley, in Naples, where we were highly gratified and instructed. At first view his numerous buildings appear to be a village, while upon examination an extent of resources and usefulness is developed far surpassing expectation. One large building, having the appearance of an extensive warehouse or store, contains, on the ground floor, a workshop for carpentry and the manufacture of implements, thoroughly equipped with tools, among which may be mentioned, as a token of the general character, a stationary horse power for running the turning lathe;—on the second floor a paint shop with machinery for grinding, &c., in one corner a very large *bee house*, and in the attic a large pile of assorted lumber, seasoning to be in readiness for any want that may arise. This establishment is balanced on one side by an apple house, on the other by a wood-house, where a circular saw, set in motion by a band from the horse power, makes the long wood short; these, with so many other buildings, the carriage house, the stable, the barns, the implement and tool house, the corn house, the boiler house, the smoke house, the ash house, the ice house, other wood houses, and two commodious dwelling houses, all substantially built, showing singular indications of useful design in the master mind. Outside of the buildings, the apple orchard of more than ten acres extent; the maple orchard, with its sugar house, containing all the best fixtures; (some peculiar to itself, suggestive of intelligent labor,) the numerous smooth, handsomely tilled, rectilinear fields, each one surrounded by substantial stone walls, and bordered with thrifty apple trees, altogether cannot fail to produce

a most agreeable and forcible impression. Then again, for present active operation, there may be seen an immense compost heap laid out in the great barn cellar, with a huge muck pile nigh at hand to aid its increase. Devon cattle sorted into different herds, according to age, sex and destination, and quietly busy men and youths. Every Cumberland County man who visits here, after seeing all this, and more especially if admitted so far into the confidence of the assiduous owner as to have disclosed to him the thoughtful, intelligent management of this domestic concern; its direction and its cares; the systematic arrangement of every department; the system of farm as well as personal accounts (each man and each field having an appropriate place in the books) must return to his own home with his mind instructed and his heart enlarged. He will, and may without sin, feel proud that his county possesses such a farm and such a farmer.

On the 24th, the committee examined the farm of Mr. Abram W. Savage, in North Bridgton, near the head of Long pond. Mr. S. was absent from home, but his son shewed that the uprooting of stumps had already commenced in the field this season, and said it was his father's intention to remove the remainder and to make the surface smooth; to drain a valley there; to set out an orchard; to replace poor fence with good stone wall; to repair his barn, and to construct a cellar under it; and to make sundry repairs and renovations within his house.

On the 25th, the committee examined the farm of Mr. Alexander Pride, in West Gray. This farm is susceptible of as great improvement as any one entered for premium; and Mr. P.'s project is sufficiently broad and comprehensive to cover and reach all; it now remains to be proved from his works. His farm has material, in the proper place, to yield immense hay crops; and every rod of the draining and underdraining, which is there the most important part of a well-thought plan, will give him an annual increase in quantity, and a better quality of hay. He purposes besides, the draining and alteration of fences for a better and more economical sub-division of the farm; improvement in orchards, pasture, stock, and buildings.

Col. Ebenezer Cobb of Gray, whose lot in the "promised land junior," the committee next examined, has taken hold of a piece of arid and barren plains with such energy and vigor as might put

down a man thirty years younger. His design is to demonstrate that the very poorest of sandy soil may, by judicious culture and management, be induced to yield up remunerating crops for men who are unable to obtain better land. To destroy the natural growth of worthless bushes, he first plows in the autumn, then throughout the following season repeatedly harrows over and thus exposes the entire amount of roots to the sun; then he spreads on muck composted with "Thomaston quick lime, gas lime, and salt." He also uses the debris of some ancient coal pits with, as he shows, marked success.

Your committee next examined the farm of Mr. Charles Hunnewell, in South Windham. Mr. H. with his wonted energy and shrewdness has laid out for himself a programme, to accomplish which will admit of but little relaxation from labor during the three years' test. His proposed improvements are in a better sub-division of his farm; in constructing better fences and walls; in his pastures and live stock; in open and under drains; in his fields and roadways; in setting out fruit and ornamental trees; in new buildings; in the completion of his new barn and its cellar; and in the restoration of a swampy swale.

In an interval between official days, two members of your committee visited "Elmwood farm," the homestead of Mr. Stephen L. Stephenson, a fine old place and a valuable tract of land, about equidistant from the villages of Gorham and Saccarappa. Mr. S. with a well informed mind, persevering energy, and genuine industry, is directing his best efforts to the restoration of land somewhat exhausted by years of close cropping without receiving adequate return of nourishment. He designs to make his farm pay, each year, for its own improvement; and his first step has been to substitute feeding off upon the place, by live stock, the produce of hay, &c.; instead of selling it off, the past practice, so likely to obtain upon a farm possessing such great natural strength and fertility. In furtherance of his new plan, Mr. S. had a large herd of neat stock in one lot and sheep in another, and he clearly, and by the figures, shewed that those of them which he had kept the preceding winter had paid him ten dollars a ton for the privilege of masticating his hay and manufacturing it into dressing for his fields. Among many excellent animals, he pointed out a remarkably fine grade Devon heifer

and some very large grade South Down lambs of his own breeding. He also shewed us a commodious and admirably contrived stable, designed by himself; framed and almost entirely constructed with his own hands. Throughout his constructions and repairs, Mr. S. has well shown with how little actual expenditure of cash much may be accomplished for convenience and economy of labor upon a farm, by the exercise of a little forethought in a wide-a-wake man determined to succeed.

The farm of Mr. J. C. Dresser, in Scarborough, was the one next examined by the committee. Mr. D. had already during the present season, built a barn for hay storage, upon a forty-acre out-lot; from which lot he intends removing numerous stumps and making them serviceable in fence; he proposes to improve his pasture by removing alders, running junipers, and a scattering scrubby growth of trees, and by draining three of its valleys; to paint, blind and repair his house; to erect a shed which shall enclose a pump; to build a new fence; to set out trees; and to improve his live stock.

The committee then examined the "Track farm" of Mr. Sylvanus Ling, in Scarborough, consisting of about two hundred acres of land. Mr. L.'s chief improvement is to be in the restoration of a peat bog. He had already this season opened drains around and through the centre of five acres, throughout which the water was rushing rapidly, and into which it was observed gushing out from the peat in frequent streams on either side. Mr. L. also designs the improvement of some acres of worn out plains land including a portion of his pasture.

The committee then meeting Mr. Goodale, by appointment, in Portland, called with him upon Mr. John Reed, in Westbrook, who possessing a natural grass farm, has devoted his attention principally to that crop, and always bound to succeed in his undertakings he exhibited a much heavier burden of excellent and well mixed grass than the committee observed any where else in the county. It was a question, raised on the spot, whether it would be possible, by picking out patches of one or two square rods, wherever the grass was thinnest, over the whole farm, to thus obtain an acre which should bear so little as a ton of hay, thoroughly dried and seasoned. Mr. Reed exhibited the marked effects of underdrains laid early the present season. He proposes extending his under drainage very considerably. Upon leaving this farm, the committee traveled leis-

urely along the road leading through the well-kept up, *park-like*, grounds of the Misses Deering, the fine order of which, excited strong desires for a closer view; and with a good long look, in passing, at the large, flat and formerly very wet field, on the Saccarappa road, belonging to Mr. St. John Smith of Portland, observed with pleasure the beneficial effect of thorough drainage, which must be as gratifying to the able superintendent, farmer John F. Leavitt, as to its owner.

The farm of Mr. Clement P. Maxwell, in Westbrook, was next examined. Here Mr. M. was found diligently working upon his new house, which was part of a well devised plan given off clearly and concisely upon the field of proposed action. It included the new house, outbuildings and barn; underdraining; reclaiming bog and rough pasture land; fencing; and live stock improvement.

The committee then called at the farm of Messrs George and Lewis P. Warren, near the village of Saccarappa, where, among interesting things agricultural, too numerous to detail, attention was directed to a deposition of fine mud at the outlet of a box underdrain (of wood) which had percolated through the seams and cracks; the quantity of it, as it lay in three large heaps, was estimated at about twenty cartloads. One hint obtained from the practice on this farm, originating with Mr. L. P. Warren, must be disclosed for the benefit of all proposing to drain with tile: it is a cheap and excellent covering for the joints, in a strip of birch bark, about four inches wide, and long enough to reach the sole of the tile, whatever size may be used. As Mr. Goodale, on noticing it, remarked, "it makes the nearest approach to pipe tile with collar." From its being so readily obtainable, its flexibility, and imperishable nature, birch bark is most admirably adapted to this purpose, and is, as a matter of economy, far superior to inverted turf, spent tan, or clean gravel, heretofore used as strainers.

On the 27th, the committee, joined by Messrs. Reed and Jones of Westbrook, made a slight examination of the farm belonging to Mr. Samuel D. Warren of Boston, Mass., situated in Westbrook, near the Cumberland Paper Mills at Ammoncongion Falls of the Presumpscot river. Mr. Warren is a partner in the Paper Mill Company, and this farm is a sort of adjunct to that enterprising and solid establishment. Unfortunately an accident had occurred to the

mill which detained the zealous business agent, Mr. Fales, and Mr. Hammond, who resides on the farm, was also absent. But the committee learned that the intention was to underdrain thoroughly, and otherwise generally improve the farm. After a pleasant hour's inspection of the beautiful place, including the examination of some fine Jersey neat stock, grade and thorough bred, among the latter an imported cow of unusual size for that race, and with a thoughtful glance over the way to the new establishment for putting up sweet corn in hermetically sealed cans, being erected by Mr. John Jones upon the site of a similar one destroyed by fire, which is to furnish (as the other did) a convenient market for neighboring farmers, your committee passed to the examination of the farm of Messrs. Solomon and Edward Cloudman, in Gorham, calling on the way to invite Gen. Edward T. Smith, of the Executive Committee to aid in the subsequent examinations.

The Messrs. Cloudman propose constructing a new barn with cellar, &c.; new farm implements; an improvement in live stock; a general clearing off of bushes; and, above all in importance, to break up the present encroachment upon their land, of water from the Presumpscot river and from the hills, by underdrains where practicable, otherwise by open ditches, and a thorough system of high, narrow beds.

The farm of Mr. John Yates, in Standish, was next examined, the visiting party being increased by the accession of another member of the Executive Board, Mr. Theodore M. Bradbury. Mr. Yates has put upon himself an immense amount of work; clearing off bushes from eight acres of pasture; building stone wall; moving walls for bettering the shape of fields; removing granite boulders; improving a wet meadow which requires a very long drain; carrying water from a spring to his house and barn; new barn; new fences; and underdraining in orchards and fields. Mr. Y.'s farm consists of more than two hundred and fifty acres, and he carries his thought of improvement over pretty much the whole.

Mr. Frederick Lowell, also of Standish, purposes a general improvement of his farm, in part by the systematic drainage of about five acres of a very wet hill side field; by clearing a rough and bush-covered pasture, &c., &c., including withal a particular regard to the advancement of his live stock. Mr. L.'s underdraining is in one

of many similar fields in his town, and if it proves efficacious in exterminating a species of brake or fern called polypod, by some, podgum, which prevails in them, it will satisfy many farmers who are looking to the results of his experiments, and encourage them to follow his example.

Your committee then examined the farm of Mr. Alvah Weeks, in Standish. Mr. W. purposes a general improvement, which comprises, among many minor details, the restoring an old orchard; setting out new trees enough to cover about two acres already enclosed by stone wall; clearing some four acres of pasture; ditching and underdraining; building fence and stone wall. Mr. W. exhibited one piece of land to the committee with the remark that, "unless grasshoppers carried knapsacks filled with food, they could not live upon it," and said that he hoped to bring to a productive condition, even that forlorn looking place.

Mr. J. R. Thompson, who also entered his farm in Standish, proposed an improvement of a rough and fern-covered pasture, underdraining of fields, &c. The stone underdrains already laid by Mr. T., cost, he says, "just about one dollar a rod, completed." And judging from what can be seen at the ends, they are very substantially and properly constructed.

Mr. Josiah Moulton of Standish, whose farm was entered, purposes an increase of an acre and a half of land to his orchard; surface and underdrains; sinking a well on a hill where there appear strong indications of living water, which he intends to carry to his barn; building good wall in place of a poor brush and stone fence; improvements in his buildings and to his farm generally. Mr. M. had already commenced in good earnest upon his barn cellar.

Mr. Ebenezer Moulton and son, also of Standish, propose to obtain a premium by building a new barn and shop, by general repairs to old buildings; by setting out fruit trees; building new fence; making smooth a rough field of about twenty acres extent; and by surface and underdraining. The underdrains already laid by Mr. M. have cost, he said, "about 75 cents a rod." A markedly improved condition of the land, in consequence of the drainage was evident, and he was, he said, well satisfied that in a district where land cost only twenty-five dollars an acre wherever it required draining, and consequently was of lower market value than the average, it paid well to underdrain.

Your committee then called upon Mr. Joshua E. Hall, in Gorham, near "Great Falls Village." Mr. Hall was absent from home, but his farm was viewed in part then, and more thoroughly since by two members of the committee. Mr. H. purposes a general improvement, comprising the building of wall; underdraining; planting new orchards, and improving some dozen or more acres of pasture.

There may be seen on this farm evidence of the most complete success in a restoration of peat bog; where the very last season his cattle were mired so that he was obliged to get them out one at a time, and that only by the aid of planks. Mr. Hall had this season a very even and luxuriant growth of potatoes, corn, peas and pumpkins, over the whole of this acre which only last year was a mere basin of soft mud matted over with an insecure carpet of moss and fresh grass, tufted with rushes.

With the examination of Mr. Hall's farm the field duties of the committee terminated. Two of the members on their way home, accompanied by Mr. Goodale, called upon Mr. Woodbury P. Manes, in Windham, who with sufficient capital and enthusiasm has undertaken to restore and improve the farm where he passed his boyhood; a portion of it consisted of a low, flat, boggy piece of land, full of water, and covered with logs, stumps, bushes and other such rubbish. Some fifteen acres of this piece is entirely changed; the land has been cleared by the axe and fire; open and underdrains and deep plowing have drawn off the water; the harrow and clod maul have made smooth the surface of twelve acres, into which two hundred and forty well trodden cords of stable manure was plowed, and this year five acres of it "laid down" with wheat, five with barley, and the other two planted with potatoes. Not a stump, or stone, or inequality of surface can be seen any where upon the broad flat beds. Within the last two years one hundred cords of wood, and the stumps with which one hundred and forty rods of fence was constructed have been removed from this now smooth field. And the plow was still in active operation, moving steadily on its way to subdue other twelve acres; it was such plowing as we read of, but seldom see, twelve heavy oxen dragging a No. 28 (Eagle) plow to its very beam, which cut below the surface nineteen inches, and broke "as obdurate a hearthpan as ever resisted the root of an oak" hancatac or swamp spruce.

An underdrain here, only ten rods long, was discharging, with the velocity of a sluice, a volume of water ten inches wide by five inches deep. On the 16th of August this farm was again visited, and the stream from this drain seemed to have lost no force, and to have diminished less than two inches in depth in that unusually dry season. We were tempted to exclaim as Dobson did to the chronicler of the Clay farm, "You've *tapped the dropsy* on it, for one thing, that's sartin."

Mr. M. had also made straight the crooked ways of a wandering trout brook, thereby relieving his low fields of a wide-spread flow of troublesome water. At our last visit he had just completed his annual painting up, and no one would suppose that the plows, cultivators, &c., had undergone such hard service as we had seen them in, but might reasonably think the farm had just been stocked with an entire new set of tools and implements. Before leaving here, "we took a deep drink all around" from a fine spring on the place, having within its "true blue" curb six feet in depth of limpid water. Mr. M. says he has just commenced his operations—he has certainly begun in earnest.

It will be perceived that the committee did not confine its examinations strictly to the farms exhibited in competition for premiums, but wherever invited, or whenever an opportunity offered, to observe anything new or interesting, connected with agriculture, anywhere upon the route required to visit the farms which were entered, sufficient time was bestowed upon such observation. This is in accordance with what the members of the committee conceive to be their duty; basing this belief upon their own understanding of the circular from the Executive Board, the last clause of which entertains the idea of an agricultural survey of each town in the county in case no applications were made for the premiums,—thus indicating, as it appears, a desire for more general knowledge of the agricultural doings of our fellow-workers of the soil. The future proceedings of the committee will of course be governed by such action as it may please the Society to take upon the matter of this report. It will be very gratifying to the several members of the committee if the Society should see fit to charge them with more explicit directions and instruction than can be gathered from the circular of 1857.

JOHN F. ANDERSON, *Chairman.*

NOTE. In connection with land drainage, the committee feel it is incumbent upon them to bring to the notice of farmers purposing this as part of their improvement, the excellent work on this subject by Judge French. It is a highly practical and instructive book. The price paid for it will be saved over and again by every man who reads it, if he undertakes but a few rods of open or thorough draining. It may be had for a dollar at the bookstores.

OXFORD COUNTY SOCIETY.

This Society, numbering 1,102 members, held its Annual Exhibition at Norway, on the 4th, 5th and 6th of October, 1859. No report of the character of the exhibition has been received. Some of the premiums awarded, were as follows :

LIVE STOCK.

Horses. First premium on stallion, to Jacob Willis of Hebron, "Rising Sun."

Second premium on stallion, to E. F. Stone of Paris, for "Brandywine."

Neat Stock. No statements are received of any thorough bred animals. The premiums on bulls were awarded on grade Herefords and grade Durhams, and a cross of Durham and Devon.

C. H. Durell obtained first premium on milch cow, a grade Durham, 8 years old, which made 57 pounds butter in June.

John Heald for best stock cow, grade Devon.

William Hall for best oxen, grade Hereford.

The herd premiums were awarded to A. T. Holt of Norway, grade Herefords, and to John Heald of Sumner, for Devons or grades.

Sheep. A. G. Morse of Waterford, premium on Cotswold buck.
John Bicknell of Paris, on flock of sheep.

Swine. C. H. Clifford, on grade Suffolks.

H. W. Millett, on same.

CROPS.

First premium on corn, to Noah Prince, 46 bushels per acre.

First premium on wheat, to John Parsons of Paris, for 26½ bushels per acre. His statement is as follows :

“My crop consisting of 70 bushels of 58 pounds to the bushel, was grown on 2 acres 105 rods, being at the rate of $26\frac{1}{2}$ bushels to the acre. The soil upon which it grew was a yellow loam about 18 inches deep, under which is an impervious subsoil. It is on an oval ridge of land dry enough to plow any time after the ground is settled in the spring. Some few large granite rocks, not many small stones. The land had been in grass 12 years; bore a light burden of June grass for four or five of the last years it was mowed. In 1856 it was broken up about 7 inches deep, the latter part of August. In 1857 it was planted with potatoes without any dressing, except a table spoonful of ashes and plaster in the hill, two parts of the former to one of the latter. In the spring of 1858, I spread on 20 loads of green manure to the acre, of about 35 bushels to the load, and 8 loads of well rotted barnyard manure, and hog manure of about equal proportions in the hill, and planted to corn. No manure was applied last spring, except 6 loads of very light manure on three-fourths of an acre of the part that was not quite so well manured the previous year. The wheat sown, is called about here, the red Turkey—is a bearded wheat. It was sown the 9th day of May, $1\frac{1}{2}$ bushels to the acre; was washed in a strong brine of salt and water and lime to dry it; was harvested the latter part of August, by mowing and raking. The cost of growing the same and its value are as follows:

DR.	<i>Crop of Wheat.</i>		CR.
To plowing once, 2 days, . . .	\$4 00	By 70 bushels, at \$1.34, . . .	\$93 80
Harrowing and rolling, . . .	2 00	4 tons straw, \$3, . . .	12 00
Sowing,	1 00	Manure left in soil for future crops, . . .	13 00
Harvesting,	8 00	estimated,	13 00
Threshing and cleaning, . . .	12 00		
4 bushels seed,	6 00		118 80
Manure left in soil from former crop, 26 00			
Interest on land,	3 00	Deduct cost,	62 00
	\$62 00	Profit,	\$56 80

First premium on potatoes, to J. C. Marble of Paris, whose statement is as follows:

“My crop, consisting of $211\frac{1}{4}$ bushels, was grown on $\frac{1}{2}$ acre and 6 rods, being at the rate of about 400 bushels to the acre. The soil upon which it grew was deep, light loam, on ground that had been seeded four years; the hay crop last year was redbud and June grass; the ground was broken up with one yoke of 7 feet cattle, without a driver, and the manure spread on and plowed in; the ground was plowed from 8 to 10 inches deep; planted May 16th, and plastered in the hill; the manure was a mixture, with some muck, made last winter. Harvested and put in the cellar September 27 and 28.”

Second premium, to Levi Gorham of Norway, for 172 bushels Jackson potatoes per acre, on light sandy loam; broken in '58 and sown to oats. In 1859, plowed, and $3\frac{1}{2}$ cords manure spread on the furrows and harrowed in.

WEST OXFORD SOCIETY.

The Annual Exhibition of the West Oxford Agricultural Society was held at Fryeburg, October 5th, 6th and 7th, on the grounds owned by the Society.

A lot containing ten acres has been purchased recently, and enclosed by a fence 7 feet high. Several hundred white pines are scattered about the lot, valuable now for shade, and hereafter for timber.

There are also within the enclosure, an exhibition building, 36 by 60 feet, two stories in height; a market house, with stalls, for the sale of refreshments, and agricultural implements and products; suitable pens for stock; a well; and a trotting course one third of a mile long.

The exhibition was in many respects the most successful and satisfactory of any ever held by the Society. Aside from the usual attractions, the presence of military companies from Norway, Brownfield and Porter, without doubt contributed largely to increase the attendance of spectators, and to add to the interest of the occasion. About three thousand people were present at the exhibition.

The annual address was delivered by Leander Wetherell, Esq., of the Boston Cultivator, as follows:

Farming and Stock-breeding, Feeding and Sheltering, promoted as Arts by Science.

BY LEANDER WETHERELL.

The art of using the soil successfully as the essential factors in producing good crops, is one that requires careful study and much knowledge. Geology, mineralogy, botany, animal and vegetable physiology must be separately and collectively considered and examined. The character and quality of the soil when known, will influence the economical husbandman in determining what kind of crops he can most successfully produce. Before he can do this, however, he must learn from tradition, observation, experience or chemical analysis, the kind of plants to which any given soil is best adapted,—a conclusion which cannot be intelligibly reached with-

out a knowledge of the habits and wants of plants, which may be learned through the study of botany and vegetable physiology. Having arrived at definite conclusions in regard to these topics, the farmer can easily decide what kind of domesticated animals it will be best for him to stock his farm with. This being done, there is presented at once the importance of possessing knowledge of the arts of feeding, sheltering, &c.—with those of animal physiology, laws of re-production, usually denominated the art of breeding, marketing, &c. This view of the subject, as will be readily admitted, requires that the farmer should be a well instructed man, if he would supervise his business economically and render it productive, profitable, pleasant and satisfactory.

The West Oxford Agricultural Society was organized and founded for the promotion of Agriculture. This being the end or purpose of its founders, the inquiry very naturally suggests itself to the reflecting mind, how can this good be most effectually attained? The fact of meeting annually will not of itself secure it. Something more is necessary to be done, and must therefore be accomplished, or else the Society must rest satisfied with merely furnishing an annual holiday,—something gained to be sure, but coming far short of the noble end, which stimulated its founders to action.

The question, “How is this end to be reached?” marks the line that divides between the known and the unknown—between traditional or practical farmers and those denominated pioneer, experimental, or theoretical farmers, and in derision often styled “book farmers.”

A practical farmer in the common meaning of that phrase is one who is governed by tradition—doing as his father did without knowing why or wherefore. He is conversant with facts, but knows not how to account for their existence. He has been told that irrigation is beneficial, but knows not why. So of draining, manuring, &c. His system of practical agriculture consists of a collection of recipes, as it were, teaching by, or embodying the knowledge of tradition. Such a farmer, so long as he thus practices,—scouting book farming as he calls it,—reminds one of the story of the green doctor of Offenbach on the Maine. He was a Jewish physician of renown, called to all cases of illness in Frankfort, Hanau, and the neighborhood; and his practice was not without success. Nature had given him a quick eye and fine powers of observation. His knowledge was obtained in a hospital in which he acted as sick attendant. He used to accompany the physician through the

sick wards, looked at the tongues and urine of the patients after him, felt their pulse, and superintended the orders about their diet. He copied the prescriptions regularly; marked them with a red cross when the patient recovered and with a black one when they died. His sheets grew by degrees to the size of a book, and when nothing new presented itself to be added, he began in the first instance to practice on a small scale, and then started on the full career of a physician. He was skilled in diagnosis, and had his prescriptions for the various cases. Those with the red crosses came first; if unsuccessful, then followed the black. In this way he acquired experience. He was very orthodox, and on the Sabbath, refrained from writing prescriptions, but dictated them in the apothecary's shop to an assistant. He commenced with "Rx" (this meant recipe); "Tart. Emet., two grains" (i. e. Tartari Emetici grana duo); *Syr. Alth.* (i. e. Syrupus Altheæ.) He could not read his own prescriptions, but his fame, as a practical physician, was so well established that the regularly educated physicians in Offenbach could not succeed in putting an end to his career, on the ground of his never having received a medical education. Hence, empiricism lived and flourished at the expense of the learned profession.

Practical farmers, who reject theory, art and science, with book farming, and cling alone to tradition, are very much like the Offenbach doctor. 1st, The recipe marked with the red cross is worded thus: "Dung, ashes and muck;" those with the black cross, "Put no trust in chemistry or chemists, scientists or science. 2d, Facts, and opinions, chiefly the latter, should be heeded." 3d, "Brook no opposition from scientists, theorists or chemists."

But there is fortunately another class who seek for the "why," regarding knowledge as above empiricism. They desire to understand the art of farming, deeming it as an art, what it really is, the antecedent of science.

Art, says Mr. Cash, has generally preceded science. There were bleaching and dyeing and tanning, and artificers in copper and iron before there was chemistry, to explain the processes used. Wine was made long before the laws of fermentation were known; and porcelain and glass were manufactured before the nature of alkalies had been determined. The pyramids of Nubia and Egypt, the palaces and sculptured slabs of Ninevah, the cyclopean walls of Italy and Greece, the obelisks and temples of India, the cromlechs and druidical circles of countries formerly Celtic, all preceded the sciences of mechanics and architecture. There was music before

there was a science of acoustics ; and painting while as yet there was no theory of colors and perspective.

Art, says Whewell, in its earlier stages, is anterior to science ; it may afterwards borrow aid from it, and, undoubtedly does.

Science inquires for the sake of knowledge, art for the sake of production. Hence, science is concerned with the higher truths, art with the lower ; science is never engaged in productive application ; art always is. The most perfect state of science, therefore, will be the highest and most accurate inquiry ; the perfection of art is the most apt and efficient system of rules. Hence, art consists of a system of rules, directing what and how it shall be done.

Science may be summed up as a collection of truths ; art, a body of rules or directions. The language of science is, This is, or This is not ; This does, or, This does not happen. The language of art is, Do this,—Avoid that. Science takes cognizance of a phenomenon, and endeavors to discover or evolve its law ; art proposes to itself an end, and looks out for, or seeks the means to effect it.

Art may be regarded as of three kinds—theoretic, practical, and mixed. Many persons are loud in their denunciations of mere theorizers, theories, and theoretic notions or methods of doing things ; for, as maintained by such, theory and theoretical are opposed to practice and practical. Theory may be knowledge, but is, more frequently, as such maintain, nought but the speculation or the hypothesis of some dreamer. Practice, say they, is the application of knowledge gained by experience ; hence empirical knowledge will only satisfy such inquirers. There is, however, no opposition between theory in its highest sense and knowledge ; for the former is the embodiment of the principles by which practice reaches, or accomplishes its end. The error, of the objectors to theory, is, in blending or using hypothetical and theoretical as synonymous with conjectural. This is untrue and therefore unphilosophical in relation to what is theoretical. Theory always implies knowledge, not conjecture, as some are disposed to maintain ; but the knowledge of things in their principles or causes. In the words of Parr, “ Theory is a general collection of the inferences drawn from facts and compressed into principles.”

Theory, Macintosh remarks, denotes the most general laws to which certain facts can be reduced.

Theory and hypothesis, according to Taylor, may thus be distinguished : an hypothesis is a guess or supposition, made concerning the cause of some particular fact, with the view of trying experi-

ments, or making observations to discover the truth. A theory is a complete system of suppositions put together for the purpose of explaining all the facts that belong to some one science. In geometry for example, hypothesis may aid in the construction of the correct theory the confirmation of which must depend upon demonstration; but let it be remembered that the inability to construct the demonstration does not disprove the correctness of the theory. Dr. Franklin in studying the laws and nature of electricity, started with the inquiry, "Is not the electrical spark identical with the flashes of lightning?" This was his hypothesis, or guess, or supposition, which by repeated experiments he succeeded in proving to be true. Hypothesis when demonstrated ceases to be hypothesis by becoming theory; for when the principles employed in the explanation of the phenomena are known to exist, you have the difference between theory and hypothesis, the latter being but supposition. Or in other words, hypothesis differs from theory in this: the former is the supposing of something, the existence of which is not proved, to explain phenomena which have been observed; the latter explains phenomena by causes which are known to exist and to be in operation.

Hypothesis, then, is no more to be rejected as useless than theory; for the right use of the former aids in discovering the latter. The suppositions of which an hypothesis is constructed are not arbitrary fictions, altogether, but suppositions conformable to careful observation, experience or analogy.

Practical art, or knowledge, is generally understood to be such as has been derived from experience. Among the Greek physicians, those who founded their practice on experience called themselves empirics; those who relied on theory, methodists; and those who held to the middle course, dogmatists. The term empiricism became naturalized in England when the writings of Galen and other opponents of the empirics were in repute, and hence it was applied generally to pretenders to knowledge. It properly relates to knowledge that is the result of experience. The term is used in the writings of Aristotle in the sense as historical. Historical knowledge is the knowledge that a thing is or was. Empiricism, then, is an unreasoning and instructive imitation of previous practice. It allows nothing to be true nor certain but what is given by experience, and, therefore, rejects all knowledge *a priori*. Locke in tracing all knowledge to experience, gives his testimony in favor of empiricism.

What the farmer needs, is what we all need, knowledge, or cognition ; that is to say, to know or have a clear perception of the connection and agreement or disagreement and repugnancy of the notions or ideas of things. Where such a perception is, there is knowledge, says Locke ; and where it is not, there may be fancy, guess, belief, think, etc., but not knowledge.

“ Learning dwells

In heads replete with thoughts of other men,

Knowledge in minds attentive to their own.”

Men of great learning are met with almost everywhere ; persons of great knowledge are far from being common anywhere, even in the most learned communities. Knowledge is the good part to be sought and chosen in this work-world of ours. It may cost much diligent and careful search, yet when found, amply rewards its possessor, from whom it shall never be taken away. Do not then underestimate a man of great learning ; you can hardly overestimate a man of great knowledge.

Let a farmer interrogate his neighbor on any subject concerning his vocation, and what kind of an answer is he likely to get ? It will come, most probably, in some such phraseology as this : “ I guess,” “ I believe,” “ I fancy,” “ I reckon,” “ I think,” etc. But says the farmer, I did not ask what you “ guess,” “ believe,” “ fancy,” “ reckon,” “ think,” or what you have learned from others, but, “ What do you *know* ?” “ Ah,” says his neighbor, on turning within, “ I find I know but little, and do not even know much of that quite certain.” The inquirer then turns to those who sit, as it were, in Moses’ seat and teach them with authority, and in a reverend and docile spirit asks for knowledge, where and when alas, he receives naught but “ learning” from the oracle interrogated. It is the lack of knowledge on the part of those who attempt to teach others, that more than aught else, has brought much of “ book farming,” so called, into deserved disrepute. No greater honor can be awarded to the good sense of practical men, whether farmers, gardeners, or artizans, than that they can and do discriminate between knowledge and learning, between what a man knows, and what he guesses, between practice with science, and hypothesis with naught but conjecture, or speculation.

The age abounds in scientific smatterers, and no industrial employment is more eagerly beset by them than that of the farmer. It therefore becomes farmers to beware of false teachers, who teach not the traditions of men, for doctrine, but their own vague con-

jectures, which have no claim of being regarded even as hypotheses. It is such a use of words without knowledge,—mere rhetorical breaths that has brought odium upon “book farming.” Farmers, however, should beware in their haste in denouncing “book farming,” not to do it indiscriminately, for the real value of true science being acknowledged, has been the occasion for pretenders and charlatans to undertake the palming off of “science, falsely so called.” Knowledge is power; and books that are books, will aid the seeker of it, in getting possession of this pearl of great price.

Every farmer should, therefore, seek to make himself thoroughly acquainted with the art of his vocation,—to be an artistic, rather than a “scientific” farmer. It is not essential to good, successful and profitable farming that the farmer should have a thorough knowledge of all the departments of science connected with his employment, for, if it were so, then good farming would be an impossibility. It would be just as reasonable to maintain that every child should be taught anatomy and physiology in order to enjoy good health, as to claim that the husbandman should have all knowledge in order to be a good farmer. In both cases there are certain rules to be observed and practiced, which may be used or employed as successfully by one, ignorant of science, as by another who is master of it. Common intelligence, with an ordinary education, with discriminating judgment, or, to sum up in one phrase, good common sense, is requisite and necessary to all tillers of the soil. All beyond, is desirable, but neither absolutely essential nor necessary to success. Art, theoretical, practical, and mixed, with theory, hypothesis, and empiricism, are all essential in the development of knowledge. But art, according to the views here presented, is of the first and chief importance to every practical man, whether farmer or artisan.

Having thus to some extent indicated the difference between theoretical and practical farming,—between art and science, I would now invite your attention to some considerations on stock and stock breeding and feeding—and especially in regard to cattle and sheep, already the leading branch of husbandry in the State.

The art of breeding with reference to special and specific points can hardly be traced much beyond the time of Colling and Bakewell. Down to their time the quality of both cattle and sheep were very much what the country made them. The cow was valued as a calf and milk producing animal, and the bull for the specific quality mentioned by Job; and when degraded to an ox, took his place

in a team with draught oxen, which, according to the biography of Elijah, were of great antiquity.

The Devons and the Herefords seem to represent races as distinct from breeds. The Longhorns are, perhaps, entitled to the same distinction. In Ireland it is stated that no distinct race or breed can be traced. Cattle from this green isle were proverbially the most inferior animals seen in the English cattle market. It was the result of the haphazard breeding which prevailed over portions of England and Scotland. This was the state of things a century ago. Since then, much improvement has been made. The first step in this was to breed from the best, and often from these accidental crossings, animals of remarkable beauty and symmetry were produced. The merits of the first cross are well known to many farmers of this Society.

In sheep, Bakewell, it is said, put together white-faced and black-faced, white-legged, and black-legged, horned and hornless, long-woolled and short-woolled; and so it is said he did with the different breeds and races of cattle. From such heterogeneous materials, have the modern breeds of cattle and sheep been made.

The improved Short horns, and the new Leicester sheep, became celebrated, and were sought and introduced into nearly every farming district in England, Scotland and Ireland; and also into this country. The uncultivated stock seemed to disappear before them like the red man before the onward march of civilization; the old and distinct races hardly proving an exception, but in their strongholds of Devonshire and Herefordshire. In these regions three ways seemed to be open for the breeders; first, to discard their own stock and adopt the new breed; or secondly, following the example set them, seek improvements by crosses of which their own herds should be the foundation; or thirdly, to seek improvement by breeding only from the best. The latter course was adopted and pursued, and hence, the purity of the races was preserved. But for this course, the beautiful Devons, the picturesque West Highlanders, and the noble Herefords, would have disappeared from England.

Breeding from the best, it was found, improved them without the introduction or infusion of other blood. This may have been less marked, but it should be kept in mind, that it started from a higher point and is more permanent.

What farmers and breeders desire to know is, "What breed or race of cattle is best for our farmers?" This interrogation should

be modified by stating the purpose for which a herd is to be kept,—whether for the shambles, for work, or for milk. The inquiry is not answered by taking ten tons of Short horns and ten tons of Devons and feeding fifty tons of food to each lot, and then selling the beef which may be as 21 to 19. The entire history of each lot must be known. The one may have credit for milk, the other for work. The cost of each, with the debits and credits, should be kept down to the day they leave the feeder for the butcher. It must be known which beef fetched the more money, that represented by 21 or by 19.

The fact of having bred animals of rare symmetry, great size, early maturity, of first rate quality, &c., is not enough to settle the point. Inquiries like these suggest themselves: “After how many failures was this done? “At what cost?” “How stands the balance?” Upon the true answers to interrogations like these every thing touching this subject depends.

The first object with a breeder should be, to furnish his countrymen with milk, butter, cheese, cream, &c. The next is to furnish beef; milk and beef in case of cattle, and wool and mutton, in case of sheep. The breeder must cater to appetites which, luckily, exertions have made keen rather than critical, as well as for those blunted by sedentary and intellectual pursuits, and thereby stimulated to the appreciation of quality, both of beef and mutton.

New breeds claim the first notice, because created by man, or more accurately, made by crossing of races. The first in this rank is the improved breed of Short horns, uniting in a most remarkable degree milking qualities with a tendency to fatten. In the market at Birmingham, where the beef of cows from dairy districts is seen, the blue loin is also noticeable. It is claimed for the improved breeds of both cattle and sheep, that from the same amount of feed in a given time, they will yield a larger weight of beef and mutton than animals of the races. This is undoubtedly true of given cases; but to give it a fair test, select 1,000 Devons or Herefords, females, and 1,000 Short horns, and with the latter, there will be fewer animals produced, and more of a low, coarse and exceptionable quality, than by either of the old races. The same would be true of the Leicester ewes. This is because art is less certain than nature, whose operations are unvarying, or nearly so, where man has not interfered. With regard to breeds, specimens of races and varieties, the combined will crop out, every now and then, to disappoint the expectations of the breeder. The nondescript, introduced into

a herd or flock because of some apparent excellence, will taint the blood most likely with defects inherent in his own. The slab side, the bad head, or the blue hard muscle of some ancestor, is sure to appear. It is said by a breeder of the Leicester sheep, that the oldest and purest flocks, produce from time to time, gray faces and black legs. Earl Spencer said to a friend who consulted him on a point of breeding, "Your cross will not justify a very high priced bull, but to secure you against anything monstrous, you must ascertain that you have several generations of good blood." Who has not noticed the diversity of shapes, quality, color, and aspect, in a drove of Short horns or Ayrshires, or modern Jerseys, on the one hand, and the uniformity of appearance in a drove of Devons or Herefords on the other. High breeding, it is said, is at the sacrifice of fertility.

Mr. Edge of Strelley, England, is mentioned as an instance of a breeder who conceived a model of size, symmetry and aptness to fatten, and then spared no pains to realize it. Aided by a correct eye, and free from prejudice, he selected at any cost and from any quarter, animals, both male and female, which he deemed most likely to answer his expectations. Nor was he disappointed in this respect. But after some years when about to attain his beau ideal, the females ceased bearing. Thus ended his experiment. Lord Spencer, an enthusiastic advocate and admirer of Short horns, in a speech, admitted that fecundity had diminished in his herd, to an inconvenient degree. The reason given is, that the females are too fat. This is not the only reason says an English writer: for a herd of Herefords of equal fatness were very prolific. Barrenness is said to be a fault in cheese-making districts where Short horns are kept. A Kentucky breeder recently said this was not a fault with his herd of Short horns.

The Short horn breed are naturally coarse and of delicate constitution, requiring a mild climate, a productive soil, careful tending and feeding, or else the refined touches of careful breeding, nursing and feeding will soon deteriorate: and if carried to the highest degree of perfection, sterility is the result: another serious evil. The beef is said to be inferior to that of the races. But in quietness, composure and docility, they have no equals. A small native scrub bull, steer or cow, will rule a herd of Short horns. Breeding seems to have subdued their combativeness. Early maturity is claimed both for the Short horn cattle and the Leicester sheep. True, but have they not had possession of the most fertile districts

of England where bred in perfection? Do they not receive more care and cossetting than falls to the lot of common animals?

With regard to the Devons and the Herefords, they have many points in common. They are prolific, but not suited, remarks an Englishman, to a farmer whose rent is to be made by the produce of his dairy. Human labor is said to be worth too much in England to be profitably associated with so slow a team as that of bullocks. They have good constitutions, bear hardships without much suffering, are kept with less care, and furnish beef superior to that of the breeds. Between the two races, says the same writer, would you please the eye, take the Devons: if the pocket is regarded, take the Herefords. The West Highlander is a more hardy race than either of the preceding, but is defective in the hind quarters,—a grave fault in the eye of the farmer. The beef is said to be very delicious.

In regard to sheep, the South Downs are the most comely and valuable for agricultural purposes of any breed known. They are hardy, grazing on short and dry pastures, yielding wool and mutton considerably above the average; and, therefore, better for common purposes than any of their congeners. The New Leicester is deemed by some the most valuable of the white-faced variety; but inferior for mutton to the South Down. "A little fat mutton makes many fat potatoes." To furnish such mutton, the New Leicester and the South Down must be bred. The South Down has been introduced into this State by Mr. Whittier and others, and bred with success. A cross with the Spanish merino, makes both a good mutton sheep and a good wool-bearing sheep.

A race is distinguished from a breed by uniformity of size and shape, a self-color, similarity of disposition and aspect, recurring generation after generation. In short, Nature where man has not interfered, seems to have fixed the type of the races; and, moreover, it does not require the interference of man to prevent deterioration. On the other hand, it is stated that Sir John Sebright of England, bred pigeons to a feather. Col. Jaques of Massachusetts, did the same with dunghill fowls. But all artificial breeds have a tendency to return to the primitive type. Man has the power of making breeds,—whether races or not is quite uncertain. Colling and Bakewell each created breeds of cattle, and the latter a breed of sheep also. Devons or Herefords removed from their native countries ever remain Devons and Herefords. Not so of the Short horns, or the Ayrshires, as now known. No one visiting England,

can help observing how soon a dairy farmer suffers loss from deterioration of his herd, if it consists of Short horns. A breed created by crossing, it is affirmed, can only be kept up by crossing, and great skill and care.

Says an English writer, the most uniform drove of oxen which I ever saw, consisted of 500 from Ukraine. There is, then, good evidence to believe that the Herefords are the representatives of a widely diffused and ancient race of cattle, for the aforesaid drove was very like the Herefords of Britain.

The mode of feeding cattle is a subject intimately connected with successful farming and profitable stock-raising. To neither over-stock, nor under-stock, requires the exercise of more than ordinary judgment. To come within half a bullock in a pasture of 100 acres, as an old English grazier was wont to do, shows the possession of remarkable skill in cattle feeding, or grazing. Grass fed beef is not up to the state of the English market now, as formerly.

Stall-feeding, as some have supposed it to be, is no new practice. The "stalled ox" is alluded to in Proverbs as a luxury. Ten fat oxen and twenty out of the pasture, are spoken of in connection with the daily consumption of the household of the man "of three hundred wives and seven hundred concubines."

Cooked feed, steamed, raw or uncooked, have been topics exciting much interest among feeders. But the conclusion arrived at, now, is, that no advantage is derived from cooking. The want of economy, to say nothing of the inhumanity of the same, is no where more apparent in rural affairs than in the neglect to provide comfortable and well ventilated stables for cattle, and sheds for sheep. An English Lord made the following experiment: He separated a flock of two hundred sheep into two equal lots. One of them was furnished with sheds with an unlimited supply of Swedish turnips. The other was supplied with equal liberality, but without shelter. After a few months, it was found that the latter lot had consumed on an average, 25 pounds a day, while the former had eaten but 21 pounds a day per head, and had gained on an average, 3 pounds a head more than the former. The loss of the lambs of the lot without shelter, was 20 per cent. greater than of the lot provided with sheds, and the loss of ewes 8 per cent. So much for the economy of shelter.

In conclusion, allow me to urge the members of the West Oxford Agricultural Society, that if they would keep up with the spirit of progress and improvement in all matters of rural economy, they

must read, study and reflect upon the contents of the best papers, periodicals and books that treat of the promotion and advancement of stock-breeding, feeding, sheltering and good husbandry, thus putting away the prejudice to "book farming."

EXTRACTS FROM REPORTS.

LIVE STOCK.

Horses. We were very much pleased with the respectable and quite numerous entries in this department of the Fair, and before going into detail, feel bound to say that no one, who has attended the exhibitions of this Society, from its start to the present time, and seen, on this occasion, the visible improvement and interest manifested in the breed and style of horses entered at this Fair, but feels conscious of the benefit of Agricultural Shows.

There were entered for premiums, but three stallions. These were quite good specimens; but West Oxford did not do her duty. While every village, in the Spring of the year, is visited by a half dozen, and every street corner and shop door is curtained with showy pictures, of groom and stallion, here, where the farmer can see, examine, and know for himself, the age, size, weight, breed, and every merit of the animal—worth, both to farmer, groom and owner, more than an acre of printed advertisements,—the meagre number of three only are on exhibition from all the best half of Oxford county! A fact not at all creditable to the intelligence and shrewdness of the owners of these animals, and a strange disregard of self-interest, not common to the alive and wide awake horse-dealers.

Of these entries, one was by Freeman Hatch of Hiram. Breed, Harpinas; weight, 1,100 pounds; six years old; raised in Hiram. To this horse we award the first premium, for best stallion.

One was entered by James Holden of Sweden. Horse seven years old, known as Young Kentucky Hunter; sired by the old Kentucky Hunter, of Canton, Mass.; weight, 1,100 pounds; a fine horse, and to him we award the second premium, for best stallion.

One by Stephen L. Bradbury of Lovell. Age, three years; dam, Morgan; sire, English horse; raised in Fryeburg, by Col. E. L.

Osgood. This horse was a fine specimen both of horse and horsemanship, being capitally broken, and kind and obedient to the slightest touch of the rein or halter. Bradbury has a good horse, and ought himself to have a premium, as a horse tamer.

Breeding Mares. There were but two presented. One by Ichabod S. Warren of Denmark. Ten years old; breed, Morgan; weight, 850 pounds; raised by him, in Denmark; and with all the points of a fine breeder and good family horse. To him we award the first premium, for the best breeding mare.

The other entry was by Thomas Farington of Stow. This mare had by her side a fine large four months old colt, which has been awarded the premium for best colt less than six months old. The mare is a good specimen of a good breeder; age, six years; weighs 1,000 pounds; blood not stated; raised in Stow. This gets the second premium for breeding mares.

Cows. The Committee on Cows report:—In order to secure the greatest good in any enterprise, a thorough, practical acquaintance with all its bearings and relations is indispensibly necessary. He who would succeed in mercantile pursuits must not only be possessed of sufficient capital in ready money, but must be qualified to transact his business economically, and invest his money when and where it will yield him the quickest and largest returns. The huntsman who would become an adept in trapping game, must first acquaint himself with the habits of the animal he pursues. He must know what kind of food it chooses, and when it takes it; when it is in the best condition, and where it may naturally be found.

So he who would avail himself of the comforts and luxuries of a good dairy, and lay the foundation of a superior stock, must become a close, practical student of the female, in all her conditions and circumstances; not only after she becomes a cow, but in earliest life. "Just as the twig is bent the tree's inclined," is no less true among the brutes, than among the human race, and neither can be neglected with impunity. Nature does all her work finally and well; and always accomplishes whatever is undertaken, unless hindered by outward circumstances, over which she has no control. Man, short-sighted and selfish as he is, arrogates to himself the ability to improve upon nature's operations; and as may naturally

be expected, always fails. Nature teaches us that the mothers of all animals know better than we, the best good of their offspring. It teaches that the calf should be allowed to run with the mother until she weans it herself; and in this way, and no other, can the young attain that growth, size and strength designed by nature. A large proportion of the heifer calves, and many steers, never know the sweet deliciousness of drawing their sustenance from the source nature has provided, but suck the bitter, cold, blue milk from a hog's trough, and take a dessert from each other's ears. What is the result? Small cows are the legitimate fruit of this course; and as like begets like, a small, diminutive, partially developed stock is entailed upon the proprietor of so narrow and circumscribed policy. One suggestion, en passant, may contain something not impracticable, but perhaps beneficial. Let farmers select a cow which brings large, well-formed calves, and allow her to follow the promptings of nature; free intercourse with her young, until they dissolve the relation of mother and child mutually; and then dry up the cow and let nature again exercise her recuperative powers and be suitably prepared to undergo and maintain with profit, the next season of reproduction. In this way a superior breed may be produced, and money made by the operation.

Where are the cows and heifers owned by the members of this Society? Have they not good cows? or are they unwilling to drive them here, lest the quantity of milk will be diminished?

We noticed only three entries of cows; two two years old heifers; five of a year old; and one heifer calf.

Willie J. Bradbury, an enterprising lad of eleven years, through dint of untiring perseverance, exhibited a nice two years old heifer. No application was legally made, but your committee feel disposed to encourage such examples of industry and energy. This lad desires to become a member of this Society, and we would recommend a gratuity.

B. F. Whitcomb of Sweden, presented a nice looking cow, but your committee were unable to decide upon her merits, as she appeared to be dry. It seems that our farmers misconceived the true plan of exhibiting cows. As a general thing such cows are presented as have been dry during the summer, and are fat and smooth; and such have always received the premiums, regardless of intrinsic

merit. Hoping that there may be more competition next year, we respectfully submit the above report.

Statement of M. K. Mabry.

The animal which I offer is ten years old. She is the offspring of a native two years old heifer, by a grade Durham bull. She was raised by me, from her mother, and her food has been of the average quality usually fed to stock, by farmers generally. She sucked six weeks, one-half the milk, and was weaned on grass by the roadside. She was pronounced unfit to winter; but soon discovered uncommon faculties for getting a living, and grew nicely. She brought a calf when three years old and has had one every year since, four of which I now own. Two give milk and bid fair to excel her in milking properties. In the month of June, in seven days, she gave 264½ pounds milk, and made 11 pounds of butter. She is very hardy, gaining flesh upon food with which other cattle will hardly hold their own. She has done better the last season than ever before, and seems to be just in her prime. I think cows may be kept with profit until they are sixteen years old, accidental cases excepted.

Oxen and Beeves. The Committee upon Oxen and Beeves, having attended to their duty, report :

The number and quality of cattle exhibited were commendable, and showed an increased interest in the exhibition, over former years. * * * * * *

We would earnestly recommend to our farmers to drive in their cattle, whole herds, that an interest may be awakened which will result in the greater advancement of our agricultural interests. It should not be the great object of these annual exhibitions, the small amount of premium offered, but the permanent benefits resulting to the great cause of agriculture.

Bulls. The Committee on Bulls report:—There were eight entries of bulls; and it is a source of sincere gratification to be able to announce to this Society that they were all noble animals, exhibiting many superior points, and shewing great care in rearing, as well as selecting those of good forms, color, breeds and races. Three full blood bulls were entered—one Durham and two Devons. The Devons appeared to be more numerous and preferred by a large majority of exhibitors. We noticed several half blood Devons, all superior animals.

Thomas J. Haley of Stow, exhibited a full blood Devon, which your committee unhesitatingly decide to be one of the finest specimens of neat stock ever exhibited at our shows.

Hosea R. Allen of Hiram, presented a full blood Durham, two years old, which is 6 feet 6 inches in girt, and weighs 1,500 pounds. The fanciers of the Short horns might have regaled themselves with an inspection of his superior qualities.

Benj. F. Whitcomb of Sweden, also presented a full blood Devon, raised by John F. Anderson of South Windham, that amateur of North Devon stock. It is such an animal as he knows how to rear.

We regret that some misunderstanding even now exists among those who compete here for premiums. Some enter on the books, but make no legal application. Some make an application but no entry. Some have made entries and left their stock at home, and no doubt will complain that no notice is taken of them. We hope that this evil may be remedied in future. We award the premiums as follows:

Thos. J Haley of Stow, the premium for best full blood bull.

Elden Barker of Lovell, for best native bull.

Ivory Wentworth of Hiram, do., second premium.

Hosea R. Allen of Hiram, best bull calf.

We would recommend a gratuity to H. R. Allen, for his full blood Durham bull.

Sheep. The committee report:—To William Woodbury of Sweden, the first premium for sheep. This was the only flock of sheep exhibited, but we consider it worthy of the premium.

To M. K. Mabry of Hiram, the first premium for best buck. This buck was of the Leicester breed, we think a profitable one for this climate. He appeared to be hardy, looked thrifty, and was in good flesh, which is rarely the case with a buck of his age. He was compactly built, of good size, weighing about 130 pounds, which is considered good weight for his age, one year, and the keeping he has had.

To William Woodbury of Sweden, the second premium, for his buck. This buck is of the native breed, crossed with South Down.

TOWN TEAMS.

The Committee on Town Teams report three entries in this department, to wit: one from North Fryeburg, one from Denmark, and a team of three years old steers from Hiram. The ox-teams exhibited were made up of beautiful animals, generally well-matched, and many of gigantic size.

First premium to the team from Denmark, entered by J. W. Davis. Second premium to the team from North Fryeburg, entered by H. D. E. Hutchins.



GRAIN.

The Committee on Grain report entries for premium on crops of wheat, by Benjamin F. Whitcomb of Sweden, Mark F. Witham of Denmark, James Walker of Fryeburg, Nelson Gamage of Sweden, and Washington Colcord of Porter. The same system of cultivation was pursued by all. The land, the previous year, was prepared for corn, and a crop raised in the common way, generally by plowing in green manure, and manure in the hill.

Benjamin F. Whitcomb of Sweden, having raised 29 bushels on one acre, we award him the first premium. He describes it as bald wheat, but not having a specimen of the same, we are unable to speak of it as it may deserve,—an omission on his part which should bear unfavorably to his claim; but as it exceeded the others by a number of bushels, we accept it, with a recommendation that hereafter such neglect should be fatal.

The second premium we award to Mark F. Witham of Denmark, who raised 24 $\frac{3}{4}$ bushels on one acre. The specimen exhibited was a beautiful white wheat, apparently of the Scotch Fyfe variety, clean and plump.

The third premium we award to James Walker of Fryeburg, for 23 $\frac{1}{2}$ bushels raised on one acre, of the Scotch Fyfe variety. The specimen exhibited was good.

Nelson Gamage of Sweden, having raised a large crop of 80 bushels on 4 acres of land, we considered as deserving our particular attention, whether the less amount raised per acre on a larger tract of land should not overbalance more wheat raised per acre on less

land. But not having a sample of his crop to decide as to its quality, we are unable to give it the station to which it may be justly entitled.

Washington Colcord of Porter raised $50\frac{1}{2}$ bushels on three acres, which he described as red bearded wheat. The specimen exhibited was fine and clean. But the quantity raised per acre was not sufficient to compete with the larger quantity raised on a less amount of land.

Joseph Stevens of Fryeburg raised 16 bushels of spring rye, from one bushel of seed, on 1 acre and 8 rods of land, being at the rate of $15\frac{7}{8}$ bushels per acre. The soil was light and sandy, and the year previous corn was raised by manuring in the hill. Thirty bushels of ashes were spread on after sowing. He is the only applicant, and we consider that he has done enough to entitle him to the first premium.

Frederic N. Frye of Fryeburg, is the sole claimant for bounty for the greatest crop of oats. He is entitled to the first premium by raising 85 bushels on $1\frac{1}{4}$ acres of land, being at the rate of 68 bushels per acre. The oats succeeded a crop of corn.

We award Mark F. Witham the first premium for seed wheat—being of the crop on which a premium is awarded.

To Samuel Stickney of Brownfield, we recommend a gratuity equal to the second premium on seed wheat, for his energy in continuing to raise a good specimen of winter wheat. We consider it important that the raising of winter wheat in the district should not be wholly given up.

The applicants for premium for the best crop of corn, with statements properly made and attested, are as follows:

J. W. Colby of Denmark, 81 bushels on one acre of land.

Reuben Kimball of Hiram, 88 bushels on one acre and 53 rods, being at the rate of 66 bushels per acre.

James Walker of Fryeburg, 62 bushels on one acre of land.

Statement of Benjamin F. Whitcomb.

My crop, consisting of 29 bushels of wheat, was grown on one acre of land. The soil on which it grew was deep upland. Was dressed on the sward the year before, with 22 loads of winter manure, and turned under to the depth of eight inches; harrowed down well, furrowed out, and 12 loads of dressing put in the hill.

Plowed again the present spring, and seeded with one and one-half bushels bald wheat. The weevil worked bad. I should probably have got 40 bushels if the weevil had not got into it.

Statement of Mark F. Witham.

My crop, consisting of $24\frac{3}{4}$ bushels of wheat, was grown on one acre of land. The soil upon which it grew was planted to corn last year, with 16 cartloads of manure; plowed this spring; sowed the 10th of May, $1\frac{1}{2}$ bushels seed; harvested about the 20th of August.

The field is a hard, stony soil, plowed eight inches deep. The cost of growing the same and its value are as follows:

Dr.	<i>Crop of Wheat.</i>		Cr.
Plowing,	\$3 00	24 $\frac{3}{4}$ bushels at \$2,	\$49 50
Harvesting,	2 00	Fodder,	5 00
Threshing,	6 00	Manure left in soil for future crop,	2 00
1 $\frac{1}{2}$ bushels seed,	3 00	estimated,	2 00
Manure left from former crop,	5 00		
Interest on land,	1 50		
		Deduct cost,	20 50
	\$20 50	Profit,	\$36 00

Statement of James Walker.

My crop, consisting of 20 bushels of 58 pounds to the bushel, was grown on one acre. The soil on which it was grown was rocky loam, of a dark color, rather fine. Depth of soil, two feet, resting on a hard, gravelly subsoil. No manure was applied to the land the present season, for the benefit of this crop. The variety sowed is called the Scotch Fyfe wheat. The cost of growing the same and its value are as follows:

Dr.	<i>Crop of Wheat.</i>		Cr.
Plowing 2 days at ,75,	\$1 50	20 bushels at \$2,	\$40 00
Harrowing,	50	1 ton straw,	3 00
Sowing,	25		
Harvesting,	2 00	Deduct cost,	43 00
Threshing,	2 00		7 25
1 bushel seed,	2 00		
	\$7 25	Profit,	\$35 75

Statement of James Walker.

My crop consisting of $23\frac{1}{2}$ bushels of spring wheat, was raised on one acre. The soil upon which it grew was a chocolate colored, stony loam, fine, resting on a hard, gravelly subsoil, about $2\frac{1}{2}$ feet from the surface. Said land was in corn, the previous year, it having been manured for that crop by 8 cords of barnyard manure to the acre. No manure was applied to the wheat crop this year. Plowed once, third day of May, 1859. Sowed May 7th, five pecks to the acre, of the Scotch Fyfe variety, washed in brine and dried with ashes before sowing. Harvested the 18th of August. The cost of growing the same and its value are as follows:

DR.	<i>Crop of Wheat.</i>		CR.
Plowing two days, . . .	\$1 50	23½ bushels at \$1.75, . . .	\$41 12
Cultivating one day, . . .	1 00	1½ tons straw at \$1, . . .	6 00
Harvesting, . . .	1 50		
Housing, . . .	50		
Threshing, . . .	3 00		
1¼ bushels of seed, . . .	2 00		
Manure left in soil from former crop, . . .	4 00		47 12
Interest on land, . . .	1 20	Deduct cost, . . .	14 70
	\$14 70	Profit, . . .	\$32 42

Statement of Washington Colcord.

My crop consisting of 50½ bushels, was grown on three acres, being at the rate of 17 bushels to the acre. The soil upon which it grew was a gravelly loam, stony and of a yellow color, rather coarse, and about one foot deep. Was broken up the last days of May, 1858,—put on about 6 cords of green manure, and planted to corn, and raised about 150 bushels. Prior to 1858, for eight years it had been in grass, averaging for the last two or three years, about ½ a ton per acre. No manure was put on in 1859. Sown May 6th. The seed was red bearded wheat, one bushel to the acre, sown dry. Harvested about August 12th. It was cut with a cradle.

Statement of Joseph Stephens.

My crop, consisting of 16 bushels of rye, was grown on one acre and eight rods of land, being at the rate of 15¾ bushels to the acre. The soil upon which it grew was a light sand. It was planted to corn, last year, which was manured in the hill, and no other manure applied. The rye was sown about the first of May, and after it was up thirty bushels of ashes were sown on the piece. The soil is about ten inches deep. I harvested it in August. The cost of seed, (one bushel,) sowing and harvesting, is \$4.50. The worth of the rye at my house is one dollar per bushel.

Statement of Frederic N. Frye.

My crop, consisting of 85 bushels of oats, of 33 pounds to the bushel, was grown on 1¼ acres of land, being at the rate of 68 bushels to the acre. The soil upon which it grew was loamy, eight inches to subsoil, dark colored. Planted to corn the previous year. Sown the middle of May. The cost of growing the same and its value are as follows :

DR.	<i>Crop of Oats.</i>		CR.
Plowing, . . .	\$3 00	85 bushels, . . .	\$42 50
4 cords manure, . . .	4 00	Straw, . . .	8 00
Carting and applying same, . . .	2 00	Manure left in soil for future crop, . . .	
Harrowing and sowing, . . .	1 25	estimated, . . .	2 00
Harvesting, . . .	1 50		
Threshing, . . .	3 00		
2 bushels seed, . . .	1 00		
Manure left in soil from former crop, . . .	2 00		52 50
Interest on land, . . .	2 40	Deduct cost, . . .	20 10
	\$20 10	Profit, . . .	\$32 40

Statement of Joseph W. Colby.

My crop consisting of 81 bushels of corn, was raised on one acre of land. The nature of the soil is light, fine and loamy, and of a yellow color, 12 inches deep. Its mechanical condition is good. The treatment of the soil and crops is given in the annexed account. The manure was spread upon the furrow. It was planted with a hoe, on the 15th of May. The seed was 8 rowed; used 16 quarts. The cost of growing the same and its value are as follows:

DR.	<i>Crop of Corn.</i>		CR.
Plowing 4 days, at 1.25, . . .	\$5 00	81 bushels, at \$1, . . .	\$81 00
7 cords barnyard manure, . . .	21 00	2½ tons fodder, . . .	17 50
Applying same, . . .	3 00	Manure left in soil for future crop, . . .	15 00
Harrowing, . . .	2 00		
Furrowing and planting, . . .	2 50		
Cultivating twice, . . .	1 25		
Hoeing twice, 10 days, . . .	10 00		
Cutting stalks and harvesting, . . .	5 50		
Husking, 8 days, . . .	8 00		
16 quarts seed, . . .	64		113 50
Interest on land, . . .	1 20	Deduct cost, . . .	60 09
	\$60 09	Profit, . . .	\$53 41

Statement of Reuben Kimball.

My crop consisting of 88 bushels of corn, was grown on one acre 53 rods, being at the rate of 66 bushels to the acre. The soil on which it grew was interval, plowed $\frac{1}{2}$ last fall and the other half this spring. It is a sandy loam, free from stones, lying on the bank of the Saco river. The field cut about 15 cwt. of hay last year. The manure was taken from my barn cellar, eighteen loads were harrowed in, in the spring, and twelve put in the hill. It was planted the 18th and 19th of May, and cut and shocked the middle of September. The seed is the large twelve rowed variety, grown by me for several years. The cost of growing the same and its value are as follows:

DR.	<i>Crop of Corn.</i>		CR.
Plowing, 6 days, . . .	\$6 00	88 bushels, at \$1, . . .	\$88 00
30 loads manure, . . .	30 00	Fodder, . . .	10 00
Harrowing, . . .	2 00	Manure left in soil for future crops, . . .	10 00
Furrowing, . . .	4 00	estimated, . . .	10 00
Hoeing, 8 days, . . .	8 00		
Harvesting, . . .	8 00	Deduct cost, . . .	\$108 00
Seed, . . .	50		58 50
	\$58 50	Profit, . . .	\$50 50

Statement of James Walker.

My crop, consisting of 62 bushels of corn, was grown on one acre of land. The soil upon which it grew was upland loam, quite rocky, 2½ feet deep, of chocolate color, not very light, resting on a hard, gravelly subsoil. Said land was in grass the previous year. In May last I spread on 8 cords of manure from my manure cellar. On the 18th I plowed in the manure and greensward, and on the 23d planted, after harrowing. Made the rows nearly north and

south, about $3\frac{1}{2}$ feet apart, with hills $2\frac{1}{2}$ feet apart. The seed planted was the eight rowed sort, large kernels, small cob, which I call the best sort of corn for me to cultivate. The stalks above the ear are small, consequently less exhausting to the soil. Put on a gill of ashes and plaster to the hill, before the first hoeing. Hoed twice. The corn was cut down by the frost in June. Harvested September 15th. I had in addition to the good corn as above, eight bushels of ears of soft corn. The cost of growing the same and its value are as follows:

DR.	<i>Crop of Corn.</i>	CR.
Plowing, 4 days, . . .	\$3 00	62 bushels, at \$1.20, . . . \$74 40
8 cords manure, . . .	32 00	4 tons fodder, at \$3 per ton, . . . 12 00
Applying same, . . .	3 75	Manure left in soil for future crop, . . .
Harrowing, . . .	75	estimated, . . . 16 00
Planting, . . .	1 50	8 bushels of soft corn will offset in-
Cultivating, 2 days, . . .	1 50	terest on land.
Hoeing, 4 days, . . .	3 00	
Ashes and plaster, and applying same, . . .	4 00	
Harvesting, . . .	75	
Housing, . . .	75	
Husking, 3 days, . . .	2 25	\$102 40
16 quarts seed, . . .	50	Deduct cost, . . . 53 85
	\$53 85	Profit, . . . \$48 55

ROOT CROPS AND PEAS.

The committee report:—Three entries on potatoes. One by Jas. Walker of Fryeburg,—it being 23 bushels on 12 square rods, equal to 320 bushels to the acre.

One by James O. Fessenden of Brownfield. Amount, 173 bushels on half acre, being at the rate of 346 bushels to the acre.

One by J. S. Walker of Fryeburg, consisting of 190 bushels, grown on 81 rods, being at the rate of 380 bushels to the acre.

To Andrew H. Evans of Fryeburg, the premium for the largest crop of ruta bagas, on 48 rods, amounting to 65 bushels—at the rate of 520 to the acre.

Stephen P. Walker of Fryeburg, entered a crop of peas, consisting of $11\frac{1}{4}$ bushels grown on 68 rods, being at the rate of 26 bushels to the acre, for which we award premium.

Statement of James O. Fessenden.

My crop consisting of 173 bushels of potatoes, was grown on 80 rods of land, being at the rate of 346 bushels to the acre. The soil on which it grew was high interval, a composition of muck and sand. It was grass land, last spring.

I used common, coarse barnyard manure—about two-thirds of a shovel-full in the hill. Planted last day of May. Used 7 bushels of seed, one-third lady-fingers, the remainder pink-eyes and whites. Harvested Oct. 3d and 4th.

The cost of growing was \$12; value at my residence, \$57.66.

FRUIT.

The Committee on Fruit report, that the exhibition of fruits was not so extensive as we had hoped to witness. Yet, when we consider the unfavorableness of the past season, we feel highly gratified with the success with which patient toil in this department has been crowned. And, though from the coldness of our climate, the character of the soil in many places, with other disadvantages under which Providence has placed us, precludes the hope of the degree of success realized in other portions of our country, yet your committee fully believe that great improvements may and should be made in this direction. They believe that more time, care, and pecuniary expenditure devoted to this branch of industry, would not only be highly remunerative, but would furnish increasing social enjoyments, and render home, as the Creator has designed it, more like an original Paradise.

And they furthermore believe that the greater the effort made in this direction, the richer will be the enjoyment when a kind Providence shall have crowned that effort with success. May we not hope then, that from year to year, new life and vigor will be infused into this interesting branch of industry, by new experiments in the culture of the various kinds of fruit capable of being raised in this climate, together with the various products of the kitchen and flower garden; and also, the cultivation of the various kinds of garden seeds, for home use, at least, together with fruit trees and shrubs of choice varieties, enough to meet our wants, without relying upon those brought from abroad, which, too often, only disappoint our hopes. Let the trial be fully and promptly made, and we have but little fear for the result.

DAIRY.

Statement of Mrs. Stickney, on Butter, who took first premium.

My dairy consists of four cows, (two farrow and two heifers.) Their average period of giving milk is nine months; the average yield of milk for the whole term is $10\frac{1}{2}$ pounds per day. During the month of greatest flow the yield is 17 pounds per day, and its quality is such that 27 pounds of it will yield a pound of butter. They are kept in winter on hay, and a little meal in the spring, and in summer on grass. My mode of manufacture is as follows: The milk is strained and set into a kettle of cold water, put on the stove until it boils; it is then carried into the cellar from 24 to 36 hours, then skimmed; the cream is put into a tin kettle, and churned the fifth day in the Gault churn. The butter is from twenty to thirty minutes coming. It is then taken from the churn and worked with the hand until free from milk. It is salted with one ounce of salt to one pound of butter. After standing 24 hours, it is worked over, and packed down in stone pots and covered to exclude the air, by putting white paper on top of the butter, then melted butter poured on to the paper. It is then put away in a cool cellar. Our method of churning is to commence slowly for about seven or eight minutes, then increase the speed until near coming, then slowly again, which we find to be better than to churn slow or fast through the whole churning.

Fall butter—mode of manufacture the same as above described for the June butter, and the addition of one ounce of salt to nine pounds of butter.

Statement of Mrs. V. R. Stickney, on Premium Cheese.

My dairy consists of four cows, of the native breed. Their average period of giving milk is nine months; the average yield of milk for the whole term is five quarts per day. During the month of greatest flow the yield is seventeen pounds per day—and its quality is such that ten pounds of it will yield a pound of cheese. The cows are kept in winter on hay and a little meal in the spring, and on grass in the summer. My mode of manufacture is as follows: The milk is strained in a large tin pan made for the purpose. Having soaked one rennet in one quart of water, put one table spoonful of the liquid to ten quarts of milk. While the milk is warm let it stand 30 minutes, then cross into eight parts; then let it stand one hour; then break it a little more, and let it stand till morning; then dip it off on to a cloth in the cheese basket; then wash the pan and put the morning's milk into it, and the same proportion of rennet; let it stand half an hour, then cross it off; then let it stand one hour; then dip it in with the other curd, and after standing half an hour, cut the curd, then during one and a half hours cut it occasionally; then pour on two quarts of water a little warmer than milk; then let it stand one hour, cut into pieces about an inch through; add $\frac{1}{2}$ oz. salt to 25 lbs. curd, produced from 90 qts. of milk; put into the press with a light weight; next day prepare curd by same process, which, after having scratched the top of that

in the hoop, add, and press as before, and the third day fill the hoop, and press till the next day: take from the hoop and put a bandage around the cheese, put in the screen, then turn and rub twice a day.

MAPLE SUGAR.

Sugar is one of the luxuries, if not one of the necessaries of life. That extracted from the maple is superior to any other, and its manufacture has become quite an important branch of domestic industry,—therefore your committee would make a few suggestions in regard to the process. First, the sap should be caught in well cleaned vessels, free from decayed leaves, bark, or any other substance which will change its color. Second, it should be boiled to syrup as soon as practicable. Third, care should be used that it may not be scorched. For this purpose the boiler should be so arranged that the fire cannot come in contact with the vessel much above the liquid within. By an observance of these rules we cannot fail to produce clean, white, well granulated sugar, while inattention and carelessness produces quite the reverse.

NEEDLE WORK AND FANCY ARTICLES.

The following suggestions were embodied in the report of the Committee on Needle Work and Fancy Articles:

Your committee would further claim the indulgence of the Society, while we endeavor to call attention to some items connected with this department, and in our crude way, throwing out some ideas which had suggested themselves to our mind.

In taking a cursory view of the subject it would seem that this department was a very trivial affair, scarcely worth the serious attention of any one and altogether beneath the notice of the *sterner sex*. Yet when we take into account the zest with which skill aids affection in ministering to their physical and spiritual requirements, and the importance attached thereto—even by the higher officers of this institution, to the onerous duties of which they have appointed a greater number than to all other household manufactures, it loses its insignificance and assumes a really responsible aspect.

We think, too, there is a specific utility in works of art, and in the exercise of taste, even in the ordinary avocations of domestic life. We most devoutly believe that in the rearing and training of families, that it is bad economy to have in view no higher object than catering to their merest animal necessities, clothing them in apparel that involves the least possible outlay of time and money.

Which child is most averse to damaging or soiling its garments, the one clad in ill-fitting and unbecoming costume, notwithstanding it may be a good defence against the inclemencies of the weather, even of costly material, or the one whose cheap but fashionably cut garments are decorated with a bordering of another shade or color, though of no better material than the garment itself?

How many a little girl has avoided a mud-puddle on her way from school, and consequently a chiding at home, perhaps castigation, by an innate desire to preserve the purity of a bit of embroidery, or tape trimming, and surely this is a cheaper, as well as more agreeable mode of *fencing*, than *railing* and *withing*.

And is not a trifling outlay in fancy needle work more satisfactory to a cultivated mind, than *scrubbing* and *botching*? or the very *botching* performed in such a scientific and artistic manner, as to become a source of pride instead of shame, to say nothing of its effect on characters being formed under its influence. To be sure, some vain and frivolous lady, who makes the embellishment of herself and family the business instead of the pastime of life, may torture our remarks into a vindication of her misapplication of time which should be devoted to higher and better purposes; but your committee are not pledged to furnish brains, we only appeal to them, and "a word to the wise is sufficient."

Our rugs and mats, also,—manufactured from the remnants of dilapidated and cast off garments, or the odds and ends of new, are by some considered superfluous articles, but which the prudent and ingenious fabricators assure us is a great saving of *dirt*, (as indeed they are, in more respects than one.)

Many a slovenly son and brother has left on the grass plot, or scraper, the fertilizing particles of the compost heap which adhered to his boots, at thought of "mother's new door mat," or, as that is usually of less delicate tint and construction than the carpet and hearth rug, and therefore of less importance in his eyes, bethinks

himself, as he sets foot thereon, of the gaudy boquets that bloom on "sister's new rug," and the soil he has brought all the way from the farm yard is received into its intricate folds, making a literal *saving* of dirt which had else been tracked to the remotest corner of the house.

Even these specimens of virtue which appeal to the senses alone, if they are wholly useless, why have the best and wisest of all ages been their greatest patrons?

When we find it not beneath the dignity of the Creator of the universe, to paint the fragrant lily, rose, and the gorgeous tulip, shall we consider it an insignificant performance of art, to reproduce such exact imitations as to deceive the eye of the practiced connoisseur? Or from the curious seed-receptacles of the coniferous forest evergreen, to fashion furniture outvieing the cunning carvers' art?

When he daguerreotypes upon the lakelet's silvery surface, the blue and gold of heaven's type, and wooded landscapes all along its margin, shall we despise the art which links to crystal the images of those we love?

When nature paints the forest, and the mountain's brow in rainbow hues, may not art transfer to crayon-board and canvas, landscapes that we admire or love, to grace our walls and cheer our indoor life?

Let us not shrink from competition, but strive for the perseverance to do our best, the courage to compare our work with others, and the generosity to rejoice at seeing ourselves outdone. Then, and not till then, will the chief obstacles be removed from the path of improvement, and our journey to perfection be really commenced.

E. E. FLY, *Chairman.*

LINCOLN COUNTY SOCIETY.

The Secretary writes:—"This Society now embraces 1,121 members, 159 new ones having been added during the past year. Its Annual Exhibition was held at Union, on the 18th, 19th and 20th days of October, 1859. Although on the first day we had a severe storm, the exhibition was a very good one, there being in the different departments about seven hundred entries. On account of the storm, the show of stock and horses was not so large as it otherwise would have been; still there was a very handsome show, being about 150 entries of stock, somewhat less than there has been at the two previous exhibitions. There was a very good show of Devon cattle, and a large number of colts, some of which were of high promise. The other departments were well filled."

Some of the premiums were awarded as follows:

LIVE STOCK.

Horses. First premium on a stallion, sired by the Gleason horse, to Samuel Quiggle of Union.

Second premium on one sired by Bush Messenger in 1847, to Edward Hills of Thomaston.

First premium on breeding mare, R. H. Sayward of Union.

Second premium to Levi Russell of Whitefield.

The committee recommend greater attention to the breeding and rearing of good horses, deeming the county behind many others in the State.

For best three years old colt, to Sumner Leach of Warren.

For best two years old colt, to Isaac Townsend of Union.

Bulls. First premium to William G. Hawes, for three years old Devon bull, reared by I. Wentworth.

Second premium on two years old, to A. B. Harding.

Several grades of Devon and Hereford also received premiums. One to A. B. Harding, for a bull of the "Comet" breed, from England.

Cows. First premium to Eben Cobb of Union, for Devon cow.

Second premium to Lewis Robbins of Union, for Devon, both from the herd of I. Wentworth, Poland.

For dairy cow, to Charles Taylor, for a native, which had made 277½ pounds butter in a season, besides supplying milk for a family and selling some.

Sheep. A Cotswold buck was shown by Samuel Ripley of Washington, reared by T. L. Hart of Connecticut. Other sheep were exhibited and received premiums, but no statements of their breed and character are found.

Swine. Those receiving premiums are described as part Suffolk and Newbury White.



FRUIT.

The committee speak of the show as very good. Among the larger exhibitors were John Currier of Waldoborough, who showed over fifty varieties apples, pears, grapes, &c.

Levi Russell, Jr., of Whitefield, showed twenty-eight varieties of apples.

Messrs. Creighton of Thomaston, and Herbert of Bristol, exhibited fine grapes, &c., &c.



CROPS.

Corn. First premium to Thomas J. Trask of Jefferson, for 100 bushels of ears on half an acre. Soil, clayey loam—greensward, plowed in fall, ten inches deep—five cords manure put on in May, and harrowed in, shovelful of compost in the hill.

Second premium to David Starrett of Warren, on 77 bushels of ears, on half an acre.

Third premium to Lewis Robbins, for 183 bushels of ears at 40 pounds to the bushel, on an acre and a quarter.

Fourth premium to Z. Collins of Union, for 145 bushels of ears on 150 square rods. Also on same piece 4 bushels of beans and a load pumpkins.

Wheat. Eben Cobb of Union, raised $22\frac{1}{2}$ bushels Java wheat on one acre.

R. F. Sweetland, 10 bushels bald wheat weighing 65 pounds per bushel, on half an acre of light soil, in corn last year, and manured then with compost of yard manure and rock weed.

H. W. Partridge, $19\frac{1}{4}$ bushels Java wheat, of $66\frac{1}{2}$ pounds per bushel, on 151 square rods. Other exhibitors state from 18 to 20 bushels per acre.

Barley. C. R. Morton of Union, 30 bushels barley on half an acre.

Thomas J. Trask, 48 bushels two rowed barley on one acre and three square rods. Other competitors state from 35 to 41 bushels per acre.

Rye. Roscoe McDowell, 28 bushels rye on an acre, burnt land, weighed 64 pounds per bushel.

Oats. Eben Cobb of Union, $51\frac{1}{2}$ bushels oats per acre.

Potatoes. C. R. Morton, 246 bushels Snowball potatoes per acre—6 cords manure, land in potatoes last year. Strong mellow soil.

N. B. Bemis, 153 bushels Jackson and Snowball potatoes on one acre old pasture land, no manure, except a bushel of plaster.

Oren O. Stewart showed samples of Davis' seedling, grown at rate of 240 bushels per acre.

Simon Litchfield, 140 bushels on 67 square rods.

Carrots. H. W. Partridge of Jefferson, 109 bushels on one-sixteenth of an acre.

Beets. E. R. Kaler, sugar beets, three-sixteenths of an acre, at rate of 700 bushels per acre.

ANDROSCOGGIN COUNTY SOCIETY.

The Annual Exhibition of this Society was held at Lewiston on the 4th to 7th of October, and was a very creditable one. A larger proportion than I expected to find, of the stock shown, bore evidence of high breeding and general success in management. Unless greatly mistaken, there has been very decided improvement in the domestic animals of this county within a few years past, and the interest evidently manifested augurs well for the future.

The Devons were out in considerable numbers, and attracted notice at once. Their symmetrical forms, beautiful and uniform color and known good qualities, win favor with all to whom great size seems of less consequence than hardihood, general adaptation to our wants, and profit in rearing.

The Herefords which are rather larger and about as good in most other respects, (dairy use excepted,) were present, but in less numbers; probably few if any of them were thorough bred, although the greater number were distinctly recognizable at a glance as partaking of the blood. There were also, as usual at our shows, cattle of various grades and of common or mixed blood; and here I may be allowed to remark, that size appears to have more consideration accorded to it usually, than would be the case if more correct views prevailed, as the value of an animal depends not so much on large size as upon the profit it may yield; and unless pastures and fields are rich and the climate warm, very large cattle have even proved less profitable than those of a size adapted to their capacity for feeding.

There is also another point upon which a remark may not be out of place here. I allude to the practice of many agricultural societies in offering premiums, to make no distinction between breeding animals which may simply please the eye of the judges, and such as are likely to impress upon their progeny desirable qualities; or in other words,

between grade animals or those of *mixed blood*, and *thorough bred*. If correctly informed, at this show the same amount of premium was awarded to each. Now if thorough bred animals do possess certain *hereditary traits* which are desirable, and may be expected to impart these to their progeny, why not offer larger premiums for these, as they cost high, and breeders need encouragement to induce them to purchase, while if they be procured, grades will be almost certain to come in plenty without such encouragement?

LIVE STOCK.

Horses. First premium for stallion, to S. J. Smith of Lewiston.

Second premium, to William Keen of Poland.

First premium for stallion three years old, to David Bowe.

Bulls. First premium for Devon bull, to A. C. Mitchell.

Second premium, to Madison Sprague of Greene.

Third premium, to J. S. Garcelon of Lewiston.

Premiums were also awarded to S. Stinchfield, Ebenezer Ham, J. C. Bryant, and others, for grades and natives. Mr. Stinchfield showed a bull calf eight months old, grade Durham, girting 5 feet 9 inches; had been on the cow all the time and had some meal.

Farm Stock. P. B. Rackley of Greene, showed twelve head of grades of Hereford and Durham, and obtained first premium.

Milton Carville showed twelve grade Durhams, and obtained second premium.

The statements regarding the animals which have been received, although they contain information useful for the judges at the show, have little of interest to the public at large. From one by S. H. Read, we learn that a grade Hereford cow, from a Native cow of excellent milking properties, gave 28 quarts of milk in one week in December, which yielded 5 pounds 7 ounces of butter. He says, "with kind treatment and good keeping, gives milk up to calving; with rough treatment and poor keeping will be likely to go dry four or five months," thus giving a hint which many may profit by.

Swine. R. P. Briggs took most of the premiums on swine, for grade Suffolks.

CROPS.

Indian Corn. First premium to S. R. Pottle of Minot, for 150 bushels, of 60 pounds each, on two acres. Thirty cords manure applied. Cost, \$151.60; value, \$210.

Second premium to Nelson Ham of Lewiston; 57½ bushels on an acre; gravelly loam; in potatoes last year. Four cords green manure spread and plowed in; 2½ cords old manure in hills. Cost, \$56; value, \$79.

Third premium to William Skelton of Lewiston; 58 bushels of 58 pounds each per acre; twelve cords compost manure. Cost of two acres, \$57.81; value, \$128.

Wheat. Elijah Hamblen of Turner, first premium for 30¼ bushels Canada wheat on one acre; deep loam; in corn last year, when ten cords manure were applied; more this year. Cost, \$20; value, \$49.

Second premium to Tristram Hill of Greene, for 26½ bushels of Scotch Fyfe wheat on one acre; strong loam; in corn the year before.

Third premium to Greenleaf Parker, for 22 bushels.

Rye. Elbridge Chadbourne of Greene, 27 bushels of 60 pounds each, on one and a half acres; on clayey loam.

Darius Briggs of Auburn, 26⅙ bushels, of 58 pounds each, on 120 rods; sandy loam.

Barley. Rufus Prince of Turner, 33 bushels per acre, on yellow loam; in potatoes last year.

Rufus Haskell, 30 bushels per acre.

Turnips. Milton Carville, 339 bushels on half acre; ten loads manure.

Samuel Chadbourne of Greene, 365 bushels rutabagas on half acre; on stony loam; in turnips before; 2½ cords new manure.

Carrots. Jesse Davis, 220 bushels on half acre; sandy loam; green manure.

Potatoes. Jacob F. Drinkwater of Webster, 240 bushels on one acre; sandy loam; corn last year; five cords manure.

Rufus Prince of Turner, 226 bushels per acre; sandy loam; pastured with sheep six years; one-third manured with green manure, on the rest no manure except a spoonful of plaster in the hill.

Samuel Chadbourne of Greene, 210 bushels on an acre; pastured in 1857; oats in 1858, without manure, yielding 30 bushels; one shovelful green manure in each hill.

SAGADAHOC COUNTY SOCIETY.

This Society held its Annual Exhibition at Topsham, on the 11th, 12th and 13th of October, 1859. The Secretary writes me that it was a very good one. Stock of various breeds and of full blood and grades were present in large numbers, including several entire farm stocks. In other departments the show was excellent. Much interest is felt in regard to it by all classes, and the Society is exerting a highly beneficial influence.

AN ADDRESS

Delivered before the Sagadahoc Agricultural Society, at its Annual Fair, at Topsham, October 13th, 1859, by Hon. F. H. MORSE.

*Mr. President, and Gentlemen of the
Sagadahoc Agricultural Society:*

Had I consulted my own inclination and obeyed the dictates of my own judgment only, I should not stand before you on this occasion in such a relation. My wish to gratify made me yield to earnest pressure, a conditional consent, believing that the conditions would relieve me from the embarrassment of attempting to grope my way, with hesitating steps, on grounds so new and unfamiliar. But your inexorable Executive Committee has allowed me no channel of escape. Conditions were disregarded, and excuses set aside. The fact that my field of labor has been quite different from that of meadow or upland—that I have but a very imperfect knowledge, either practical or theoretical, of the great subject which should occupy our thoughts to-day, was considered no insuperable objection to my appearance on this platform, annually erected to the goddess of harvest. If, therefore, the remarks which I propose to offer should be deemed inappropriate, or should not meet your just expectations, I beg you will not attribute all your disappointment to the rashness of the speaker in venturing on ground his life and

studies have not fitted him to occupy, but remember that he was over-persuaded and pressed into the service by your agents, and comes with doubt and hesitation to lay his humble sheaf by the side of the rich and beautiful gifts which nature and art have so profusely spread around us.

These luxuriant fruits of the garden, the orchard, the dairy and the fields—these flocks, herds and steeds from your stalls and pastures, eminent for beauty and usefulness, all attest your skill in your happily chosen vocation. It is not then of the adaptation of seed to soils, of gardening, orcharding, stock raising, the dairy, or of the subject of fertilization, or any other branch of practical agriculture that I would speak in such a presence. Permit me therefore to depart from the beaten track, and turn from these rigidly practical questions, to themes which, if less interwoven with the farmer's daily life and daily toil, are none the less real, and none the less worthy of our careful study and earnest consideration. I ask your attention to a few brief suggestions, having reference to the position and responsibilities of farmers as *American citizens*; and the influence of agriculture, as a pursuit, on the formation of character.

Agriculture, as a distinct occupation in this country, commenced with, and has been attended throughout its rapid growth in all the free States of our Union, by a series of facts and circumstances more favorable to the development of an intelligent, moral, independent and robust population, than ever before attended and led on the progress of a rural people on any part of the globe, or at any prior period of human history. In nearly all the leading nations of the earth the cultivators of the soil were once held, either in the most abject form of human slavery, or in the milder form of villanage, vassalage or serfdom. They were bought and sold, and transferred with the soil like flocks and herds.

Although in many countries of Europe this system of bondage has become extinct, and will in time disappear in all, the soil is too generally retained in the hands of landholders, and its tillers are mere tenants at will, working the soil of their landlords for a portion of its product. There they have but little influence in the government that rules over them. From year to year, from century to century, from age to age, they have toiled on, surmounting obstacles with difficulty, and advancing but slowly and tediously up the heights of human progress. They are yet toiling in the middle passage, with those longed for summits far far above them, almost lost to

human vision. But their gaze is upward, and with eyes steadily fixed on those dizzy heights, and "*excelsior*" for their cheering cry, those advancing hosts will yet stand up in the full stature of men, redeemed, disenthralled, and all their rights acknowledged. Let us give them our warmest sympathies, and continue the aid of our noble example, as a beacon light in their upward course—God grant they may not grow faint in heart, nor weary on their toilsome march!

Under what widely different circumstances, and a widely differing policy did the Anglo-Saxon race commence and continue its career on this continent. Europe had broken through the obscurity of the dark ages and was fast becoming illuminated by trade, commerce, literature and learning; rapid discoveries in every branch of knowledge and a far more progressive spirit than had characterized any preceding age. It was an age of inquiry and of active intellectual and physical development. Men began to feel, more earnestly than ever before, the grandeur of humanity, the sacred nature of human rights, and the fires of liberty were kindled on a thousand altars to light up the pathways to freedom. Largely imbued with this spirit of progress and liberty, and a strong wish to realize their fruits untrammelled by obstructing governments and institutions, our Pilgrim Fathers came to this newly discovered continent, into the wilderness, to enjoy civil and religious liberty, and to plant a nation in freedom. Coming, themselves, from the common walks of life, from among the people, they left behind them despotic ideas, oppressive institutions and wornout systems, and brought with them the idea that the security of liberty and the elevation of man ought to be the great objects of human governments. They came to a country rich in soil and natural productions, uncultivated and unpeopled, except by scattered tribes of roving Indians, who lived by the chase. No monopolizing landlord stood ready to take away one-half the product of the soil for rents, but land was nearly free to all; and so cheap has it always been in the United States, that the ownership of a farm has ever been within the reach of every industrious man who desired one. The standard government price for its lands has long been \$1.25 per acre, and good farming lands can be bought to-day in some of the Western States, and in all the Territories, at this rate, and in our own State for about one-half this sum. Land and permanent homes being thus within the reach of all, each tiller of our "free soil" is the cultivator of his own acres, which, with our free insti-

tutions, gives us a large, independent and stable class of intelligent, rural population, such as never before enriched and gave security to any country or age.

Agriculture, in its various branches, always has been, and always must be the chief employment of all civilized countries. It feeds and clothes earth's teeming millions, and supplies by far the largest part of the material of trade and commerce. Our small traders and grocers, our "merchant princes," with their well filled store-houses and richly laden ships on every sea, and from every clime, are but middle men—exchangers or agents, standing between the producer and consumer to facilitate exchanges between them. Wealthy towns and cities, with their art and luxury, are built up, and the most of their wealth created by the profits, charged in some form, on agricultural, mechanical and manufacturing labor. This system of exchanges, or mercantile system, even as it is, is an important part of the world's industry. But if it were conducted on fair, sound and economical principles, about one-half of our exchangers might become producers, and the producing classes relieved from the burthen of supporting them, which is now done by the large profits levied on the products of their industry. Let me illustrate this by an example:—Take almost any of our villages and towns, or the different localities in them, and you will find more traders than are actually necessary to supply the wants of the places where they are located. Frequently one trader could do the business now done by half a dozen; and by having his business increased six fold, and out of its profits to pay rent, taxes and insurance, on only one store instead of *six*, and having to support only one family instead of six; it must be readily seen that if trade were conducted on correct principles, the consumers would be relieved of burdensome taxes, now paid to superfluous agents in the form of profits on merchandize sold by them. But we may hope that the future will bring a reform in our system of exchanging productions, and so large a portion of the profits of labor not be wasted on this unnecessary number of exchangers and non-producers.

By the census of 1850 it was shown that about one-half the population of the free States were engaged in agriculture, cultivating 108,200,000 farms, and turning out an annual product worth nearly \$900,000,000. The farmers of Maine bear about the same proportion to her whole population, nearly one-half of our people being engaged in agricultural pursuits. Agriculture has already become

the leading and most important pursuit of our people, and we believe it is, in the future, destined to occupy a much larger space in the public mind, and in the public economy, or policy of our State, than it has in the past. Maine is no longer emphatically *the* lumber State. Her dense forests of valuable timber are fast disappearing, and she must prepare for the day, and that in no distant future, when lumbering will cease to be a great and profitable branch of business. Lumbering in the vicinity of our great rivers and their tributaries, has heretofore occupied a large share of the industry of our State, diverting it from agriculture, and often dividing men's time between the logging camp, the drive on the river, and the farm: and always to the injury of the latter—for a farm is one of the last things that will bear slight and neglect. The result of such inattention is always short and poor crops, lean stock of an inferior breed, and a perfect holiday for thistles and all kinds of noxious weeds. As our forests of marketable lumber disappear and retire towards the sources of our great rivers, agriculture receives more attention and additional strength and steadiness: and consequently is much improved in method and the quality and quantity of its crops. As the wealth hitherto derived from the forest is gradually withheld, and its sources disappear, our people are in a measure compensated by an increase of agricultural strength, closer attention, more scientific methods, abundant crops and an improved stock.

Nearly all kinds of manufactures can be carried on to advantage in our State. We have a variety of raw material for manufacturing purposes, and whatever disadvantages may arise from our climate are more than made up by the industry and energy of our people. This branch of business has too long been neglected by our capitalists: but it will in time give employment to many of our people and largely increase the home market for agricultural productions.

The sea fisheries give employment to a portion of our capital and labor, and can, no doubt, be largely extended with profit to those who engage in them. But the chief business of our sea-board population is ship building and maritime commerce. Maine is not an importing State, or but partially so. She builds ships for sale and to engage in the carrying trade for whoever will pay best, and receives her reward mainly in freight money, and what she can gain by constructing vessels. The carrying trade has had many years of great prosperity, and has been extremely liberal in its

returns to the most of those who have engaged in it. But it has had its periods of depression and is now passing through one, of perhaps greater length and severity than was ever before known in a time of peace. In nearly all of our sea-board towns, may be seen the sad faces of shipwrecked men, who, after a great struggle had to bow their heads and fall before this great commercial storm, whilst many who survive are borne up by hope, and anxiously watch the shifting scud in the commercial sky to find some sign that the storm is abating and calm returning. To whatever cause we may attribute the current mercantile disasters, whether to a general overtrading, a too rapid and large accumulation of tonnage for the world's business, or to other causes, we must all unite in the hope of a speedily returned prosperity to our commerce.

But with all its buoyant hopes, its brilliant allurements, its periods of high success, of stirring excitement, and generally its appearance of enduring strength, it must not be forgotten that its paths are beset with danger, and whoever treads them commences a journey of care and anxiety, which, in a majority of cases, ends in disappointment, and too often in disaster and ruin.

The improvements in machinery, new discoveries of, and changes in, the commodities of commerce, and its fluctuating ebb and flow—a more universal engagement in manufactures, which must lead to a less transportation of heavy raw material—the effort now making to change, to some extent, the commerce of the sea by the use of steam in ocean navigation, all tend directly to a re-adjustment of the course of trade, and to create material changes in the channels of commerce. Whatever changes may come, I trust our people will show as much facility in meeting and adapting themselves to them as the people of any other State or country.

The pursuit of agriculture is free from these violent fluctuations and changes, and far more sure to yield to industry a fair reward. If it excites no glowing dreams of anticipated millions, rarely seen but in golden visions: if its quiet pursuit builds up but few overgrown fortunes, it offers the great consolation that it is not borne up on wrecked hopes, that it leaves none to perish by the way-side, and that all who try may succeed, and gain a fair reward for their industry, more than enough to satisfy all temperate wants, beside that which is above all price, calm peaceful lives, comparatively free from care and anxiety. I do not mean to be understood that a farm is an elysium upon which care and trouble never enter. Far from it. I speak of the pursuit of agriculture in comparison with

other leading branches of business, and say there is none so sure of placing those who follow it above the reach of want, and leaving the mind so much at rest, free from that care which haunts our daily steps, and that anxiety which corrodes the life. I know that the farmer has his cares and occasionally his troubles also. Some seasons are too wet and cold, and vegetation is backward. Some are too dry and the crops do not reach an average. Sometimes an early frost may cut short the corn and the weevil the wheat. But on the whole there are few drawbacks that the farmer, devoted to his business, cannot, in some way, provide against. The surplus of the years of plenty will always make up for the years of deficiency. But he is never overtaken by such great and overwhelming disaster—such stagnant gloom as often settle down upon mercantile and commercial communities, reaching and paralyzing all the veins and arteries of trade. It is true these periods of suspended trade make dull markets for farmers and in other ways affect him, though in a secondary degree, yet but lightly in comparison with others. They do not touch his bread, his own granaries supply that, and kind nature continues to work for him in the field, the orchard, the garden and woodland, hour by hour, day by day and month by month, until his crops are ripened for the harvesters. She never tires or falters, but toils on through darkness and storm, by sunshine and starlight, preparing God's bounteous gifts to man, notwithstanding the marts of trade may be silent and sad, and the sails of commerce flap lazily on the ever restless sea.

To show the comparative security of those who cultivate the soil against the dangers and misfortunes which constantly hang upon the steps of those engaged in commercial, manufacturing, mercantile, mechanical and speculative pursuits, let me state the number of failures, so far as they were ascertained, which recently occurred within the United States in a single year. The mercantile agency has its head quarters in the city of New York, with branches and agencies in all sections of the country. Its business is to collect information, for its members, concerning the character and pecuniary standing of business men in all parts of the country, and to report the number of failures. In their report for the year 1857, the last which I have examined, the number of failures reported as having taken place for that single year in the United States were 4,927, and the liabilities of the same \$291,450,000. Of these nearly 5,000 failures, 82 are reported for Maine whose liabilities amount to \$1,000,000. It is not probable that over fifty cents on the dollar

of this large sum of nearly \$300,000,000, will ever be paid, consequently there will be a loss to somebody of about \$150,000,000. How many of these five thousand bankrupts suppose you were farmers, those making agriculture their business, and what amount of this vast bankrupt debt of near \$300,000,000, is due from them? Although nearly one half of our population are engaged in agricultural pursuits, I think it would be entirely safe to say that not one in twenty of these 5,000 bankrupts was a farmer, and not one dollar in forty of their liabilities was due from farmers.

Another statement sets this view in a still stronger light. It has frequently been said, on the authority of bank and insurance officers, old mercantile firms and other reliable sources of information in several of our leading cities, that *nine* in ten of all traders and merchants fail at some period of their career, many of whom again commence their business lives anew. No such extreme embarrassment and danger attends the business of agriculture. The farmer can pursue the even tenor of his way without the distressing thought that to-morrow may bring him a list of protested notes and drafts, with an injured credit. He fears no disasters by sea, and does not watch with trembling anxiety the barometer of trade to see what changes may take from or add to his means, or fear some desperate speculation may turn out disastrously. Whatever may be his anxieties they are not for fear of ruined fortunes, or that want may sit a ghastly companion at his generous table. The farmer then has every reason to be content with his calling—it is a safe and noble one.

To the young men, the sons of farmers who are about to choose their occupation and commence the serious business of life, permit me to say in all earnestness, think seriously, weigh well all the chances of success before you decide to abandon the pursuit of your fathers. It is a pursuit worthy of man's highest aim. If the long summer days are sometimes weary, they are not attended by harrassing and distracting thoughts, and night brings its social joys and calm repose, not sleepless hours, an aching brow and dread apprehensions of the morrow. If the advantages, the excitement, the empty show and fashionable follies or dissipations of city life tempt you from the industry, peace and virtue of your rural homes, think how much of extreme poverty, agonizing misery and revolting vice is contained within the limits of cities, creeping along their dark allies and crouching in the shadow of their marble palaces. Think of how many disappointed expectations, blighted

hopes and ruined fortunes those cities are built upon, and how very small the chances are for obtaining fair and honorable success. Think how many wanderers there are from their father's house and their native State, who would be glad to-day to seek peace and rest in the paternal mansion, and who would to-day rejoice to be the recipients of the peaceful independence of the farmer's life in the good State of Maine.

But such is the haste to become rich in this country, and so strong the hope of reaping large rewards by trade and speculation, and such the desire to live without labor, it matters not to many on whose industry, that men, more especially young men, are constantly enticed away from their homes and those industrial pursuits which are sure to bring a liberal supply for all our temporal wants. They join that large throng of adventurers who are constantly rushing toward our large towns and cities in search of employment and bread, or float about the country without any distinct plan or object in view. A large percentage of these young men who go out from their native towns, and in most cases from their native State, are from our agricultural districts. They leave the old homestead, the pleasant hillside with its pure air and exhilarating health, the beautiful valley, with its songs of birds and fragrance of flowers, to become mechanics and manufacturers, toilers in the counting-house, to encounter the dangers of the mariner's life on the sea and in the tropical climates, to become rash speculators rushing upon bankruptcy, or often, far too often mere adventurers without definite aim or object, floating waifs upon the currents of life.

How vastly important then, that these young men should be well fitted by educating the moral sense, or conscience, and the affections, as well as the head, to encounter the battles of life. As the best and only safeguard midst temptation they must have that high moral tone, that sincere religious trust, that unswerving honesty, that devoted patriotism, that will prove the only security against compromising justice, honor or country for gold or power. Besides a good English education, as a necessity for success and true manhood, they need a father's constant good example, sound counsel and watchful care in their moral training, and a mother's pure love and devoted affection to instill pure principles and elevate the soul to a love of the holy and true. Give your sons and daughters these high attainments, my friends, and you will give them that which will prove better than name or fortune, the best

possible panoply of protection against temptation, vice and dishonor.

But I do not wish to be understood that I would have you bestow these high mental and moral attainments upon those who go out from among you to the neglect, or detriment of those who remain. As I before remarked nearly one-half of the population of the free States is engaged in the pursuit of agriculture. It is from our agricultural districts that the country is furnished with its best models of physical, intellectual and moral manhood and womanhood. By their moderation, prudence, healthy example, and by their power at the ballot box, the farmers of the country exercise a controlling influence over its character and destiny. As a whole class they should be well prepared by education and general intelligence to exert this power in the way best calculated to advance the interest and welfare of our whole country. When we reflect that our government and its benign institutions are upheld, and can only be upheld and borne on to the future by the intelligence, virtue and patriotism of the people, we see and realize the magnitude of the duties and responsibilities which the American people have undertaken. We owe it to ourselves, to our country, to the age in which it is our good fortune to live, and to that liberal free spirit which is advancing to the conquest of the world, that these responsibilities be fully met, these duties well performed. Education or general information then is one of the necessities of the American people, and it is both the duty and interest of our rural districts to make the best provision for good free schools that the circumstances by which they are surrounded will permit. Although the good industrious farmer will always find something useful and profitable to do about his farm, and need never have any surplus time to waste away in idleness, he can spare more leisure hours for mental culture, for studying the science and best modes of agriculture, and for general reading than any other of all the industrial classes into which communities are divided. If we could all realize more fully the immense value of time, how rapidly it draws us to our journey's end, how much we ought to learn to enable us to perform our various duties even decently, we should be far more eager to seize the passing moments, and so use them as to make us better and more capable men and citizens, and our lives a living illustration of the benefit and happiness conferred by time well spent.

The first duty of the farmer is to make himself master of his

chosen pursuit. This I presume can be done by observation and practice: by reading the best works and papers on agriculture; by meeting in farmer's clubs where questions relating to agriculture can be freely discussed, and the benefit of each others knowledge and experience obtained; and by adopting all real improvements, wherever made, which can be applied to our soil and climate. After all these duties have been well performed there will be much time left for general culture. This time it would be an abuse of God's gift to man, of the absolute wants of our nature, of our best means of happiness, and an unpardonable neglect of our duty as citizens and intelligent beings, to trifle away in useless or pernicious pursuits.

Labor-saving machinery is now extensively applied to agricultural labor, and is doing much to enable the farmer to do his work easier, better, and more of it in the same space of time, than under the old methods, and with the old tools of years gone by. Much of the genius and inventive power of the nation have for many years been devoted to improving the form and working of hand tools, and to inventing machines worked by hand, horse or steam power to perform more rapidly and cheaply the various branches of agricultural labor. A great variety of labor saving machines has been the result. Plows, planters, rakes, mowers, reapers, shellers, threshers, and hundreds of other inventions, applied to a great many different purposes are continually asking public favor, until recently the steam plow has appeared at the great National and other agricultural fairs, tearing up the ground at the rate of three and a half acres per hour. In this field of invention the future will be more prolific, and more sure of results than the past, discovering and perfecting until machinery shall be made a substitute for human muscle in nearly all cases where much hard labor is required. Let no one be content to plod on in the old fashioned way of half a century ago, but wherever we find an improvement adapted to our wants, one that will lighten our labor and do our work as well, or better and more of it, adopt it at once as so much added to your capital or the laboring force of your farms.

Great improvements have been made in all branches of agriculture, horticulture and pomology, during the present century, more particularly during the last few years, and those leading branches of human industry are now deservedly receiving a much larger share of public attention than ever before. Our great National Agricultural Fair, and the State and county Fairs, held during the

autumnal months of each year, especially in the free States, are doing a good service for this essential interest and are turning the attention of the country more and more each passing year to its vast importance. It has now been a little over five years since the organization of the Sagadahoc Agricultural Society, and its fifth yearly exhibition is about drawing to a close. As you have thus year after year driven up your best samples of farm stock, and laid the best products of a generous soil and a patient industry before the public eye for inspection none can have failed to notice from the first a steady improvement in all the leading features of the exhibitions. The most careless and indifferent must admit that this annual, public display of the capacity of our soil and climate, and the skill of our farmers are having a most salutary effect on the agriculture of this vicinity. I mean agriculture in its largest sense, including horticulture, pomology, poultry and stock raising and the dairy. The mechanical and artistical departments, needle work, bread making, and other branches of the house-wife skill, to which I should be glad to give more than a passing allusion did time permit, add much to the interest of these occasions.

These exhibitions are so full of instruction, so full of gratifying and profitable results, that all who come within the territorial limits of this Society, young and old, men and women, should see to it that the interest in them does not abate, but that at, or near the return of each harvest moon, as the departing year prepares its shroud of beautifully tinted leaves and makes ready to lie down with its hoary companions in the past, lulled to rest by the requiem of autumnal winds, a still more choice collection is brought together, culled from the storehouses of nature and art, and a still wider interest awakened to all branches of industry here represented. A walk through this building and these fair grounds on exhibition days teaches us a useful lesson. The most thoughtless may be forcibly impressed with our complete dependence on our mother earth for all the necessaries, comforts and luxuries of life, and with what ought to be our true position on earth and in relation to each other. Although we here see that earth is a generous and bountiful mother, and can supply all our real wants with a liberal hand, we can also see that a tax is imposed by the God of Nature on all who would enjoy her bounties. She has formed rich ores and minerals in the earth, placed fish in the sea, given to seeds the germinating principle, to soils their life nourishing power—in short, she has given to man control over the vegetable, animal and

mineral kingdoms, the raw materials for the gratification of all our wants, but she has not given us metals and minerals wrought into forms for use, she has not given us shelter, food, raiment, and articles of necessity and luxury, all prepared for our enjoyment. The tax she imposes to prepare them for use is labor. She has provided nothing that will satisfy the wants of civilized or savage life without labor. She yields nothing to idleness, and has therefore provided for no drones in her system. They are interlopers, excrescences on her plan of human economy, living on the industry of others and fill no place in that economy. Labor is Nature's universal law; it is a condition of existence which must be obeyed by all who live in harmony with her laws. It is an ordinance of God himself, dignified and made honorable by the divine judgment and the divine will, and he who shirks from it and escapes his just share of the world's toil, throwing it upon others, practically sets the will of his Maker at defiance, and creates disorder and discord in human society. I do not intend to convey the idea that the amount of physical labor now performed by the nations called civilized, will be necessary or desirable in the highest condition of the human race. We are living in an age of labor, emphatically a mammon worshipping age. Wealth, luxury and useless show are the great objects of desire and the leading ideas of the age through which the nations most highly civilized are now passing. A large portion of the world's labor is now employed in providing superfluities and luxuries which a more civilized people, in some future age, will dispense with, and the valuable time now consumed on them, be put to better and higher uses. People and nations rise from barbarism by successive steps, as a child rises in his education, from the alphabet through all the stages of advancement to the ripest scholarship. This exclusively material age will surely, in its turn, draw to a close, and an era of higher moral and social development dawn upon man. The coming ages will exhibit a people of few and simple material wants, of generous and noble character, refined, of high intellectual and moral attainments, and whose lives will be in continual harmony with the laws of their being. The human race will then come nearer filling the position for which it was designed, and to which it is slowly advancing. When this higher civilization comes—as come it surely will—human toil will be lighter, more equally divided, and its performance made a pleasure.

With the pursuits of the farmer more especially can be mingled the highest pleasure and profit. With an enlarged and elevated

mind he will know and realize the importance of his position and calling, and the nature of that calling will afford him continual satisfaction. In connection with it he can notice and study the order and succession of the seasons as they come and go, agreeably to the laws which regulate them. As the long winter draws to a close, and the frost-bound earth begins to feel the warmth of the genial sun, he hears music in the voice of the swollen brooks, the softened winds of spring, and the grateful songs of birds, returned from their winter flight to their summer homes. He watches the opening of leaf and flower and grassy blade, in field and meadow, and studies the beautiful and mysterious laws which govern them. He looks at his flocks and herds as they graze on hill side or lawn, or seek shelter from the noonday sun in some embowering shade, and takes pleasure in noticing their habits and understanding their nature. The germinating seed, the opening bud, the fresh green stocks, the ripened fruit, the full ear, the waving grain, are all watched to their maturity and harvested with the greatest care and interest, and the laws which govern each sought out and studied. His life is spent midst the beauty, harmony, and sublimity of nature, and he can see the certainty of her laws regulating and governing all created things. For him the laws which control the humblest flower by the wayside, the stream that winds through meadow and forest, the bird upon the wing, the cloud that floats above him, every material thing may be full of wisdom and speak of divinity; so that when time, the great reaper, shall come to the harvesting of death, he may bow to his scythe without fear, conscious that he has performed the part assigned him on earth.

LIVE STOCK.

Horses. Best stallion, Harvey McManus of Brunswick.

Second best, C. Weston of Brunswick.

Best two years old do., John H. Millay of Bowdoinham.

Best breeding mare, Joel Curtis of Bowdoinham.

Second best, Isaac Wilson of Bowdoinham.

Bulls Best two years old, Collamore Mallett of Topsham, for Devon.

Best one year old, Thomas Minot of Brunswick, for Devon, bred by I. Wentworth.

Nathaniel Snow of Brunswick, for a Jersey, sired by "Czar," from an imported cow. Mr. Snow, in his statement, well remarks: "On the pastures of this county we should not regard beef cattle merely, but bestow more attention to raising cows for milking qualities." And also that "a Jersey cow now owned by John Foster Williams of Roxbury, Mass., has given milk of which four quarts made a pound of butter."

Cows. Best milch cow, premium to John Graves for a grade Durham, which gave 20 quarts per day in June and 12 quarts in September.

Second premium, for a Native cow, giving milk all the year, and averaging over 8 quarts per day.

Isaac Mallett, premium for Devon cow.

L. W. Tedford of Topsham, do.

S. F. Dike of Bath, premium for Native cow, of which he says:

"The cow dropped her calf January 16th, 1859. Weighed her milk—Feb. 8th, 33 lbs.; Feb. 9th, 34 lbs.; Feb. 10th, 35 lbs.; Feb. 11th, 36 lbs. Continued about one week on the above amount. At the end of week, 32 lbs. for two or three days, till Feb. 21st, when it was 30 lbs. The next week it fell one or two pounds per day, but did not reach so low as 10 quarts per day during the winter. During the spring it was about 16 quarts per day; sometimes a little short. In June it increased again."

Mr. Dike also took premium on a Jersey heifer two years old.

Messrs. Mallett, Tedford and Jordan took premiums on Devon heifers.

Sheep. Best buck, premium to Given Jameson, for a Cotswold, imported from England by Capt. Lombard of Webster. Weight of fleece this year, thirteen pounds.

The other bucks receiving premiums are called English breed.

For best flock of Sheep, to John Alexander.

Swine. Premium for best breeding sow and litter of pigs, to W. B. Trufant of West Bath—Suffolk and Newbury White.

Second, to Daniel Fulton, for grade Suffolks.

MISCELLANEOUS.

Sagadahoc sets her sister societies an example which may be well followed by all those which are situated "along shore," in showing at her exhibitions models of marine architecture, ships, brigs, steam-boats, &c; also articles of ships furniture or apparatus, which constitute a very attractive feature of the mechanical department of shows in a State so deeply engaged in ship building as ours.

CROPS.

Indian Corn. Premium on best field of two acres or more, to Solon White of Bowdoinham, $93\frac{1}{2}$ bushels of ears per acre on swale land, underdrained; pastured for three or four years past; green manure plowed in, and compost in hills—also fifty pounds guano per acre, mixed with plaster.

Best acre of corn, to Paul Randall of Harpswell, for 147 bushels ears on one acre.

Second best, Isaac P. Tebbetts of Topsham, for 106 bushels per acre.

Third, to David Brown of Richmond, for 95 bushels per acre.

Wheat. First premium to William Alexander of Harpswell, for $23\frac{3}{4}$ bushels per acre. Soil redish loam, in corn the year before, which was manured—barn manure mixed with rockweed.

Second, to Isaac P. Tebbetts, for 12 bushels Rio Grande wheat, a variety which he states to be well adapted to the climate.

Barley. First premium to Rufus Thompson of Topsham, 36 bushels per acre.

Second, to Paul Randall, for $33\frac{3}{4}$ bushels per acre, two rowed barley, seed from Canada—weighs 56 pounds per bushel.

Rye. First premium to William Alexander of Harpswell, for 20 bushels of 63 pounds each, on one acre.

Second, to Rufus Thompson, 19 bushels per acre.

Potatoes. First premium to William E. Haley, for 200 bushels per acre.

Beets. Thomas Pennell of Brunswick, 139 bushels sugar beets, on one-eighth acre.

Solon White, 91 bushels Mangolds on 26 square rods.

Lewis Simpson, 700 bushels Mangolds on seven-eighths of an acre.

Turnips. William E. Haley, 83 bushels on 30 square rods.

Carrots. I. M. Sandford of Bowdoinham, 67 bushels carrots on one-eighth of an acre.

UNDERDRAINING.

Underdraining seems to be practiced to some extent, in this county, as several premiums were awarded; one to S. F. Dike, who states that he is fully convinced of its great advantage in cold wet lands. He has greatly improved his apple trees by draining the soil.

N. Perkins of Topsham, made 840 feet drain, but only $2\frac{1}{2}$ to 3 feet deep—($3\frac{1}{2}$ to 4 is much better ordinarily.)

Solon White of Bowdoinham, in a statement regarding his farm operations, says :

“Experience has taught me to cultivate no more land than can be properly dressed, and never to work it until it is sufficiently dry. These two points are established in my own mind, but to accomplish the last, has been a difficult thing for me until of late. A portion of the soil on my farm has always been troublesome to cultivate, in consequence of its being very wet and springy, seldom obtaining a good crop on such land, and the grass is always of inferior quality. I have one small field of three acres, the most of which is of this kind of soil, which has been so wet that I finally abandoned the idea of cultivating it, and turned it out to pasture. Last summer I dug an underdrain through it for the purpose of draining my orchard; finding it had so good an effect on the land, I continued my work until I drained the whole field; plowed and planted two acres of what had always been the wettest, with corn, and raised 187 bushels of ears. This is land that no one ever pretended to put corn on before. The effects of underdraining on this piece has been such as not only to encourage me to continue draining, but has created such an interest in the neighborhood, that several of my neighbors have already commenced draining their farms.”

The drains reported, are mostly of stone, consequently requiring a very large excavation of earth and involve great expense. These

are reported as costing 70 cents to over \$1 per rod, which is more than many farmers can afford, and more than will (generally) *pay*, which is the true test of the expediency of draining as well as of plowing or any other agricultural operation. It may pay to drain land peculiarly situated, as near ones dwelling, at a cost of a \$100 per acre or more; but where tiles can be procured at fair prices, good drains (better than any stone drains) ought to be made at a cost of not more than 55 cents per rod under ordinary circumstances, and in the average of soils requiring drainage. The attempts of beginners (especially if they use stone, or any thing except tiles) usually cost 50 to 100 per cent. more than when made by skilled workmen. (See J. H. Shedd's paper on excavation of trenches in Report of Secretary for 1858, page 247.)

Besides the draining of Mr. Dike already mentioned, he says :

“I also drained a piece of grass land three years ago, and the crop has continued to increase every year since, with much less dressing, than it received in previous years. Formerly the grass winter killed; but since the underdraining, I have no trouble of this kind. The cost of underdraining depends very much upon circumstances. My own has cost me more than a dollar per rod. I think draining with tiles is cheaper than stones; but when I purchased my farm, I had a large quantity of stones suitable for drains, and they were very much in the way above ground; but they are now nearly all below the reach of the plow, and I intend to use tiles. I believe the farmer can make no better investment on his farm every year, than a small sum, say \$50, or more if he has the means, spent in laying underdrains. Try an experiment in a small way at first.”

KENNEBEC COUNTY SOCIETY.

The Annual Exhibition of this Society was held at Readfield Corner on the 11th, 12th and 13th of October. The exhibition was not so good as was anticipated, owing to a misunderstanding as to the time of holding it, but quite as good as could be expected under the circumstances; and much fine stock was shown.

LIVE STOCK.

Horses. First premium on stallion was awarded to Wm. Beals of Winthrop, for an Eaton horse.

Second, to Benj. Philbrick of Mt. Vernon, for a chesnut horse, Eaton blood, from a Witherell mare.

Third, to Josiah Brown of Vienna.

First premium on breeding mare, to S. G. Fogg of Readfield.

Second, to G. C. Vance of Readfield.

Bulls. First premium on Short horn bulls, to Elijah Wadsworth of East Livermore, for his bull "Prince," five years old.

Second, to Jesse Wadsworth of East Livermore, for "Bay State 3d," both thorough bred animals.

First premium on Devon bulls, to G. B. Whiting of East Winthrop, for one reared by I. Wentworth.

Second, to John S. Haines of Readfield, for one bred by Mr. Hall of Connecticut.

First premium on Hereford bulls, to Joseph H. Underwood of Fayette, for "Cronkill 3d," bred by Mr. Clark of Granby, Mass.

Cows. Jesse Wadsworth, first premium for his Short horn cow "May Flower," and the second premium for "Pocahontas." Also, first and second premiums on two years old heifers—all pure Short horns, and highly commended by the committee.

First premium on pure Hereford cow, to Joseph H. Underwood of Fayette.

The committee say that "no Devons were shown, but it will be well for old Kennebec when many of them can be seen feeding upon her hill-tops and in her valleys."

Of grade animals, many fine specimens were shown of various breeds.

Sheep. J. O. Wing of Winthrop, first premium on long wooled buck and ewes, a cross of three-fourths Leceister and one-fourth Cotswold.

J. R. Marston of Mt. Vernon, first premium for fine wool buck.

Obadiah Whittier of Vienna, showed a fine South Down buck, reared by Samuel Thorne of New York out of stock imported from Jonas Webb; both its sire and dam having taken prizes at the Royal Society's show in England. Cost \$150. Weight of fleece at two years, 10 pounds; highly commended by the committee.

Swine. Samuel Jackson of East Winthrop, first premium on boar, for a White Chester, bred in Chester Co., Penn.

Second premium to A. D. Chase of Fayette, for a "Tuscarora."

Premium on grade Suffolks to D. Craig of Readfield.

DAIRY PRODUCTS.

These seem to have been largely shown, but the names of the competitors (successful or otherwise) do not appear in the statements.

NORTH KENNEBEC SOCIETY.

The Secretary, Joseph Percival, Esq., of Waterville, writes me : "This Society now embraces 250 members. Its Annual Exhibition was held at Waterville, on the 4th, 5th and 6th days of October, 1859. The weather was remarkably fine. The show of animals, while less in number than at some former exhibitions, on the whole, compared favorably with those of former years. The different breeds were all represented. Full or thorough breeds were few, but their grades show that they are choice animals, and that their owners have done the community a good service by bringing them into our limits. The Durhams, as heretofore, predominate, and are the favorite breed, on account of their large size and remarkable docility. The North Devons, if we can improve their size and milking qualities, will be all that we want, and will more than rival the Durhams. We had a large and fine show of horses and colts. The introduction into our midst of the Morgan horses, by Mr. Lang of Vassalborough, has given to this department, a new impulse. Our show of sheep was larger and better than ever before. This department of husbandry is exciting (as it deserves) every year, more attention and interest. Our farmers all agree that it pays better than any branch of their business, aside from the fact that sheep farms increase in fertility faster than under any other circumstances."

LIVE STOCK.

In a statement regarding a cow, Mr. Percival speaks very highly of a cross of Ayrshire and Short horn for dairy cows, giving a large quantity and of superior quality—docile and fine for stock.

Obed Emery of Fairfield, in a statement about a Durham cow, says :

“In regard to the merits of the Durhams, I think they surpass others bred in this State, especially for oxen, being rugged, strong and excellent workers, and for beef readily fattened. I keep both Durhams and Devons; like the Durhams best for cows, as being more docile and gentle milkers; yet the Devon is a richer milker, but they are nervous, and in fact too smart for my use. I think the Durhams crossed with the Devons or Herefords might be an improvement on either.”

DAIRY.

Daniel Jones of Fairfield, who obtained first premium on cheese, gives his method of manufacture, as follows:

“I strain the milk into a tub at night, but add no rennet. In the morning, I bring it to the same temperature that it was when taken from the cow, by warming twenty minutes; let it stand one hour; cut the curd in the tub about two inches square; let it stand till it is sufficiently settled, then dip it carefully into a basket and let it drain until it is quite dry. Then slice it and pour scalding water to it; drain it again, and salt to the taste. I then put it in a hoop and press lightly, half an hour; then remove it to the cellar where it remains till I make one or more curds, proceeding with the latter as with the former. When I have made the last curd I slice the first with a knife and mix them together. Then put it into a *slow* press and increase the pressure gradually, till it is well pressed. When taken from the press fit a cloth to the cheese; dip it in hot butter and sew it up; turn and dress every day until cured for market.”

CROPS.

Rye. Clark Drummond of Winslow, first premium for spring rye, 24½ bushels on one acre.

Potatoes. C. Drummond, first premium on 237 bushels Jackson potatoes, on one acre old pasture—20 bushels leached ashes and 2 bushels plaster put in the hills.

Second premium to Thomas Ayer of Waterville, for 175 bushels grown on three-fifths of an acre, being 292 bushels per acre.

FRANKLIN COUNTY SOCIETY.

This Society held its Annual Exhibition at Farmington on 6th, 7th and 8th of October, 1859.

LIVE STOCK.

Horses. First premium on stallions, to H. G. Eaton.

Second premium, to K. Larkin.

First premium on three years old, to Alex. Norton.

First premium on brood mare, to H. Belcher.

Second premium, to Josiah Green.

Neat Cattle. The show of full blood Durham or Short horn stock seems to have been large. The committee say:

1st.—Examined the Company Bull Duke of Manlius, owned near Farmington Falls, and were unanimous in pronouncing him a very nice animal. Your committee were not furnished with a statement of pedigree, therefore cannot report. Consider him the best bull on exhibition.

2d.—Examined a bull owned by Obadiah Whittier of Vienna. Your committee recommend him worthy the patronage of all your stock growers. Being owned out of the county, we cannot report on him.

3d.—Examined the bull Stately, owned by A. Hillman of Farmington; found him a good animal. Said bull is four years old. Your committee award him the first premium, being the only bull over three years old entered.

4th.—Examined the cow Aurora, owned by A. Hillman of Farmington. Said cow is seven years old, and bred by J. Wadsworth; has a calf by her side; both were good animals. There being no competition, your committee award her the first premium.

5th.—Examined the two years old heifer Caroline, got by Stately out of Aurora. Your Committee award her the second premium.

6th.—Examined the yearling heifer Susan, got by Stately out of Aurora, owned by A. Hillman. Your committee thought she was the best, and award her the first premium.

7th.—Examined the bull calf owned by Almon Brown of Wilton. Said calf was sired by the Duke of Athol out of the Lady Fairfax, and is three months old. Your committee pronounce him a very good calf, and worthy the Society's premium. No other entered.

8th.—Examined the two years old heifer Fairfax, bred by J. Wadsworth, sired by Bay State out of Lady Fairfax. She possessed some very good stock points, and had a very fine calf by her side; owned by A. Brown of Wilton. We award her the first premium.

Mr. Brown also entered a yearling heifer, but did not present a statement. Your committee judged her second best.

Sheep. The committee report:—But few sheep on the ground, but of fair quality. There seems to be a lack of interest in sheep, proportionate to their income and profit.

On fine wool bucks, the first premium was awarded to Joseph Titcomb, the second to Wm. S. Gay, and the third to J. F. Butler.

On fine wool ewes, the first premium was awarded to William S. Gay.

On lambs, the first premium to Wm. S. Gay.

On long wool bucks, the first premium was awarded to James Allen, the second to A. Hathaway of Wilton, and the third to Josiah Godding.

(The only statement returned is regarding Mr. Hathaway's buck which was a grade Cotswold.)

On coarse wool sheep, the first premium to Z. H. Greenwood.

On lambs, the first premium to Z. H. Greenwood.

Swine. The Committee say:—“Only one entry in this important department was made. This animal was presented by Col. David Ingham of Farmington, and was purchased by him of Mr. Wood, in Chester county, Pennsylvania, called the Chester White, four months old, and weighing nearly two hundred pounds. This breed is reported to excel in docility, and the ease with which they take fat renders them peculiarly profitable, while they can be kept as cheap as any other breed. In symmetry and size they are un-

surpassed. Your committee have no hesitation in pronouncing this one of the noblest specimens of the porcine family, and award the Society's first premium to his owner, Col. David Ingham of Farmington. The Society has cause to regret that no more interest is taken in the improvement of swine; and your committee beg to say that no surer test of prosperity of a farmer can be given than in the fat and thriving condition of his porkers, for besides the profitableness of the meat and lard, unlike their *biped cousins*, though very similar in some other respects, the *quadruped* gentry support themselves by their daily work."

Poultry. The Committee say:—"There was no large gathering of fowls for our inspection. Two lots of hens were brought to the notice of the committee, viz: Bolton Greys, golden and black and Golden Polanders. For table use and the production of feathers, we prefer the Polanders; but from the laborious disposition of the Bolton's, and their inclination to work for the good of the human race, without tiring or setting. We award the first premium to S. West. The second premium to Z. Greenwood.

There were two kinds of Turkeys. One was snow white, and the other jet black. Both were very beautiful, and of excellent quality. The male white turkey has adopted the fashion of letting a wisk of hair grow on his frontal parts. Whether the turkey follows the fashion of the young gentlemen of the day or the young gentlemen the fashion of the turkey, is not for your committee to decide.

Having long lived in a country where there are strong prejudices against color, and having imbibed some of the same towards turkeys, and believing the white ones to be more intelligent, and without doubt intended to govern, your committee do not hesitate to award the Society's first premium to the white turkeys."

FRUIT.

Premiums were awarded on Baldwin, Spitzenberg, Black Oxford, Somerset, Golden Russet, and other apples.

Also upon Concord grapes, quite ripe. Specimens of chestnuts, shown by S. Farmer of Temple.

CROPS.

Indian Corn. First premium to Jonas Goding of Farmington, for 55 bushels on one acre, and 8 bushels of inferior quality. Land in grass for 9 or 10 years past, yielding about half a ton per acre; eighteen loads manure spread on sward and plowed nine inches deep; shovelful of compost to each hill. Premium on half acre to James M. Mosher, for 80 bushels of ears.

Potatoes. First premium to J. B. Morrison of Farmington, for 400 bushels on one acre—Lapland, Peach-blow and State of Maine, on interval land, which had been mown for 25 years past. Four cords strawey manure spread on the furrows.

Premium on half acre, to David Miller of Wilton, for 153½ bushels; old bound out grass land; two cords manure spread on furrows, and four cords applied in the hills.

R. S. Currier of Wilton, 126 bushels on half acre.

Barley. Warren Bullen grew 54½ bushels of two rowed barley. Land in corn last year.

Turnips. John W. Dyer of New Sharon, 154 bushels on one-fourth of an acre; old mowing land; plowed in June; one and a half cords manure from the sheep fold—a little ashes and plaster applied.

NORTH FRANKLIN SOCIETY.

This Society held its Annual Exhibition at Strong, on the 28th and 29th of September. The Secretary, J. M. Kempton, Esq., writes me as follows:—"The exhibition of animals was not so large as usual, on account of stormy weather, but would compare favorably as to quality. This Society, heretofore prosperous, has made very marked improvement during the past year. Much interest has been manifested in the improvement of neat stock, sheep and swine. Several pure blooded Durham bulls have been introduced; also some grades of the same, and some of the Herefords. The sheep raised in this section are mostly a cross of the Eastern coarse wooled sheep with the Merino; they are hardy, stand the winter well, and shear good fleeces.

The swine, heretofore mostly Berkshire and Native, are being improved by the White Chester. This last variety is considered on the whole, the best and most profitable known to us.

The horses most esteemed, are a mixture of the Eaton and French bloods. The Morgan and Messenger breeds are also spoken of very highly.

Much interest has been manifested in manufactures, especially the more substantial fabrics of ladies' manufactures, such as flannels, carpetings, &c.

The following, are some of the premiums awarded :

LIVE STOCK.

Bulls. Durham and Hereford bull, first premium to Charles H. Vining of Strong.

Second premium to Orison Dill of Phillips.

One full blooded Durham bull, owned by J. B. Knowlton of Strong, was shown. The statement accompanying, says he was

three years old last spring, imported from New York, one year ago. This bull, Young Symmetry, No. 2453, vol. 3, American Herd Book, was sired by the celebrated imported bull, Fairmount, No. 490, American Herd Book. 1st, Dam, Fanny; 2d, by Dandy, No. 402; 2d, Fanny by Symmetry, 166; 3d, Matilda by Splendid, 161; 4th, Gipsy by Ajax, 2944, E. H. B.; 5th, by Red Lady by Washington, 1500, E. H. Book.

First premium on one year old bull was awarded to C. Harvey, Jr., of New Vineyard, for Durham, raised by Mr. Percival of Waterville.

First premium on bull calf to Cyrus H. Brett of Strong.

The owner says in the statement, "that he prefers Durham and Hereford as a cross, because the Durham is too large and bony and the Hereford is much inclined to take fat."

Sheep. The committee on sheep award the first premium on fine wool buck to S. W. Pratt of Phillips.

Second to Charles Vining of Strong.

On coarse wool buck, first premium to J. B. Knowlton of Strong.

Second to Orison Dill of Phillips.

On six coarse wool lambs, first premium to J. B. Knowlton of Strong.

Second to John Church of Phillips.

On six coarse wool ewes, first premium to J. B. Knowlton of Strong.

Swine. First premium on boar to J. B. Knowlton of Strong.

First premium on breeding sow to J. B. Knowlton of Strong, for Chester swine. The committee say:—"We consider them a very excellent breed and would recommend them to the patronage of the farmers of North Franklin."

CROPS.

Wheat. First premium to Thomas Vining, for 25 bushels on one acre. Sown June 1st on land in potatoes the year before, and manured in the hill. Fifteen loads manure spread on in '59. Red wheat.

Second premium to Charles T. Burnham. Amount not given.

Third premium to Samuel Jacobs, 21 bushels; sown 10th May; old grass land; planted to potatoes the year before.

Gilbert Voter 2d, of Madrid, 20 bushels, on burnt land.

Mr. Voter also received premium on 15 acres of wheat, producing 225 bushels.

Indian Corn. First premium to Benj. Soule, for 138 bushels ears on one acre.

Second premium to C. J. Burnham, 50 bushels on one acre.

Third premium to R. S. York of Strong, 45 bushels.

First premium on half acre to Harrison Beal, 79 bushels of ears.

Second premium to Stephen Manchester of Avon, 63 bushels of ears.

Third premium to Lewis D. French, 62 bushels of ears.

Oats. First premium to Thomas Ellsworth, 155 bushels on two acres; land in oats in '57, with no manure—in corn '58, with four cords manure.

I. T. Cook of Avon, 73 bushels on one acre.

Rye. First premium to R. F. Perkins of Avon, 31 bushels of spring rye on one acre; in corn and potatoes last year.

Second premium to Gilbert Voter 2d, 20 bushels on one acre.

Buckwheat. First premium to William Ross of Phillips, for 26½ bushels on half acre.

Barley. First premium to William Ross, 57½ bushels on one acre.

Peas. First premium to T. F. Perkins, 12 bushels on half acre. No manure.

Potatoes. First premium to Enoch Craig of Freeman, 265 bushels on one acre.

Second premium to R. S. York, 196 bushels.

First premium on half acre to Harrison Beal, for 144 bushels.

Second premium to John Abbott, 107½ bushels on one-quarter to one-third acre. Statements are found of 340 bushels per acre.

Turnips. I. T. Cook of Avon, 150 bushels on one-eighth acre, (rutabagas.)

Samuel Whitney, 121 bushels on one-eighth of an acre.

J. R. True of Freeman, 120 bushels on one-eighth acre.

The competition on crops seem larger than in any other society in the State; a great number of statements being returned, and some giving larger products than these receiving premiums—as 85 bushels of oats per acre, &c. Perhaps they lacked the required corroboratory evidence.

SOMERSET CENTRAL SOCIETY.

The Secretary of this Society writes me as follows:

"This Society held its Annual Exhibition at Skowhegan on the 27th to 29th September, 1859.

In making our annual return we are sorry not be able to give you more material for consideration. The exhibition of stock of all kinds, at the annual show, was very large, and would compare favorably with that shown at other exhibitions in our State.

The improvement in stock of all kinds within the last few years in this community has been great. Our horses command much higher prices than formerly, and are hard to be beaten, either in speed or endurance. Our oxen which are mostly grade Durhams, are not surpassed by any in the State, if we take those that have been on exhibition at the different shows, for samples.

Some very fine cows were exhibited, and half a dozen or more girted 6 feet 6 inches, and a few even more than that, and were claimed by their respective owners to be good milkers as well as good for stock.

Quite an interest is now taken in relation to improvement in sheep. The Spanish Merinos take the lead, and are claimed by our farmers to be the most profitable of any."

LIVE STOCK.

Horses. Amos Garland, first premium for stallion Black Hawk, five years old. Also for a Morgan, thirteen years old, reared in Vermont.

J. S. Bigelow, second premium for stallion over seven years old, for a Witherell horse eleven years old.

First premium for breeding mare, to Peter Robinson of Skowhegan.

Second premium to Sheldon Reed of Madison.

Bulls. Only one claiming to be a thorough bred, of any breed, was shown, and that without a pedigree. The committee, however, awarded his owner, John Weston of Bloomfield, the first premium for him as the best in competition.

About twenty grades were shown, some of which were highly commended by the committee.

Cows. First premium to S. W. Coburn of Bloomfield, for Durham.

Second, to Edgar Hilton.

Third, to Elijah Hilton—both Durhams, and nearly all the grades shown appear to be of the same breed. The committee say:—"There were quite a number of fine stock cows, a large number of good milkers, and a few combining in good degree both qualities—a point as desirable as it is difficult to attain. Six or more of the cows were from 6 feet 6 to 6 feet 10 inches, though there was but one at the State show this year so large as 6 feet 6 inches, and was from this county. The heifers were generally small; and will hardly fill the places of such cows.

It is worthy of inquiry whether our farmers are taking quite the pains their interest requires to keep up the size of their breeding cows, and whether this is not a fruitful source of the deterioration of Durham stock, of which many complain.

Steers are usually crowded to a large size, but heifers too often have to *get up* as they can. Would not a little more attention to outward marks of indication of good milking qualities save many young animals from the shambles, and subject others, comparatively worthless, to their fate?"

The oxen shown appear to have been large; only one yoke being mentioned in the report which was not upwards of 7 feet in girth.

Sheep. A Cotswold buck and some half blood lambs, very large, were shown by A. G. Glenwood.

Merinos were shown by Edgar Hilton and others.

Swine. The report says:—"Your committee award the first premium for best boar and sow to Jotham Weston of Bloomfield, for a pair of fine Chesters which he imported last June at considerable expense from Pennsylvania. They are 5½ months old and weigh

225 pounds. This breed is particularly noted (where it is better known) for its quiet habits, for its readiness to fat while young, and is also capable of making large hogs if kept long enough. They are said to be always ready for the butcher's knife, and make more pork than any other breed for the amount of food consumed. The Albany Cultivator states that the average weight of the Chester stock at sixteen months old is from 500 to 600 pounds, and when kept till two years old they frequently run up to 700 and 800 pounds. We would cheerfully recommend this breed to all admirers of good porkers."

CROPS.

There appears to have been but little competition on crops, at least so far as the returns show. A paper purporting to be a report on root crops awards divers premiums, but only upon pumpkins and squashes. One statement only is found *on grain*, by Thomas L. Pratt of Bloomfield, whose crop of Indian corn was 88½ bushels on one acre; yellow loam; in grass for five years before; twenty loads barn manure, spread. Five bushels beans grown on same acre.

NORTH SOMERSET SOCIETY.

The Annual Exhibition of this Society was held at Bingham, October 12 and 13. The Secretary writes:—"This exhibition was the best we have had. The show of horses embraced various breeds, the Morgans and Messengers taking the lead. The stock was mostly grades of Durham. Some good calves, sired by the grade Hereford bull Hercules, were shown. This is the first bull of this breed yet introduced into this vicinity. The influence of the Society for good is perceptible every where, among outsiders as well as members. The fair was excellent, and articles presented by the ladies abundant and highly gratifying."

LIVE STOCK.

Stallions. First premium to Chandler Baker of Bingham, for the French and Morgan horse Dolphin, 8 years old.

Second premium to Jesse Smith, for Morgan and Norman, 5 years old.

Breeding Mare. First premium to Jona. Bessett, Moscow.

Second premium to Stephen Merrill.

Sheep. First premium to James Baker, Moscow, for French Merinos.

Swine. First premium to R. S. Howes, for grade Essex.

CROPS.

Indian Corn. First premium to Jotham Whipple of Solon, for 129 bushels ears on an acre. Soil redish loam, in sward, and yielding half ton hay per acre, broken in November; 15 loads barn

manure spread and harrowed in and about the same applied in the hills. Cost of crop on $1\frac{3}{4}$ acre, estimated \$59. Value, \$107.

Second premium to J. S. McIntyre of Bingham, for 123 bushels ears per acre—dark colored sandy loam—in potatoes last year—12 loads, of 35 bushels manure from hog yard, 3 bushels plaster and some leached ashes in the hill. Cost, \$20.75; value, \$63.37.

Third premium to E. Hathorn, for 90 bushels on an acre.

Wheat. First premium to R. S. Howes, $21\frac{1}{2}$ bushels red bearded wheat on an acre of light loam, in corn last year.

Second premium to N. Smith, 15 bushels winter wheat on land burnt in 1858; sowed 20th September, 1858.

Third premium to Jotham Whipple, 14 bushels.

Barley. First premium to Zenos F. Hathorn, for 38 bushels two rowed barley, on rocky land, in corn last year, with a light crop.

Second premium to Ansel Holway, for $28\frac{1}{2}$ bushels six rowed barley, land rocky, in corn the year before.

Oats. First premium to H. McIntyre, for 79 bushels per acre, dark clayey loam, in corn the year before.

Second premium to Willard Goodrich, for 68 bushels of 36 pounds per bushel per acre—yellow loam, in corn the year before.

Third premium to J. S. McIntyre, for 71 bushels of 32 pounds per bushel per acre—light sandy loam.

Oats and Peas. First premium to Z. F. Hathorn, for 36 bushels of 40 pounds per bushel—rocky loam, in pasture two years before and in oats and peas last year—no manure.

Second premium to Ansel Holway, for $18\frac{1}{2}$ bushels of 57 pounds per bushel, on "old mortgage land" covered with bushes, broken logs and scurf, so it could not be more than half plowed this year—seed mostly peas.

Carrots. First premium to Z. F. Hathorn, 78 bushels on one-eighth acre—land stony loam, in carrots two years past and in the three years three loads barn yard manure.

Onions. To the same, for $4\frac{3}{4}$ bushels on one square rod, old manure and two bushels ashes applied.

Turnips. First premium to H. McIntyre, for 304 bushels on one-fourth acre, clay loam, turnips last year, 8 loads green manure in furrows, and top dressing of plaster and 6 bushels ashes—thinks the ashes made half the crop.

Second premium to Ansel Holway, 205 bushels rutabagas on one-fourth acre; sward land, gravelly soil, yielding one and a half tons hay per acre, and horse manure applied, (quantity not stated.)

Third premium to Willard Goodrich, for 180 bushels on one-fourth acre; dark loam; sward; 6 loads barn manure.

Potatoes. First premium to J. S. McIntyre, for 224 bushels per acre; light yellowish loam; sward, broken up in fall previous; 16 loads green manure; two bushels each of plaster and ashes in the hills; seed, Jackson and other sorts.

Second premium to Nicholas Smith, for 200 bushels per acre; sward; light loam; 12 loads green manure; seed, 8 bushels Californias; 5 bushels of peas also grown on same acre.

Third premium to Ansel Holway, for 196 bushels per acre.

WEST SOMERSET SOCIETY.

The Secretary furnishes the following report :

“The Annual Exhibition was held at Anson village, on the 5th and 6th days of October. There were entered for premiums, three town teams of ten yokes of oxen each; three town teams of six yokes three years old steers each; ten yokes matched oxen; fifteen yokes working oxen and eleven yokes draught oxen; twenty-one pairs three years old steers; eleven pairs two years old steers; fourteen pairs one year old steers; three pairs steer calves; twenty-one stock cows; twelve milch cows; three three years old heifers; twelve two years old heifers; four one year old heifers; three heifer calves; four bulls; three bull calves; three stallions; ten breeding mares; eleven three years old colts; seven two years old colts; four one year old colts; four flocks sheep, 16 each; four do. lambs, 25 each; seventeen bucks; four swine and two litters of pigs; making in all, entries for 66 yokes of working oxen; 79 pairs of steers; 33 cows; 22 heifers; 7 bulls and bull calves; 35 horses and colts; 217 sheep and lambs; 25 swine, including pigs.

No premiums on crops has been offered by this Society before this year. But four entries were made, statements of which have not as yet been filed.

The Fair at the meeting house was excellent. The products of the dairy was less than last year; but in every other department nothing lacked to make it a grand show. The exhibition of domestic manufactures and needle work, paintings, &c., showed that the ladies had not been idle, who were present in large numbers, to give us ‘aid and comfort’ in the good work.

The exhibition as a whole was larger and more successful than ever before. An increasing interest seems to prevail among the members of the Society, and the people generally manifest great interest in its success. Under the influence of this Society much

has been done to improve the breed of farm stock of every kind, as well as an improvement in the *keep*, providing better shelter, and in every way improving the condition of animals, and this also at less expense than heretofore. The improvement of farms generally, is a subject now receiving more attention than at any former period, and much interest is felt in the promotion of the cause of agriculture in all its departments.

The Society has voted to make a permanent location, and have raised a fund of \$750, by life membership, with which it has purchased a beautiful spot of land containing eighteen acres, which they intend to enclose, and erect suitable buildings, stalls and yards in season for the next annual show. When this is done and all things are ready, we hope to make a better show in the agricultural world than heretofore."

LIVE STOCK.

Horses. First premium on stallion, to Hiram Andrews, of the "Norman" breed.

J. F. Collins showed a Morgan, and L. F. Allen a Black Hawk.

First premium on breeding mare, to Wm. R. Flint of Anson, a Morgan and Messenger.

Second, to Wm. W. Waugh of Starks.

Bulls. First premium to Cyrus Bryant of Anson, for grade Durham, nine years old.

Second, to B. F. Hilton of Starks, for grade Hereford, two years old.

Third, to A. Bailey, for grade Durham, two years old.

A full blood Devon bull was shown by E. S. Hopkins of New Portland. Mr. H. in his statement, says:

"This breed, or rather race, possesses some excellent properties, well deserving the attention of farmers. They are of uniform color, and the oxen are easily matched. They are peaceable and easily managed and trained. They are active and fast travelers, and make the best oxen for service, girding from $6\frac{1}{2}$ to 7 feet. They are round and close built, and hardy animals, being heavy in proportion to their appearance, and thriving on ordinary keeping, being well adapted to our short pastures and cold winters. The cows give rich milk, but not a great flow, but when bred towards milk they make excellent dairy cows."

Unless there was reason to doubt the purity of blood in this animal, or he had some special defect, or there was some rule excluding him from competition, it is not easy to see why he did not take a premium over *grade* animals, as the value of a bull consists not in his own personal appearance, but in his power of imparting to his progeny certain desirable qualities; and with thorough bred animals this is nearly or quite certain, while with *grade* bulls *no certainty at all* exists. Nothing but a *probability*, greater or less as the case may be.

Milch Cows. First premium to S. W. Hapgood, for a Native eight years old; gives 28 quarts per day for two months of best feed, and makes 8 pounds butter per week for four months of summer.

Second premium to Perry Moore, for a Durham.

Third, to John Pierce, for a cross of Devon and Durham; last year made 130 pounds butter in less than five months, June to October, and raised calf till six weeks old.

Stock Cows. First premium to S. W. Hapgood of Avon, for *grade* Durham.

Second, to Edgar Hilton, for same.

Third, to John Gray, for same.

E. S. Hopkins showed a thorough bred Devon cow six years old, and Perry Moore a full blood Durham.

Sheep. First premium on buck, to S. W. Smith, for Spanish Merino, brought from Vermont, four years old; fleece of this year weighed 14 pounds 6 ounces.

Second and third premiums to Wm. R. Flint of North Anson, for Spanish Merinos.

First premium for 25 ewe sheep, Spanish Merinos, to Benj. Lane of Anson; average weight of fleece, 5½ pounds.

Second, for 25 ewes, Jos. M. Smith, for same.

First premium for 25 lambs, to S. W. Smith of Anson, for Spanish Merino.

Second premium to George B. Gray.

Third premium to Wm. Pullen—all Spanish Merinos.

EAST SOMERSET SOCIETY.

The Secretary, Mr. Fuller, writes as follows:—"This Society now embraces 183 members. Its Annual Exhibition was held at Hartland, on the 13th, 14th and 15th days of September. We had the largest show of animals we have ever had since the Society was organized. There were 211 head of neat stock on exhibition. There have been a number of half blood Hereford bulls brought into the limits of the Society, which I think will improve our stock very much. There is quite an interest felt in raising horses. There were 86 horses and colts exhibited, and some of them very fine specimens. The show of sheep and swine was rather small. There is not so much interest taken in raising sheep here as in the western part of the county. The corn crop has been small, generally, but some very good. Wheat was almost a failure. Barley has done well; much larger amount raised than usual. Oats much better than last year. The crop of potatoes has been very large for what was planted, and the quality very fine. Carrots and turnips are cultivated more extensively than in former years. Our soil is well adapted to the raising of all kinds of roots."

NEAT STOCK.

These appear to have been mostly grade Hereford, Devon and Durham. Some are spoken of as crosses of Devon and Hereford. A grade Devon cow is represented as being a very deep milker.

Sheep. Israel Smith showed a French Merino buck—the sheep generally appear to have been grade Merinos.

CROPS.

Indian Corn. First premium to Ai Woodbury of Hartland, for 140 bushels of ears on one acre.

Second premium to T. H. Ellit, 140 bushels.

Third premium to A. B. Taylor, for 138 bushels.

Fourth premium to Eleazer Crocker, for 137 bushels. Mr. C. grew on the whole of the piece (3 acres) 414 bushels of ears.

Barley. First premium to P. C. Haskell, for 44½ bushels on one acre.

Second premium to Philip Hubbard, for 44 bushels on corn land well dressed.

Third premium to J. C. Webb, for 46½ bushels on one acre and sixteen square rods.

Fourth premium to John Rowell, for 40½ bushels.

Rye. First premium to Israel Vining, 23 bushels on one acre.

Oats. First premium to Israel Vining of St. Albans, for 61½ bushels on an acre.

Second, to J. C. Webb, for 58½ bushels.

Wheat. First premium to Warren Fuller, for 18½ bushels per acre.

Carrots. First premium to Sewall Davis, for 84 bushels on one-sixteenth of an acre.

Second, to Seth Webb, for 67 bushels.

Third, to Wm. M. Palmer, for 66 bushels.

Fourth, to Bryce Whiting, for 54 bushels on one-sixteenth of an acre.

Ruta Bagas. First premium to David F. Libbey, for 222 bushels on one-fourth of an acre.

Second premium to Thomas Fuller, for 159 bushels on one-fourth of an acre.

Fourth and fifth, each for 96 bushels.

Potatoes. First premium to Israel Vining, for 203 bushels on half acre.

Second, to John Russell, for 190 bushels.

Third, to Americus Morrill, for 140 bushels.

Fourth, to W. J. Hall, for 137 bushels on half acre.

The soil upon which most of the root crops were grown, is described as a slaty loam; and they were not very highly manured.

PISCATAQUIS COUNTY SOCIETY.

The Annual Show was held at Dover on the 5th and 6th of October, 1859.

LIVE STOCK.

The animals shown seem to have been mostly grades; the statements are few and very imperfect.

Premium, for best Durham bull, to Josiah Dow; best bull calf, to Byley Lyford.

For best Hereford bull, to P. M. Jefferds; bull calf, to E. L. Hammond; also, to same for best cow.

For best Devon bull, to F. W. Brown; second best, to J. L. Robinson; best bull calf, to F. W. Brown.

For best stock cow, to George Blake.

For best milch cow, to N. B. Fish.

PLOWING MATCH.

This appears to have been more successful and satisfactory than is always the case. The committee say:

“The plowing match was an after thought, set to fill up the time of a two day’s show, where one day only was the design when our prize list was issued, and no premiums are offered on this part of our exhibition. Under these circumstances, it is with much satisfaction that the managers of the society for the current year, witness the zeal that has been exhibited by so many to make the match interesting and profitable. It has been the fortune of some of the committee to witness many plowing matches at state and county fairs; and we speak with no desire to flatter—our honest thought—when we say that we never witnessed one better conducted as a

whole, so far as the competitors are concerned. We have not heretofore been inclined to look on these contests with much favor, for the good to be drawn therefrom. Eight teams entered for the trial, six working with oxen and two with horses. The plows used were, with one exception, from the well known manufactory of Chandler, Brown & Co. of Foxcroft, the exception being a Hersey plow, from South Paris, Me. The depth of work made was from 7 to 9 inches, and the width about double the depth. The field was in a rather stiff sod; the conditions of soil varying from a sandy loam to that of a harder substance and mixed with stones, small and great, to a degree most perplexing to a plowman not possessed of a good christian temper. The great diversity in condition of the several lands drawn by the contestants, contributed much in making the assumed position of your committee one of extreme delicacy. The discipline of the teams, the careful, quiet and humane deportment of the several teamsters, the skill of the plowman, the condition of the plows, whether working with *isolated* or *fin* cutters, and the general appearance of the work when completed, were all noted as well as the diversity in soil as above; and so nicely balanced is the whole thing, with this uncertain sliding allowance for harder lots, that we would like to be excused from indicating our preferences in the case."

Premiums were, however, awarded to Simon Crockett of Dover, plowing with horse team, James Chandler of Foxcroft, with horse team, P. M. Jefferds of Foxcroft, W. B. Holmes of Foxcroft, Daniel Hutchinson of Sangerville, William Gilman of Foxcroft, Leonard Robinson of Foxcroft, and William S. Mayhew of Foxcroft, each working with oxen.

CROPS.

Indian Corn. First premium to Andrew J. Chase, 68½ bushels on one acre.

For best mixed crop, to Byley Lyford, Jr., for 72½ bushels shelled corn, 3½ bushels beans, and 4 loads pumpkins, on one acre.

Second, to E. L. Hammond, 60 bushels corn, 4½ bushels beans, and 3 loads pumpkins.

Barley. Charles Loring, first premium for 55 bushels on one acre.

Potatoes. First premium to C. B. Goodell, 256 bushels on one acre.

Ruta Bagas. Andrew J. Chase, for 195 bushels on one-fourth of an acre.

Mr. Hammond's statement of mixed crop, grown upon worn out land, is as follows :

“ My crop consisting of $180\frac{1}{2}$ bushels of ears, 38 pounds to the bushel, was grown on one acre twelve rods, being at the rate of $167\frac{1}{2}$ bushels of ears to the acre ; also, about 3 common cartloads pumpkins, and $4\frac{1}{2}$ bushels beans. The soil upon which they grew was a gravelly loam, of yellowish color ; formerly quite rocky ; mostly cleared off ; dry and light ; not hard to work when free from stone. Before plowing cut from 600 to 800 lbs. per acre, hay. Broke up May, 1859, eight inches deep, turning about six cords quite strawy barn manure ; harrowed well ; furrowed north and south about three and a half feet apart ; hills about three feet apart ; manured in the hill, with old barn manure and dirt from under the stable ; used 200 pounds bone-dust on one-fourth of the piece—half in the hill and half in top dressing ; sprinkled each hill after dropping the corn with a compost of salt, lime and plaster—300 pounds quick-lime, slacked with 100 pounds salt dissolved in water (slaked dry,) one-third part plaster added, (by measure,) used about a gill to six hills ; top dressed with hen manure, salt and plaster, composted—four bushels hen manure, one salt, two plaster—put *around* the hill (not *on* it.) Plowed between rows once, and cultivated once ; hoed twice ; five kernels to the hill—eight rowed mostly. Planted about the 20th of May ; cut up and shocked about the 20th of September. I had also about 10 bushels potatoes from the same ground. I weighed one bushel, measured the remainder, and judge from a calculation based upon such measurement of ears, that there will be 60 bushels of sound corn and about 5 bushels soft. I kept no minutes, have made no exact measurement, except the land, and but for the fact that I considered it a good crop for *worn out* or *exhausted* land, with the *small quantity of barn manure* I was able to apply, and that I relied in a great measure upon the artificial manures, or composts, as above specified, I should not have entered or made any statements of it.”

NORTH PENOBSCOT SOCIETY.

Mr. Patten, acting Secretary, in absence of Mr. Clark, writes me that this Society held its Annual Exhibition at Lincoln, October 5th and 6th, 1859. There was decided improvement in the stock exhibited over former years. The show in other departments was highly creditable. There is a demand for more light and knowledge on matters pertaining to agriculture. Thought is more active and discussions more frequent and interesting.

LIVE STOCK.

Premiums were awarded to William R. Ayer of Lincoln, for full blood Devon bull, bred by I. Wentworth.

Timothy Fuller, for Devon heifer and heifer calf, from Kennebec county.

First premium on Durham bull to Benjamin Whitten.

Second premium to A. C. Ingersoll, for Durham bull, 1½ years old.

Shepard Bean showed a bull, cross of Devon and Durham.

First premium on stock cow to A. W. Russell, for Durham cow "Victory,"—dam a full blood cow of the Fitz Favorite family, and sired by young Shepard.

First premium on milch cow to A. J. Bates, Lincoln.

William R. Hersey, first and second premium on draft horses.

Best breeding mare to Joseph Lambert of Enfield.

Second to Moses Bagley of Lincoln.

FRUIT.

Best winter fruit to John Treat of Enfield.

Best fall fruit to Merrill & Hueston.

The committee specially notice the Mangolds shown by Wm. C. Hammatt of Howland, and recommend the extensive cultivation of this valuable root for feeding to stock.

WEST PENOBSCOT SOCIETY.

The Secretary writes me as follows :

“This Society now embraces 207 members—9 new ones having been added the past year.

Its Annual Exhibition was held at East Corinth on the 27th and 28th days of September, A. D. 1859. This exhibition was good—fully up to any of the previous ones. The farmers appear to take an interest in the improvement of all kinds of stock and of agricultural products, of which there was a good show of the different kinds. I think the Society is exerting a good influence upon the agriculture of this vicinity.”

So far as can be judged from returns made, few, if any, of our county societies are actuated by a more commendable spirit, or better accomplish their mission, than the West Penobscot; certainly, in the style and completeness of the returns made to this office, Mr. Batchelder, as Secretary, is excelled by no one.

LIVE STOCK.

Horses. First premium on stallion, to Simon Leighton of Exeter, on a Drew horse, six years old.

Second, to G. A. Bachelder, for a Drew horse, for which he says the owner has refused \$1,000.

Third, to M. L. F. Walker of Exeter, for Eaton Messenger, seven years old.

First premium on stallion four years old, to Albert G. Tibbetts of Exeter, Drew horse.

Second, to R. W. Doe of Corinth.

First premium on three years old, to Chauncey Cochran of Corinth, for a Morgan Messenger.

Second, to G. A. Proctor of Exeter.

Third, to F. N. Sawyer, Drew horse.

Breeding Mares. First premium to George A. Bachelder of Exeter, for a Morgan.

Second, to Nath'l E. Brown, for a "Tiger."

Third, to Joseph Richardson of Corinth.

Bulls. First premium for Devon bull over two years old, to Matthew Ritchie of East Corinth, for one of four years, bred by I. Wentworth.

John Chandler of Corinth, one two years old, and bred by Wentworth.

For best yearling Devon, to Sherburne Tilton of Charleston, for one bred by Mr. Ritchie.

Best bull calf, to Matthew Ritchie.

For best Short horn bull two years old, to Isaac W. Case of Kenduskeag, for one bred by him, got by "Bay State" out of the cow "Stella," bred by R. H. Green, Esq. of Winslow.

Cows. For best Short horn cow, to Isaac W. Case, for "Alice 4th," a Herd Book animal, bought by him in Mass. in 1857.

For best and second best Devon cow, to C. Cochran of Corinth—both bred by Wentworth.

Third, to Matthew Ritchie.

Milch Cows. There were grades and natives, and the statements (as is too often the case) give the very indefinite information that they were "excellent milkers" and kept on "very poor pastures." And here let me mention as something remarkable, and which ought to be better known if really a fact—noticeable, however, no more with regard to the statements from this Society than in *all others*—that the greater the yield of a milch cow, if the statements are to be relied on, the poorer has been her keeping. This is a point worth being settled; and in order to do so, let me suggest that societies in future offer two classes of premiums, one on animals kept *without food*, and one on such as are *well kept*.

Sheep. These were mostly grade Leicesters, and esteemed highly for mutton.

Swine. These were grades of Essex, Suffolk and Newbury White.

DAIRY.

The first premium was awarded on June butter, accompanied by the following statement—(excellent butter, no doubt, but might not have been any worse for knowing some other particulars concerning its origin.)

“ My dairy consists of 6 cows of the breed known as the Durham Short horn, which I believe the best ; their average period of giving milk is, I don't know nor care how many months ; the average yield of milk for the whole term is do. pounds per day. During the month of greatest flow the yield is do. pounds per day—and its quality is such that do. pounds of it will yield a pound of butter, and do. pounds of it will yield a pound of cheese. Don't make any. The average yield of butter per annum to each cow is do. pounds. They are kept in winter on roots—beets are preferred—hay, and other coarse fodder, and straw plenty, (not to be fed on, but to lay on,) and in summer, good dry pasture clover and white clover, with good running water. You see I don't go into all this fuss of weighing milk and keeping account of every cow's milk, as I don't keep a *clerk*, and my time about the farm and other business is worth more than weighing and measuring milk. But the mode of manufacturing good butter is very simple, as follows : First see that every pail, pan, dish, churn, and vessel that is used, is sweet and clean ; now commence the operation—let the cow's bag be well brushed and the cow milked clean ; milk stand 30 or 40 minutes ; then the froth scum off ; now strain, but mind and not be so greedy as to drain the very dregs from the bottom of the pail that settles in the 30 minutes, and thereby cheat the pig of a pint of settlings ; milk set four and twenty hours ; then skim in a pot and keep tight from the air ; (churn, New York Patent,) churn, draw off the buttermilk, and strain in pure cold water to cover the butter, churn five minutes, draw off the water and buttermilk, and add the water again five minutes—draw off and turn the crank the other way till the butter is thereby dry, (be careful that the striped cow's milk is all worked out,) then add one ounce of salt to the pound : then keep on rolling till the salt is well worked in, (add no sugar or salt-peter, for butter is made of milk or cream, not of sugar,) now remove the dasher from the churn, take your butter patters and run over in such form as you wish for balls or brick as you choose, to a board, to suit yourself ; now place it in the firkin, strew in very little fine salt on the layers ; now the sequel, to keep till next spring, it is this : Cover it with cloths enough to keep it tight from the air, and not open it till wanted, and I will warrant it to remain sweet and good for a year.”

The perfect cleanliness of the above mode, and taking off the cream at the end of 24 hours, might be copied with great advantage in many dairies.

CROPS.

Wheat. First premium to William Grinnell of Exeter, 15 bushels per acre.

Indian Corn. First premium to T. H. Norcross of West Charleston, for 138 bushels shelled corn on $1\frac{1}{4}$ acres—110 bushels per acre.

Second, to J. C. Clements of Kenduskeag, for 178 bushels ears on one acre and 60 rods.

Third, to Matthew Ritchie, for 131 bushels ears on one acre.

Fourth, to William Grinnell, for 120 bushels.

Barley. First premium to Hall Bagley of Charleston, for $82\frac{1}{2}$ bushels on one acre and 50 rods—62 bushels per acre—land in corn last year.

Second, to J. O. Tilton of Kenduskeag, for 85 bushels on one acre and 115 rods— $49\frac{1}{2}$ bushels per acre—land in corn for three successive years previously.

First premium on half an acre, to T. H. Norcross, for 32 bushels and 13 quarts.

Second, to J. C. Clements, for $25\frac{1}{2}$ bushels.

Oats. First premium to George W. Worster, for 74 bushels per acre—36 pounds per bushel—land in corn last year.

Second, to W. L. F. Walker of Exeter, for $72\frac{1}{4}$ bushels on one acre—land in oats last year—spread three cords manure and plowed 8 inches deep—6 bushels seed sown.

Oats and Peas. First premium to Asa Shaw, for $43\frac{1}{2}$ bushels on one acre.

Second, to J. C. Clements, for 43 bushels on one acre—clayey loam—in grass for several years—broken up in August, 1858—no manure applied.

Potatoes. First premium to T. H. Norcross, for $357\frac{1}{2}$ bushels on one acre.

Second, to E. F. Crane of Kenduskeag, for 320 bushels on one acre.

Third, to Matthew Ritchie, for 283 bushels.

Fourth, to William Grinnell, for $237\frac{1}{2}$ bushels.

Carrots. First premium to E. F. Crane, for 285 bushels on one-fourth of an acre.

Second, to E. B. Stackpole, for 194 bushels on 47 square rods.

Third, to Asa Shaw, for 178 bushels on one-fourth acre.

Ruta Bagas. First premium to E. F. Crane, for 240 bushels on one-fourth acre. Mr. Crane's statements are as follows:

"The ground upon which I raised the rutabaga turnips, was planted to potatoes last year and was a sandy loam, entirely free from stones. Plowed about 8 inches deep last spring, and well harrowed, furrows 18 inches apart. Horse manure worked over by the hogs put in the hill; sowed half pound of seed in drills, on one-fourth acre; came up quite thick; had to thin them out; sowed on the 20th of June and harvested last of October. Whole expense in raising and harvesting, including manure and every thing else, is estimated at \$12. Yield on one-fourth acre, 240 bushels.

At 30 cents per bushel,	\$72 00
	12 00

Net profit,	\$60 00
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The carrots were raised on land that was under a high state of cultivation, being planted to carrots last year; two cords of manure spread on the land and plowed in 8 inches deep; harrowed well; rows 18 inches apart; sowed half pound of long orange seed in drills, to the quarter acre. Whole expense, including every thing in raising and harvesting, \$10. Yield, 285 bushels.

At 33 cents per bushel,	\$93 00
	10 00

Net profit,	\$83 00
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The land on which the potatoes were raised was green sward, broken up in the fall of 1858; harrowed in the spring; furrowed for rows, 3 feet apart; put a small shovelful of straw manure in the hill; hills about 18 inches apart; planted on the last of April and first of May; hoed twice; harvested about the middle of Oct. Yield, 320 bushels."

Mr. Norcross' statement of crop of 138 bushels corn (on the same piece there were also 8½ bushels beans, 13 large cartloads of pumpkins, and 564 pounds squash) on one and a quarter acres, is as follows:

"My crop consisting of 138 bushels of 62½ pounds to the bushel (shelled) was grown on one acre and 40 rods, being at the rate of 110 bushels 3 quarts to the acre. The soil upon which it grew was a loamy brown color, fine, friable. It had been in grass, mowed for the last 12 years, without any dressing, and only produced five hundred lbs. to the acre, of poor hay. The 24th of May last, 1858,

I hauled 11 cords of coarse manure on to the piece; last of May broke it up; first of June sowed three bushels of oats to the acre; grew very stout, worth as much as three tons of hay; fed without threshing. This spring, 1859, I commenced for the crop under consideration, 16th of April; hauled 15 loads of good manure from the stable cellar, and placed in three heaps, beside the ground, half cord to the load, and as shoveled on, I sowed two bushels fine salt, 4 do. dry slacked lime, 6 do. ashes, and 4 do. plaster; covered it with leached ashes and let it lay till wanted for the hill; 20th May, commenced plowing crosswise of the furrow 10 inches, or below the old sod or furrow and manure, with a long breaking up plow; then harrowed well; then hauled off the rocks that were plowed up; then hauled on 15 cords muck and barnyard manure, spread and plowed in; then harrowed and cultivated three times. 26th of May, began to plant; first furrowed $3\frac{1}{2}$ feet, from 8 to 9 inches deep; then a shovelful from the heaps which was nice and warm; covered smooth and patted down; planted with Varney corn planter, 5 in a hill; I think there were but two hills missed in the piece; planted hill of beans between every hill of corn; stuck one pumpkin seed point down, in the third hill of every third row, with a few marrow fat squash seeds, and finished up 28th, at night, some tired. Cultivated and hoed first, about 20th of June; second, first July; then weeded as occasion would admit. Cut up first of October and shocked in small shocks. Cost, \$87.70. Value of crop, \$212.09."

Mr. Stackpole's statement on carrots, is as follows:

"My carrots grew on 46 and 5-6 rods of ground, and the crop amounted to 194 bushels of orange carrots, which weighed 62 pounds to the bushel. The soil was of a clayey loam, with a few small stones; was plowed from 7 to 8 inches deep, and was planted without applying any manure this year. Soil, stiff, subsoil of clay, one foot below the surface. It has been planted with carrots the two previous years, and well manured, both years. I sowed the seed the first of June, with a machine, in drills about fifteen inches apart, and harvested the first of November. Did not come up well, and they were injured by the drouth. I hoed and weeded them twice."

Expense of cultivation,	\$14 25
194 bushels carrots at 2s. per bushel,	64 67
	<hr/>
Net profit,	\$50 50

Mr. E. B. Stackpole presented garden vegetables. He says:

"The soil on which they grew was light and gravelly, what is termed here "horse back." The vegetables I present, are 3 varieties of cabbage, 1 of cauliflower, three of turnips, 4 of beets, 3 of onions, 1 of parsnip, 1 of carrot, 3 of corn, 4 of squash, 3 of beans, 2 of peppers, 1 of rhubarb, 1 of tomato, and 1 of cucumber, making in all, 31 varieties, which were all grown in the open air, and were planted and sowed the 24th and 25th days of May. The same land has been used for a garden 12 years; last year there was not any

manure on this land, which produced a crop worth \$63.86. The lot contains 28 square rods. This year there were 4 cords barn yard manure spread on and plowed in, and some leached ashes raked in on top of the beds before sowing the seed. I have not gathered my crop this year, and cannot state its value. I also present 25 different varieties of potatoes."

Mr. Norcross, in a statement about vegetables says, the Orono potato grows large and yields well, but is apt to be hollow hearted and not good. The Christie keeps all the year and are good. The Halifax white yields well and is of fine flavor, resembles the Butman, but much larger. Of cabbages, the Pumple foot is the best of 5 varieties. Purple top rutabaga the best turnip, but not sure of a crop.



FRUIT.

Apples in large variety and great excellence were shown, by Messrs. Foss, Sinclair, Tibbetts, Chapman and others. Pears by Messrs. Chapman, Sinclair, Foss and others. Plums by Messrs. Sinclair, Foss and others. Mr. Sinclair also showed several varieties of grapes, including the Concord, which he finds to ripen early and well.

WALDO COUNTY SOCIETY.

This Society held its Annual Exhibition at Belfast on the 12th and 13th of October, 1859.

LIVE STOCK.

Horses. First premium for stallion, to Horace McKenney of Monroe.

Second premium, to W. W. Berry of Montville.

First premium on breeding mare, to Reuben Higgins of Morrill.

Second premium to James L. Twitchell of Montville.

Most of the horses shown appear to have been Morgans and Messengers. The statements regarding animals of all kinds are very few in numbers and meagre of interest.

Bulls. First premium to Joseph Ellis—no statement returned.

Second premium to Albert Beveridge, for a grade Durham.

Milch Cows. First premium to Samuel Shaw of Belfast, for Ayrshire cow.

Second premium to Jeremiah Evans of Waldo—Native breed; gives 18 quarts per day, and makes $1\frac{1}{2}$ pounds butter daily in good feed.

Stock Cow. First premium to Jeremiah Evans of Waldo, for grade Devon.

The neat stock shown appears to include grades of Hereford, Devon and Durham.

Sheep. First premium to I. D. Tucker of Lincolnville, for "Irish sheep," and very highly commended by the committee.

Second premium to Thomas McKinley of Belfast, for South Downs.

Mr. Tucker showed, also, a fine full blood Leicester buck, imported from New Brunswick.

Swine. First premium to D. L. Pitcher of Belfast, for Suffolk sow and pigs; also, for Newbury White Boar.

Second premium to Orrin Cunningham, for Berkshire sow and pigs.

FRUIT.

Apples were shown by R. R. Swett of Belfast, who obtained first premium. Howard Murphy, second premium. Also, by David Norton, H. Tabor, &c.

Pears, by Vinal Hills.

Grapes, by S. G. Thurlow, Geo. R. Sleeper and E. A. Pitcher.

CROPS.

Potatoes. Robert Patterson of Belfast, first premium on potatoes, 273 bushels on one acre; ground newly broke up, and four cords manure applied.

Second premium to Samuel F. Shaw of Belfast, 87 bushels on one-fourth acre.

Third premium to T. T. Roberts of Brooks, 195 bushels on half acre.

Turnips. Robert Patterson, first premium for 775 bushels rutabagas on one acre; greensward broke up, and ten cords stable manure applied. Cost, \$51.45; value, at 25 cents per bushel, \$203.75.

Second premium to S. F. Shaw, for 325 bushels rutabagas on half acre. Cost stated to be \$15.85; value, at 33 cents per bushel, \$110.

Third premium to T. T. Roberts, for 215 bushels rutabagas on one-fourth acre. Cost stated to be \$9.56; value, at 15 cents per bushel, \$24.55.

D. L. Pitcher, 176 bushels flat turnips on one-eighth acre.

Carrots. First premium to R Patterson, for 950 bushels on one acre and one eighth, or 831 bushels per acre. Soil, gravelly loam; in sward; top dressed with stable manure, ten cords per acre. Cost stated at \$68.20; value, \$226.80.

Beets. First premium to D. L. Pitcher, for 176 bushels man-golds on one-eighth of an acre.

Second premium to Robert Patterson, for 125 bushels on one-eighth of an acre; gravelly soil, in sward; plowed and top dressed with two and a half cords stable manure.

REPORT OF COMMITTEE ON GRAIN CROPS.

There were fine samples of corn presented by the following gentlemen: Robert Drinkwater, William Marriner, Vinal Hills, Rob't Patterson, Samuel F. Shaw, George Gilmore, Samuel Bullen, and J. M. Paul.

Statement of Robert Drinkwater—First Premium on Corn.

My crop consisting of 120 bushels of ears, was grown on one acre of ground, being at the rate of 60 bushels to the acre. The soil on which it grew was loam; spread six cords of manure and put one shovelful in the hill; hoed once and pulled weeds among the same in August. The cost of growing the same and its value, as follows:

DR.	<i>Crop of Corn.</i>		CR.
Plowing 1 day, . . .	\$2 00	60 bushels at \$1, . . .	\$60 00
6 cords barn yard manure, . . .	18 00	Fodder, . . .	10 00
6 cords other manure, . . .	10 00	2 bushels beans, . . .	3 00
Carting and applying the same, . . .	3 00	Pumpkins, . . .	10 00
Harrowing and ridging, . . .	1 00	Manure left in the soil for future	
Furrowing and planting, . . .	3 00	crops, . . .	10 00
Cultivating once, . . .	75		
Hoeing, 3 days, . . .	3 00		
Other cultivating and weeding, . . .	50		
Cutting stalks and harvesting, . . .	2 00		
Husking, . . .	4 00		
8 quarts seed, . . .	25		
Interest on land, . . .	1 25	Deduct cost, . . .	\$93 00
			48 75
	\$48 75	Profit, . . .	\$44 25

Statement of Wm. Marriner, Lincolnville—Second Premium.

My crop consisting of 120 bushels of ears, was grown on 1½ acre, being at the rate of 106½ bushel to the acre. The soil on which it grew was stony loam. Previous to 1857, soil run out. Plowed the same in 1857, and sowed to oats; in 1858, plowed, spread manure, and sowed to wheat and barley; 1859 manured in the hill and planted to corn. The cost of growing the same and its value are as follows:

DR.	<i>Crop of Corn.</i>		CR.
Plowing, 1½ days, . . .	\$2 50	120 bushels at 50c., . . .	\$60 00
Barnyard manure, . . .	6 00	Fodder, 1½ tons, . . .	7 50
Carting and applying, . . .	2 00		
Harrowing and ridging, . . .	1 50		
Furrowing and planting, . . .	5 00		
Hoing two days, . . .	2 00		
Cutting stalks and harvesting, . . .	4 00		
6 quarts seed, . . .	25	Deduct cost, . . .	\$67 50
	\$23 25	Profit, . . .	23 25
			\$44 25

Statement of Vinal Hills, Northport—Third Premium.

My crop consisting of 102 bushels of ears, was grown on one acre, being at the rate of 50 bushels to the acre. The soil on which it grew was fine loam, broke up last October, 10 inches deep; five cords green manure spread and harrowed in, and five cords put in the hills, three feet by three and a half feet apart. Covered manure before dropping seed; dropped with a corn planter; planted beans between the hills on half of the ground and pumpkins on the other half. The cost of growing the same and its value are as follows:

DR.	<i>Crop of Corn.</i>		CR.
Plowing 1 day, . . .	\$4 00	50 bushels at \$1, . . .	\$50 00
10 cords barnyard manure, . . .	20 00	2½ bushels beans, \$1.50, . . .	3 75
Carting and applying the same, . . .	3 00	150 pumpkins, at 3c., . . .	4 50
Harrowing and ridging, . . .	1 00	Fodder, . . .	10 00
Furrowing and planting, . . .	2 00	Manure left in the soil for future crops, . . .	15 00
Cultivating twice, . . .	1 00		
Hoing twice, . . .	4 00		
Cutting stalks and harvesting, . . .	4 00		
Husking, . . .	4 00		
8 quarts seed, . . .	50		
8 quarts beans, . . .	50	Deduct cost, . . .	\$83 25
	\$44 00	Profit, . . .	44 00
			\$39 25

Samuel F. Shaw raised on one acre, 98 bushels ears, 6½ bushels beans, and 6 loads pumpkins, making a net profit of \$39.45.

Robert Patterson raised on one acre, 95 bushels ears, 8 bushels beans, and 6 loads of pumpkins, making a profit of \$42.38.

Other statements wanting in some particulars, were not considered.

Statement of Harrison Tabor of Lincolnville—First Premium on Wheat.

I raised on 1½ acre, 25 bushels of good clean wheat; sowed 2 bushels and 1 peck of seed. The land on which I grew this wheat was broken in August, 1857; planted to corn in 1858; put one shovelful of manure in each hill; plowed the second day of May, 1859; sowed the 4th of May, five pecks of seed, and on the 9th one bushel more. The weevil injured the first sowed, but not the last. Seed, the Piper, Java and Red beard, mixed together. The cost of growing the same and its value are as follows:

Dr.	<i>Crop of Wheat.</i>		Cr.
Plowing, sowing and harrowing,	\$3 50	25 bushels wheat, at \$1.25,	\$31 25
Seed,	3 94		
Salt, lime and labor washing, .	50		
Harvesting,	3 00		
Interest on land,	3 00		
Taxes,	60	Deduct cost,	<u>\$14 54</u>
	<u>\$14 54</u>	Profit,	<u>\$16 71</u>

Robert Patterson presented a superior quality of pressed hay, on which your committee recommend a gratuity. Says he has thirty tons of the same quality in his barns.

HANCOCK COUNTY SOCIETY.

The Secretary writes as follows :

“ This Society now embraces 400 members—119 new ones having been added during the past year.

Its second Annual Exhibition was held upon the Fair grounds, Ellsworth, on the 11th, 12th and 13th days of October, 1859, and were fortunately favored with good weather during the entire exhibition. Whole number of entries, three hundred and ninety seven.

The show of working oxen on the first day was good; showing that Hancock County is not behind the more favored counties in the State in producing superior stock of this kind. Of bulls, steers, cows and heifers, there was a good display—the Durhams and Devons, many of them showing full blood with grades and natives competing successfully for many of the premiums offered. The show of horses was far better than last year.

The vegetable and fruit departments were creditable to the county. Amongst the vegetables we noticed many samples of potatoes of large size and excellent quality; long blood beets, turnip beets and mangold-wurzels; orange and white field carrots; red, white and yellow tomatoes; yellow flat onions of large size and well ripened. Specimens of wheat, winter and spring rye, barley, oats, beans, peas and corn, in abundance.

There were water-melons, citron-melons, apple-pie-melons, egg plants, apples, pears, plums and grapes, a good variety,—together with the farming implements and household manufactures in the hall, rendered the exhibition one of much interest to all concerned.

The Society now hold a lease of thirteen acres of ground about three-fourths of a mile from this village (Ellsworth) for a term of twenty years, with the privilege of buying at any time within four years, at a stated sum specified in the lease. The grounds have been enclosed the past season with a neat and substantial board

fence. A half-mile course has been made upon the grounds, thirty-five feet wide, and with a small expenditure another season, will make it one of the best tracks in the State. A reservoir twenty feet deep, fourteen feet across after being stoned, and affording an abundant supply of water. A flagstaff one hundred and sixty feet high has been put upon the grounds. The building of the fence, race-course, stalls for the cattle, and all the expenditures upon the grounds amount to fourteen hundred and twenty-three dollars. And by the generous liberality of the citizens of Hancock County the Society has been furnished with funds to meet this outlay, and also all other expenditures of the Society the past year, which reached the sum of nearly two thousand dollars."

LIVE STOCK.

Horses. First premium on stallion, to E. J. Durgin of North Sedgwick, for a Morgan horse.

Second, to Wm. H. Black, for a horse of the Drew stock.

Breeding Mares. First premium to William H. Black of Ellsworth.

Second, to John Armstrong of Ellsworth.

Bulls. First premium to Parker & Pearl of Dedham, for a Short horn bull, four years old, bred by Jesse Wadsworth; pedigree in Am. Herd Book, Vol. 3, page 51. Said to be of an excellent milking family.

The others shown were chiefly or wholly grades.

Cows. A cow entered as Hereford was shown by N. Varnum, and one said to be three-fourths Galloway and one-fourth Durham by Rufus W. Clement of Ellsworth.

Swine. First premium on boar, to Thomas Smith of Surry, for a Berkshire, bred in Albany, N. Y., from an imported sow and boar from England.

Sheep. First premium on buck, for a South Down, to Francis Buck of Orland. Also, for South Down ewes.

Ebenezer Clark of Hancock showed buck and lambs, a cross of South Down and Cotswold, and one from Mr. Perley's flock, (Woodstock, N. B.)

CROPS.

Wheat. Chas. P. Silsby of Amherst, 24 bushels per acre.

D. G. Wagsatt of Orland, 45 bushels on three acres; burnt land.

Rye. Parker & Pearl of Dedham, 24 bushels per acre. Burnt land.

Barley. Wendall Silsby of Amherst, 60 bushels on one and a half acres; land in potatoes the year before.

Oats. John Armstrong of North Ellsworth, 144 bushels on two and a half acres.

Potatoes. James G. Moor, 125 bushels on half an acre.

Newell Osgood of Bluehill, 138 bushels on half an acre, (Jackson, and Jenny Lind.)

(A premium was awarded for an Essay—subject not stated; but the essay itself was not among the returns.)

WASHINGTON COUNTY SOCIETY.

The Secretary, Wm. D. Dana, writes me:—"Its Annual Exhibition was held at Pembroke on the 28th and 29th days of September. The Cattle Show was a decided improvement upon the last—as to good order, good feeling, and a good time generally; but was not a success, so far as cash receipts go to make success. This exhibition showed the results of the efforts to improve stock—Grade Devons being quite plenty, and as handsome as anything of the ox kind can be. As a contrast, a Jersey cow and bull, and some Galloways, were exhibited—not pretty, (as some think,) but good. The influence of the Society for good is plain to any one who will take pains to observe carefully the results of its operations."

LIVE STOCK.

Horses. First premium on stallion, to J. W. Hartford, for a Drew and Tiger horse.

Best breeding mare, to E. W. Chadbourne.

Neat Stock. For best bull to Andrew Rogers; breed not given.

For best Devon bull, to W. E. Stoddard.

For best one year old Devon bull, to Wm. D. Dana.

For best Jersey (Alderney) bull, to William D. Dana, for one of which he says:

Alderney Bull, five years old, thorough bred.—This bull was presented to the N. B. Charlotte County Agricultural Society, by a Mr. Sharp of London, and sent out to St. Andrews in 1856. He was kept in St. Andrews till Sept. 1859, when I purchased him and brought him into this county. I know nothing of him, more than that Mr. Sharp in his letter, of which I furnish the committee a copy, describes him as a superior animal, and seems anxious that the county (Charlotte) should avail themselves of his valuable properties. The stock of his get fully sustains his reputation.

Several cows stated to be Galways (Galloways?) were shown by William Low and Samuel Leighton.

Premium on best milch cow, to John Andrews, for one which he says has not been dry six months since she had her first calf in 1853. Calved in May, and gave in June and July 20 quarts daily, and made 12 pounds butter per week.

Wm. D. Dana obtained premium on a pure Jersey cow, of which he says :

“Sired by the Alderney bull here to-day, on a full blood Alderney cow from an importation by Admiral Owen, bought by me at two years old. Kept on straw and turnips through the winter, and in pasture in the summer. Made in three weeks after calving, seven pounds of butter in seven days. The quantity is not remarkable, but the quality as compared with the other butter made in the same dairy at the same time, was vastly superior.”

First premium on butter was obtained by Mrs. Sarah E. Dana, and from the milk of Jersey cows.

CROPS.

Wheat. First premium to Isaac Loring, for 19½ bushels. Land in potatoes last year; in mowing eight years previously.

Barley. First premium to N. P. Pattangall, for 42½ bushels per acre; on old greensward, plowed and 150 pounds guano applied on the furrow to 60 square rods, and compost on the rest.

Second, to Otis Lincoln, for 42 bushels per acre. Land in carrots and turnips last year.

Oats. First premium to Wm. D. Dana, 140 bushels on 3½ acres. Soil, clayey loam; in pasture two years previously; no manure. Cost of crop, \$36; value, \$66.

Hay. First premium to Andrew Rogers, for 77 cwt. on one acre.

Second premium to Aaron Frost, for 7,965 pounds.

Third premium to Otis Lincoln, for 2½ tons.

Ruta Bagas. First premium to Andrew Rogers, 540 bushels per acre.

Hugh Porter, 282 bushels on 70 square rods.

Carrots. Isaac Shields, 213 bushels on one-fourth acre; land manured with hog manure and guano.

Wm. D. Dana, 200 bushels on 38 square rods.

Field Beets. William D. Dana, 80 bushels Golden field beets on $16\frac{1}{2}$ rods—equal to 775 bushels per acre:

“The soil upon which it grew was gravelly loam, and has been in grass for several years till 1857, when it was used for a hog-yard. In the spring of '59, spaded eighteen inches deep, after spreading a thick coat of manure from the hog pen; three rows manured from the house slop sewer, and three rows where the manure was applied as a top dressing, yielded equally well with the others. Weeded and thinned to ten inches apart in the rows, and vacancies filled by transplanting when the plants were four inches high. The rows were thirty inches apart.”

Statement of Hugh Porter.

Raised two hundred and eighty-two bushels of rutabagas on seventy rods of land. Greensward, plowed in the fall of 1858; manured in the drills with compost made of hog manure, muck and Plaster of Paris—the compost covered three inches deep, then leveled smooth and applied a small portion of phosphate of lime before sowing the seed. Weighed some of the turnips—12 and 14 pounds. Drills two feet apart.

Mr. Dana, the Secretary of the Society, furnishes the following notes. It is very desirable that others would furnish similar notes in other localities:

General Features of the Season.

	Max. Temp.	Min. Temp.	Mean Temperature.— <i>Fahr.</i>	Inches of Rain.	Days on which rain fell.
April,	—	—	38°	3.52	9
May,	83 $\frac{1}{2}$	30	52.14	4.62	10
June,	78	35	57.24	7.90	18
July,	82	46	63.72	4.14	10
August,	82	42	62.98	0.95	4
Sept.,	74	30	54.09	3.76	12

MAY—First note of frogs, 20th. Apple, pear and cherry in blossom, 25th. First dandelion, 10th.

JUNE—First ripe strawberries, 10th. White and red clover in flower, 20th. Orchard grass headed out, 4th.

SEPTEMBER—Frost, 7th. Ice, 17th.

Grass and grain crops good, and harvested in fine order.

Early planted root crops good.

Late planted root crops light—as after July 4th till last of August, very little rain fell.

Common potatoes—good crop, and of good quality.

White Blue Nose—light crop, and superior.

WEST WASHINGTON SOCIETY.

This is understood to have been, at the time of holding their first show in September, 1859, an unincorporated Society, and wholly a voluntary association, springing up from the need felt for more active exertions to promote agriculture, and being at too great distance from the seat of operations of the old Society to derive much benefit from it, or participate in its exhibitions. May success attend their efforts.

The Secretary writes me as follows :

“This Society embraces 180 members. Its first Exhibition was held at Columbia on the 29th day of September. The show of neat stock was not large—chiefly of grade Devon, Durham, Hereford and Natives. A fine Devon bull was shown by Jesse Plummer, also one of Durham and Hereford stock by John F. Pineo of Columbia. Some very fine stock was exhibited sired by a bull introduced into this section by Gamaliel Pineo. The horses at the show were principally of Messenger and Native blood. There were some fine Leicester sheep, and also some Suffolk swine on exhibition. The farmers generally feel the importance of improving their stock, and of late have been actively engaged in procuring the best blood the country affords for breeding stock of a better grade. The attention of the inhabitants of the section embraced within the limits of our Society, has from the first settlement of the country been mainly directed to lumbering and shipbuilding, and from that cause we are perhaps the least agricultural of any people in the State, but, of late, there appears to be a general awakening, and a wide-spread interest is manifested in the importance of tilling the earth. Perhaps a season never closed with so much preparation for farming in this section as at present.

OFFICERS—*President*, J. Walker Moore of Cherryfield.

Vice Presidents, William B. Smith of Machias, M. J. Talbot of East Machias, A. K. McKenzie of Addison.

Secretary—James L. Buckman.

Treasurer—Stillman W. Nash of Harrington.

Directors—Gowen Wilson of Columbia, M. T. Hill of Machias, John Plummer of Addison, George W. Taylor of Jonesborough, J. D. Parker of Steuben.”

NORTH AROOSTOOK SOCIETY.

The Secretary writes me that "its Annual Exhibition was held at Presque Isle, October 5th and 6th. The stock in all departments, except sheep, made a fine appearance. Although there was less competition than in some former years, it was never so good. The improvements making are very marked. The North Devon blood is becoming widely disseminated, and is the favorite stock of our farmers. Crops this year were excellent, except Indian corn, which was extensively cut off by spring frosts, but the late planted did very well. Wheat, potatoes and oats were never better. It is plain that the Society is exercising an increasing influence for good upon the agriculture of the county.

AN ADDRESS

Delivered before the North Aroostook Agricultural Society, at the Annual Fair at Presque Isle, October 6th, 1859, by Rev. D. STICKNEY.

Mr. President, Ladies and Gentlemen:

I stand here to-day, by the invitation of the Trustees of your Society, with but very brief opportunity for preparation, to speak on this occasion.

Of course it will not be expected that I should be very interesting or instructive. But, standing as we do, amidst the gorgeous scenery of the grand old forests of the Aroostook, at the season when

"Nature has in her gayest livery all things clad,"

in a country rendered almost classic, by the fact that it was "long time ago," the refuge and home of a people of "pleasant magnetisms," compelled to flee from the rapacity of foreign spoilers, upon a soil which, but recently, was on the eve of being the battle ground upon which contending armies should mingle in all the pomp and circumstance and horror of war—on a spot, which within

one brief year was vocal with the assembled wit and wisdom of the editorial fraternity of our State, who departed to tell in story and song of the glories and beauties of this garden of Maine; and, surrounded as we have been by your flocks and herds, your various and varied specimens of agricultural industry and manufacturing skill, and above all, having for auditors this numerous and intelligent gathering, dull indeed must be the mind, obtuse the intellect, that cannot say *something*, although it may not be what you may desire.

It was the conceit of a clever poet, that

“Man wants but little here below,
Nor wants that little long.”

There is unquestionably less of *poetry*, but a great deal more of fact, in my idea that

Man wants a great deal here below.

Man was made by an infinitely wise Creator—the creature of want, and of constantly recurring wants. Give us day by day our daily bread, implies that we have daily wants which need to be supplied.

I purpose then, to speak briefly of some of these wants, and of the means you have here of supplying them.

As I have already said, we have wants which need to be supplied, and unless supplied, we fail to realize the purpose and object of our existence.

These wants are physical, intellectual and moral or spiritual; all of which must be supplied, and constantly supplied, or man is not what it is his privilege to be, what it his *duty* to be.

And first—we should have a healthy parentage. There are a great many of us that were born wrong; that is, we had a parentage which was wrong—parents physically or morally diseased, or both, and the iniquities of the father are by an irreversible law of nature visited upon the children of the third and fourth generation. I do not offer this as a theological dogma, but as a truth of natural science, to which it would be well for the world to give heed. I do not expect that any of us at this late day will be able to improve our own nativity; that is a matter over which we have no particular control; but the generations yet to come, will hold us to a strict responsibility for a healthy, physical, intellectual and moral organization.

Second.—A man ought to be well “brought up.” Some persons, of words polite and classical, would say “*educated*”—but

I like the good old Anglo Saxon phrase, "*brought up.*" This means something—there is some pith to it. It means, not only, that children should be taught grammar, and geography, and arithmetic, and natural philosophy, and Greek, and Latin, and music, and drawing, and dancing, and all the arts and sciences, useful and ornamental, and the mind disciplined and developed, so that it can grasp the abstruse and the profound: but it means that they shall be taught to obey father and mother, to love brother and sister, to reverence and worship God, to do by others as they would that others should do unto them; to know how to fell the forest and pile up the logs; to raise potatoes, and corn and oats, and wheat: to swim the river, if necessary, to camp out in the woods, and be able to withstand the winter's cold and summer's heat, by having all their physical powers developed and made strong by vigorous exercise. This is what Solomon meant, when he said, "train up," (bring up, he meant) "a child in the way he should go, and when he is old he will not depart from it."

Third.—Man needs a home—a place on earth which he can call his *own*. A spot of earth upon which he can stand, and proclaim to all the world around, that these acres, more or less broad, as the case may be, are his. A spot of which he can say with truth, "*of this I am monarch!*"

This beautiful earth of ours was given to man for a possession. Not to one man alone, but to all men; by Him who made of one blood all nations of men to dwell upon the face of the earth. It is the duty of men to *divide* this earth among themselves, so that every one shall have a part. And I hold that any social or legal system, which enables a few men to spread their title deeds over thousands of acres which they cannot occupy, whilst all around them are their landless and homeless brethren, is a *gross* violation of the laws of nature and of nature's God. They have no right to land which they cannot occupy, when another comes and wants it for actual occupancy, any more than one man has a *right* to another's sinews and strength. Having secured his portion of soil, more or less extensive, just as the case may be, and his occupation requires, he wants a house, a place having walls and a covering, into which he can retreat from the inclemencies of the elements, and, when he is so disposed, shut out every outside barbarian, taste the sweets of the pleasures of retirement in the bosom of the loved ones of his own household: where husband and wife and children can enjoy the pleasures of free and social converse, with

“No noisy stranger entering here,
 No intermeddling neighbor near,
 To spoil their heartfelt joy,”

Where prattling children, with rosy cheeks and auburn locks, can climb on father and mother, “the envied kiss to share;” when, unobserved by a gainsaying world, he can gather his loved ones around the family altar, at the hour of prayer, and commend them to the care of his Father in Heaven—and where, at last, when “life’s fitful scene shall be o’er,” he may have a chamber, in which the good man may meet his fate—

“Quit the world’s vain scenes without a fear,
 Without a tremble or a tear,
 And mingle with the dead.”

Fourth.—This home needs to be embellished and made beautiful. There is no human being destitute of the sense of the beautiful. Deprive a person of this sense, and he would not be a man, any more than he would be if deprived of the religious element. To gratify this faculty of the mind, God has scattered all over the face of the earth, every conceivable form of beauty. The grand and glorious forests, of the valleys of the Aroostook and St. John, were not made merely for timber to send to a British market, or to construct your buildings, or to make articles of merchandize, or to furnish fuel for your dwellings, beneficial as all of these uses are; but they were made that the eye of every man that rests upon them, whether civilized or savage, may have their gorgeous scenery upon which to feast and revel in never ending delight. Katahdin was not made merely to be the home, the throne of the storm king, where to forge his thunderbolts, and from whence to dash them on the world below, and pour his torrents to swell your rivers, to fertilize your intervalles and cause them to produce immense crops of hay, oats and potatoes. O! no! no! Useful as is Katahdin in this way, it has another mission to perform—it is to inspire noble thoughts, to kindle noble resolves, to be a never ending feast of the sublime and the glorious to the eye of every beholder.

Nor are the flowers of your orchards, your gardens, and your fields, intended to be merely the means, by which fruit and food are raised. No, no, Heaven never gave them their various hues, and tints, and shades, for this purpose alone. These flowers might have all been of the color of an old weather beaten house, and been just as useful for the purposes of reproduction as they are now,

but the great chemist of nature, He, who by his touch can turn every thing to gold, gave them their endless variety of coloring, to please and gratify a desire, which he had before implanted in the bosom of his children.

A house then, should not be merely so constructed as to keep out the storm and cold, prevent thieves from breaking in, and children from running out, but it should be made convenient, embellished and adorned, without and within, to the extent of the ability of the owner, made attractive and pleasant to its inmates, so that they will be ready to sing, with the spirit and the understanding also,

*Home, sweet home,
There is no place like home."*

As a hint, how easily and cheaply a house may be embellished, and made beautiful, by the planting of trees and shrubbery. I will give you a quotation from, I think, Sir Walter Scott, in which he puts into the mouth of a Scottish Lord, the following, addressed to one of his tenants: "When you have nothing else to do Jock, be sticking out a tree Jock: it will grow when you are asleep Jock." A few hours, spent at the proper season, in planting trees and shrubbery, around our homes, which will grow while we sleep, and soon become valuable ornaments, a source of pride and pleasure to ourselves and our children, for long years to come, will be an investment yielding abundant dividends.

Having a home, and having that home embellished and adorned, so as to render it a pleasant one, every man needs a wife, every woman needs a husband. Man was not made to be alone. It is not *good* for man to be alone. It is not *good* for woman to be alone. And in the near and dear relation of husband and wife, should every two of the human family, sooner or later, live. This is a relation ordained of high Heaven, and human happiness is incomplete without it. I close this part of my remarks, by saying to the young gentlemen who are my hearers, as soon as you have a cage, *catch a beautiful bird*, not beautiful merely for its plumage or its song, although both are very desirable, but beautiful because it has a sweet temper, a loving spirit, a gentle soul. And I shall be pardoned the remark to my young lady friends, that if any young gentleman shall attempt to *catch* you, who drinks ardent spirit, is profane, a scoffer at religion and its institutions, speaks disrespectfully of his mother, or unkindly of his father, or neglects his sisters, *beware of all such fowl*.

Having a home and family, we need, we want the means of subsistence, of living, to render that home pleasant and happy. A home without victuals, without comfortable clothes, without a competence—which will enable us to live as our neighbors do, will never be the home that we desire.

The old adage, that, "when poverty comes in at the door, love jumps out of the window," is one of the maxims of wisdom. The idea of verdant boys, and love-sick girls, that they can live, no matter where, and subsist on, no matter what, and be *supremely* happy if they can *only be in each others company*, is an illusion that time will cure, sooner than bank paper ever matured with the insolvent debtor. They will find that love alone is poor stuff on which to live, although it is excellent as a desert after a dinner of roast beef and vegetables.

The individual ownership of property is an appointment of Heaven. And every man, to enjoy life, must have a competence which he can call his own. He must have property to which he has a legal right, which he can hold as against the world, and without it, he cannot have that independence of character, which is essential to true manliness. It is not necessary that he have immense wealth—indeed great wealth is as detrimental to happiness as abject poverty; but it is he who holds fast the golden mean, and lives contentedly between the little and the great, who, like Agur, is desirous of neither poverty nor riches, who has enough to supply all his natural wants, and a competence for old age, that best fulfills the condition of happiness, derived from money and what it procures.

We need the means of intellectual improvement. We want intellectual food. The mind needs food just as much as the body, and will pine away and die, just as surely as the body if it does not have it. It is continually craving and desiring to know something which it does not now know. This want must be supplied. It will obtain its intellectual repast somehow, whether we design to supply it or not. Intellectual, like physical hunger, will break over a stone wall. Just like the animal appetite, if it cannot obtain wholesome food, it will have unwholesome, and so, if we do not supply our sons and daughters with good intellectual food, they consume with avidity, the nauseous trash which comes like the rush of many waters from a corrupt press; the base literature which comes up from the purlieus of Paris, New York and other large cities, enervating, corrupting and debasing thousands of souls

made in the image of God—and bringing to premature intellectual graves, untold thousands of the otherwise lovely and good.

Lastly.—In the enumeration of human wants, man needs a hope beyond the grave. Earth is not the whole of human existence. These material scenes will last but for a season.

In the casket which God hath given to you and to me, there is a jewel, worth more than any ruby or diamond that ever glittered on the brow of royalty, or that adorns the cabinet of any earthly monarch. That jewel is the human soul: which is to live on and on whilst eternity shall endure. A part of the business of earth is to polish this jewel, and prepare it for Heaven. A heavenly hope and trust man needs in order to accomplish this object. He must have the means of spiritual and religious improvement.

One of the conditions of human happiness is to remember the Sabbath day to keep it holy.

The stated worship of God, stated seasons for religious contemplation and improvement, are essential to the prosperity of individuals and communities.

Having thus imperfectly sketched some of the more common wants of man, wants which are not peculiar to this community, or to any community, but to all, to the world, I will now devote a few moments to the consideration of the question, whether you, *ladies and gentlemen*, have the elements, the means within your reach, of supplying these wants.

The whole subject resolves itself into one inquiry. Have you the elements here in Aroostook of pecuniary prosperity? Have you the means of accumulating material wealth? Because, by the right disposition and use of wealth, all these other wants may be supplied. The answer by every intelligent and reflecting mind to this inquiry must be in the affirmative.

In the first place, you, in common with myself, and every other person having his home in Maine, are citizens of one of the best States of the American Union. I do not mean to say that there are not States, that have advantages which we have not. But what I do say is, that taking into the account our soil, our climate, the variety of our productions, our extended sea coast, our noble rivers, our inexhaustible forests, our mines, our quarries of slate and lime and granite, our boundless water power, the hardihood, enterprise, industry, and perseverance of our people, the devoted moral character of our population, the excellence of our schools and seminaries of learning, the universal diffusion of the institutions

of religion ; there is no State in this Union in which a person would be likely to enjoy through life a sum total of happiness greater than in Maine. This being true, it follows of course that *we* have

“The happiest spot below.”

I speak of our soil. I know it is common to talk of our barren and sterile soil, and yet where are there larger crops raised than in Maine? Where is there more corn, or oats, or barley, or wheat, or potatoes, or turnips, or beans, or hay, raised from an acre than in Maine?

I speak of the variety of our productions. And where is the State or country of the size of Maine, that actually produces a greater variety of what enters into the consumption of the human family than our own State?

We have a hundred varieties of fruit, and as many of fish ; we have game from our forest, and beef, mutton and pork from our fields, poultry and eggs, an unlimited supply ; sugar and molasses from our groves, and honey from our thousand flowers ; corn, wheat, rye, barley, oats, buckwheat, potatoes, beans, peas, and an endless variety of garden vegetables ; our flocks furnish our clothes, and the skins of our herds every variety of leather ; our forests pour upon us their annual flood of wealth ; our slate quarries are unsurpassed in the world, and the lime of Maine is known the world over. We have iron enough to checker the earth with a net work of railroads, and granite sufficient to fortify the world.

In addition to all this and more, we have six hundred thousand men and women born and reared either upon our three hundred miles of sea coast and its thousands of islands where old ocean thunders and roars amidst the granite walls which held him in ; or else, among the mountains and valleys, lakes and forests of the interior, inured to toil, disciplined amidst all that is great, noble, and magnificent in the handiwork of God ; *the noblest crop that ever the world produced.*

Now friends, what do you want better than Maine? or where beneath the sun will you find a better home?

The old Georgia blacksmith, who used to sit in the mountain pass watching for Methodist ministers, singing—

“Georgia is a glorious State,
Her mountains are noble,
Her people are great ;”

might have sung to some purpose, had he been a resident of Maine.

So much then for Maine as a whole. And now, in regard to that portion of it which is your home, the far famed, the noted Aroostook. It is no exaggeration to call it, what it has so often been called, the best part, the garden of Maine. It is not the language of hyperbole to say, that the sun never shone on a more glorious land than the American Union; that, of our Union,—New England, the land of the pilgrims, is the best of it all. That Maine, as has already been said, has no superior among her sister States, and that this new, vigorous and growing county of yours has no equal in Maine.

There is excellent soil in other portions of Maine, but no where else so large tracts of unequaled fertility. No where else is every lot in town after town as it is here, capable of becoming an excellent farm. No where else, is the labor and expense of converting the wilderness into a fruitful field so small as here. And no where else do so beautiful crops reward the labor of the farmer.

The wise policy of the State, in recognizing the eternal truth, that land like air and water is not the exclusive property of any man, but the common property of all, and that every unoccupied spot belongs to him, and him only, who will first enter, and live upon it, and improve it, is rapidly settling your county with a class of industrious, enterprising, intelligent, and worthy citizens, who will soon cause these wild woods to give place to luxuriant harvests, and happy homes.

Your silvery streams, that have for ages rolled on and on, through dark and silent forests, disturbed only by their own ripple and roar, will ere long glide past verdant fields, be harnessed to busy machinery, and become the slaves of thousands of wheels and spindles. Busy and thronged villages and towns will start up everywhere as if by magic, and ere long the iron horse, whose provender is fire, and whose muscles are revolving wheels, will come snorting into your villages, his speed outstripped only by the electric fluid, which will come flashing along the wires. The realization of all this is only a question of time; and shorter will be that time than most of us anticipate.

And now, friends, what is there to prevent your having your every want supplied? To prevent your having all that heart can wish? What is there to prevent the future generations of this county from having a healthy, vigorous, virtuous and enlightened parentage? What prevents your bringing up your children as they should be, training them to be *men* and *women* in the noblest

sense, making them worthy members of church and of State? What prevents your sons from being plants grown up in their youth, and your daughters being corner stones polished after the similitude of the palace? What prevents every one of you from having a home, embellished, adorned, made beautiful, attractive, and lovely by a blending of the natural and artificial, a place where you can live in comfort and die in peace? What prevents your having a sufficiency of wealth, flocks and herds, and well stored granaries, and the means of obtaining every desirable gratification? What prevents your having the means of intellectual improvement for yourselves and families; schools of every grade for your children, and books and periodicals, of every desirable kind, for yourselves and them? And what prevents every one from having a hope, big with immortality beyond the grave; from having a hope, that,

“When days and years are passed,
We all shall meet in heaven?”

The answers to these deeply important questions are involved in the inquiries, the solution is with each one individually. God has beneficently spread all around us the elements of happiness—it is for us to say whether these shall be wisely improved.

LIVE STOCK.

Horses. First premium to John Allen for best breeding mare; to J. D. Pike for second best.

John Allen for best three years old colt; David B. Pike for second best.

Henry C. Currier for best two years old colt; J. D. Pike for second best.

James Rafford for best one year old colt.

Bulls. First premium on pure Durham bull, to John Allen of Maysville, for one bred by Charles Perley of Woodstock, N. B.

The other bulls appear to have been high grades of Devon, Hereford, &c.

Cows. First premium to Joseph Blake for best stock cow; Eben Richardson for second best.

Veranus Chandler for best milch cows; Benjamin Whidden for second best.

Henry Rolfe for best three years old heifer.

Addison Powers for best two years old heifer; Henry Rolfe for second best.

C. P. Bean for best one year old heifer; Sumner Whitney for second best.

C. P. Bean for best heifer calf.

Sheep. Hiram Stevens for best buck; Cyrus Pomroy for second best.

Six sheep were presented by Sumner Whitney. The committee express much regret that there was not a greater show. The sheep were Leicesters and grades of Leicester and South Down.

Lacking statements on crops, (the premiums offered being too small to induce many farmers to keep accurate accounts with their crops,) I append an extract from a letter written by Rev. J. C. Fletcher, too well known as an extensive traveler, close observer, and impartial witness to need any endorsement in regard to this fertile section of our State:

“And now that I am drawing my Aroostook letters to a close, let me say that my motives are of the purest kind. To the damage of my own pocket, I went to the Aroostook that I might know the truth of the matter, and benefit others. I know that there are many families growing up, who have not money enough to go West, and who are not able to sustain themselves amidst the strong competition of business of every kind in the more populous States. Let such think of the Aroostook. A gentleman in Oswego county, New York, last year saw it stated, in about ten lines of a newspaper, that each actual settler could obtain, in the fertile Aroostook, 200 acres of land, at 50 cents per acre, to be paid in making one's own roads. He went to bed, but did not sleep that night. He had a large family of sons, and no apparent future for them. He determined to write to the sheriff of Aroostook county, to know if it were true—if such inducements were realities. He told his neighbors what he had done. They laughed at him, and said he would never hear

from his letter. But in four days he received a polite answer, and a circular from the land office of Maine confirming all. This year he went to see for himself. He entered lands for himself and for each son, and also had orders from his neighbors to select for them. An emigration has thus really commenced from one town in New York to the East, thus reversing the usual order of things.

I would say to all who wish to know more about this matter, to send a letter, asking for a circular, to the Land Agent of Maine, and directed either to Augusta or Bangor, and they will get all the needful information. Or, if they wish to look for themselves, let them take the Menemon Sanford each Wednesday and Friday night, at Boston, steam it to Bangor, and then in three days they will reach Presque Isle. Let them, if fond of gunning, take along a musket or rifle, for there is the finest pheasant or partridge shooting in the world. Often stage drivers take their guns, in order that they may provide themselves with a dozen partridges before they reach the end of their route. Now is the time for hunting moose, whose steaks leave a reminiscence of the most pleasant kind. It is not difficult to get a crack at a bear, so that, in the line of the chase, the Aroostook is well worth a visit."

PENOBSCOT AND AROOSTOOK UNION SOCIETY.

The Secretary writes me that the Society embraces 80 members. Its Annual Exhibition was held at Patten on the 13th and 14th of October, 1859. The first day was pleasant, and there was a larger attendance than usual, and a fine display of animals. Mr. Cushman's full blood Durhams, lately introduced, and the cows of Messrs. Twichell, Peake and Miles, excited much interest. The second day was rainy, but did not debar the citizens from the satisfaction of listening to an instructive Address from Mr. Cushman.

AN ADDRESS

Delivered at Patten, at the Annual Fair of the Penobscot and Aroostook Agricultural Society, October 14, 1859, by ALFRED CUSHMAN, Esq.

Ladies and Gentlemen:—Again, has ever rolling time, brought another autumnal harvest. Again, are we assembled, as friends and neighbors to give and receive the friendly hand; and see what improvement each other has made in the greatest of all pursuits, that for which man was created, agriculture. Again can we bear witness to the truth of the sacred promise, that seed time and harvest shall not fail. Although tilling the soil is the oldest of all occupations and a very large majority of men are engaged in it—although nearly every article of food and clothing consumed by the 1,000,000,000 of the human race are the direct productions of agriculture, yet very little improvement, in scientific knowledge has been made in it in this country. Men have been content to do as their fathers did, each succeeding generation following in the foot steps of its predecessor, and thus, while the rest of the world has been rapidly advancing, agriculture has stood nearly still. While no other pursuit is so sure to produce happiness and competence, none is so sure to produce morality and virtue. It is said of the Reform Schools of Maine and Massachusetts, that no farmers

sons are there. No other occupation is so exempt from panic, or hard times. Witness the late financial storm, which swept over the country like a wild tornado, prostrating thousands, supposed to be independent, while its effect upon the farmer, was like the cold and driving winter's storm to the inmates of the warm and comfortable house—it only served to increase their happiness. Yet with all the advantages it possesses over other pursuits, how many farmers' sons in the country leave their quiet and happy homes to seek employment in the city—away from the friendly counsel of father, mother, brothers and sisters, surrounded with temptation on every hand, like a ship upon an unknown ocean, without compass, uncertain into what port or upon what rocks, it will be ultimately driven. As cause and effect are inseparably connected, let us inquire what is the cause? Why is it, when the farmers constitute four-fifths of the population and possess an equal amount of wealth, that they exercise so little influence in the counsels of the nation? Is it not because they have not the scientific attainments of the learned professions, that they do not attain a position to which they are entitled? How is it in our halls of legislation? When have we had a legislature over which a few scheming lawyers did not exercise an almost entire control? But few farmers hold office of trust or profit. From the eighty thousand farmers in this State, not even a candidate for Governor, has ever been selected. All the Presidents of these United States have been lawyers except the first; he was a farmer and we have never had his equal. While many thousands of the farmers' money is freely given to endow seminaries to educate the learned professions, agriculture, and that only, is neglected. The friends of agricultural education, saw with hopeful anxiety, a bill introduced at the last Congress to wrest from the grasp of greedy speculators a sufficient quantity of the public lands, to endow a college in each State in the Union, for the promotion of agricultural and mechanical knowledge. That bill, after passing both branches of Congress, was struck down by that arbitrary, anti-democratic power, the President's veto; thus inflicting upon the great productive energies of the nation, the deepest wound which his high position, as executive of this nation, could possibly enable him to do. It may be asked, why was it done? The answer is, in nearly half the States in this Union, all learning is denied the laborer; and for them to build a college to educate the farmer would be like putting a blacksmith's shop in a powder mill. In other enlightened nations

it is not so. In Europe, agricultural colleges are a source of great national wealth and prosperity; and doubtless would be in this, were they established. Some may think because we export breadstuffs to Europe, our agricultural knowledge is as good as theirs, and that Americans are as wise and learned as Europeans. That this country has produced men of world wide fame, for their scientific and philosophic research and inventive skill, cannot be denied. But shall we presume because our Franklin chained the lightning, and Morse made it carry the news, because our Fulton invented the steamer, and Hoe the lightning press, there is no attainment in agriculture to which Yankee enterprize has not already arrived? Let us look at Great Britain and see. When the famous corn laws of England were repealed, popular clamor was raised against it. They said our soil is old and exhausted, we cannot raise our bread, whence shall we obtain it? But wise and learned men thought otherwise, and by the aid of chemistry, Baron Liebig and others analyzed soils and plants, ascertained and pointed out of what the plants were composed and the soil deficient, and the fertilizing remedy for the soil, which resulted in astonishing increase of crops. In the older parts of this country the cultivation of wheat is abandoned because they think the country is so old it will not grow. But in England, an average crop of wheat is over thirty bushels per acre, almost double ours, yet that Island had been cultivated more than two thousand years when Columbus discovered this. It is sometimes said that no other country is accumulating wealth as rapidly as ours, especially in the rise of real estate. And when we consider that a large proportion of our territory was obtained of the Indians for a few worthless trinkets, and still more worthless rum, the opinion seems well founded. But let us look at France and see. When the desolating wars of Napoleon were ended, by his grand defeat at Waterloo, the nation's attention was turned to agriculture. By the valuation of 1820, the real estate of France was less than \$8,000,000,000. After a period of thirty years, in 1850, that same real estate was valued at over \$16,000,000,000, an increase of over \$8,000,000,000 in thirty years—while all the taxable property in these United States, including real estate, commerce, manufactures, live stock, the southern slaves, valued at \$1,000,000,000, amounts to only \$6,500,000,000; or \$1,500,000,000 less than the rise of real estate alone in France, in thirty years. The all important question for us to ask is, how did they manage to increase their wealth at such an enormous rate.

The answer is plain and simple, no witchcraft or anything supernatural about it. The great, the wise, the learned men, for which France is so renowned (whose attention for twenty years had been engrossed by the arts of war) were now turned to agriculture. Every available means to enrich the soil was resorted to. Manufactories were established, for the purpose of converting the bodies of dead animals, the offal of slaughter houses and other unwholesome and offensive matter into deodorized and highly valuable fertilizers. They adopted the system of turning the products of the farm into their most concentrated form. The hay, the grain, and the roots were fed to pork, beef, mutton, poultry, &c., and much returned to the farm to fertilize it. Agriculture was the pride of the nation. No man was too great or too good to labor. Incredible as it may appear, we can do the same if we will. I do not believe there is a single farm, within the limits of this Society or even State, which may not be doubled in value in less than thirty years. Notwithstanding the great improvement in agriculture in France, her's is far behind that of Great Britain. It should be the object of every farmer in this country to raise the agricultural standard, at least as high, as it is in any other. For that purpose, the first and most important step is, to acquire knowledge. How little we know and realize the thousand blessings kind Providence has spread around us. How little we know how to appropriate them to our advantage and comfort. Are we not, in that respect, too much like the Californian Indian, who remains miserably poor, hungry and naked, while roving over the richest mines of gold? No man should engage in any pursuit without securing the best knowledge of it which he can obtain; for ignorance of one's own business is almost certain to result in failure. No farmer should be without the best agricultural books and newspapers. But are there not many who do not furnish themselves' with any agricultural work whatever? Do farmers generally read and regard, as they should, the valuable information given the public by the reports of the Secretary of our Board of Agriculture? Do they take and read that excellent journal, the *Maine Farmer*? We have eighty thousand farmers in the State, yet only ten thousand copies of that paper are published. Are there not a majority of the farmers in this State, aye and in this Society too, who not only take no agricultural work, but no newspaper whatever? And the excuse they generally give is, they are too poor to take a paper. But I believe no industrious farmer is so poor that he cannot afford to

take two good weekly newspapers. I am sure he cannot afford to do without the information they bring him. By them he learns the price of any article he wishes to buy or sell; the best mode of cultivation; the best and most improved implements; the best breeds of stock, kinds of seeds, &c.

It is highly important for the farmer to select the best and most improved implements, of which the plow stands at the head; no other implement is so indispensable; no other can take its place. The man who wields the plow is a thousand times more the benefactor of mankind, than he who wields the sword; yet the one is immortalized and the other forgotten. Great improvements have been made in the plow within the last forty years. Then the neighboring carpenter made the wooden part and the nearest blacksmith ironed it. The old broken hoes and shovel blades were carefully laid aside to nail upon the moldboard. Well do I remember the first plow I ever held, which if here to-day would be the greatest curiosity at this exhibition. And well too, do I remember my vain attempts to keep the little awkward thing in the ground; and when I denounced it as worthless, grandfather said "it was an excellent plow," and it probably did excel the plow described by Stevens, in his Arabian travels, drawn by an old woman and jackass harnessed together. But now, how changed; not only are large manufactories making every description of plows, where the farmer may get any size or pattern his fancy may dictate, but already is the steam engine attached to a gang of plows, capable of plowing in the best manner, a hundred acres per day. Nor are improvements lacking in other things: the horse reaper and mower may be seen sweeping down whole fields, while the old scythe and sickle cut their acres.

Perhaps the greatest improvement farmers have made is in neat stock. I can recollect when it was said in my native town, that steers three years old, girthing five and a half feet, were middling; now it is common to see yearlings above that size. That is occasioned mainly by improvement in breeds. Since the introduction of the Durhams, Devons and Herefords, a very great improvement has been made. I was told by a member of the Board of Agriculture, that by the introduction of improved breeds in his vicinity, neat stock had doubled in value within the last five years. Here, improvement is but just begun; and like other improvements it has its deadly foes. Some say one thing and some another. Some say the Durhams are large and handsome, but they are nothing

more than middling for milk or work, and fit for nothing for beef. Others say they would be very nice if they were hardy; but in this cold climate they are so tender, they are worthless. Others still say that Natives would be just as large and handsome if they were kept as well. In answer to these objections I reply:—The cow which took the first premium at the United States Fair, at Kentucky, for quantity of milk and butter, was a full blood Durham. The Durhams have been bred in England hundreds of years, with express reference to beef, and the New York Cattle Market shows the fattest and largest beeves to be Durhams.

The Patent Office Report of 1854, gives the statement of several men from Kentucky, saying the Durhams are preferred to any others, are kind and good for work. The only objection is, they are apt to get too fat for the yoke. I might add my own experience, which is, I never wintered stock more easily kept, or more hardy. I have one now, two years old, which would be cheap at \$200, while I have others of the same age, always kept in as good condition, which would be dear at \$20. I was told when I got my Durham stock, if I kept it as I did my Natives, it would starve to death. If that was so, I wished to know it, so I kept my calves together, precisely alike, on skimmed milk, poorer than I ever kept any before, and the result was, the Durhams outgrew the others, and in the fall was as heavy as any two of them.

It is common where the value of Durham stock is known, for a single animal to sell for one, or two, and sometimes five thousand dollars, and all we need to raise animals equal to any in the world is the breed and good keeping; which is, no meal of any kind, but good hay and a few roots in winter, and good pasture in summer. With that keeping, and the Durham breed, we may safely challenge the world. Of the profit of raising good neat stock there cannot be a doubt; for good handsome working oxen and good milch cows will always command a high price; and good beef, butter and cheese will always sell for cash.

I think one other branch of stock growing may nearly equal it, all things considered; I refer to sheep husbandry. My plan would be this:—on land, made smooth with the plow, I would fence off an acre for every eight or ten sheep; the land in three or four years would be sufficiently rich to produce three or four heavy crops without manure. When the first piece should be sown to grass seed, the second would be ready to plow up. The first would bear grass as long as the second would grain, and the third

ready to plow up. In that way a rotation of pasturing, grain and grass would be produced, which would be attended with but little labor, and when connected with the sale of wool in the spring, and lambs in the fall, would be very profitable. Of the different breeds different opinions exist. Some prefer those producing fine, high priced wool, growing on small tender sheep; others those producing long coarse wool, large, hardy and valuable for mutton.

Another branch of farming, in my opinion may be made highly profitable, which is, pork raising. By raising a large quantity of roots, to mix with buckwheat, oats and peas to feed to swine and furnish them all the materials they can convert into manure, the farm may be brought to a high state of fertility. There are many other ways to make farming profitable. Perhaps fruit growing would be quite as profitable according to the outlay, as either of the preceding. It is now abundantly proved that fruit trees will flourish here as well as elsewhere. Trees further south, have suffered much more by cold winters than ours. Apples grown here will keep two or three months longer than the same varieties grown in Massachusetts, which will always insure us a high price. Large fair apples are valuable for drying; the price is annually rising, and they are of easy transportation. Many object to planting an orchard, because they say native trees produce poor fruit, and grafted ones are not hardy. But I know the facts are otherwise; my grafts are more hardy than natives; I have over one hundred varieties grafted, some of which are as hardy as the trees of the forest, and very productive. If every farmer within the limits of this Society would plant and cultivate large orchards of grafted apple trees, and take proper care of them, in ten years they would be a source of great profit. If you want good health and light doctors' bills, plant an orchard and take care of it; no other employment will insure such happiness; for it was selected by Infinite Wisdom for man's primeval bliss. If a good collection of fruit trees and shrubs were planted on every farm, it would greatly increase the happiness and comfort of many families. Their sons would be less likely to leave their homes discontented, as many now do. How often young men collect all their means—the hard earnings of many years—and start for the great West. They hear of this, or that young man who went there and made his fortune in the rise of land, and they think they can do the same; entirely ignorant and unacquainted with the deceptions of wicked men, elated with the prospect of success, they start for the promised land. How often are they

disappointed and find themselves homeless, penniless and discouraged in a strange land.

But the tide of emigration which has caused such a destructive drain, not only of bone and muscle, but of enterprise and intelligence, is now in some measure stayed, and the settlement of our own wild lands is the result. We can now give a cordial invitation to all good citizens to come and buy farms without money and without price. What spot on earth offers a greater inducement? Our soil is fertile—our climate healthy. To those who like sport, our waters abound in fish, and our forests in game; and those who seek the sublime in nature may ascend Katahdin's naked summit above the clouds, and there sport in sunshine while storms and tempests roll beneath their feet. But let us look at this society, and see if we are making all the improvement we can. This is our fifth exhibition. It is now time for us to look around and see what are its effects upon the community. Have we made improvements in our modes of cultivation; have we increased our crops; have we improved our stock; our seeds; in our manufactures; in the shop, and in the house? We have made a good beginning in improvements, but there is much yet to be done.

In conclusion I would say, let us all improve the blessings within our reach; make the best of what we have. As the forest is cut away, the climate will become more mild; we shall have less frost and snow; our seasons will be longer, and Indian corn, hitherto considered doubtful, will be our surest crop. Let us adapt our seed to our climate and we are sure of success. I would again impress the importance of cultivating fruit; not only apples and pears, but cherries, plums, currants, gooseberries and grapes. It is said 500 gallons of wine can be made from an acre of currants, worth \$1.50 per gallon, and that rhubarb will produce four or five times as much, and equally as good. If we cultivate the fruits adapted to our climate, we may sit under our own vine and fruit tree, so often referred to by the ancient sacred writers as the climax of earthly happiness. We are told by the great Jewish historian, that when man was created, Infinite Wisdom saw that it was not good for him to be alone and created a help-meet for him; and man needs a help-meet now, as much as then. About an equal number are created male and female, whether happy or unhappy they are inseparably connected. They are equally interested in agriculture, horticulture, and every industrial pursuit. Therefore on an occasion like this, a part should be addressed to the other sex.

Ladies, I would say a few words directly to you. You probably need not be told, that men treat women according to the state of civilization in which they live. In countries highly civilized or grossly barbarous, the difference in treatment is very great. In the one, they are treated with kindness, tenderness, and as equals; in the other, they are treated as slaves and compelled to perform the hardest labor and most degrading drudgery. But with respect to you, although you have no voice in electing the officers and making the laws by which you are governed, you can perform a very important public service. Although you can neither make laws nor command armies, you can form the minds which do both. One of our greatest statesmen and best men, whose father was nearly his equal, said, if he had done the world any good, if he had benefited mankind, the credit was all due to the influence of his mother. Your influence over men is very great, whether they admit it or not. Your opinion will have an influence in the choice of their pursuits, in the style and finish of the house and the ornaments which surround it. But in the house, in the family circle, your influence is almost supreme; nothing can fill your place. With that in view, the poet exclaimed:

"What is a table, richly spread,
Without a woman at the head."

You can make home the most sacred and happy place on earth—a paradise of joy, or seat of misery. Your smiles or frowns will cause the sun of domestic happiness to rise or set. Many contend that men and women should enjoy equal political rights; that to compel them to obey laws in making which they have no voice, is both unequal and unjust. Others contend that women are inferior in intellect, and therefore unfit for public affairs. But our seminaries of learning show that while young men graduate at 21 years, young ladies do at 17; and when had England a wiser or better sovereign than her present virtuous Queen?

I would here give my views on treating the young. Many are nearly or quite ruined for life, by being restrained from action and kept in the house, under the mistaken idea of parental kindness. Action, energetic action in the pure air, from infancy to manhood, will insure a strong and healthy body and active mind, in nearly every individual. Young lady, what better situation could you have, than be a thrifty young farmer's wife? With a good farm, beautiful buildings, garden, orchard, fields, flocks and herds, when taking the healthy walk over such a farm, with what delight and

pride you would reflect all these are ours. I have daughters, and for them I ask no greater earthly bliss. Such a farm would be like that described by Adams, in his poem on the wants of man. A farm

“Where flocks may range, where herds may low,
Where kids and lambs may play;
And flowers, and fruit, commingled grow,
All Eden to display.”

LIVE STOCK.

The first premium on stallion was awarded to J. S. Stacy of Golden Ridge, for “John O’Gaunt,” reared by Ira Fish, Esq., and sired by an imported Hunter of the same name. His dam was sired by the Wiggin colt, so called, the sire of which was the imported Arabian Hogarth; his dam a half blood English mare. The grand dam of John O’Gaunt was lady Eaton, whose sire was an imported horse formerly kept in New Hampshire, called the Tilton horse. Her dam a full blood Morgan.

For breeding mare, first premium to John McCorren of Golden Ridge, Messenger.

Second to James Roche of Dayton plantation.

Bulls. First and second premium to Alfred Cushman, for Durhams.

Cows. First premium to N. Weymouth, for Durham.

Second to A. Cushman.

Premiums were also awarded on neat stock to James Bean, John Palmer, D. W. Gould, Henry Blake, J. S. Hall and others, for grade and native stock.

Sheep. For pure Leicester buck and grade sheep, to B. F. Whitehouse, first premium.

Second to Henry Blake.

Third to Thomas Myrick, for grade South Downs and Dishleys.

Swine. First premium to Joseph Heald; also to Thos. Myrick, William A. Hunt and others, grade Berkshire, Suffolk, &c.

FRUIT.

First premium to Charles Fish. The apples included Duchess d'Oldenburg, Bell's Early, Williams' Favorite, Heald's Bearer.

Second to H. N. Darling, for Duchess d'Oldenburg and others.

DAIRY PRODUCTS.

First premium on June butter, J. S. Mitchell.

First on September butter, Eli Kellogg.

First on cheese, Jonathan Palmer.

CROPS.

The committee on field crops report as follows :

“They award first premium for best crop of spring wheat to William H. Hunt of Patten, he having raised at the rate of 17 bushels per acre, on four acres.

They award first premium for best crop of corn to Alfred Cushman of Golden Ridge plantation, he having raised at the rate of 75 bushels to the acre, on one-half acre.

They award second premium on corn to Morgan L. Gerry of Golden Ridge plantation, he having raised at the rate of 54 bushels to the acre, on one-half acre.

They award third premium on corn to Joseph Heald of Patten, he having raised at the rate of 50 bushels to the acre, on one-half acre.

They award first premium for best crop of potatoes to James S. Mitchel of Patten, he having raised at the rate of 300 bushels to the acre, weighing 62½ pounds to the bushel, on one-half acre.

They award second premium on potatoes to Morgan L. Gerry of Golden Ridge, he having raised at the rate of 284 bushels to the acre, on 90 rods of land.

They award premium for best crop of beans to Dr. Luther Rogers of Patten, he having raised at the rate of 25 bushels per acre, on one-fourth of an acre.

They award premium for best crop of rutabaga turnips to Alfred

Cushman of Golden Ridge plantation, he having raised at the rate 1040 bushels to the acre, on one-eighth of an acre.

Several applications have been made for premiums where the parties have not conformed to the conditions required by the Society. One man, John Davis of Township No. 3, sent in three applications, one for premium on wheat, one for rye, and one for oats. He raised wheat at the rate of $24\frac{1}{2}$ bushels to the acre, on 146 square rods of land; at the rate of 25 bushels of rye per acre, on 159 rods, and at the rate of 62 bushels of oats to the acre, weighing $41\frac{1}{4}$ pounds to the bushel, on 139 rods. The Society's premium on wheat, rye and oats, for the best crop of each, on not less than one acre,—Mr. Davis not having an acre in either piece aforesaid, it was their unanimous opinion that there was no authority to award him anything. Your committee regret exceedingly, that no more applications were made for premiums on field crops. There are many parties within our limits who have raised much larger crops. Some of them were furnished with blanks, but their applications were not sent in. We cannot but hope that in future, more interest may be felt, and more competition be seen, among our best farmers, on the subject of field crops, than has been manifested the present season."

The following papers from active members of this Society have been furnished, and I am happy to give them a place in this abstract, conveying as they do valuable information regarding the capabilities and resources of this young and interesting section of our State.

James Brown, Esq., of Dayton plantation, Aroostook county, writes as follows :

"Our crops were unusually good. Every kind of a crop succeeded well. Grain weighs well; I weighed a bushel of the Siberian spring wheat, to-day, of my own raising, which weighed sixty-four pounds. This variety is but little known here. I commenced three years since with a few kernels obtained from the Patent Office; but I must say it is while growing, and ripening, and after it is cleaned, the handsomest thing I have seen called wheat.

There was but little wheat sown near me last spring, but it was almost universally of good quality and a satisfactory yield.

Lemuel T. Sewall of Island Falls, told me he raised from less than one bushel of the Scotch Fyfe, seventeen and a half bushels on three fourths of an acre—(the Scotch Fyfe was received from the Patent Office.) We think well of this variety. It ripens early, is short and stiff straw, and is not apt to lodge; and if sown early gets an important start of the rust and weevil, two very serious hindrances. I think by proper management we may run nearly clear of both. To get the start of the weevil we need an early variety. On dry ground it is safe to sow wheat as soon as the frost is out to the depth of three or four inches—the wheat will get out of the way of the weevil before he gets ready to perform his mission of evil.

Wheat brought northward fifty or a hundred miles (the same year) is not apt to rust. I once brought a peck of wheat from Sandy river, in this State, and sowed it on a corner of a three acre piece on which I sowed four bushels of the same kind of wheat; the little corner sowed by the peck did not rust, but the rest of the piece rusted badly. I got more wheat from the peck sowing than from all the rest of the piece.

I have seen the Siberian wheat standing between two other kinds so near each as to mix—both the other kinds rusted, but this remained as bright as gold to the last.

Buckwheat has proved itself to be a most important crop. While others are indispensable to the farmer, this is most certain to remunerate his labor. An average crop of buckwheat is about 35 bushels to the acre—a bushel will produce 32 pounds of meal, equal to corn meal, which makes a feed for fattening pork equal to any other, and costs much less than any thing we can produce of the same value.”

Dr. Luther Rogers of Patten, Secretary of the Society, writes :

“Farmers need money. The great desideratum in farming is, to make the products of the farm pay the current expenses of the farm and family. Within the limits of this Society, much attention is necessarily given to the clearing of lands. The first crops of grain and hay are always large; and in this community, grain and surplus hay find a ready market. Farmers, while clearing lands realize a good business, and have cash at least once a year to meet all necessary expenses

With older farms and with lands that have been cropped several

years, the case is different; the lands must be fertilized. How shall we make the lands fertile and realize a profit while doing it? A few examples of successful farming will show how the thing may be done.

Messrs. S. & W. Waters of Patten raised this year 900 bushels of oats, worth \$450; 80 bushels of wheat, \$120; 40 bushels of peas, \$80—total value, \$650.

Andrew McCourt of Patten raised 580 bushels oats, \$290.

J. S. Hall of Patten raised 510 bushels oats, \$255.

Messrs. Waters and McCourt raised their oats principally on lands that were fertilized with the grass crop without manure. They plow the grass land in June, and in the fall cross-plow, and in the ensuing spring sow the oats without plowing. They get an income from 15 to 25 dollars the acre. Mr. McCourt raised his crop, valued at \$290, with the labor of one man and two horses. They plow with a strong team, and plow deep.

Messrs. Waters keep a large stock of cattle and consume all their hay on the farm. Their farm contains 300 acres of excellent land. The first clearings were commenced about twenty years since; they have now one of the best cultivated farms within the limits of this Society. They make farming a business, and make money by it.

Moses Perry of Golden Ridge raised this year 260 bushels of oats on $3\frac{3}{4}$ acres of new land, at the rate of 60 bushels per acre—worth in cash, \$130; 128 bushels wheat on 5 acres, at the rate of 25 $3\text{-}5$ bushels to the acre, \$192; 22 bushels rye, from one bushel sowing, on $\frac{3}{4}$ acre, at the rate of 29 bushels per acre, \$22. Total, \$344.

Mr. Thorne of Island Falls raised this year 67 bushels of good wheat on 4 acres of new land. Value, \$100.

Mr. Isaac Robinson of Island Falls raised this year 25 bushels of winter wheat on $\frac{2}{3}$ acre of new or burnt land, at the rate of 28 bushels to the acre—worth in cash, per acre, \$42. Mr. Robinson's wheat is very nice, and makes flour of excellent quality."

Mr. Jesse Craig of Island Falls, has had several years experience in raising winter wheat. He says:—"I think it is more subject to rust than spring wheat, more especially if sown late. If sowed between the 1st and 20th of September, it is as sure as spring wheat. It has one advantage, it comes off earlier, and makes superior flour. I think it may be sown later on burnt than on plowed land.

On account of the weevil, it is desirable that more experiments should be made with winter wheat.

Mr. Joseph Heald of Patten, has had some experience in raising winter wheat. He thinks it should be sown in August, as it gets more deeply rooted, and is not so likely to winter kill.

Rev. Mr. Fobes of Crystal plantation, to avoid the weevil, sowed one bushel of wheat on the last day of April. He raised a good crop. It was not injured by the weevil. Mr. F. thinks the wheat matured before it was time for the weevil to work. More experiments of this kind are desirable.

Mr. Craig says, in his township the potato crop was a great yield, and of excellent quality.

Daniel Sleeper of Golden Ridge, raised 26 bushels of good wheat on one acre of burnt land—worth \$39.

Charles Jackman of Golden Ridge, raised 70 bushels of oats on one acre of burnt land—worth \$35.

BALLOON FRAMES.

By GEO. E. WOODWARD, Architect and Civil Engineer, 29 Broadway, N. Y.

[The papers given below originally appeared in the "Country Gentleman." Mr. Woodward courteously permits their re-publication here. They will be found worthy perusal by all interested in building.]

In these days of ballooning it is gratifying to know that there is one practically useful, well tested principle which has risen above the character of an experiment, and is destined to hold an elevated position in the opinions of the masses. That principle is the one applied in the construction of what are technically, as well as sarcastically, termed Balloon Frames, as applied to the construction of all classes of wooden buildings.

Since Solon Robinson's description of the mode of building balloon frames, published a few years ago in the New York Tribune, there appears to have been but little further information furnished on the subject.

Who the originator was is not known; the system is not patented. The first approach in that direction is a plan for a portable cottage or tent, or a combination of both, published in Loudon's Encyclopedia of Architecture, some twenty years ago. It is more than probable, however, that the balloon frame has been known since the early settlement of the West, or after the demand for a class of buildings above the grade of a log cabin. The settlers on the prairies, remote from timber, now find, as a matter of economy, that frame buildings are the most desirable, a comfortable log cabin really costing more money; and from the fact of portable buildings or frames being prepared at the mills or larger towns, and with absolute conditions of lightness for transportation and economy in construction, shows pretty conclusively the origin of the so-called Balloon Frames—a frame that, throughout the great West, is almost exclusively used in the construction of every grade of wooden buildings, from a corn-crib to the largest railroad freight depot—adapted to sustaining heavy loads; entirely secure from lateral thrust; without a mortice or tenon or brace; exposed to all the fury of the prairie blasts, it stands, with more than 30,000 examples of every conceivable size and form, a perfect success.

So general is its use west of Lake Michigan and throughout California, that a builder of the old style of timber frame would be regarded with the same sympathy as a man who prefers to travel by stage instead of by rail.

The decreased amount of timber to be used, the whole labor of chopping, hewing and framing dispensed with; the great economy in its construction, and the ease with which any intelligent man who can lay out a right angle and adjust a plumb line may do his own building, are among its recommendations.

The moment the foundation is prepared and the bill of lumber on the ground, the balloon frame is ready to raise, and a man and boy can do all of it. The sills are generally 3 inches by 6 inches, halved at the ends or corners, and nailed together with large nails. Having laid the sills upon the foundation, the next thing in order is to put up the studding. Take a 2 by 4 stud

of any length, stand it on the corner, set it plumb, and with a couple of stay laths secure it in position. Nail the stud by four large nails driven diagonally, two on each side, through bottom of stud into the sill. Continue to set up studs on end, 16 inches between centers, around the entire building, and secure each in the same manner. Pay no attention to the length, for they can be readily spliced or cut off when the time comes. Leave the necessary openings for doors and windows. Some prefer to put 4 by 4 studs alongside the window frames and for door posts, and also at the corners, but they are not necessary, unless the building be a large one. The best plan for corners, and one usually adopted, is to place two 2 by 4 studs close together, so they form a right angle, that is, the edge of one stud placed against the side of the other, so as to form a corner. Next put in the floor joists for the first floor, the ends of the joists to come out flush with the outside face of the studding; nail the joists, which are 2 by 11, one to each stud at both ends and diagonally through the edge to the sill on which they rest. Next measure the height to ceiling, and with a chalk line mark it around the entire range of studding; below the ceiling line notch each stud one inch deep and four inches wide, and into this, flush with the inside face of the studding, nail an inch strip four inches wide. This notch may be cut before putting up the studs. If the frame be lined on the inside, it will not be necessary to notch the strip into the studs, but simply to nail it to the studding; the object of notching the studding is to present a flush surface for lathing, as well as to form a shoulder or bearing necessary to sustain the second floor; both of these are accomplished by lining inside the studding—(for small barns and outbuildings that do not require plastering, nail the strip 4 by 1, to the studding)—on this rests the joists of the second floor, the ends of which come flush to the outside face of the studding, and both ends of each joist is securely nailed to each stud; the bearing of the joist on the inch strip below it is close by the stud, and the inch strip rests on a shoulder or lower side of the notch cut to receive it. This bearing is so strong that the joists will break in the center before the bearing gives way. No tenoned joist in the old style of frame will hold half the weight.

The joists being nailed securely to the side of each stud, the lateral thrust caused by heavy weight, as hay, merchandise, &c., is in the direction of the fibre of the wood.

The tensile strength of American White Pine is sufficient to sustain 11,800 pounds for each surface inch in its cross section. Medium bar iron will sustain 60,000 lbs. per square inch of its cross section surface, so that white pine pulled or strained in the direction of its fibre is equal to nearly one-fifth of the strength of iron. If, in erecting a building, we can so use our materials that every strain will come in the direction of the fibre of some portion of the wood work, we can make inch boards answer a better purpose than foot square beams, and this application of materials is the reason of the strength of balloon frames.

When the building is designed for storage, it is customary to set an outside strip into the studding at the ends of the building on which to nail the ends of the flooring, so that the thrust of the building endways is in the direction of the fibre of the flooring, and sideways, as before stated, in the direction of the fibre of the joists.

We have now reached the second floor. A third floor, if required, is put in in the same manner. Having reached the top of the building, each stud is sawed off to an equal height; if any are too short they are spliced by placing one on top of the other, and nailing a strip of inch board on both sides. The wall plate, 1 by 4 inches, is laid flat on top the studding, and nailed to each stud; the rafters are then put on; they are notched, allowing the ends to project outside for cornice, &c. The bearing of each rafter comes directly over the top of each stud, and is nailed to it. Put in the partitions, and the balloon frame is complete, and in labor, strength and economy stands unequalled. If lined inside of the studding with common lumber, and clapboarded outside,

it is beyond the reach of harm from any test within the bound of reason, and, I will venture to say, unapproachable in strength and durability by any form of the old fashioned style of frame.

This style of frame can be used with confidence for barns of all sizes, for all manner of dwelling houses, outbuildings, &c., and can be put up by anybody of the least mechanical genius. In Rural Architecture it is a good desideratum, and although ridiculed by eastern mechanics, it will assume the same importance that it has and still occupies in the West.

There are many different plans for building these frames. Some lay the first floor, and commence the frame on top of it—others, for small buildings, put in the studding 4, 6 or 8 feet apart, with horizontal strips between, which is a good plan where vertical siding is used—others tenon the studs and mortise the sills—not desirable, as it injures the strength, makes more work, and hastens the decay of the timber.

A first class balloon frame should be lined, if for vertical siding, outside the studding—if horizontal siding is used, line inside; it makes the frame stiffer and the building warmer. Some line diagonally, say from center next the first floor towards extreme upper corners both ways; others line one side diagonally in one direction, and the other in an opposite direction. This makes assurance of strength doubly sure. If lined inside, nail perpendicular lath to the lining 16 inches from centers, and on this lath horizontally for plastering.

If the house be much exposed, fill in between the studding with brick turned edgewise, and laid in mortar. Put up in this manner the balloon frame building is as warm as any other known style of wooden building. No Hook and Ladder Company could ever pull it down; they might roll it end over end, like a basket, and with as little success of destroying it.

It has been thoroughly tested in every position, and found fully adapted to every known want for which wooden buildings are required, mills and manufactories excepted. Buildings for storage should have timber adapted for their uses; but the cutting of mortices and tenons, and boring augur holes, thus reducing a heavy stick of timber to the strength of one very much smaller, is a decided mistake. If the rural community want stronger buildings at a much less price, let them adopt the balloon frame.

Agricultural societies have offered premiums for nearly every class of agricultural and mechanical productions, but who ever heard of one inviting competition in the art of building, in plans for barns, the various classes of farm buildings and residences, in which department I will venture to say there is a wide field for improvement, and equally as much so in the arrangement as in the construction. We have premium or model farms each year—why not have a model barn, or a model farm house, that shall take a prize, and continue to do so until more successful ones be brought forward? Then let their plans, elevations, cost, &c., be published, and we shall at once make a perceptible advance in home comforts and conveniences.

The records of the Patent Office show this country to be profusely supplied with inventive talent; yet a new and original idea in the art of building does not seem to have been put forth. Is it because a plan that promises a decrease in expenses of building, meets with such disfavor among practical men as to prevent its introduction? We plod on in the same old beaten track of our forefathers, with all the faults that a scientific investigation shows to exist, and apparently without an effort or a desire to dispense with useless work, weight and encumbrance, and substitute real strength and economy. If architects and practical men would turn their attention to investigating the strength and arrangements of materials, and the improvement of the best existing models of architecture, they would undoubtedly receive the thanks of the building community, who are too often made the means of experimental forays into the field of originality.

The existence of the balloon frame for wooden buildings seems to have been called forth by necessity, and not by the mechanical skill or inventive genius

of any one individual. It has been tested so well as to leave no doubt of its superiority; its recommendation is its continued use throughout the west, and those portions of our country where its principles are understood. Properly constructed, and with timber adapted to its purposes, it will stand securely against the fury of the elements, and answer every purpose that an old fashioned timber frame is calculated to fulfil.

There is no limit in size or weight to be sustained that the balloon frame is not capable of being used for, and is equally applicable to the same extent as the old style of frame; but the timbers of a barn 50 by 80 must be of a different character than those of a dwelling house 16 by 24.

The timbers of a balloon frame are so arranged and fastened that many of them perform a double duty. The floor beams, ceiling joists, plates, lining, &c., all become ties, and do duty in the direction of their fibre.

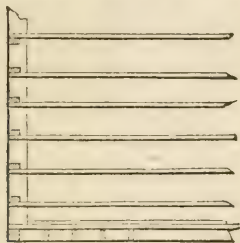


Fig. 1—Floor Plan.

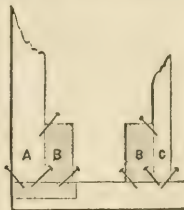


Fig. 2—Elevation Section—manner of nailing—A. corner stud, 4 by 4—B. joist, 5 by 3—C. 2 by 4.

By reference to fig. 1, we see the arrangement of studs and joists, each joist being brought by the side of the stud, and both are nailed diagonally, or toed to the sill and to each other. The spikes that are driven through the joist are pointed not only downwards, but towards the centre of the building, so that they form a claw for each joist at its end, the manner of nailing being shown in figs 2 and 3. The single nail, like the single strand of a cable, is comparatively weak, but in numbers there is strength.

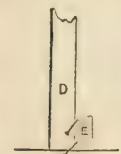


Fig. 3—Upper edge of joist—E. stud.

The sills for a balloon frame may be as thin as will give a hold to the nail, the main object being to give the studding and joists a broad bearing on the masonry. The entrance to the Lating Observatory in this city, was built in balloon style without sills. If the building is to be erected on piers, as is often done with barns and outbuildings, then the sills should be heavy.

Sills on a full foundation are spliced by being halved and spiked together as shown.

Fig. 4 is the side elevation, showing the ends of the joists and their position. The strip, 1 by 4, on which the joists of the 2d floor rest, is notched into the studding as shown in fig. 5, end elevation, but for small buildings this does not require to be let in—the plate, 1 by 4, is nailed to top of studding in the manner shown. The arrangement of joists by changing to opposite sides of studding both ways from center, is not generally practiced, but is recommended as an improvement, as, when the flooring is nailed to upper side of the joist, and the ceiling joists or strips nailed to lower side, there is no possible chance for the building to spread endways, as the studs bear against the joists both ways from center. The floor joists being toed and clawed with suitable nails and spikes, all lateral or sideway thrusts is in the direction of their fibre.

If the joists are 2 by 9, each joist will bear a practical tensile strain of 17 tons. In theory the compressible and tensile strength of timber are considered equal. The neutral axis of a beam exposed to a cross strain is said to be in the centre, the fibres above being compressed, and those below being separated

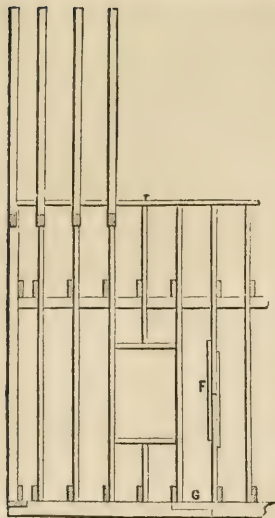


Fig. 4—Side Elevation—G. Manner of splicing sills—F. Manner of splicing studs.



Fig. 5—End Elevation.

at the same time. Each 2 by 4 stud, when braced by the siding, will be capable of practically sustaining 12 tons. The strip on which the joists rest will sustain nearly three tons by each stud, so that supposing the floor joists to be equal in strength with the bearings, the floor of a balloon frame building 16 by 24, with 2 by 4 studs, will practically sustain an equally distributed weight of 100 tons, weight of floor included.

The floor joists in a balloon frame may be as heavy as desirable, equal with those used in the old fashioned frame, but they are not injured in strength by cutting tenons.

Some builders of balloon frames notch the under side of the joists, and lock them over the strips. There is no advantage in this, as an extra spike will answer the same purpose, save the work, and preserve the full strength of the timber—4 by 4 studs will be found best adapted to the corners. The manner of splicing studding is shown in fig. 4.

A building designed for storage should be lined diagonally, to prevent a possibility of being thrown out of a perpendicular.

Barns require no lining, except as rendering more comfortable the portions used for horses and cattle—a single strip 4 or 6 inches wide might be nailed to the studding diagonally. Dwelling houses do not require any such strengthening, though diagonal strips add very much to the stiffness of the frame.

The balloon frame is simple in its construction, and from practical experience I give the preference to that form of it which is entirely free from mortices and tenons—that which costs the least labor is the strongest.

Those who adopt the balloon frame for every class of farm building, for wooden houses of every class, will do a sensible thing. For barns of all sizes, tenant houses, lodges, cottages, granaries, corn-cribs, residences, &c., it is the best style of frame known, and the only one used in the great grain growing and stock raising portion of our country west of the great lakes.

The Balloon Frame is one of those innovations, which, like the sewing machine, the husking machine, and the apple-parer, is destined to put an end to those social gatherings, which, in by-gone days, assembled to accomplish by united efforts that which by the advent of machinery is now performed with far greater ease and rapidity.

Balloon Framing is not, however, a manner of effecting by machinery what has formerly been done by hand, but embraces a series of improvements in the art of building, which time and experience have shown to be thoroughly practical—that which has hitherto called out a whole neighborhood, and required a vast expenditure of labor, time, noise, lifting, hoisting, and the attendant danger, can, by the adoption of the balloon frame, be done with all the quietness and security of an ordinary day's work. A man and boy can now attain the same results with ease, that twenty men would on an old-fashioned frame.

Suppose we compare the heavy, cumbersome barn frame of to-day with the barn of fifty years ago, with its rotten tenons, bulging sides, and broken-backed roof. Can we see one single mark of improvement? Has fifty years advanced the art of building frames? What change is there for the better?

What is demanded, is something in keeping with the progressive spirit of the day. We want really better and stronger frames, and we want them to cost less. If our houses, barns and out-buildings can be built for less money, and be just as good, as convenient, and as safe, it is an improvement that will suit us.

The Balloon Frame answers these requirements. It has long since ceased to be an experiment; and where its principles are understood, no other style of frame is used.

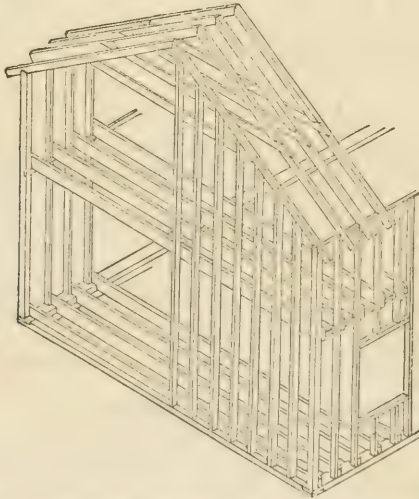


Fig. 1.—Isometrical Perspective View of the Balloon Frame.

The engraving shows a portion of a Balloon Frame, drawn in isometrical perspective. This is sufficient to show the whole manner of construction, the other parts of the building being a repetition. The manner of securing the different timbers is shown in figs. 2 and 3—the nails being driven diagonally, and in a manner to secure the greatest amount of strength.

The sizes of the different pieces of timber in a frame of this size, are sills 3 by 8—corner studs, 4 by 4—other studding, 2 by 4—plate, 1 by 4—side strips, or side girts, 1 by 4—rafters, 3 by 6, or 2½ by 5 will do—collars, 1 by 4, floor joists, 3 by 8, or may be 2 by 7. Rafters, studding and joists, are 16 inches between centers.

Small buildings of this character, not calculated for heavy storage, may have all timbers two feet between centres. Small buildings of one story, as tool-houses, granaries, cottages, &c., will be perfectly strong and secure, if all

the timbers above the first floor joists are ripped from common 1½ inch floor plank—thus make studding, ceiling joists, and rafters, 1½ inches by 5 inches.

For large barns, storehouses, &c., larger sizes will be required. The weight and power necessary to injure a building with 3 by 8 studding, with a double row of bridging, is more than is ever practically applied to any storehouse.

The lining of a balloon frame adds immensely to its strength, particularly so if put on diagonally; it may be done outside or inside, though on the whole the inside is preferable. If done outside, it should be carried over the sill and nailed to it; the sill being wider than the studding, in order to get a larger bearing on the masonry, and the floor joists being in the way, does not admit of inside lining being put on in the same manner. Close or continuous lining is not necessary for strength, but for dwelling houses adds much to the warmth. Large buildings, not used as dwelling houses, can be sufficiently well braced by diagonal strips of 1 inch board, 6 inches wide, nailed to the studding inside, 6 feet apart. Where vertical siding is used, these same strips can be put on in the same manner outside the studding. Let the strips run over the sill and nail to it. Between the strips on the sill, nail an inch board, and it is then ready for upright or battened siding. Small outbuildings, barns, &c., do not require any diagonal bracing.

Every stick of timber in a balloon frame not only has a weight to support, but its tensile and compressible strength, which theoretically is 11,800 pounds per square inch of its end area, is taken advantage of. This is not the case with the old style of frame. A balloon frame looks light, and its name was given in derision by those old foggy mechanics who had been brought up to rob a stick of timber of all its strength and durability, by cutting it full of mortices, tenons, and auger holes, and then supposing it to be stronger than a far lighter stick differently applied, and with all its capabilities unimpaired.

The balloon frame has been known in the newer sections of our country for many years; it has been tested and found to stand the test. It is not, nor cannot be patented; there is no money to be made out of it except as a public benefit, in which all share alike.

The following are some of the advantages claimed for it:

1. The whole labor of framing it is dispensed with.
 2. It is a far cheaper frame to raise.
 3. It is stronger and more durable than any other frame.
 4. Any stick can be removed and another put in its place without disturbing the strength of those remaining—in fact the whole building can be renewed, stick by stick.
 5. It is adapted to every style of building, and better adapted for all irregular forms.
 6. It is forty per cent. cheaper than any other known style of frame.
 7. It embraces strength, security, comfort and economy.
- Architects, builders, mechanics, and practical men, are respectfully invited to prove the contrary.

THE PROGRESS OF ENGLISH AGRICULTURE.

[From the London Quarterly Review.]

In the year 1856, a few Englishmen accepted the invitation of the French Government, crossed the Channel with their best live-stock and implements, entered into competition with the picked agricultural and mechanical skill of continental Europe, and found themselves by a long interval first in the arts and sciences required for producing meat and corn in the most economical manner, under a climate not eminently favorable, and on land which has long lost its virgin fertility. This is the problem which modern cultivators have to solve.

The live stock of the British islands are distinguished for three merits—the early period at which they become ripe for the butcher, the great amount of food they produce in return for the food they consume, and the large proportion of prime meat which they yield.

The agricultural implements of England are distinguished for solidity of construction, as well as for the rapidity and completeness with which they execute their work—especially that class of work which in other countries is more imperfectly and expensively performed by the labor of men or cattle.

The best evidence of the superiority of British live stock and agricultural machinery will be found, not in the premiums and medals awarded to them in Vienna or Paris, but in the constantly increasing exportation of both to every part of the world where scientific cultivation has superseded the rude expedients of earlier times.

Farmers are prosperous, landlords are intent on improving their estates, laborers have ceased to hate the drill and the threshing machine; during the past harvest the reaping machine has come into working-use; and competent judges are of opinion that an economical steam cultivator has been almost perfected. The time seems propitious for reviewing the series of events which during the last hundred years have combined to place English agriculture in the position which it now by universal consent enjoys. Different men and different means have, in important particulars, founded the agricultural prosperity of Scotland, although the two kingdoms have more than once exchanged improvements. A Scotchman only can do justice to the unwritten history of Scotch agriculture.

There is rarely a great invention received by the world of which the germ is not to be found in some preceding age. This is the case with the system of artificial manures, which has recently worked such wonders in agriculture, and which is touched upon as follows in “The new and admirable Arte of Setting Corne,” by H. Platte, Esquire, published in 1601, by “Peter Shorte, dwelling at ye signe of ye Starne on Bred Street Hill:”

“Shavings of horne, upon mine own experience, I must of necessity commende, by means whereof I obtayned a more flourishing garden at Bishopdal, in a most barren and unfruitful plot of grounde, which none of my predecessors could ever grace or beautifie either with knots or flowers. I have had good experience, with singular good success, by strewing the waste sope ashes upon a border of summer barley. Malte duste may here also challenge his place, for foure or five quarters thereof are sufficient for an acre of ground. And sal armoniake, being a volatile salt first incorporated and rotted in common earth, is thought to bee a rich mould to plant or set in. Dogges and cattes and other beastes, and generally all carrion, buried under ye routes of trees, in due time will make them flourish and bring forth in great abundance.”

Thus we find that so long as two hundred and fifty-seven years ago an Englishman "had discovered the utility of ammonia in bones and flesh." Even in agricultural implements great inventions were suggested and forgotten, because the farmers of England were not prepared to receive them. The reaping machine carries us back to the agriculture of the Gauls. The horse hoe, the drill, and the water or wind driven threshing machines were employed in a few obscure localities, but it was not until necessity made farmers adventurous, and facilities of communication rendered one district conversant with the doings of another, that they grew into general use. Whatever, therefore, might have been effected on particular estates, the condition of English agriculture at the close of the eighteenth century nearly resembled that of the greater part of continental Europe at the present time. Wheat in many districts was rarely cultivated and rarely eaten by the laboring classes. Rye, oats, and barley were the prevailing crops: a naked fallow, that is to say, a year of barrenness, which was too often a year of exhausting weeds, was the ordinary expedient for restoring the fertility of soil. Farm-yard dung, exposed to the dissolving influence of rain, and carelessly applied, was almost the only manure. Artificial grasses, with beans, peas and cabbages, were rarely grown, and turnips were confined to a few counties, where they were sown broadcast. Cultivation (except plowing and harrowing) was performed almost entirely by manual labor; the rude implements were usually constructed on the farm, and often in a way to increase labor instead of to economize it. The cattle were chiefly valued for their dairy qualities or for their powers of draught, and were only fattened when they would milk or draw no longer. The greater number of breeds were large boned and ill shaped, greedy eaters, and slow in arriving at maturity; while as very little winter food, except hay, was raised, the meat laid on by grass in the summer was lost, or barely maintained, in winter. Fresh meat for six months of the year was a luxury only enjoyed by the wealthiest personages. Within the recollection of many now living, first class farmers in Herefordshire salted down an old cow in the autumn, which, with slices of fat bacon, supplied their families with meat until the spring. Esquire Bedel Gunning, in his "Memorials of Cambridge," relates that, when Dr. Makepeace Thackeray settled in Chester about the beginning of the present century, he presented one of his tenants with a bull-calf of a superior breed. On his inquiring after it in the following spring, the farmer gratefully replied, "Sir, he was a noble animal; we killed him at Christmas, and have lived upon him ever since."

The reclaiming wild sheep walks, an improvement in the breeds of live stock, an increase in the quantity of food grown on arable land for their support and a better rotation of crops, are the events which distinguish the progress of English agriculture during the last century. The next step, after some advance had been made, was to break down the barriers which separated the farmers of that day, and which left them nearly as ignorant of what was going on in every district besides their own as of what was passing in China or Japan. The active agent in this work was the son of a prebendary of Canterbury—the well known Arthur Young, one of the most useful and sagacious, if not one of the most brilliant of men. Within the last twenty years, railways, the penny postage, and a cloud of newspapers have rendered personal and written communication universal. Let a superior animal be bred, an ingenious machine invented, or a new kind of manure be discovered, and in a few days the particulars are circulated through the press round the whole kingdom, and bring visitors or letters of inquiry from every quarter. But in the time of Arthur Young the most advanced counties communicated with the metropolis and each other by thoroughfares which could hardly be traversed except by a well mounted horseman or a broad wheeled waggon drawn by twelve horses, while as "not one farmer in five thousand read any thing at all," the printing press could not supply the place of personal inspection. Norfolk, with a subsoil which allowed the rain to filter through,

boasted her natural roads, and the inhabitants quoted with pride a saying of Charles II., that the county ought to be cut up to make highways for the rest of the kingdom. But this only proved how deplorable was the condition of the other parts of the country, for when Young visited Norfolk he did not meet with a single mile of good road. In Essex he found lanes so narrow that not a mouse could pass a carriage, ruts of an incredible depth, and chalk waggons stuck fast till a line of them were in the same predicament, and it required twenty or thirty horses to be tacked to each to draw them out one by one. The thoroughfares in fact were ditches of thick mud cut up by secondary ditches of irregular depth. In attempting to traverse them, Young had sometimes to alight from his chaise, and get the rustics to assist him in lifting it over the hedge. Such was the state of things when in 1767, he abandoned the farm in which he had experimented too much to be successful, and, availing himself of the frank hospitality which has in every age been the characteristic of our farmers and country gentlemen, made those celebrated "tours," which are absolute photographs of agricultural England, and are models of what all such reports should be—graphic, faithful, picturesque, and philosophical!

About half a century after Young had published his principal English tours another celebrated man copied his example, and made his "Rural Rides" through various counties between the years 1821 and 1832. It would be natural to refer to this entertaining work of Cobbet to discover the changes which had taken place in the interval, but scarce a notion can be gleaned from it of the condition of agriculture. Superior to Young in talent, in force of language, and in liveliness of style, though not surpassing him in lucidity, which was impossible, he is, beyond comparison, inferior to him in information and candor. * * * Devoting a large portion of his life to agriculture, and having won by his talents and his pungency the ear of the public, he did nothing whatever to advance the science. His powerful and reckless pen was chiefly employed in maintaining errors; and while Young, by the accurate record of impartial observations, has left his footmark deeply imprinted upon the soil, the turbulent cleverness of Cobbett was like a wind which makes a great stir at the moment, and then is hushed forever. The name of Arthur Young will always be mentioned with gratitude in every record of British farming; the name of Cobbett, if it is mentioned at all, will only be quoted as a warning. On recurring to his "Rural Rides," we have found them next to a blank upon the subject of which they profess to treat; and though abuse, egotism, conceit, dogmatism, and prejudice, when set off by vivacity, may make amusing reading, they contribute nothing to the promotion of agriculture.

Foremost among the men whose merits Arthur Young helped to make known to his contemporaries and hand down to posterity, was Robert Bakewell of Dishley; a man of genius in his way, for he laid down the principles of a new art. He founded the admirable breed of Leicester sheep, which still maintains a high reputation throughout Europe and the United States of America; and although he failed in establishing his breed of "Long horn cattle" and of "black cart horses," he taught others how to succeed. The yeoman farmer had not yet removed to a "parlor," and Bakewell sat in the huge chimney corner of a long kitchen hung round with the dried joints of his finest oxen, preserved as specimens of proportion, "a tall, stout, broad-shouldered man of brown red complexion, clad in a brown loose coat and scarlet waistcoat, leather breeches, and top boots. There he entertained Russian princes, French and German Royal Dukes, British peers and farmers, and sight seers of every degree." Whoever were his guests, they were all obliged to conform to his rules." "Breakfast at eight o'clock, dinner at one, supper at nine, bed at eleven o'clock; at half past ten o'clock, let who would be there, he knocked out his last pipe. There he talked on his favorite subject, breeding, "with earnest yet playful enthusiasm;" there, "utterly

indifferent to vulgar traditional prejudices," he enumerated those axioms which must ever be the cardinal rules of the improvers of live stock. "He chose the animals of the form and temperament which showed signs of producing most fat and muscle," declaring that in an ox "all was useless that was not beef;" that he sought, "by pairing the best specimens, to make the shoulders comparatively little, the hind quarters large;" to produce a body "truly circular, with as short legs as possible, upon the plain principle that the value lies in the barrel and not in the legs," and to secure a "small head, small neck, and small bones." As few things escaped his acute eye, he remarked that quick fattening depended much upon amiability of disposition, and he brought his bulls by gentleness to be as docile as dogs. In sheep his "object was mutton, not wool, disregarding mere size," a vulgar test of merit.

The great physiologist, John Hunter, confirmed in one essential particular the observations of Bakewell, for he asserted that in the human subjects he had examined he found small bones a usual concomitant of corpulence. Mr. Clive, the celebrated surgeon, who paid much attention to the breeding of cattle, also came to the conclusion that extremely large bones indicated a defect in the organs of nutrition. But "fine boned" animals were in fashion when Bakewell commenced his career, and to the majority of people it seemed a step backwards to prefer well made dwarfs to uncouth giants. One or two enlightened persons having suggested at Ipswich fair that a piece of plate should be presented to Arthur Young for the public service he had rendered in introducing the Southdown sheep into Suffolk, a farmer determined to put forth the counter proposition, "that he was an enemy to the county for endeavoring to change the best breed in England for a race of *rats*." The tenantry of that period were strong in the self confidence of ignorance. "To attempt to reason with such fellows," said Young of some of those he met with in his tours, "is an absurdity," and he longed to seize a hedge-stake in order to break it about their backs. Even if they were persuaded to try some improvement to which they were not previously inclined, they reported that "their experience" was unfavorable to it—their experience being in reality the foregone conclusion which was antecedent to experience, and which blinded them to the results of experience itself. The graziers who adhered to the old huge-skeletoned race of stock were accustomed to give as the reason for their preference that a beast could not get fat unless there "was room to lay the fat on." It would have been just as rational to argue that none but farmers of large stature could have felt Young's proposed application of the hedge-stake, because in smaller men there would not be room to lay it on. Numbers of short, round, tub-like agriculturists, who uttered the current excuse for breeding bones in preference to flesh, were living representatives of the fallacy of their assertion. But there were others who were not slow to see the truth. A Southdown ram belonging to Arthur Young got by accident to a few Norfolk ewes of a neighboring farmer. When the butcher came in the summer to select some lambs, he drew every one of the Southdown breed, which, he said, were by much the fattest in the flock. The owner instantly took the hint. Upon the whole the principles of Bakewell were more favorably received than most innovations in that day, and some of the pupils succeeded in improving upon the stock of the master. The brothers Collings in Durham established the Durham or Teeswater breed, now known as the "Short-horn." Quartly successfully applied himself to improving the North Devon. Price took up the Hereford, and Ellman of Glynde the Southdown sheep, then little better than half a dozen other heathland kinds. The emulation gave rise to the forerunner of the modern fat cattle show, in single oxen of monstrous size, dragged round the country in vans, and with such success that in 1800 a Mr. Day refused 2000*l.* for the Durham ox he had purchased two months previously for 250*l.* Graziers who were not able to join the sheep-shearings of Holkham or Woburn, who did not read the agricul-

tural works of Arthur Young, and would not have been convinced if they had, found their prejudices in favor of local breeds shaken by a personal interview with gigantic specimens of the Teeswater ox.

In 1798 the Duke of Bedford, Lord Somerville, and others, with Arthur Young as honorary secretary, established the "Little Smithfield Club," for exhibiting fat stock at Christmas time, in competition for prizes, with a specification of the food on which each animal had been kept. This society has rendered essential service by making known the best kinds of food, and by educating graziers and butchers in a knowledge of the best form of animal. We smile now on reading that in 1806, in defiance of Mr. Coke's toast, "Small in size and great in value," a "prize was given to the tallest ox." Length of leg has long been counted a serious fault; for it is the most unprofitable part of the beast. In 1856 a little Devon ox, of an egg-like shape, which is the modern beau-ideal, gained the Smithfield gold medal in competition with gigantic short horns and Herefords of elephantine proportions; and in 1854 a large animal of Sir Harry Verney's was passed over without even the compliment of a "commendation," because he carried on his carcass too much offal and more threepenny than ninepenny beef.

But the fattening qualities and early maturity of the improved stock would have been of little value beyond the few rich grazing districts of the Midland counties, without an addition to the supply of food. The best arable land of the kingdom had been exhausted by long years of cultivation, and the barren fallow, which annually absorbed one-third of the soil, failed to restore its fertility. A new source of agricultural wealth was discovered in turnips, which, as their important qualities became known, excited in many of their early cultivators much the same sort of enthusiasm as they did in Lord Mombodo, who on returning home from a circuit went to look at a field of them by candle-light. Turnips answered the purpose of a fallow crop which cleaned and rested old arable land; turnips were food for fattening cattle in winter; turnips, grown on light land and afterwards eaten down by sheep which consolidated it by their feet, prepared the way for corn crops on wastes that had previously been given up to the rabbits. By this means the heaths and wolds of Yorkshire and Lincolnshire, with the help of marling in certain districts, the blowing sands of Norfolk, Nottinghamshire, and Bedfordshire, were gradually reclaimed and colonized by the race of farmers who have been foremost to adopt all the great improvements in English agriculture for the last century. This new system required a capital on the part of both landlord and tenant. It required from the landlord barns and yards, and houses fit for first-class farmers. Mr. Coke of Holkham laid out above a hundred thousand pounds in 20 years on dwellings and offices. It required the tenant to expend a considerable sum on flocks and herds, and, above all, in labor for the years before the wild land began to yield a profit. Mr. Rodwell, in Suffolk, sunk 5000*l.* in merely marling 820 acres, with a lease of only 28 years. Such spirited proceedings demanded no mean amount of intelligence to conduct them with discretion and profit. The value of Mr. Rodwell's produce during the 28 years of his occupancy was 30,000*l.* greater than the 28 years which preceded his improvements. No needy race of peasant cultivators, no rack-rent absentee line of landowners, could have achieved this conquest over the English wilderness, then far from ports, manufacturing towns, and markets.

This great advance in arable farming took its rise in Norfolk. The king of Brobdignag gave it as his opinion, "that whoever could make two ears of corn or two blades of grass to grow upon a spot of ground where only one grew before, would deserve better of mankind and do more essential service to his country than the whole race of politicians put together." This passage might have been written upon Lord Townsend, who retired in 1730 from public affairs, which went on none the worse without him, and devoted the remaining eight years of his life to improving his estate. He originated practices which increased the produce not only two, but a hundred fold, and of which

the world continues to reap the benefit at this hour. To marl and clay farms was an old practice in England; for Harrison, in his "Description of Britaine," in the reign of Queen Elizabeth, says, "Besides the compost that is carried out of the husbandmen's yards, ditches, and dove-houses, or out of great towns, we have with us a kind of white marl, which is of so great force, that, if it be cast over a piece of land but once in three-score years, it shall not need of any further composting." The usage seems, however, to have died away, and its advantages were rediscovered by Lord Townshend and a Mr. Allen, who applied it to the sands of Norfolk, and converted boundless wilds of rabbit-warrens and sheep-walks into rich, grain-bearing soil. Young estimated that before the close of the century "three or four hundred thousand acres of wastes had been turned into gardens," and rents rose from sums between sixpence and two shillings an acre to fifteen shillings and twenty. Many of the tenants realized a capital which amounted to more than the reputed worth of the property. A Mr. Mallett made a fortune in thirty years on a farm of 1500 acres, and bought land of his own of the value of 1700*l.* a year—a more remarkable example even than that of the Scotch proprietor mentioned by Dr. Cartwright, who, being compelled to sell his estate, hired it on a lease, and afterwards repurchased it with the profits he derived from his tenancy.

But marling would not of itself have reclaimed the Norfolk deserts. Turnips, which are said by Young to have been brought into farm cultivation by the celebrated Jethro Tull, found such a zealous advocate in Lord Townshend, that he got the name of "Turnip Townshend." This crop he had the sagacity to see was the parent of all the future crops. Without winter food little stock could be kept, without stock there could be little manure, and with little manure there could not be much of anything else. The turnips were, therefore, employed to secure a large dung-heap, and the dung-heap in turn was mainly appropriated to securing the largest possible store of turnips. This tillage in a circle was as productive as it was simple. The ground, cleaned and enriched by the root-crop, afterwards yielded abundant harvests of corn; and, as we have already stated, the treading of the sheep upon the loose soil, while they fed off a portion of the turnips, gave it the necessary firmness. Thus through the agency of turnips a full fold and a full bullock-yard made a full granary. Essex and Suffolk soon copied the method, but they did not carry it so far as Norfolk; and in many places the turnips were never thinned or hoed, upon which their size and consequently nearly all their value depended.

The rotation of crops was, however, considered the especial characteristic of the Norfolk husbandry. Until past the middle of the century no just ideas prevailed upon the subject in any other portion of the kingdom. Sir John Sinclair says that all courses were thought to be alike, and deserving neither of praise nor censure. The grand rule of the Norfolk cultivators, to which they steadily adhered, was never to be tempted to take two corn-crops in succession. But, in truth, no one part of their system could be dispensed with, and its value was as a whole. They had not only learnt the importance of alternating grain with other products of the soil, but they had ascertained the particular advantage of having the barley follow the turnips, the clover the barley, and the wheat the clover; for the fibrous roots of the latter were the finest possible pabulum for the lucrative wheat, and nothing else would have been equally efficacious. Young found this four-course system widely prevalent in 1767. The principal variation, he says, was in the duration of the clover, which some persons allowed to remain for two or three seasons before breaking it up for wheat. All these changes were brought about in the thirty years, from 1730 to 1760, but they were confined, with slight exceptions, to Norfolk itself; and it was not till after Young appeared upon the scene that they began to penetrate into other districts.

After a considerable interval, during part of which Francis, Duke of Bed-

ford, was the agricultural leader, another great Norfolk land-owner succeeded to the mantle of Lord Townshend. This was Mr. Coke, of Holkham, afterwards Earl of Leicester, who, towards the close of the last, and throughout the first quarter of the present century, headed the movement. The reclaiming the wastes of Norfolk, the marling the light land, the extensive cultivation of turnips, and the introduction of the rotation of crops, have all been ascribed to him. But as Young, in the *Tours* he published several years before Mr. Coke possessed an acre in the county, states that every one of these practices was then in common use, and constituted the general features of the Norfolk husbandry, it is evident that this is another of the numerous cases in which the last improver is credited with the accumulated merits of his predecessors. But though the precise nature of what Mr. Coke effected is often misunderstood, the amount of his services has not been overrated. He stands foremost among the class of whom Arthur Young wrote in 1770—"Let no one accuse me of the vanity of thinking that I shall ever, by writing, wean farmers of their prejudices: all improvements in agriculture must have their origin in landlords." Five years afterwards Mr. Coke succeeded to the estates of the Leicester family. The fine house at Holkham, erected from the designs of Kent, about the middle of the last century, bears an inscription which imports that it was built in the midst of a desert tract, and its noble founder was accustomed to say, at once jeocularly and sadly, that his nearest neighbor was the King of Denmark. There was still many a broad acre in its primitive state of sheep-walk, and Mr. Coke graphically described the condition of portions of the property surrounding this princely mansion by the remark "that he found two rabbits quarrelling for one blade of grass." His first care was to apply the existing methods to fertilizing his barren wilds; his second was to improve on the prevailing practices; his third was to persuade his countrymen to follow his example. From the thirty years, between 1700 and 1790, both landlords and tenants were content to follow in the track which Lord Townshend had marked out for them—a track which led to such wealth that it is no wonder they were not tempted to further experiments. Mr. Coke roused them from their lethargy, and what Young calls a "second revolution" commenced. The great evil of the time was the isolation in which farmers lived. They were nearly as much fixtures as their houses, and what was done upon one side of a hedge was hardly known upon the other. The Lord of Holkham instituted his annual sheep-shearing, at which he feasted crowds of guests from all parts and of all degrees. Under the guise of a gigantic festival, it was an agricultural school of the most effective kind, for the social benevolence engendered by such magnificent hospitality disarmed prejudice, and many who would have looked with disdain upon new breeds of stock, new-fangled implements, and new modes of tillage, regarded them with favor when they came recommended by their genial host. Hot politician as he was, according to the fashion of those days, his opponents forgot the partisan in the agriculturist; and when Cobbett, who had no leaning to him, rode through Norfolk in 1821, he acknowledged that every one "made use of the expressions towards him that affectionate children use towards the best of parents." "I have not," he adds, "met with a single exception." The distinguished visitors who came from other counties to the sheep-shearings, carried home with them lessons which had an effect upon farming throughout the kingdom. Excluded by his political opinions from Court favor or office, Mr. Coke must have found abundant compensation in the feudal state of gatherings, at which, as a contemporary journalist records, "hundreds assembled and were entertained—farming, hunting, or shooting in the mornings—after dinner discussing agricultural subjects, whether the Southdown or the new Leicester was the better sheep—whether the Devon or the old Norfolk ox was the more profitable." In dealing with those who farmed under him, he showed the same wisdom as in his own tillage. He formed an intimacy with Young, and acted on three of his maxims, on which agricultural progress may be said to depend—that "a

truly good tenant-farmer cannot be too much favored, or a bad one have his rent raised too high"—that "good culture is another name for much labor"—that "great farmers are generally rich farmers." By these methods he raised his rental to more *thousands* a year than it was *hundreds* when he inherited the estate, and had enriched a numerous tenantry into the bargain. Mr. Coke showed that no profession in the world was so lucrative as that of a landlord who devoted his life to the improvement of his property. The wealth, nevertheless, which accrued to himself was the smallest part of the gain. He was a national benefactor upon a mighty scale, and was the cause, directly and indirectly, of adding a countless mass of corn and cattle, of beef and mutton, bread and beer to the resources of the country.

No discovery, perhaps, in agriculture was made by Mr. Coke, but he showed a surprising sagacity in singling out what was good in ideas which were not received by the farming public at large, in combining them into a system, and persevering in them till they prevailed. Young states, in his "Report on the Agriculture of Norfolk," which was published in 1804, that Mr. Coke had even then grown the invaluable Swedish turnip for several years with the greatest success, and used large quantities of purchased manure in the shape of rape-cake. Above all, he at that date drilled the whole of his crops, turnips included, and he was the prominent champion of this much opposed system, which is now universally adopted for the time and labor it saves, for the facility it affords for applying the manure directly to the seed, for keeping down weeds and stirring the soil by means of the horse-hoe, and for thinning out the crop with regularity and speed.

The Norfolk farmers, while attending to arable culture, had never turned their attention to improving their stock. One of Mr. Coke's most intelligent tenants said that "bones and offal, rather than meat, were the production of the best grass lands in the county." A small number of Norfolk or Suffolk cows, good milkers but miserable graziers, were kept, and a flock of the black-faced, long-horned, Norfolk sheep—an active, bony, hardy animal, well suited to pick up a living on the wild, bare heaths, and which gave a little wool every year, and a little mutton at the end of four or five. It is just fifty years since Mr. Coke said, in one of his annual Holkham speeches, "that a Norfolk flock had hitherto been considered as little more, in point of profit, than a dung-cart." He soon taught his tenants that, valuable as was manure, they had better keep animals which would at the same time make a return in flesh and fat. His own skill in the difficult art of judging of the qualities of stock was great, and he used to assist his neighbors in parcelling out the ewes to the rams according to the shapes of each, that the defects of one parent might, as much as possible, be remedied by the good points in the other. "I have seen him and the late Duke of Bedford," says Young, "put on a shepherd's smock, work all day, and not quit the business till darkness forced them to dinner."

A new system of fattening sheep, which has been attended with wonderful results, was commenced in 1824, on the suggestion of Mr. Coke's steward, Blaikie, by Mr. John Hudson, now known throughout England in connection with his present farm of Castle Acre. He ventured to supply his young wethers with sliced turnips and purchased oil-cake. Such was the success of his experiment, "that, to Mr. Coke's astonishment, when he asked to see the produce of his tup, he found they had been sent fat to market twelve months before the usual time." Yet all John Hudson's neighbors, including his father, a man of agricultural progress, prophesied his ruin from his extravagance in buying food for sheep, which was regarded in much the same light in farming as for a young spendthrift to go for money to the Jews. At the present day the purchase of linseed-cake, or meal, or foreign pulse, is one of the regular means by which an increased quantity of meat is manufactured. Wherever turnips are grown and sliced, there cake-troughs are to be seen, and the improved feeding, coupled with the natural tendency of the improved breeds to early maturity, has multiplied to an enormous extent the amount of

mutton produced. Mr. Morgan states that twenty years ago the majority of the sheep brought to Smithfield Market were three and four years old, and it was difficult to find a score under two. Now a three year old sheep is scarcely to be met with, and fat sheep only a twelvemonth old are plentiful. Besides the vast increase in the numbers kept, we have thus three generations got ready for our tables in the same space of time as we had one in 1838. Bought food would have been wasted on the former slow-growing species; but applied to the improved stock bred on Bakewell's principles, it created a demand not only for tups from Sussex, steers from the Quantock hills, and oil-cake from Germany, but for improved implements and machinery—the turnip-slicer, the cake-crusher, the chaff-cutter, and the bone-mill, as well as the drill, horse-hoe, heavy roller, and better contrived plows and harrows.

The Leicester breed was for some time adopted by Mr. Coke. He afterwards substituted the Southdowns as superior; and the perfecting of these in the present generation by Mr. Jonas Webb, may be said to have been due to one of those trivial circumstances that are always influencing the events of the world. His grandfather was a breeder of Norfolk rams, and it was the amusement of the old gentleman at his annual sales, to set his grandsons to ride on his tups, holding fast by their huge horns. It was during the races on these sharp-backed animals that Jonas determined, as soon as he was a man, to breed sheep with "better saddles of mutton." A lean, hurdle backed, black-faced Norfolk ram, and the beautiful firkin-bodied Southdown, for which Mr. Webb refused five hundred guineas at the Paris Exhibition of 1856, are the two extremes, the two mutton-marks between the boyhood and manhood of the same individual. Nothing but the Norfolk sheep could have found a living on the uncultivated Norfolk heaths; nothing but the "roots," artificial grasses, cake, and corn of modern days could have raised the Babraham "Downs" to their marvellous perfection.

Another instance of a different kind, and one in which extremes meet, marks the contrast between the past and the present. Mr. Coke's first agricultural adviser was Mr. Overman, of Dutch descent, whose sons are still tenant-farmers on the Holkham estate, and prize winners at Royal Agricultural and Smithfield fat-stock shows. The heads of the covenants were drawn, at Mr. Coke's request, by Overman, and only restrained tenants in obedience to the famous Norfolk rotation, from growing two consecutive corn crops. Now, after a lapse of eighty years, the second Earl of Leicester wisely encourages his tenants to return to the once justly condemned system of two white crops in succession, because the soil that in 1770 was exhausted, has, by a long course of high-farming, been rendered almost too fertile.

A complete history of English agriculture from 1750, would comprise names worthy of record from almost every county, and the name of George III. would worthily appear at the head of the list. He had a considerable practical knowledge of the science, and contributed, under the denomination of Ralph Robinson, to Young's monthly periodical, "The Annals of Agriculture." His devotion to the pursuit did much to recommend it to others, and he was often fondly and proudly spoken of as "Farmer George." But no sketch can do justice to so extensive a subject, and, for the sake of brevity and simplicity, we have purposely confined ourselves to the tillage of Norfolk, which long led the van in agricultural improvement, and where nearly all the methods which stood the test of time were early adopted. The very laborers seemed animated with the same spirit as their employers, for both Young and Marshall remarked that in no part of England did the workman display an equal activity. We now arrive at a period when Norfolk no longer occupies its old position, not because it has dropped behind in the race, but because other counties have pushed forward, and the course of events are tending to equalize the arts of cultivation throughout the kingdom. This last epoch is chiefly distinguished by the immense extension of drainage, by the discovery of artificial manures, by the increased purchase of food for cattle, by the im-

provement of implements, and still more by the improvement of those who use them. "It is well known," says Sir John Sinclair, "that the best cultivated districts are those which possess the greatest facility of internal communication, without which agriculture languishes in the most fruitful soil, and with it the most ungrateful soil soon becomes fertile." The effect which railroads have produced upon farming is a signal illustration of the justice of this remark, for without their aid the larger portion of the recent progress would have been impossible. They furnish cheap and rapid conveyance for goods which were too bulky to admit of free interchange in the days of horse-power—for corn and cattle, coal, iron, and timber, implements and machinery, oil-cake and artificial manures—all that a farmer has to sell or wants to buy—and, above all, for the farmer himself, who brings home with him new ideas as well as new inventions. The railways practically converted distant rural parishes into the suburbs of towns, and thus inoculated them with a spirit of inquiry and commercial enterprise which could never have existed under pack-horse or wagon communication. Wesley, who had a wide experience of the different classes in England, thought the tenantry the most ignorant, stupid, and unfeeling part of the community. "In general," he added, "their life is supremely dull, and it is usually unhappy, too; for of all people in the kingdom, they are the most discontented, seldom satisfied either with God or man." Wilkes said that, reversing Pope's Maxim, they held that "Whatever is, is wrong." Wesley, however, was mistaken both in supposing that husbandry was a dull occupation, and in imagining that the grumbling of the husbandman, which was chiefly designed to keep down rents, was the real measure of their discontent; but, taken as a body, they neither read nor thought, were sluggish in their minds, and the slaves of an antiquated routine. The suddenness with which they have started from their lethargy, and with which the many have displayed the aptitude which formerly was the prerogative of a few, is without a parallel in the annals of farming.

The starting point of the new era may be dated from the years 1837 and 1838, which were signalized by the foundation of the Royal Agricultural Society of England. This now famous association was suggested in a pamphlet published in 1837 by the late Henry Handley, M. P., a fine specimen of a Lincolnshire squire—a good sportsman, an excellent judge of stock, and cultivating his own estate with more intelligence and success than was usual at that time among his class. The first annual encampment of the society took place at Oxford in 1839, and its first Journal was published in 1840 under the admirable editorship of the late Philip Pusey, a lively and forcible writer, and a most zealous farmer, who to the day of his death in 1854, devoted his time, his talents, and his fortune to promoting the improvement and recording the progress of his favorite science. He was an example of that delightful combination of scholarship and practical energy which is so common in England, and he exercised the double influence of an accomplished gentleman and an enlightened agriculturist.

In every institution which meets with distinguished success, results are always produced which were not anticipated by its originators. Thus it happened that, when the Agricultural Society was founded, not one of the promoters foresaw the importance of the mechanical department. In the ten sections of the charter of incorporation defining the objects of the association, "implements" are only incidentally referred to as one of the subjects to which men of science were to be encouraged to pay attention, in a miscellaneous paragraph, which includes "the construction of farm-buildings," "the application of chemistry to the general purposes of agriculture," "the destruction of insects injurious to vegetable life," "and the eradication of weeds." At Oxford a few manufacturers saw an opening for obtaining customers, and found their way to the show-yard in spite of the difficulties from the want of that cheap conveyance which is now common to the whole kingdom. One gold medal for a collection of implements, three silver medals, and

five pounds for a "paddle plow for raising potatoes," were all the rewards distributed in 1839 for what was destined to be the most attractive, as well as the most useful feature of the Society's exhibitions. After the Cambridge meeting in 1840, the importance of the implements was acknowledged; and the number displayed, beginning with some 300 at Liverpool in 1841, increased at the rate of about 100 on every succeeding year, until, in 1853, at Gloucester, they reached their highest point in a total of 2000. The rise or fall of a few hundreds chiefly depends upon the importance and railway facilities of the town where the show is held, and the number of articles exhibited is less a test of the progress of mechanical invention than of the sales which are likely to be effected in any particular district. The annual show is only one of the numerous modes in which the makers advertise and display their productions. The true prize to the manufacturer is plenty of custom.

For several years past all the railway companies have agreed to convey live stock free, and implements at half their usual charges, to and from the shows of the Royal Agricultural Society, the railway company at the towns where they are held generally providing accommodation for the mechanical compartment. This at Chelmsford cost the Eastern Counties upwards of 3000*l*. Railway fares and pace could alone bring the number of shilling-paying strangers who contribute to the enormous expense of these exhibitions. The population of the city of Salisbury, including men, women, and children, only amounts to 10,000, but the visitors to the show-yard in 1857 were over 35,000. This is of itself a striking proof of the wide and eager practical interest which is felt in agriculture, for there is little to gratify the eye of mere holiday gazers; and when in addition we consider the mountains of coal, iron, timber, artificial manure, lime, and chalk, conveyed in the one direction, and the quantity of live stock and corn in the other, we cannot help coming to the conclusion that George Stephenson's locomotive has been the great cultivator of the farmer's mind and the farmer's land—the great agent for the extraordinary advance which British agriculture has achieved in the last quarter of a century. Very significant were the figures given by the chairman of the Eastern Counties Railway at the Chelmsford dinner, when he told his farmer friends that, in the course of the preceding twelve months, the lines over which he presided had conveyed 24,000 tons of guano and other portable manures, 700,000 quarters of grain, 550 sacks of flour, 71,000 beasts, 380,000 sheep, 13,000 tons of meat and poultry, and 43,000,000 quarts of milk. Who can calculate the value of the money rewards held out to breeding, feeding, and corn-growing, in the shape of four thousand miles of railway? and how little are men who live in the midst of these changes conscious of their magnitude, until the results are collected and put upon paper!

The benefit which has accrued from the Royal Agricultural Society has surpassed the expectations of its most sanguine promoters. The improvements in cultivation and implements, which had been effected by a few men in advance of the spirit of the age, have now, in great part by its exertions, ceased to be received by the majority of farmers with contemptuous incredulity, and by the laborers with stubborn opposition. In the old days distance operated as a barrier to imitation, and three-fourths of England only heard of what was done in the well-cultivated fourth to ridicule and despise it. When the father of Mr. George Turner, of Barton, Devon, the well-known breeder of Devon cattle and Leicester sheep, who had learned something in his visits with stock to Holkham, began to drill turnips, a well-to-do neighbor looked down from the dividing bank and said to his son, "I suppose your father will be sowing pepper out of a cruet next." Indeed the whole history of the turnip cultivation affords a characteristic contrast between the spirit of the past and the present. It took upwards of a century to establish the proper growth of this crop, notwithstanding that the wealth of meat and corn which proceeded from it was as plain to those who would open their eyes, as that a guinea was worth one-and-twenty shillings. The first difficulty was to persuade farmers

to try it at all; and not one turnip was ever seen on a field in Northumberland till between 1760 and 1770. The second difficulty was to get them to be at the expense of hoeing, insomuch that Young said that he should be heard with incredulity in most counties when he bore testimony to the vast benefits which were derived in Norfolk from this indispensable portion of the process. The third difficulty was to induce them to replace broadcast sowing by drilling, which appeared, as we see, to novices no less ridiculous than peppering the land from a cruet. The bigotry of the farmer cramped the energies of the mechanics whom he now welcomes as among his best friends. The implements, even by the first manufacturers, from the absence of criticism and competition, from the limited extent of custom, and from the want of artisans skilled in working iron, were, however excellent in idea, both clumsy and costly. The choicest specimens which existed in 1840 have been so altered in execution by cheaper materials and improved workmanship that they can scarcely be recognized.

The Royal Agricultural Society, with its council of peers, squires, tenants, and implement-makers—its professors of chemistry, botany, and veterinary art—its thousands of subscribers, spread over every county of England—its Journal of transactions and reports—and, above all, its annual encampments in the centres of successive districts—has done for farming what the great fairs of the middle ages did for commerce—concentrated and diffused knowledge, brought customers and producers into contact, and helped to extinguish prejudices in the excitement of social gatherings. They have carried to provincial cities the best live stock, the best implements, and the best cultivators. The influence of example, of competition, and even of rank fashion, has been brought to bear on local obstinacy. Squires have been encouraged to improve their estates by the speeches of even greater men than themselves, and young noblemen, in want of an object, have found it in agricultural duties. Implement-makers have had the advantage of the suggestions of their customers, and, thus taught and teaching at the same time, have every year become more dependent on tenant, and less on fancy farmers. Men who went to Shows staunch champions of the flail, have been vanquished by the mere sight of a steam-engine driving barn-machinery; as an old Homeric Greek, if he could revisit the earth, would instantly recognize the inferiority of stones hurled by the hand to the iron balls projected from the cannon's mouth. The greatest landlords, wandering unknown in the show-yards, have had opportunities of learning wholesome truths from the tenants of other landlords. Self-satisfied ignorance is abashed, and triumphant skill finds at once a large and eager audience. These agricultural exhibitions are, in fact, the Woburn and Holkham sheep-shearings, made national and expanded to the dimensions of an age of steam-driven threshing-machines.

Having described the important functions discharged by this central Society for the advancement of farming, we proceed to touch upon the particular improvements which have been effected during its career. Attempts to drain have been made from the earliest times. Specimens may be seen of very clever workmanship more than a hundred years old; but the when it should be done, and the why, and the how, had never been reduced to rule. Lord Bacon, who had a large collection of works upon agriculture, had them one day piled up in the court-yard and set on fire, for, said he, "In all these books I find no *principles*; they can, therefore, be of no use to any man." This was just the deficiency with respect to drainage, and it could not therefore progress until Josiah Parkes, in 1843, expounded the "*principles*," and in 1845 made suggestions which led to the manufacture of the steel tools which were necessary for forming the deep cuttings, and the cheap pipes which were essential to carrying off the water from them when formed. Up to 1843 little was done beyond tapping springs, or endeavoring to convey away the rain which fell on the surface by drains so shallow that the plow frequently spoiled them, it being the popular belief that moisture would not penetrate through retentive

clay beyond twenty or thirty inches. In 1833, when Mr. Parkes was engaged in draining a peat-bog near Bolton, in Lancashire, for Mr. Heathcote, he had an opportunity of seeing the great effect produced by deep cuttings, and he was led to ponder on the advantage that would be derived from relieving the soil of a certain number of inches of the water, which is stagnant during a rainy season, and remains until removed by evaporation in a dry season. By experiments continued for several years, he found that a deep drain began to run after wet weather, not from the water above, but from the water rising from the subterranean accumulations below, and that, by drawing away the stagnant moisture from the three or four feet of earth next the surface, it was rendered more friable, easier to work, more penetrable by the rain, which then carried down air and manure, and much warmer and more suitable for the nourishment of the roots of the crops. He came to the conclusion that the shallow draining, advocated by Smith of Deanston, was a vital error, and that four feet, which left a sufficient layer of dry, warm surface earth, after allowing for the rise of the moisture by capillary attraction above the water level of the drain, should be the minimum depth.

The first field drained on the four feet plan was on a farm near Bolton, belonging to a celebrated Lancashire bone-setter. This was a small beginning of the subterranean net-work of pipes which has more than doubled the value of our retentive soils. In 1843 Mr. Parkes gave his evidence before the Agricultural Committee of the House of Lords, and was strongly supported by the Earl of Lonsdale, whose experience as a commissioner of highway trusts had proved to him the advantage of the system. But nothing could be done without tools and pipes. A Birmingham manufacturer, on Mr. Parkes' suggestion, produced in 1844 the set of drain-cutting implements which have by degrees been brought to perfection. A cheap conduit was still a difficulty. Stones choked up in many soils, and where they had to be broken and carted to the ground, often made the cost enormous. In 1843, at the Derby show of the Royal Agricultural Society, John Reade, a gardener by trade, a self-taught mechanic, well known as the inventor of the stomach-pump, exhibited cylindrical clay pipes, with which he had been in the habit of draining the hot-beds of his master. His mode of constructing them was to wrap a lump of clay round a mandril, and rub it smooth with a piece of flannel. Mr. Parkes showed one of these pipes to Earl Spencer, saying, "My Lord, with this pipe I will drain all England." The Council, on his Lordship's motion, gave John Reade a silver medal for his idea, and in the year following offered a premium for a tile making machine. A great deal of money was wasted in attempts, and many patents were taken out for the purpose with indifferent success; but in 1845, at Shrewsbury, Thomas Scragg received a prize for a machine which triumphed over the difficulties, and pipes can now be made quite as fast as kilns can take them.

The work from that hour went rapidly forward. In 1846 Sir Robert Peel, whose management of his own property had made him thoroughly alive to the national importance of the subject, passed the Act by which four millions sterling were appropriated towards assisting landowners with loans for draining their land, with leave to repay the advance by instalments extending over twenty-two years. Nearly the whole of the first loan was absorbed by canny Scotch proprietors before Englishmen had made up their minds to take advantage of it. But the four millions of government money was small in comparison with the sums furnished by private enterprise for the execution of an improvement which, on the worst class of wet land, gave visible proofs of its value by immediate profits. Another circumstance stimulated the work. About the period that the system of deep draining was perfected, the great landowners were anxious to encourage their tenants, depressed by the approaching free trade in corn, and thorough draining became the most fashionable improvement. The sheepfolding Norfolk rotation had done great things for light land, brought the cultivation of roots to a high pitch, and proportionately

increased the live stock on every light land farm. The owners of strong retentive soils were anxious to imitate their light land neighbors, and to grow the roots which were seen to afford such profits in beef and mutton. Deep drainage enabled them to realize these aspirations.

For centuries the farmers of clay soils had been engaged in trying various expedients for saving their corn crops in wet seasons. The land was laid up in "lands," "backs," or "steches," that the rain might flow off into intervening surface-drains, a few inches deep, and which were formed of turf, bushes and stones. Not unfrequently an anxious farmer would traverse his cornfields after heavy rains, spud in hand, and try to lead the stagnant little pools to the neighboring ditches. In favorable seasons the clay usually gave excellent crops of corn, (grain), but a wet season destroyed the husbandman's hopes. These stiff soils had been preferred, until light heath land had been brought by sheepfolding, marling, and root-growing into profitable culture. The introduction of thorough drainage restored them to their ancient pre-eminence. Hundreds of thousands of acres, formerly condemned to remain poor pasture, or to grow at long intervals uncertain crops of corn and beans, have been laid dry, rendered friable, and brought into a regular rotation, in which roots find their place. Sheep stock thrive where previously a few dairy cows starved; the produce has been trebled, the rental raised, and the demand for labor increased in proportion. In the neighborhood of Yorkshire manufactories, moor-land not worth a shilling an acre rent, has been converted into dairy farms worth two pounds. When it is remembered that the principle upon which these results depend was not enunciated till 1843, it will be seen how rapid and mighty has been the recent progress in agriculture. A second public loan of four millions was granted in 1856, and it has been estimated that in the ten previous years upwards of sixteen millions had been invested by the nation, and by private companies and individuals, in thorough drainage. There is no longer truth in the saying that the capital and soil of the country have never been acquainted. All the branches of farming business felt the influence, for the improved stock originated by Blakewell, the artificial food raised to feed the improved stock, the scientifically constructed drills, horse-hoes, and other implements which the Norfolk rotation called into use, all met with an extended development in the retentive soils rendered kindly by the use of "Parkes' clay pipes." It will usually be found that an advance in one direction gives a corresponding impulse in every other.

The Royal Agricultural Society had an important share in the propagation of the principles of thorough drainage, first propounded by their author in a complete shape in a lecture at one of their meetings at Newcastle. Another great change, by a fortunate coincidence, accompanied, or rather preceded the conquest over the clay lands. This was the chemical revolution, which gave the farmer the use of concentrated portable manures, for stimulating the growth of crops in a degree unknown to the preceding generation. Previous to 1835, as nearly as we can fix the date, agriculturists, in addition to farm-yard dung or night-soil, employed as manures, lime, chalk, gypsum, marl, soot, salt, saltpetre, rape-cake, and bones. The discovery of the fertilizing properties of bone was accidentally made at a Yorkshire foxhound kennel. Liberally used on the heaths and wolds of Lincolnshire, it was the philosopher's stone which turned rabbit-warrens and gorse fox-coverts into fields of golden grain. A Mr. Nelson, one of the late Lord Yarborough's tenants, used to say that "he did not care who knew that he had made 80,000*l.* out of his farm by employing bones before other people knew the use of them." But what succeeded in one parish, or even in one field, often failed in the next, and sometimes the farm which had once yielded bountifully in return for a dressing of lime or gypsum, stubbornly refused to respond to a second application. Worse than all, the root crop—the foundation of the famous Norfolk rotation, the wealth of half a dozen counties—began to fail, devoured in tender infancy by the fly; and, without the turnip, where was the food for sheep and winter fed

cattle? The philosopher came to the assistance of the farmer, and rescued him by timely aid from the difficulties which beset him. Nitrate of soda and guano were imported, super-phosphate of lime from bones was invented; and agricultural chemistry, having earned the place of a practical, that is, a profitable science, the anomalies in connection with the use of lime, chalk, gypsum, &c., were mastered and explained by the joint exertions of the farmer and his new ally, the chemist.

Nitrate of soda was imported from Peru and sold in small quantities by an agricultural manure dealer somewhere about 1835, and in the same year a cargo of guano was consigned to a Mr. Meyers, a Liverpool merchant. Guano (of any agricultural value) is the dung of sea-fowl feeding on fish in a zone where rain rarely falls. The guano of the Peruvian islands was protected in the time of the Incas by special laws. In 1609 its properties were fully described in a work published in Lisbon by Garsilaso de la Vega, but this precious fertilizer was neglected in Europe until the date of Mr. Meyers' importation, when investigations into the chemistry of agriculture commenced by Sir Humphrey Davy with very little practical effect during his lifetime, and carried on by the continental philosophers, were beginning to bear fruit. Guano, although incredulously received by farmers in 1836, was eagerly accepted by the dealers in artificial manures, and sold either in a pure state, or under a special name, mixed with less active ingredients. In 1843, a store inferior to that of Peru having been discovered on the Ichaboe Islands, on the coast of Africa, 1100 feet long, 400 broad, and on an average 35 feet deep, the whole was removed before the close of 1844, and realized upwards of a million sterling. Three years previously, an article of forty-three pages, from the German of Dr. Charles Sprengel, appeared in the first volume of the "Journal of the Royal Agricultural Society," in which, though every kind of animal manure was described, guano only received a passing mention as a curiosity, and no note to supply the deficiency, was attached by the editor; so little was it then known to the most intelligent cultivators, and so speedily had the knowledge of its value spread in the interval. This single fact would alone show that we had reached a new era in the history of farming.

In 1840, before the farming public had become accustomed to these imported manures, Professor Liebig suggested that the fertilizing power of bone manure would be increased by the application of sulphuric acid, and the consequent production of superphosphate of lime. There have been periods in our history when a book like that of Liebig would never have traveled farther than the libraries of our men of science; but in 1840 we had in our dealers in manures a commercial class keenly alive to the possible profits of a philosophical suggestion. A carboy of sulphuric acid was easily poured over a few bushels of ground bones, and soon Suffolk drills, charged with superphosphate and guano, were sent to teach farmers that if they wished to grow great root-crops, there was something to be added to the invaluable "muck."

One of the first to experiment upon the new manure, and then to manufacture it on a large scale, was Mr. J. B. Lawes, a Hertfordshire squire and scientific chemist. He was followed by Mr Purser, of London, who began in 1843 with a single carboy of sulphuric acid, price 10s., and has since frequently purchased ten thousand carboys at one time. At Southampton, a few years later, Messrs. Dixon and Cardus made an excellent speculation by a contract with the Government of Buenos Ayres for the exclusive right of exporting the charred flesh and ashes of joints of meat burned for want of other fuel on the treeless Pampas, to boil down the tallow. The animal refuse, the accumulation of a quarter of a century, when treated with sulphuric acid, is converted into valuable superphosphate. But although every quarter of the globe, even battlefields, were ransacked for bones, the supply was insufficient, and some new resource was required in order to keep down the price.

The chemists having so far done their part, the next contribution to the progress of agriculture came from the geologists. Professor Henslow, whose

great acquirements as a botanist had not prevented his attending to other branches of science, had noticed in 1842 some nodules at Felix Stowe, on the coast of Suffolk. In 1843, haunted with the idea that they were something of importance, he returned to Felix Stowe, collected a quantity of them, and placed them in the hands of a Mr. Potter for analysis. The analysis showed them to be fossils, commonly called coprolites, on the supposition that they consisted of animal excrement, and containing from 50 to 55 per cent. of phosphate of lime. From this discovery Professor Henslow might have realized a considerable fortune. The quarry of coprolites was to be had at a common rent, and there were manure manufacturers prepared to pay for the information, but he "did not consider such a course consistent with his position as a man of science and a clergyman," and after keeping silence on the subject for some months at the request of Mr. Potter, "who wished to have the chance of availing himself of the discovery," he gave the results of his investigation to Mr. J. B. Lawes, who made the superphosphate obtained from coprolites the subject of a patent, which he was not able to maintain. Subsequently, beds of coprolites were discovered in Cambridgeshire, Hampshire, and Dorsetshire, and further investigations in Norway placed Mr. Lawes in the exclusive possession of great beds of another fossil called *apatite*, rich in phosphates—of which he imports whole cargoes for his manufactory at Bow, near London. The superphosphate of lime, however, produced from fossils being much less soluble than that from fresh bones, can only be usefully applied when mixed in moderate proportions with the latter.

One other important addition to the portable manures was discovered about seven years ago by Mr. Odams, in the blood and garbage of the London slaughter-houses, which, formerly thrown down sewers and upon dung-heaps, is now contracted for to the extent of nearly eight hundred thousand gallons a year. Mixed with ground or calcined bones and sulphuric acid, it is converted into powerful corn and root fertilizer, known to agriculturists as the "Nitro-phosphate manure." The mere fact that these products were articles of sale, and not of home manufacture by the farmer, had a powerful influence in extending their use. Those on whom the essays of Professors and the orations of landlords produced little effect, were worried into inquiry by the agents of manure vendors, and as the new practice spread, were convinced almost against their will by great crops in the fields of their enterprising neighbors. The vendor of artificial manures helped in another particular the general movement. He soon discovered that his fertilizing stimulants were robbed of half their value on wet or ill-cultivated land. Hence he became the eager advocate of thorough drainage, and that thorough preparation of the soil which can only be effected by the best class of plows, harrows, horse-hoes, and clod crushers. His customers would have been customers no longer, unless he could have convinced them that the fault was in themselves, and not in the goods. He argued to ears which had at last been opened, and prevailed without the assistance of the hedge-stake. A man grudged growing weeds with the fertility for which he had paid in hard cash, nor could a manure that cost 10*l.* or 12*l.* a ton be refused the economy of a machine to distribute it carefully; and thus drill husbandry, which is identified with clean husbandry, spread, led by pipe-drains, from Norfolk, Suffolk, and Bedfordshire, into every county of England, and with it brought all the machines and implements required for "clean, rapid, concentrated cultivation."

It was between 1816 and 1836—the twenty years in which the breaking up of poor pastures and the reclamation of waste lands were most vigorously carried on by the means of turnip-drilling, sheep-folding, and the four-course rotation—that the crude forms of the greater number of the agricultural implements which are now considered "standard," were either invented or brought into use among the great light land farmers. In general the ingenuity of the mechanic outstripped the wants of the cultivator, and many excellent contrivances had been forgotten, because they were in advance of the

requirements of the day. Under the new demand for mechanical aids, more than one ingenious blacksmith or wheelwright rose from a humble position, and has since expanded his small forge into a factory where steam-power and the best artisans are employed in the construction of agricultural implements. Experience has convinced most persons that the use of agricultural machinery creates an increased demand for labor of a superior kind. The true effect of the iron workman is not to displace the human, but to perfect cultivation, to multiply produce, to increase the means of subsistence, and to add to the prosperity of the entire community.

It may be taken for an axiom, that when a farmer has used even one good implement, he derives so much advantage from its rapid and accurate work, that he returns again and again to the manufacturer's yard, until he has, as far as possible, substituted horse for human power, and steam for horse power.

* * * * Nothing illustrates better the change which has come over farming in the last few years, than what has taken place with respect to so ancient and familiar an article of husbandry as the plow. Although an implement more than two thousand years old, it is only within the last sixteen years that it has been reduced to an uniform shape and material. In engravings, to the eye of the casual observer, there is now no difference between the plows manufactured for the same purpose by every one of the eminent makers; and, in fact, in general construction, they are all alike, except where the "turnwrests of Kent and Sussex" are used, although some have a marked superiority in the details and in durability. They are fashioned entirely of iron and steel, of long graceful wave-like form, provided with a pair of wheels of unequal size, and drawn by a chain attached to the body of the plow. Iron screws and levers have replaced wooden wedges. A few seconds are sufficient to attach the share or adjust the coulter. It was quite otherwise in 1840. Out of six plows engraved in the *Journal of Agriculture* for that year, two are swing, two have two wheels, two have one wheel each, all are of wood, except the shares and breasts, all are drawn from the extremity of the beam, and the awkward inferiority of their respective shapes is perceptible at a glance. In 1840, Lincoln, Rutland, Bedfordshire, Berks, and almost every other county, had its separate plow, and knew little of its form in the rest of the kingdom; the exceptions being among the customers of the scientific makers, whose trade was restrained by the cost of conveyance, the want of publicity, and the want of intelligence. The improvement since then is as great as the change from the old musket to the Minie rifle. Skilful manufacturers, each eager to command the market, study, with all the aids of mechanical knowledge and a wide experience, to secure excellence of design, durability of make, and economy of price, while the former in his turn has learnt that science is a better constructor than ignorance, and no longer prefers the clumsy efforts of a village artisan. The marvel is in the rapidity with which these changes have been effected, as of some magician of agriculture had waved his wand over our favored island.

The pecuniary gains of agricultural progress are not to be estimated by the mere saving in wages, horse labor, seed or manure. Thorough draining not only diminishes the cost of plowing, but it renders it possible to grow great crops of roots—of mangold-wurzel from thirty to thirty-five tons an acre, and of turnips from twenty to twenty-five tons. Ten times more live stock is thus fed on the land than it maintained before. The corn crop follows the roots in due course without further manuring, and is made certain in addition, even in wet seasons. The well-shaped modern plow saves in horse labor, as compared with the clumsy, old-fashioned swing plow, a sum which can only be calculated in reference to the tenacity of each kind of soil, but which on an average exceeds the power of *one* horse, besides enabling youths, skilful but not strong, to act as plowmen, encouraging deep plowing, the foundation on the best land of good root crops. The advantage of the drill over broadcasting is not only in the smaller quantity of seed and manure required, or in the power to sow

seed and manure together, or in its permitting the use of the horse-hoe, though these effect a saving in money equal to one-fourth of the value of the crop; but its great saving in the moist, uncertain climate of England, is time. A day's delay in sowing by hand has lost many a season, whereas one horse-drill does the work of fifteen men. The clod-crusher, again, reduces the lumps to tilth, that no wooden "beetle," no loaded "sledge," no army of clotters could have broken, while on light land it gives consistence to the soil, making thousands of acres of corn stand upright which would otherwise have been rotting on the ground.

Under high farming, the manual labor employed is both increased and concentrated. A greater number of men are required per acre, and a lesser number in proportion to the produce. With mechanical assistance the crops are less dependent on the seasons, and each operation is more quickly performed. With improved breeding the stock is increased in quantity, more early and matured, and bears finer and more profitable meat. Four year old horned sheep are replaced by mutton grown in thirteen months. The aged cows or worn-out oxen, which form the staple of the continental meat markets, lose from fifteen to twenty per cent. more in cooking than our well-fattened oxen and heifers, to say nothing of the difference in the quality of the flesh. At every stage the farmer who farms for money profits—not like the backwoodsman, the metayer or peasant proprietor, merely to feed his family—loses by rude implements, ignorant cultivation, and coarse-bred live stock. At every stage of progress the modern English farm becomes more like a manufactory, producing on a limited surface enormous quantities of food for man, turning Peruvian guano into corn, bones from the Pampas into roots, Russian oil-cake, Egyptian beans, Syrian locust-pods, into beef and mutton. The gain to the farmer and the landlord is, we repeat, the most insignificant part of the benefit. The agriculturist is the manufacturer of food for the nation, and upon his skill, under Providence, it depends whether plenty or scarcity prevails in the land.

To give some idea of the modern system of English agriculture, we subjoin a brief description of three farms in three different districts of England—the first, a light land self-drained; the second, clay, sand, and good pasture; the third, stiff clay; and all cultivated by tenants who have not expended money to purchase glory, but who have invested capital in order to earn a profit.

Mr. John Hudson, whose name is familiar to all English, and many French and German agriculturists, began farming half a century ago. In 1822 he entered upon his now celebrated farm of Castle Acre, which consists of self-drained land, and is a fair specimen of the Norfolk light soil. At that period the only portable manure was rape-cake, which cost 13*l.* a ton, and did not produce any visible effect upon the crops for a month. The whole live stock consisted of 200 sheep and 40 cattle of the old Norfolk breed. He adopted what was then the new, now the old, and what is perhaps destined to become the obsolete four-course Norfolk system—that is to say, 250 acres pasture, 300 wheat, 300 barley: or, in dear years, 600 wheat, 300 roots, and 300 seeds, the rest being gardens and coverts. On these 1200 acres he at present maintains 10 dairy cows, 36 cart-horses, a flock of 400 breeding ewes, and fattens and sells 250 Short-horns, Herefords, Devons, or Scots, and 3000 Down sheep. The crops of swedes average from 25 to 30 tons, the mangold-wurzel from 30 to 35 tons per acre. His wheat had, in 1855, averaged for the previous five years, 48 bushels per acre; the barley 56 bushels. Of the seeds, the clover is mowed for hay, the trefoil and white clover are fed down by sheep, and there are no bare fallows. The purchased food given to the cattle in the straw-yards and sheds, and to the sheep in the field, consisting of oil-cake, meal and beans, cost 2000*l.* a year. The greater part of this oil-cake is charged to manure, which it enriches in quality as well as increases in quantity; but the direct expenditure on artificial manure—guano, nitrate of soda, and superphosphate of lime—amounts in addition to 1000*l.* a year. Wages absorb from

2600*l.* to 3000*l.* a year. Seven or eight wagon loads of farmyard manure are plowed in on land intended for roots, besides above 30*s.* worth per acre of superphosphate of lime drilled in with the turnip seed; while wheat has a top-dressing of 1 cwt. of guano, $\frac{1}{2}$ cwt. nitrate of soda, and 2 cwt. of salt, mixed with earth and ashes. No weeds are grown. The turnips are taken up in November, and a troop of "boys and girls," under the care of an experienced man, traverse the ground, forking out and burning every particle of twitch or thistle. The same "troop" is called in during the progress of the root crop, whenever occasion requires, and immediately after harvest they go over the stubbles with their little three-pronged forks, exterminating the slightest vestige of a weed. The expenses of cleaning are thus kept down to 1*s.* an acre, a price which excited the admiration and doubts of that admirable agricultural essayist, the late Mr. Thomas Gisborne, and which proves that, by stopping the evil at its source, and never allowing the enemy to get ahead, land may be kept wholly weeded more cheaply than half weeded. Lord Berners mentioned, as recently as 1855, that he found in Leicestershire hundreds of acres netted over with twitch as thick as a Lifeguardsman's cane, and studded with clumps of thistles like bushes. Such neglected land required an expenditure of 5*l.* to 6*l.* an acre to put it in heart. The farmer who saw a thief daily stealing from his dung-heap would soon call in the aid of a policeman. The weeds are an army of scattered thieves, and if the pilferings of each are small in amount, the aggregate is immense. The wise and thrifty farmer, therefore, keeps his constabulary to take up the offender, and consign him as quickly as possible to death. He who allows himself to be daily robbed of his crop, and the community to the same extent of food, and all the while looks helplessly on, is not only a bad farmer, but in effect, though not in design, a bad citizen also.

Mr. J. Thomas, of Liddington Park, our second example, farms about 800 acres of a mixed character, under the Duke of Bedford, of whom it is the highest praise to say that he is a landlord worthy of such tenants, consisting in part of clay, which has been rendered profitable for arable cultivation by deep drainage, and in part of what is locally called sand, which has been reduced from rabbit-warrens to cornfields by the Norfolk system. This intelligent cultivator read a paper some time since to the Central Farmers' Club, in which he stated, with the assent of his tenant audience, that, under very high farming, it was not only possible, but advisable to reduce the fertility of the soil by the more frequent growth of grain—as, for instance, by taking barley after wheat, and returning to the once fatal system of two white crops in succession. He said that, under the four or five course he began to find his "turnips subject to strange, inexplicable diseases; his barley (where a large crop of swedes had been fed on the ground by sheep, with the addition of cake and corn,) laid flat on the ground by its own weight, and in a wet harvest sprouted, thus rendering the grain unfit for the maltster, the straw valueless as fodder, while the young clover was stifled and killed by the lodgment of the barley crop." Thus, while Roman agriculturists, with all their garden-like care, were tormented by a decreasing produce on an exhausted soil, we, after ages of cropping, have arrived at the point of an over-abundant fertility—an evil to be cured, not by any fixed rule, but "by permitting the diligent and intelligent tenant farmer a freer exercise of judgment." In this speaker we have another specimen of the invaluable class of men by whom, during the last ten years, on tens of thousands of acres, the produce of meat and corn has been doubled.

At Liddington, where there is strong clay to deal with, and more good grass land than exists at Castle Acre, it is not necessary to purchase so much food to keep live stock for manure. But there are about one hundred and fifty beasts and one thousand sheep sold fat, besides a choice breeding flock of four hundred Downs, the result of twenty years' care. By these sheep the light land is consolidated and enriched. If they are store sheep, they are allowed to gnaw the turnips on the ground a part of the year; if they are young and

to be fattened for market, the turnips are drawn, topped, tailed and sliced by a boy with a portable machine. Thus feeding by day, and penned successively over every part of the field at night, they fertilize and compress, as effectually as any roller, the light-blowing sand, and prepare soil which would scarcely feed a family of rabbits for luxuriant corn crops. The cattle, consisting of two year old Devons, Herefords, or Short horns, or three year old Scots or Angelsea rants, purchased at fairs according to the supply and market price, in spring or summer, are run on the inferior pasture until winter, then taken into the yards or stalls, fed with hay, swedes, mangolds, ground cake, linseed or barley meal, and allowed an unlimited supply of clean water. When the spring comes round they are put on the best grass, and sent off to market as fast as they become ripe, having left behind them a store of manure, which is the capital from which everything else must spring.

Ten years ago four miles of rough bark fences were cleared away on the clay half of this farm, and replaced by single rows of blackthorn, dividing the fields into square lots of forty or fifty acres. Under the old system two hundred acres were poor pasture; now under the rotation system the strong clay feeds four times as much live stock as before, and bears wheat at least twice in six years. According to the latest experience, the most profitable system in its present light condition would be to devote the farmyard dung to growing clover, to eat down the clover with folded sheep, and then to use the ground fertilized by the roots of the clover, without home-made manure, for cereal crops, assisted by a top-dressing of guano, to be followed by roots nourished with superphosphate of lime. Good implements come in aid of good methods of cultivation. Mr. Thomas has eight or nine of Howard's iron plows—both light and heavy—iron harrows to match the plows, a cultivator to stir the earth, a grubber to gather weeds, half a dozen drills, manure distributors, and horse-hoes, a clod-crusher, a heavy stone roller, a haymaking machine, and horse-rakes. Reaping machines are to follow. To deal with the crops, a fixed steam-engine, under the care of a plow boy, puts in motion the compendious barn machinery we have already described, which threshes, dresses and divides the corn according to its quality, and raises the straw into the loft, and the grain into the granary, besides working a chaff-cutter, a bean-splitter, a cake-crusher, and stones for grinding corn or linseed. With machinery no large barn is required in the English climate; the corn can remain in the rick until required for market. About twenty men and thirty trained boys, under an aged chief, are constantly employed.

No land is here lost by unnecessary fences; no food is wasted on ill-bred live stock; no fertility is consumed by weeds; no time or labor is thrown away. One crop prepares the way for another, and the wheeled plow, under the charge of a man or boy, follows quick upon the footsteps of the reaper. The sheep stock is kept up to perfection of form by retaining only the best shaped ewe lambs, and hiring or buying the best South-down rams. The profit of keeping first class stock was proved at the Christmas market of 1856, when twenty-five pure Down shearlings, of twenty months old, which were sold by auction at Hitchin, made an average of 4*l.* 8*s.* each, being nearly double the usual weight. The large produce, whether in corn or meat, is the result of a system the very converse of that practised by the Belgian peasant proprietor, or French metayer, whose main object is to feed his family, and avoid every possible payment in cash. As for laying out sixpence on manure, or cattle food for making manure, no such notion ever crosses the minds of those industrious, hard-living peasants, and the diminution in the means of subsistence in consequence, is almost past calculation. He who puts most into the land, and gets most out of it, is the true farmer. The bad cultivator gives little; and receives accordingly.

When the Central Farmers' Club discussed the advantage of returning to the plan of more frequent corn crops, which before the days of artificial manures was found to be utterly ruinous, the then chairman said that he "had for

several years taken a crop of wheat every other year; and that on such soil as that of his farm, as long as he manured accordingly, he considered that he was not using the land (one-half of which is his own freehold) unfairly." This Weald of Sussex farm shall be our third example; and we adduce it to show what may be done with the most intractable class of retentive soils. A few years ago it was divided into enclosures of from four to eight acres each by broad hedge-rows, many of them with ditches on both sides. It was among the evils of these small enclosures that they facilitated the old make shift plan of draining by surface furrows to shallow sub-drains of bushes, because the water had not far to run. A partial cure postpones completer remedies. In the numerous hedges, according to the custom of the county, the landlord grew oak timber and the tenant underwood for fuel and for mending fences. Before railways had made coal cheaper than hedgrow cuttings, the laborers were employed in fine weather during the winter in trimming the hedges, and clearing out furrows and ditches; in wet weather they retreated to a large barn and threshed out wheat or oats with a flail, in a damp atmosphere, the most unfavorable for the condition of the corn, and a time of the year most convenient for pilfering it. The usual course of cropping was—1, fallow; 2, wheat; 3, oats; 4, seeds. The seed crops were fed until the beginning of June with all the stock of the farm, and then broken up for a bare fallow with a woolen turnwrist plow. The crops were about twenty bushels of wheat per acre once in four years, about forty-eight bushels of oats the year following, and hay and seeds in the third year. The stock consisted of about twenty-five cows, and ten young beasts, which were sold half fat. The horses plowed four at a time in a line, and were usually the plumpest animals on the farm. Sheep there were none, nor was it believed possible to keep them without Down feed. Lime was the only manure purchased, and hay the only winter food. The present owner and farmer of Ockley Manor, after traveling through England to study the best specimen of modern tenant farming, began by reducing a hundred enclosures to twenty, and by borrowing enough money from the public loan to drain the whole of his clays, the stiffest imaginable, three feet six inches deep. He would have preferred four feet deep, but the expense lopped off six inches. This indispensable preliminary process enables him to grow roots and keep a large stock of Southdown sheep on his clovers and seeds, with plenty of cake, running them on the land almost all the year round. To assist in disintegrating the drained clay he avails himself of "Warne's box feeding" system, manufacturing a large quantity of long straw dung, which, when plowed in, exercises a mechanical as well as a fertilizing effect.

There are three modes of feeding cattle in use—open yards, stalls, and boxes. Well built yards are surrounded by sheds for shelter, the open space is dish-shaped, thinly sprinkled with earth, and thickly covered with straw, which is renewed from time to time as the cattle trample it into manure. The roofs of all the surrounding buildings are provided with gutters, and the rain is carried into underground drains. The liquid manure is pumped back upon the prepared dung-heaps. These yards are attached to all root feeding farms, and by their appearance and the quality of the cattle fed in them, a fair opinion may be formed of the management of the tenant. In stalls the cattle are tied by the head under cover, with more or less straw under them, according to the proportion of arable land. On the "box system," each beast is penned in a separate compartment under cover, and supplied from day to day with just as much straw as will cover the solids and absorb the liquid dung. By the time the beast is fat his cell is full of solid, well fermented manure, of the most valuable description for clay land. The cattle, whether in yards, stables or boxes, and all are often to be found on the same farm, ought to be bountifully fed with sliced or pulped roots, mixed with chaff, hay, oil-cake, linseed, or corn. The extra buildings make boxes the most expensive plan, but in no way do the animals thrive better, and where there is an ample supply of straw

it is the most advantageous method of manufacturing manure. Box feeding affords one more instance of the antiquity of many modern agricultural practices. In Sir John Sinclair's "Statistical Survey of Scotland," published 1795, we read that in the Shetland Island of Unst, "The method of preserving manure is by leaving it to accumulate in the beast-house under the cattle, mixed with layers of grass and short heather, till the beasts cannot enter. When the house is full, the dung is spread over the fields." Doubtless the islanders of Unst found, in their damp climate, that dung collected out of doors lost all of its fertilizing value. At Ockley farm, with the assistance of the grass land, from one hundred to one hundred and twenty of the best class of Sussex, or Devons, or Scots, are fattened every year in boxes, built cheaply enough of the timber from the condemned hedgegroves, interlaced with furze and plastered with Sussex mud. Though not very sumptuous externally, they are warm and well ventilated. Twenty Alderney cows eat up what the fat cattle leave on the pastures, (each cow being tethered,) and supply first class butter for Brighton—a market which requires the best description of farm produce. In manufacturing districts quantity pays the grazier or dairyman the best; in fashionable quarters, quality. Eight hundred fat Down sheep and lambs, and about eighty pigs, which are sold off cheaply in the shape of what is popularly called "dairy-fed pork," complete the animal results on this Weald of Sussex farm.

On four hundred and fifty acres devoted to arable cultivation, wheat is grown every alternate year, at the rate of from forty to forty-eight bushels per acre. The sheep and lambs, which get fat on the clover or other seeds, assisted by cake, prepare the soil for the alternate corn crops, and have doubled the original produce. The roots fatten the cattle in boxes, and while they are growing ripe for the butcher they manufacture the long straw manure, which both enriches the tenacious soil, and by its fermentation assists to break it up. Space, light and air have been gained by clearing away huge fences, which, besides their other evils, harbored hundreds of corn-consuming vermin. By these and such like methods, all novelties in Sussex, the produce of the farm has in ten years been trebled, and the condition of the soil incalculably improved; and all would have been vain, and much of it impossible, without the adoption of deep, thorough gridiron drainage. This has done in the Weald of Sussex clay what sheep-feeding and drill-husbandry did for the warrens of Norfolk, the sands of Bedford, and the Downs of Wiltshire and Dorsetshire. The result, however, is not so satisfactory in a profitable point of view as in light land counties, because, as Talpa has shown in his "Chronicles of a Clay Farm," it is almost impossible on a retentive soil, with any paying number of horses, to get through more than one third of the plowing before winter sets in with its rain and snow. The cultivators of the farms which from their natural fertility in dry seasons were in favor for centuries, while what are now our finest corn growing districts were Moorland deserts, are often beaten by time, prevented as they are by the wet from getting on the land, and obliged to work slowly with three or four horses. Yet on autumnal cultivation depends the security of the root crops—and the root crops are like the agricultural "Tortoise" of Indian mythology, the basis on which rests the rent-paying corn crop. Much, therefore, as deep drainage has done for advanced farmers, on retentive clays, it has not done enough, and they look anxiously forward for the time when a perfect *steam cultivator* will make them independent of animal power, and enable them, if needful, to work night as well as day during every hour of dry weather.

We have not thought it necessary to dwell upon any of those profitless agricultural miracles which are from time to time performed, to the great amazement of the class with whom turnips are only associated with boiled legs of mutton, and mangold-wurzel with salad. As little have we cared to describe liquid manure farms, netted over with iron pipes, irrigated by hose and jet, and a perpetually pumping steam engine, for the simple reason that, while

deep drains, guano, superphosphate of lime, long straw manure, and other aids to agriculture introduced within the last fifteen years, give an early result, liquid manure, under an English sun, has never been proved to be effective, except for grass crops on a dairy farm. We have contented ourselves with selecting illustrations which, though not specimens of perfection in every department, for they all have defects, and in two out of three the buildings and implements might easily be improved, are yet fair types of the system of cultivation which is making rapid progress through every district of England. These are farms which are cultivated on commercial principles, instead of being mainly expensive raree-shows—farms which pay fair rents and return fair profits, and yield an amount of meat and corn which is at least double that raised by unintelligent farmers in England, and above four-fold that obtained from a more fertile soil and genial sun by the peasant proprietors of France and Germany.

In the absence of agricultural statistics, we have no exact data for comparing the produce of England before and since the era of "high farming," but the following figures will convey some idea of the fixed and floating capital invested by landlords and tenants in modern improvements. Since 1839 at least twelve hundred thousand tons of guano have been imported, for which not less than twelve millions sterling have been paid. In the year 1837 the foreign bones imported were valued by the Custom House authorities at 250,000*l*. After that date we have no return, but since 1840 one million at least has been paid annually for bones, sulphuric acid and artificial manures, independently of guano. Since 1846 at least sixteen millions have been invested in deep, thorough drainage. Thus we have an expenditure of upwards of thirty millions, without counting the value of new implements and machines, purchased every year by thousands, or the large sums laid out in adding to the productive acreage of farms by throwing down useless hedgerows, or rebuilding the rude homesteads that served the preceding agricultural generation, and in replacing the inferior local breeds of stock by better animals suited to the soil and climate.

There are other facts which are full as significant. In 1847 the proprietor of a now prosperous school of agricultural chemistry could not, out of a large number of pupils, find one who was willing to be gratuitously instructed in the science for which farmers willingly pay him at present a heavy fee. Even Mr. Pusey, who devoted his life to improvements in cultivation, made the mistake, in his last report, of undervaluing the services which chemistry had rendered to agriculture. Such, however, is found to be its practical value, that the demand of farmers have created a class of chemists who make the relative value of manures, and artificial food, and the constituents of soils their especial study. To such inquiries Mr. Lawes devotes the Rothamsted experimental farm and laboratory, an establishment over which Dr. Gilbert presides, at an expense for the last fifteen years of more than 1000*l*. a year. Professor Way, who has lately been succeeded by Professor Voelcker, was bound by his appointment under the Royal Agricultural Society to supply analyses to the subscribers at certain low fixed rates, and he was amply employed by the tenant farmer community. In the West of England, Professor Voelcker delivered last year at Exeter, Barnstable, and Newton Abbott, at the request of the Bath and West of England Agricultural Society, a series of most admirable lectures, the results of experiments carried on at Cirencester, on such subjects as "The Value of Artificial Manures," "Farm Yard Manures," "The Composition of Fertile and Barren Soils," "The Nutritive Value of Different Oil-cakes." In 1840 there was no chemist sufficiently familiar with farming to treat usefully on those topics; and if he could have talked the very quintessence of practical wisdom, there certainly was no agricultural audience prepared to listen to him. That he spoke the language of science would of itself have been sufficient to convince the tenantry throughout the country that he did not speak the language of common sense. It is true that Coke of Holk-

ham, with his usual acuteness, had long before invited the attention of Sir Humphry Davy to the chemistry of Agriculture, and even especially retained a Mr. Grisewood's services for Norfolk; but the public were not yet ripe for instruction, and the lever of superphosphate of lime and guano was wanting to move their minds from traditionary routine. From that period the work went on with railroad celerity. When Mr. Josiah Parkes called on Mr. Handley in 1837, he found him experimenting on "a new manure called guano." Ten years later, although the consumption was enormous, many farmers looked upon its use as a sort of treason, and met innovators with a maxim, which is in one sense sound: "Nothing like muck." Others equally ignorant, but more enterprising, used it freely, and grew great crops without caring to know the reason why. The desire to ascertain the reason why quickly followed, and has already converted many a farmer into a creature of reason from a creature of rule-of-thumb.

If it be asked what has been practically gained within the last twenty years by the investigations of the agricultural chemist, we would answer, *certainly*. We knew years ago that farmyard manure was excellent; by the light of chemical science we learn why it is "perfect universal manure," we learn how to manufacture and employ it best, and we learn why on clay soils it may be safely, nay advantageously, left for weeks on the surface before being plowed in. Chemical science again teaches us why lime, which is not an active manure, although valuable as a destroyer of elements hostile to fertility, produces great effect for a series of years, and then not unfrequently ceases to show any profitable results; it teaches us to what crops guano, to what superphosphate of lime, to what farmyard manure may be most profitably applied, and when a mixture of all three. Chemistry settles the comparative value of linseed cake, cotton cake, and karob beans; shows when pulse should be used for fattening pigs, and how to compound a mixture of Indian corn and bean meal which shall fat bacon neither hard nor wasteful. The conclusions of science were previously known empirically to a few, but their range was limited and their application accidental. They have been reduced to order and rendered universally available for the use of plain farmers by the investigations of men like Lawes and Voelcker. As the latter observes, "there are too many modifying influences of soil, climate, season, &c., to enable us to establish any invariable laws for the guidance of the husbandman;" but the more we can trace effects to their causes and ascertain the mode in which nature operates, the nearer we are to fixed principles and a sure rule of practice.

It would seem, then, that the first great epoch of modern agricultural improvement began with Lord Townshend, who demonstrated the truth embodied in the adage,

"He who marls sand
May buy the land,"

showed the value of the turnip, and, as we presume, must have been a patron of the four-course system, which had its rise in Norfolk about the same time. The second epoch was that of Bakewell, whose principles of stock-breeding have ever since continued to raise, year by year, the average value of our meat-producing animals. The third epoch dates from the exertions of such men as the Duke of Bedford and Coke of Holkham, the latter of whom, combining usages which had been very partially acted upon, brought into favor drilled turnip husbandry, carried all the branches of farming as far as was permitted by the knowledge of his time, and did the inestimable service of inoculating hundreds of landlords and tenants with his own views. The fourth epoch, if we were to take each advance from its earliest dawn, would comprise the various dates of the opening of the first railroad, the importation of the first cargo of guano, the publication of Liebig's first edition of the "Chemistry of Agriculture," and the deep draining of the Bonsetter's field on Chat Moss; but in general terms it may be said to date from the first meeting of the Royal Agricultural Society at Oxford in 1839, when farmers began to be

familiarized with men of science, and men of science learned not to despise agricultural experience. This last era is almost the birth of yesterday, and already, as compared with any former period, the results read more like a page from the Arabian Nights than like a chapter in the history of agricultural progress. Deep drainage, artificial manures, artificial food, improved implements, and railroad conveyance, have been the leading means by which the change has been wrought. Deep drainage has brought into play the inexhausted fertility of our strong clays: portable manures and purchased food have increased the crops on land of every degree. Mangold and swedes have been made to flourish on stiff soils, and cereals on sieve-like sands. Downs have been transformed from bare pastures to heavy root and rich grain bearing fields. The visitors to Salisbury Plain at the agricultural show of 1857 were surprised to find a large part of it converted into productive corn land—a change which has been almost entirely effected within the last twenty years. The scientific mechanic has provided the tools and machinery for breaking up and pulverizing the ground, for sowing the seed, for gathering the crops, for preparing it for market, for crushing or cutting the food for the stock, with an ease, a quickness, and a perfection unknown before. The railroad is the connecting medium which maintains the vast circulation, conveying the agencies of production to the farmer, and the produce of the farmer to market. The steam cultivator is, perhaps, about to be added to the triumphs of mechanism, and then will be realized the expression in the fine lines of Mr. Thackeray on the Great Exhibition of 1851—an expression which was premature if it was intended to be historic, but which we hope, and almost believe, will prove to be prophetic:

“Look yonder where the engines toil;
 These England's arms of conquest are,
 The trophies of her bloodless war;
 Brave weapons these.
 Victorious over wave and soil,
 With these she sails, she weaves, she tills,
 Pierces the everlasting hills,
 And spans the seas.”

The spirit of the old agriculture and the new are diametrically opposite—that of the old agriculture was to be stationary, that of the new is to progress. When Young made his tour through the east of England in 1771, he remarks as a peculiarity that the turnip cabbage of a Mr. Reynolds, which had a special superiority, was gradually adopted by his neighbors—“a circumstance,” he adds, “that would not happen in many counties.” His works are, in fact, a narrative of individual enterprise and general stupidity. A Mr. Cooper who went into Dorsetshire from Norfolk could only get his turnips hoed by working himself year after year with his laborers, and refusing to be tired out by their deliberate awkwardness for the purpose of defeating his design. After he had continued the practice for twenty years, and all the surrounding farmers had witnessed the vast benefits derived from it, not a single one of them had begun to imitate him. Mr. Cooper, with two horses abreast, and no driver, plowed an acre of land where his neighbors with four horses and a driver plowed only three-quarters of an acre. Yet not a laborer would touch this unclean implement, as they seemed to think it, and no farmer, with such an example perpetually before his eyes, chose to save on each plow the wages of a man, the keep of two horses, and the extra expenditure incurred by the diminished amount of work performed in the day. No longer ago than 1835, Sir Robert Peel presented a Farmers' Club at Tamworth with two iron plows of the best construction. On his next visit the old plows with the wooden mould-boards were again at work. “Sir,” said a member of the club, “we tried the iron, and we be all of one mind that they made the weeds grow.” On Young recommending the Dorsetshire agriculturalists to fold their ewes in the winter, they treated the idea with contempt; and on pressing them for their reasons, they replied, “that the flock, in rushing out of

the fold, would tread down the lambs," though no such accident had ever been heard of, "and that the lambs would not be able to find their dams in a large fold," though certainly, says Young, "a lamb in Dorsetshire has as much sense as a lamb elsewhere." Whether the method had been beneficial or not, the grounds for rejecting it were equally absurd. Of two neighboring counties one was sometimes a century behind the other. A lazy desire to creep with sluggish monotony along an established path, and a feeling of impatience at being pushed into a novel track, helped to maintain hereditary prejudices, and tenants invented fanciful excuses for not doing what was plainly advantageous to be done, because they preferred present sloth to future profit. They were like a man who had lain upon one side till he shrunk from the trouble of turning over to the other, though when the process was performed the new posture might be easier than the old. But once roused and put in motion, and the inherent reluctance to stir being overcome, the gain in interest as well as in pocket was felt to be great. He who has profited by one innovation is ready to try another, and his pride and his pleasure is to improve where his fathers gloried in resisting improvement. There are still large districts of England which have yet to be converted to a rational system of agriculture—landlords who are ignorant of the principles of management which attract or create intelligent tenants—and tenants who are ignorant of the methods by which the land is made to double its increase. But the wave of agricultural progress has acquired irresistible might, and they must mount it or it will sweep them away. The best thing which can be done for these laggards in the race is to persuade them to take in an agricultural newspaper, to get them to consult the commercial travelers who collect orders for the manufacturers of artificial manures, to talk them into replenishing their worn out implements from the mart of the great makers, to prevail on them to visit the annual shows of the Royal Agricultural Society, to throw them, in short, in the way of seeing the products of advanced husbandry, and of hearing the ideas of enlightened cultivators. By some or all of these means they may be put upon the high-road to improvement, and when they have gone an inch there is little fear, unless they are afflicted by a hopeless incapacity, that they will refuse to go the ell. He who lives within the diameter of a little circle has ideas as narrow as his horizon, but the influence of numbers and skill together is irresistible, and no impersonation of ignorance or bigotry has probably ever visited a single great agricultural exhibition without returning a wiser and a better farmer.

The present volume being in press when the following document appeared, place is given to it here rather than in that for 1860, in order that it may have an earlier circulation.

AUGUSTA, May 28, 1860.

TO S. L. GOODALE, Esq., Dr. AMOS NOURSE, Dr. E. HOLMES.

Gentlemen:—In view of the existence of a contagious and fatal disease among the cattle of a neighboring State, and the magnitude of the interest involved, should the malady extend to this State, it has seemed to me important to be possessed of full information as to the nature and extent of the disease, the method of treatment, the manner of infection, and what measures may be deemed necessary to prevent its spread, or arrest its progress. For this purpose, and to provide for the safety of this important interest, and preserve it, if possible, from the impending calamity, I have instituted this commission, and authorize and request you, without delay, to visit the Commonwealth of Massachusetts, and especially the district therein infected with the disease, for the purposes above mentioned, and make report at your earliest convenience.

Very respectfully yours,

LOT M. MORRILL, *Gov. of Maine.*

REPORT.

*To the Honorable the Governor and the
Executive Council of the State of Maine :*

The undersigned, Commissioners appointed by the Governor to proceed to Massachusetts and inquire into the character and extent of the alarming disease prevailing there among cattle, and the means to be employed for its prevention or extirpation, have attended to the service assigned them, and respectfully

REPORT :

That we find the disease called Pleuro-Pneumonia existing in some of the herds of Massachusetts ; that it was introduced thither by means of cattle imported from Holland by Winthrop W. Chinery, Esq., of Belmont, and which arrived on the 29th of May, 1859. Two of the four animals thus imported died soon after arrival ; one was noticed to be ill about the 20th of June and died in nine days after—the fourth is yet living. Some time in August another cow in Mr. C.'s herd became sick, and died in about a fortnight, and in the course of the two subsequent months he lost about thirty head of cattle by the disease. Veterinary surgeons were called in from time to time, and the mortality was, at first, ascribed to want of proper ventilation ; which was, undoubtedly a serious cause of aggravation, but the true nature of the disease was not discovered until November, when Dr. E. F. Thayer, a skillful veterinary surgeon, on visiting the herd, at once, and unhesitatingly pronounced it to be the disease known in Europe as Pleuro-Pneumonia ; and here we may remark that this name appears to be an unfortunate one, inasmuch as it conveys to those familiar with the term, a false as well as a true idea of its character ; true, in that both the lungs and pleura are diseased, and false, because this disease differs essentially from pleuro-pneumonia proper, as hitherto known both here and abroad, and in both men and in brute animals, and which is a less fatal disease, and is not contagious.

Mr. Chenery's farm is so situated that very little communication has existed between his cattle and those of others, but on the 29th of June, the very day on which the cow died which Mr. Chenery believes to have been the first victim of the disease; (the death of the first two he ascribes to injuries sustained during the voyage;) he sold three Dutch calves to Curtis Stoddard, a young farmer of North Brookfield. On their way thither in the cars, one was noticed to falter; soon it became quite ill, and Mr. Leonard Stoddard, father of Curtis, took the calf home with him to care for it, and placed it in a barn in which he kept forty head of cattle. It grew worse, and in a few days the son took it back, and in about ten days it died. In about a fortnight the disease appeared in the herd of Leonard Stoddard, and one after another of his animals sickened and died. In November, and for reasons independent of the disease, young Stoddard sold the larger portion of his herd, reserving nine of the most valuable animals. This sale scattered eleven in various directions, which carried the infection *wherever they went*, and one of them is said to have infected more than two hundred others. Without a single failure the disease followed these cattle.

A yoke of oxen from the herd of Leonard Stoddard was employed in a team of twenty-three yokes gathered from various quarters to move a building from Oakham to North Brookfield. One pair of these oxen has, since then, so changed owners that it has not been traced, and nothing is known of its fate; *but in every other instance it is known* that the animals took the disease.

Without dwelling upon numerous other cases in which contagion can be traced with equal distinctness, it is sufficient to say, that no case is known to have occurred where communication with diseased cattle cannot be traced; and it is believed that nowhere in Europe has there been an opportunity of obtaining so convincing evidence of its contagious nature as in Massachusetts.

As with all other contagious diseases, both among men and brutes, some individuals are found to be less susceptible to the contagious influence than others, and some are not affected by it at all; and doubts have arisen in the minds of several European writers on this point, the weight of opinion being, however, very strongly in favor of its contagious nature; but we submit that the facts in Massachusetts are such as *to prove it beyond a reasonable doubt*. We find the disease to be not only contagious, but insidious and deceptive, malignant and fatal. *Insidious*, inasmuch as it often creeps upon an animal so stealthily that it is difficult, and some-

times impossible, to fix with any accuracy the date of the attack. *Deceptive*, in that, in animals which have had the disease and may be fairly presumed *from appearances*, to have recovered, one or both lungs have been found, on slaughtering them, to be little else than a mass of disease.

That it is both malignant and fatal unhappily needs no proof. Nearly one thousand animals have already fallen victims, either to the disease, or to the efforts made with a view to its extirpation; and more than an additional thousand are either known to be sick, or from having been exposed are under the ban of suspicion. It is not true that the distemper is universally fatal, for not a few survive which have been its subjects; but it is not yet positively known that even *one* has been absolutely *cured*. They often come to eat well, drink well, and thrive tolerably: thus exhibiting the ordinary characteristics of health, and yet, a post mortem examination has, within our own observation, shown how utterly fallacious were all these indications in such a case.

Regarding the term of incubation, and of propagation, or the length of time which elapses between exposure and the appearance of disease; and also during what period the animal is capable of conveying the disease to others, we greatly regret our inability to arrive at definite or satisfactory conclusions. In some cases the disease is apparent within ten days after exposure; in others, twenty, thirty, sixty, ninety days or even more, are supposed to elapse. One case is reported where the exposure was seven months previous. The more usual period appears to be not far from twenty days. When the capability of the animal to convey disease to others begins or ends, we have no knowledge. This is a most important point, but all we *know* is, that it may and does do so before any symptoms of illness appear: and, as the lungs of some which have been slaughtered exhibit evidence of the later stages of the disease in one portion and of the earlier in another, there seems reason to fear that the term may sometimes be indefinitely prolonged.

As already remarked, this lung murrain, or by whatever other name it be called, is of the most insidious nature. Any disturbance of the animal's health is rarely noticed until the disease is fully established, and effusion into the chest has made some progress. The ordinary rule, that not much ails an animal until it refuses to eat, does not hold good with this disease. The early symptoms are so faint and obscure as to excite neither anxiety nor attention.

By-and-bye the animal gets a dull and dejected look; if at pasture, it may be found in the morning apart from the herd; the back arched, the fore legs rather wide apart, the hair staring, a little uneasy and don't eat well; but later in the day, it looks better, joins the herd and eats as usual. A slight, but *husky* cough is occasionally heard, and sometimes quicker breathing, as if from extra exertion. If a cow, the milk diminishes, accompanied with heat and tenderness of the udder.

As the disease progresses, the eyes look duller, the head is lowered, the nose protruded, the cough more frequent and husky, the appetite lessens, rumination is suspended, the limbs and surface cold, the skin tight over the ribs, the spine becomes tender, and pressure upon it, or between the ribs, produces evident pain. As the disease approaches an unfavorable termination, the breathing becomes fearfully laborious, and is accompanied with moans and sometimes with grunts; the eyes sink, the extremities cold, the mouth is covered with froth, the strength fails, and the poor beast falls and dies; or, if the animal is to recover, the severity of the symptoms abate, it looks better, eats some—if a cow, the milk returns, the hair becomes sleek, &c.

Percussion and auscultation furnish the most reliable means of judging, in the living animal, of the state of the disease. Upon striking with the ends of the fingers upon the affected side, a dull sound is usually elicited, proportionate to the consolidation of the lung, or to the presence or absence of fluid in the cavity of the chest. Upon applying the ear to the sides of the chest, one or the other, and sometimes, though rarely, both are found to be affected. The various sounds cannot be easily or exactly described, but a practised ear will judge with great accuracy between the natural murmur of healthy lungs, and the different sounds recognized in the several stages of the disease.

In what manner, and through what channel, the disease enters the system—whether it makes its attack directly upon the solids, or begins by corrupting the blood,—these and other kindred points, are at present, matters of pure conjecture.

With regard to the treatment, little of a satisfactory character can be offered. The severity or mildness of the attack and its termination, whether favorable or fatal, may, not improbably, depend more upon the susceptibility of the individual, and upon the amount or intensity of the contagion taken into the system, than upon any treatment bestowed.

Whether subjected to a course of medication, or trusted wholly to the recuperative powers of nature, some will recover in whole or in part, but we have little reason to believe that any will so recover as to be secure from a second attack, or to become *able bodied and sound, or valuable for the ordinary purposes for which domestic animals are kept*. Considering the probable unsoundness of those which survive, bearing also in mind the exceeding importance of active and healthy lungs, and the expense necessarily involved in the treatment and isolation of those which are lost, as well as those which are saved, the conviction is forced upon us, that attempts to *cure* this disease will rarely, if ever, pay. We may remark, however, that COUNTER IRRITATION, by diverting diseased action from the vital organs to the surface, promises beneficial results, and the application of highly stimulating liniments, blisters, setons and the like, is understood to have been of more service than aught else.

The appearances after death vary greatly, but there are usually extensive adhesions; consolidation of a portion of the lung tissue marked by a *peculiar marbled appearance*, is one of the most striking and uniform accompaniments of this disease. In some cases an immense cavity is found in one of the lungs, and, enclosed in that cavity or cyst, a cheesy substance or lump, having no attachment to, or connection with, the adjacent lung. In others, the process of detachment had not been fully completed. Some lungs were found to be so hypertrophied as to weigh three or four times as much as in health, and in one the estimated weight was from fifty to sixty pounds!

As, in our present relation to this disease, we deem prevention to be of incomparably greater importance than either a knowledge of the symptoms attending it, the treatment best adapted to mitigate its results, or the morbid appearances presented after death, we will not longer dwell upon these, but rather urge the importance of arousing at once to a prompt appreciation of the magnitude of the threatened calamity. If once it becomes naturalized among us, we may never again expect immunity from its attacks. When once fairly established, either here or elsewhere, its seeds may remain, even after apparent subjugation, and whenever the necessary conditions present themselves, it may break out again with fearful violence.

Our only safety lies in keeping clear of it, and we urge the utmost vigilance upon every individual, and upon all competent authori-

ties, to see that *no animals be admitted into the State, either directly or indirectly, from any quarter where there is reason to believe that the disease exists.*

We are prepared to say, that absolute and perfect non importation is the only preventive measure worthy even of consideration. We have no security whatever against the introduction of the disease, so long as animals from neighboring States are permitted to be brought in, whether directly or indirectly, through highways or byways, by land or by water. The temptation to get rid of animals which have been exposed is very great; the absence of any indications of disease gives great facilities for doing so, and apparent cheapness may be a fatal lure to the unwary purchaser.

The question of extirpation is, happily, not yet before us. Should it arise as a practical matter, we do not hesitate to recommend the instant slaughter of all animals affected with the disease, and the complete and perfect isolation from all other animals of such as may be reasonably suspected of having been exposed to the contagion. Massachusetts is wide awake. Her efforts to save herself and sister states from an unparalleled calamity, are worthy of the highest praise. The only regret is, that the efforts at extirpation were not commenced earlier. Had the legislation been more prompt, and the first appropriation (of \$10,000) been made a month sooner, it would in all probability have sufficed to extirpate the disease utterly. As it is, \$25,000 have been expended, and it is now proposed to use \$100,000 more, if needed, an appropriation to that amount having been made.

The undersigned cannot conclude their report without adverting to the whole-hearted courtesy with which they were greeted and treated by the legislative committee then in session, and by all the public functionaries of Massachusetts with whom they were brought in contact. Every facility for investigation was liberally accorded, and every avenue to knowledge freely opened.

Respectfully submitted,

S. L. GOODALE,
A. NOURSE,
E. HOLMES.

AUGUSTA, June 13th, 1860.

ADDENDUM.

A few remarks regarding the history of this disease in other countries may not be without interest, and we accordingly add, that its origin is very uncertain. Epizootic diseases of the respiratory organs have raged at various times in Europe for more than a hundred and fifty years past, but the earlier ones, judging from the accounts given, were not identical with the present pleuro pneumonia. It appears, however, that one exactly analagous to this, has existed for an uncertain length of time in Switzerland, Holland, Germany, and other parts of Europe, and has been attended with great fatality. It appears, also, that this disease was introduced from the continent into Ireland, and that in the spring of 1841 it crossed the Irish Channel into the western part of England, and following the course of the Irish droves, gradually appeared in various directions. Prof. Simonds says "it destroyed great numbers of cattle, and not only were the hopes of the farmer blighted, but in many cases it effected his ruin." Mr. McGillavray, V. S., in his essay on Pleuro Pneunonia, published in 1849, says, "The immense value of live stock in Great Britain shows their importance as forming a very large proportion of the national wealth; moreover, it is stated, on high authority, that the annual loss from disease among our domesticated animals, is about £10,000,000," (fifty millions of dollars,) and adds his own belief in the truth of the statement: and although he does not state the exact proportion of this amount due to pleuro pneumonia alone, we may judge from the connection in which the paragraph appears, that he deems it a very considerable one. It remains still, both on the continent and in Great Britain, and it is only by the most vigorous sanitary measures, embracing the killing of diseased animals and the complete isolation of all which have been exposed, that it has been kept in check.

The disease was introduced into South Africa, about six years ago, by a bull from Holland, brought thither to improve the breed. It there spread with great rapidity, there being no enclosures or any adoption of sanitary measures, and was exceedingly fatal, in so

much that it rarely spared over five out of a hundred. Hundreds of thousands of animals perished. Inoculation, which has in Europe, yielded somewhat contradictory and unsatisfactory results, was tried, and found effective in saving from a third to two-thirds, if performed before exposure, and skillfully done. Judging from analogy, we cannot see how inoculation should be of any avail with this disease. It is well known that some contagious diseases can be readily communicated from animal to animal in this method, and that the disease thus taken proves less dangerous than when taken by the "natural" method. But in all these cases, it is to be remembered that the disease in both *is essentially of the same nature and affects the same parts of the system*; but inoculated pleuro-pneumonia is asserted to produce *no disease of the lungs*, but only a local effect upon the tail or some other part distant from the lungs. It is possible, however, that as this distemper fails in many respects, to follow the laws which govern disease in the human system, there may be some preventive efficacy in the operation; but the results of experiment upon some thousands of animals in Europe, furnish little ground for confidence in the operation.

In 1847, this disease was brought from England into New Jersey, but its contagious and deadly nature being early discovered, it was immediately and effectually extirpated by killing the herd, involving a sacrifice, it is said, of about ten thousand dollars, which was borne by the proprietor. What a contrast does the conduct of such a man present, compared with that of one, who, for thirty pieces of silver, would consent to sell a diseased animal to go into a healthy district!

Quite recently this disease was carried from England into Australia. As soon as discovered, the most active measures were adopted. The herd was killed, the loss shared by those interested, and at the last accounts the success was deemed complete.

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