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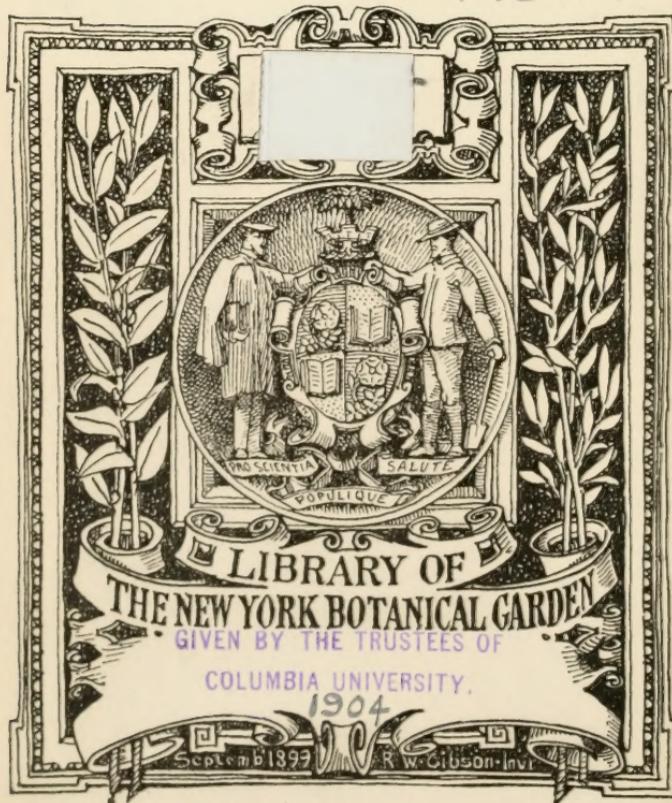
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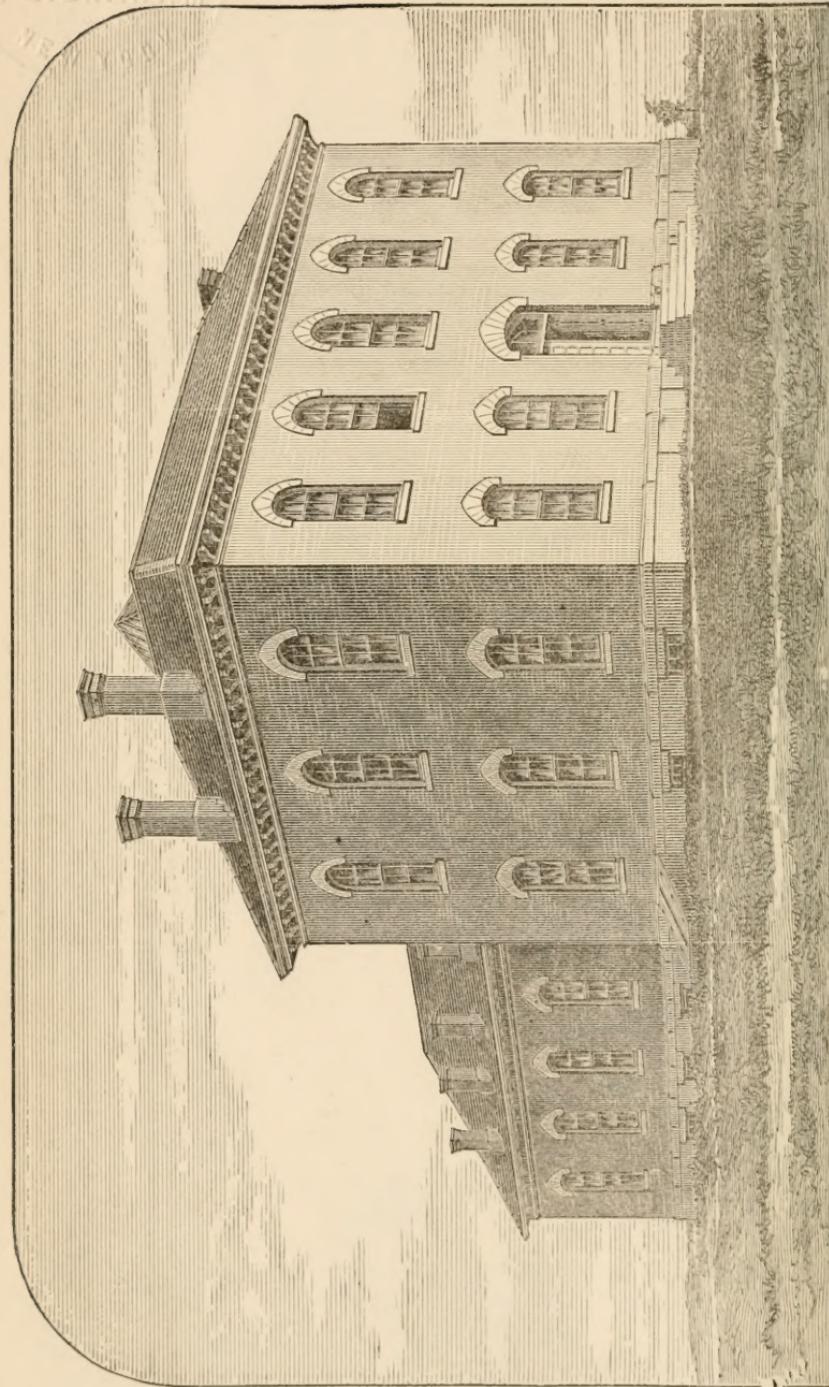
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TWENTY-FIRST ANNUAL REPORT

OF THE

SECRETARY

OF THE

MAINE BOARD OF AGRICULTURE,

FOR THE YEAR

1876.

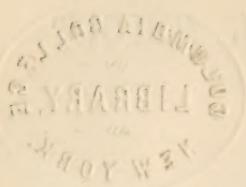
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Henry Carmichael.....	Brunswick.....	1877
C. F. Allen.....	Orono	1879
George E. Brackett.....	Belfast	1879
D. M. Dunham.....	Bangor.....	1879

MEMBER CHOSEN BY STATE AGRICULTURAL SOCIETY.

B. M. Hight.....	Skowhegan	1877
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MEMBER CHOSEN BY STATE POMOLOGICAL SOCIETY.

J. A. Varney.....	North Vassalboro' ..	1878
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MEMBER CHOSEN BY MAINE POULTRY ASSOCIATION.

W. W. Harris.....	Portland.....	1877
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MEMBERS CHOSEN BY COUNTY SOCIETIES.

Samuel Wasson	Hancock	East Surry	1876
Joel E. Shaw.....	Penobscot.....	West Hampden.	1876
A. L. Bradbury.....	Franklin	Phillips.....	1876
Lyman Lee.....	Piscataquis.....	Foxcroft	1876
Timothy Williams.....	Knox	Rockland.....	1876
Isaac Barker.....	Aroostook	Houlton.....	1876
Ira E. Getchell.....	Kennebec.....	N. Vassalboro' ..	1877
Z. A. Gilbert.....	Androscoggin....	East Turner....	1877
Lyman H. Winslow...	Lincoln	Nobleboro'	1877
C. W. Hersey.....	Washington	Pembroke	1877
P. W. Ayer.....	Waldo	Freedom	1877
Horace Bodwell.....	York	Acton.....	1878
Thomas Reynolds.....	Oxford.....	Canton.....	1878
J. Marshall Brown....	Cumberland	Falmouth	1878
George Flint.....	Somerset.....	North Anson...	1878
Isaac E. Mallett.....	Sagadahoc	Topsham.....	1878

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INTRODUCTION.

*To the Honorable Senate
and House of Representatives:*

I have the honor to transmit herewith, the Annual Report of the Maine Board of Agriculture for the year 1876.

The annual meeting was held at Lemont Hall, in Brunswick, February 8th, 9th and 10th, 1876, at which the following officers were duly elected: President, J. E. Shaw of Hampden; Vice President, Ira E. Getchell of Vassalboro'; Secretary, Samuel L. Boardman of Augusta. The usual committees for the year were appointed, the new members qualified and took their places at the Board; after which an eloquent and appropriately worded address of welcome was given by Hon. Charles T. Gilman of Brunswick. The public exercises then opened with the reading of a paper by the Secretary, on the place which the horse should occupy at our agricultural exhibitions. This paper was prepared in accordance with the instructions of the Board, and will be found in full at page 120 of this volume. After its reading, a general discussion of the same was engaged in, which occupied the entire forenoon. With a few exceptions, the speakers endorsed the views presented in the essay. So far as breeding was concerned, it was believed it should be the aim of our farmers to breed a good moving, stylish, well proportioned, kind, serviceable class of horses, of good size, good for the road, the farm, the heavy load—with good speed added to other desirable qualities—and not waste so much effort in the endeavor to raise a two-thirty horse from material that will hardly produce a three-minute one. Concerning the matter of speed, there was little diversity of opinion, and in the main the position taken in the paper was supported. Mr. Gilbert said it was much easier to find fault with than to correct the handling of horses at exhibitions. He said that at the present time we could not have horse trots without some evils; and he thought agricultural exhibitions should be conducted without horse racing; sup-

porting his argument by the fact that the outlay was greater than the revenue. As to preventing gambling at fairs, it was a thing easier said than done. Mr. Harris replied, and said he believed gambling could be kept from exhibition grounds, but the revenue to societies was chiefly obtained from this feature of our fairs. Mr. Wasson took the ground that of the 70,000 horses in Maine, five or six thousand are trotters—which would show that the production of horses was a leading industry of our agriculture, and he knew of no reason why it was not a legitimate industry. He knew there was an indiscriminate objection to trials of speed at fairs, but for these abuses the community is largely responsible. If the public say what is right is to be permitted, and what is wrong is to be prohibited, the evils that accompany trials of speed will be corrected. The discussion was closed by Mr. Tenney of the Brunswick *Telegraph*, who spoke in a pertinent and forcible manner upon the subject, and believed the trials of speed at fairs, properly conducted, was a great source of revenue, and a satisfaction to the spectators. In the afternoon a paper was read on the relations of veterinary science to agriculture (followed by a discussion); and in the evening a lecture, giving the results of certain experiments in Plant Nutrition, by Prof. Levi Stockbridge of the Massachusetts Agricultural College. Both these are given in full in a subsequent part of this Report.

At the previous semi-annual meeting of the board, the subject of Fences and Fencing was assigned as a leading topic for consideration at this session. This subject was divided into four sections, viz.: history of fences; statistics of fencing in Maine as to amount; cost of the fences in the State, and the law of fences with its needed changes. These subdivisions formed the topics of papers which were treated respectively by Mr. Gilbert of Androscoggin, Mr. Getchell of Kennebec, Mr. Ayer of Waldo, and Mr. Wasson of Hancock. The first two papers formed the programme of the forenoon on the second day of the session, and with the discussion following are given in subsequent pages. In the afternoon Prof. Stockbridge gave the second of his lectures, viz.: On the Management of Pastures, given in full at page 70 of this volume. The two lectures of this distinguished gentleman form a marked contribution to the present volume on the Agriculture of Maine, and are of so valuable and practical a character as to be of great service to all farmers. There are few more important matters coming within the range of

the farmer's study or practice than those which form the subject of these lectures, and they are presented in so clear and comprehensive a light as to be of great service to all who will master their contents by a diligent and careful reading. I earnestly hope their truths may be acquired and put in practice by all. In the evening an able lecture was given by Prof. M. C. Fernald of the Maine State College, on Taxation, elsewhere given in full.

The forenoon of the third day was devoted to the consideration of the cost of fencing in Maine; and our fence laws as they are and as they should be—bringing to a close the discussion of this topic as proposed by the programme. These papers are published entire, and the discussion following them in satisfactory fullness, in their proper place. The afternoon session opened with a paper by Mr. Lyman Lee of Foxcroft, on the Value of Covered and Uncovered Manure, in which he introduced the results of an experiment conducted by a celebrated Scotch farmer to determine their relative value. Four acres of soil of uniform character were selected for an experiment, two of which were manured with uncovered ordinary barnyard manure, and two with an equal quantity of manure from covered sheds. The whole was planted to potatoes with the following result :

Uncovered manure, one acre, produced	272	bushels.
" " "	293	"
Covered manure, " "	442	"
" " "	471	"

Or an increase of 348 bushels from the sheltered manure on two acres. The following year the field was sown to wheat, and the result found to be as follows :

Uncovered manure, one acre, produced	41	bushels, 18 pounds.
" " "	42	" 38 "
Covered manure, " "	55	" 5 "
" " "	58	" 47 "

Each bushel containing 61 pounds; the latter showing a gain of 31 bushels on the acre. The straw on the portion dressed with manure which had been covered, was also one-third heavier. Mr. Lee followed these experiments with an earnest appeal for farmers to give more care and attention to the manufacturing, collection, and use of fertilizers upon the farm. We can hardly give too much attention to this subject, and if we but protect the manure of our farmyards from the wasting influence of sun and rain, we may assure ourselves that we have all that is necessary for the best cultivation of our crops. Manure cellars and sheds are im-

portant auxiliaries in the manufacture and saving of composts, manures and fertilizers—and the greater value of manures thus protected will more than pay the expense of building such sheds and cellars. In his own experience he had applied twenty-five loads of manure to the acre for corn, and by observing a proper rotation had kept his fields in good condition, and produced good crops of corn. In the winter of 1871-2, in consequence of a light hay crop, farmers were obliged to use western corn to "help out" the hay-mow. This corn could be purchased at 70 or 75 cents per bushel, at the depots in this State. This low price of corn had led many farmers to believe they could purchase western corn for feeding, cheaper than they could grow it, and they had been raising potatoes to sell for the purpose of purchasing corn. But it was a bad system and was sure to reduce the fertility of the fields—as but little manure was used in their culture, the crop was generally light, and prices low. This was a wrong course. Farmers should make and protect their farm dressing, manure liberally, and depend upon raising, themselves, rather than purchasing, their corn and other staple crops. Following this Mr. Shaw, the President of the Board, read a paper on some points of general farming as conducted in Maine, and the session closed with an essay and discussion on Co-operation, the former of which, by Mr. D. M. Dunham of Bangor, is published in full. In the evening Prof. H. Carmichael of Bowdoin College, and one of the Members at Large, delivered a lecture on the Beet Sugar Industry. It has been my hope to give this lecture as delivered, in this report, but owing to a multiplicity of college and professional duties the author has been unable to place a copy in my hands for this purpose; consequently I am forced to content myself with a brief outline of the same in this place, and to substitute it, farther on, with an essay on the same subject, to which I invite particular attention, from the pen of Prof. Alfred E. Aubert of the Maine State College. The lecture of Prof. Carmichael was accompanied with large tables and diagrams showing the chemical analysis of the sugar beet; increase of sugar production from the beet for the past thirty years in France, and the different kinds of machinery used in the manufacture of sugar. These diagrams were fully explained by the professor while lecturing, and the following brief abstract of his remarks will give an idea of the points to which he referred: Of the 3,000,000 tons of sugar consumed in the whole world the last year, 700,000 were the product of the

beet. These are the two great rivals for the world's supply of sweetness. The cane and the beet sugar are of very unlike origin and expectations. The former was introduced by the crusaders, and it has been extracted to this day by the crusade processes and by ignorant laborers, to the lasting detriment of the warm lands where the cane has been raised. The manufacture of beet root sugar is comparatively a recent industry, and is peculiarly the product of northern sagacity. By the demands its difficult separation makes upon the skill and intelligence of sugar producers, it has brought about a combination of labor, capital and scientific knowledge to which no other industry can furnish a parallel. The history of its cultivation shows such vast, direct and indirect advantages that it seems likely at no distant day, to supplant the cane. The beet has already virtually driven the cane from the European market, and the question arises, why America forms such a conspicuous exception. It is not from the lack of a proper soil or climate, it is not from the price of labor, the abundance of cane sugar or the absence of necessary machinery. It is agreed to be solely from the fact that no adequate experiment has ever been made upon the eastern seaboard. The question of its profitable introduction should be studied and solved in New England. The history of the beet sugar industry reveals the secrets of its success in other countries, and points out the conditions of its successful production in America. 1st. It was born of science and has always been allied with it. 2d. It has been fostered by government at the outset. 3d. It has been dependent upon sound agriculture. 4th. It has secured the co-operation of labor and capital. To the total neglect of one or all of these conditions the hitherto unsuccessful attempts to transplant it are well understood, and the recent successes in the West excite the hope that the beet root culture is now permanently established in this country. Without abundant capital, skilled labor, scientific knowledge, and co-operation of agriculturists, any attempt would be folly. With these, the venture would be safe, large profits be fairly expected, and the experience of other countries leads to a promise of success in our own.

The semi-annual session was held at Fryeburg, in Oxford county, on the last day of October and the first and second days of November. At this session the students of the State College of Agriculture and the Mechanic Arts were in attendance, having, through the liberality of the Maine Central, Portland and Ogdens-

burg, and European and North American railroads, been furnished free transportation for this purpose—that provision of the statute requiring one session of the Board annually to be held at or near the State College being held to be complied with, if the students can attend such meeting in any part of the State free of expense to them. The students were in attendance during the entire session, and under the command of Capt. W. S. Chaplin, the Military Instructor at the College, won generous applause from all who saw them, for their fine military discipline and gentlemanly bearing. The sessions of the Board were held in the Methodist Church, and were very largely attended.

On assembling, a most cordial address of welcome was extended to the Board, in behalf of the West Oxford Agricultural Society, and the citizens of Fryeburg, by Hon. George B. Barrows. Some of the interesting facts connected with the Indian occupation, and with the settlement of the place, were detailed, and the members were informed that some four-fifths of the cultivated land in the town consists of the rich intervals that line the winding course of the Saco; that besides these there are four or five thousand acres of low meadow land, and that the balance of the area is made up of pine plain not valuable for cultivation, but producing with great rapidity successive growths of white and Norway pine lumber, and that the especial lack of the farmers was in a deficiency of pasturage, there being little or no good grazing land within the town limits. The farmers of Oxford had looked forward to this meeting of the Board with anticipations of pleasure and the expectation of receiving profitable counsel which should assist them in developing their resources. The speaker referred with gratification to the recollection of his own pleasant association with the Board in former years. This was responded to by the President of the Board, and the remainder of the forenoon was given up to a general discussion on practical matters, which proved very interesting and instructive. It was participated in by Hon. Geo. B. Barrows, Col. James Walker, Mr. C. W. Waterhouse, and others of Fryeburg, besides several members of the Board. Mr. Waterhouse gave some of his personal experiences in farming, which contain so much that is practical and useful, especially concerning the use of lime on his land, that I give from the reporter's notes some account of the same.

Mr. Waterhouse said: I began last year to plow in June and seed in the fall. I had excellent success—got the best catch of

grass I ever had. I sowed $1\frac{1}{4}$ acres with rye and $3\frac{3}{4}$ to grass seed alone, in both cases getting an excellent crop. I put on only a peck each of red-top and herds-grass to the acre, and I put on as much as that besides clover when I sow in the spring. This fall I have seeded down about 20 acres. The reason I seed so much is because the grass winter-killed on about 16 acres last winter. I use a good deal of lime on my land. This fall I use 62 casks of lime and 3200 lbs. plaster. Some who use this dressing do not put enough on to make it pay. We can cheat one another, but we cannot cheat mother earth. I tried some winter wheat this summer. One dull day in haying I plowed up a couple of acres, went 30 miles and got my seed, and sowed wheat and grass seed together. The wheat is up and looks finely. I have had good success in raising oats. I have raised 400 bushels of oats on three acres, and my crop has not generally fallen short of from 60 to 75 bushels per acre. I generally sow two bushels to the acre. I have good success in raising potatoes. When I have my ground fixed right, I generally get from 300 to 400 bushels per acre. I think people do not take so much pains to prepare and enrich their ground for potatoes as they do for corn, and they pursue a wrong course. I am satisfied we can raise potatoes here. It takes me three times as long to cultivate my land as it does some of my neighbors to cultivate theirs. I hold that land should be thoroughly pulverized, and I think it pays to do it. I take pains to plow or dig clear out to my fences, and do not allow any bushes in my field. I have nearly 100 acres of this intervalle land. When I lay it down I mow it a few years, and then turn it out to pasture when it will cut two or three tons of hay to the acre; pasture it awhile and then take it up again. By this plan it does not take so large a piece of ground to pasture my cattle. I do not know whether this is the best way, but it is the way I manage. Some people say a pasture should be fed close, but I have the best success when I have a good growth on my pasture land. In plowing to lay down land, I do not plow so deep as when I plow for cultivation. I have an idea that there is a good deal of nourishment in the roots. This fall I did not allow the men to plow over six inches deep, and I then put on the Nishwitz harrow and cultivated it down deeper, and that left the ground all mellow and the grass roots mixed with the soil. In breaking up I want to go deeper the second time than the first, as I hold to having the sod well mixed with the soil. I have used a good deal of superphosphate

for the past fifteen years—from 1000 to 1500 lbs. per year, and have had very good success with it. I bought Coe's, first, and then Bradley's, and then I thought if I was going to use superphosphate I had better buy two kinds and try them. I got two barrels each of Bradley's and the Cumberland, measured it out and dropped it myself; went seven rows with one kind and then seven with the other, and so on until I used the two casks. I could see but little difference in my corn. I thought that on the Cumberland ripened a little earlier, but not enough to make any account of. The next year I sowed oats and had about 75 bushels to the acre. I spread on what dressing I used and harrowed it in. One of my neighbors was looking at the oats and he said to me, "You can see where each of your rows of corn was last year," and come to look, you could tell where part of it was, and I went through the piece and you could tell where the seven rows of Cumberland were and couldn't discern the Bradley's. And so I concluded that you do not lose the Cumberland the first year—that it leaves something in the ground that the other does not, and I have used it every year since. I have sowed some on grass land but thought it was not so cheap as the lime and plaster, and these answered every purpose. By putting on four casks of lime and three bushels of plaster I can get three tons of hay to the acre—as much as I can with a liberal dressing of manure. I do not know as I could follow that up. I generally put on lime at one time, and the next time put on manure and put my lime in another place, and sometimes I put on a little manure and three or four casks of lime to the acre. When I was paying for my land I hired money to buy lime and superphosphate, and I found when I bought the most I could pay the most. I have used ashes some. Some say leached ashes are as good as unleached. I have not found them so. I bought some leached ashes last year and sowed them, and I noticed that the grass did not grow well on that edge of the piece where they were sown. I think farmers do not keep accounts enough to know what their crops are paying. I love farming so well that I take all the notice I can, and try experiments, and if I try a new method I try to see what it costs and what my profits come from. I think quite an improvement has been made in farming in my section of the town since I came there. I sow four casks of lime per acre, if I sow it without plaster, but I think it is better with plaster—I mean four casks before it is slackened. I buy the best lime I can and think it is the cheapest. It will

average $6\frac{1}{2}$ or 7 bushels to the cask after it is slacked. I bought some refuse-black lime once, but did not think it profitable. I harrow it in. Generally I use only the roller with which to cover my grass seed. The discussion occupied the entire forenoon, and was regarded as very profitable.

In the afternoon a paper on the Resources of Aroostook County, was read by Isaac Barker, member of the Board for that county. "There is no county in Maine so rich in all the elements of a great wealth and for sustaining a great population as the county of Aroostook—with its noble river and tributaries entering more than fifty townships, many of them still covered with primeval forests, which become more and more valuable each year as immigration still continues to these hitherto worthless forests. Aroostook's mighty forests contain hundreds of thousands of acres of pine, spruce, hemlock, cedar, maple, birch, beech, ash, elm and basswood. In addition to all this, there is scattered about this county limestone of excellent quality. Since the opening of the railroad to Houlton, larger quantities of hay, oats and potatoes are shipped to Boston. Starch factories are scattered about the county to the extent of ten or twelve, which consume annually from fifty to eighty thousand bushels of potatoes each. With us, as in other counties, the stimulating idea of a 2 40 nag has proved detrimental to the farmers' true interest. But in consideration of the many cheese factories which are being built throughout our county and the facilities for grazing, it is hoped the farmers will awaken to the idea of keeping more cows and raising more stock." Following the reading of the paper, proper, Mr. Barker made some additional statements concerning farming in the county, of which a summary is given herewith :

There are in Aroostook county three cheese factories and eight or ten starch factories. The latter pay from 25 to 30 cents per bushel for potatoes—at Houlton 30 cents; at Bridgewater and Presque Isle, 25 cents, and I believe they pay 35 cents at Fort Fairfield this year. They take them large and small, as they come. When the factories were built the farmers contracted to furnish potatoes, delivered at the factories, for 25 cents per bushel for five years. The factories are owned mostly by parties in the county. They run as long as they can get potatoes. How much they could afford to pay on the average I cannot tell. They do not want to tell us what their profits are, but they say 30 cents is as much as they can afford to pay. They buy them by weight, 60

pounds to the bushel. The farmers bring them in barrels which are emptied and taken back. A large part of the potatoes are raised on burnt land. Some raise 200 bushels to the acre ; I have known as high a yield as 400 bushels. I know a man who says his potatoes cost him 8 cents per bushel when he got them in the cellar ; the average is far above that ; he raised on new ground and I presume did not reckon the cost of clearing the land. All varieties are used for starch. The Garnet potato is a favorite with the farmers for its large yield. We raise wheat to some extent, but not as much as we used to. In some sections it is a good crop ; in others, midge and rust hurt it. Some sow it as soon as the snow is off, others not until the last of May or first of June. I think the early wheat has done the best on the whole. I should think the average per acre is from 15 to 20 bushels, not less than 15 I think. They do not raise any winter wheat at Houlton but they do in the vicinity of Presque Isle. There are different kinds of wheat raised. Some raise the Lost Nation, some what is called the Fife Wheat. I think the Lost Nation rusts more than other kinds, and is longer ripening. Barley does well ; it is the most profitable sown crop with me. It now sells for 25 cents per bushel. A good many oats are raised. I should think the average yield would not be above fifty bushels to the acre. They do not use fertilizers for oats ; some may a little, but they generally raise them on the green-sward. We generally lay down land with wheat or barley. I have got a good catch with oats but they are apt to lodge. We raise considerable buckwheat. It is a crop we can put in after our other grain. We do not raise much corn about Houlton. A good many beans are grown—generally as a separate crop. First quality hay is worth \$8 per ton at the barn ; the buyer pressing it and the farmer hauling it to the station after it is pressed. Last year it was up to \$10. It is shipped to Boston. I raise some grass seed, but do not make much account of the straw after I get the seed from it. I thresh with a flail and then clean up with a winnowing machine. Some grind it out with a threshing machine, and some have clover machines to clean it up. I think the yield per acre would be perhaps from two to three hundred pounds. I threshed some one winter with a flail, and after I had done my day's work I would have a half bushel of clean seed. I believe that with hay at \$10 per ton you would get more from it to let it ripen for grass seed ; but it injures the ground more to grow grass seed than hay. The

labor of getting out the seed can be done when we havn't much to do. They are getting in pure-blooded stock of different breeds—more Jerseys, I think, than any other. There has been some splendid stock driven from the Aroostook. I know of one thoroughbred Ayrshire bull that has been brought there. Large numbers of sheep are raised and sent to the Boston market. From 600 to 800 sheep per day, from the Aroostook and the Provinces, pass over the road. Blooded sheep have been introduced—some Cotswolds, but mostly Leicesters. Occasionally we have a frost in August, but generally not till September—sometimes not till October. I do not think we have them as early as we used to. We can generally begin farming in Aroostook as early as they can in Somerset county, and I think the fall frost is not much, if any, earlier. We cannot raise corn as well as they can—we have colder nights, but other crops we can raise as well as in any other part of Maine. I do not know as I could average the value of land, including buildings in the county. Farms about Houlton village are worth more than they are further back; as they value them at about \$15 per acre. Following this, a paper on Cranberry Culture, by Mr. Washburn, was read—given in full in its proper place; and the discussion which followed it occupied the remainder of the afternoon. In the evening the subject of Sheep Husbandry was presented, the paper by Mr. Flint of Somerset county, being published in full in a subsequent portion of this report.

The forenoon of the second day was partially given up to the reports on crops in the several counties represented, as follows :

Aroostook: Hay yielded better than the average, and it was secured in excellent condition; oats better than the average; barley and rye not much sown, but very good; not much corn is raised in the county, but it ripened well, free from frost; potatoes generally good, the early ones rotted, while the late ones were sound; fruit, good; grass seed filled well; the cheese factories in the county made somewhat less cheese than last year, but have done a very fair season's work, cheese selling for 11 to 12½ cents, and the product about half sold; starch factories in the county seem to be doing well. *Hancock:* Hay twenty per cent. below the average; potatoes better than the average; wheat yielded double what it has for the past fifteen years; cranberries about half a crop, owing to the drouth; fruit more than an average. A new industry is springing up in the town of Hancock in the form of a factory for the extracting of tannin from sweet fern, and also

from alder. The former is proving a success, but the latter is yet somewhat uncertain. From a ton of sweet fern a barrel of extract tannin is made, worth \$22, and also a barrel of second quality worth \$7.50 per barrel. From the alder, one cord will make one barrel of extract, worth \$20; while from hemlock bark, one cord will make a barrel first-class extract, worth \$20. The sweet fern is dried twenty-four hours before being hauled to market, and the price paid for it at the factory is \$5 per ton, with 25 cents per mile for hauling. *Cumberland*: Where the hay crop was harvested early it was good, and farmers have found out the great advantage of beginning to cut their hay before July 4th, especially on the seaboard; roots damaged fully fifty per cent. by drouth; early potatoes good; oats light, on account of drouth; the Colorado beetle was observed about Portland and vicinity. *Knox*: Hay yielded about an average, and was harvested in good order; corn is not planted largely in the county, but was extra good; wheat and grain of all kinds fully an average; potatoes light and much below the average, on account of drouth; fruit crop not an average in the county; currant worm very destructive, but no signs yet of Colorado bug. *Lincoln*: Hay not above an average, but secured in good order; grain of all kinds fully an average; corn a very good crop and much better than the average, and the same is true of potatoes, which are of excellent quality; root crop better than an average; the best crop of beans ever raised in the county has been raised this year, also of cabbages, and of the latter considerable quantities are raised which this year have sold for from 1 to $2\frac{1}{2}$ cents per pound; more than an average of fruit, but not of wheat; cheese factories have done about as well as usual; Colorado beetle all over the county. *Oxford*: The hay crop was an average one and was secured in excellent order; corn abundant in localities where it was not injured by drouth, and especially on such lands it was never better; potatoes on moist land were good, but light on dry soils, on the whole being about an average; grain was somewhat under an average, being injured by drouth and grasshoppers; roots an average, but apples about a total failure; last year in some orchards where one hundred bushels were harvested, not more than a peck has been gathered; cheese factories have done about two-thirds as much as last year—last year the Canton factory made 15,000 pounds, and this year about 9,000 pounds; hops from one-half to two-thirds of an average, with prices from 27 to 28 cents; the Colorado beetle has been

plenty, and the currant worm has taken everything before it.

Piscataquis: An average amount of hay, and of good quality, secured in good order; wheat crop, a fair one but not as good as last year on account of the drouth; oats almost a failure, owing to the drouth; potatoes, average crop; fruit, good; cheese factories made less than in 1875, because there have been less cows to furnish milk, and it has sold for 12 cents per pound.

Somerset: The hay and corn crops both above the average; wheat below the average and much less sown than formerly; potatoes an average crop and of excellent quality; root crop two-thirds of an average; beans good; fruit below the average, on account of the ravages of caterpillars; cheese factories fallen off in yield one-fourth from last year.

Sagadahoc: Hay above an average, and harvested in good order; grains of all kinds fully an average, and will probably largely exceed the average of the past ten years; wheat culture is increasing in the county, and when not sown too early does well; farmers find now that it is better to sow wheat the 10th of June than to sow earlier; early planted potatoes good, the later varieties and those planted later, inferior in quality; fruit fully an average; the Colorado beetle is in the county, but not yet to any great extent.

Waldo: The hay crop large and got in better condition than usual, except in cases where it was cut late; corn heavy and nice; wheat where it was sown late was good, early sown being generally a failure and below the average; oats light; potatoes large and good; fall fruit plenty, winter fruit somewhat scarce; cheese factories in the county have done a smaller business than last year, but have sold their products for 11 cents; Colorado beetle making its appearance; fall feed good and remains as it is.

Washington: Hay about two-thirds of an average crop, but secured in excellent condition; potatoes an average crop of an excellent quality; grain, owing to the dry season, light; pasture short throughout the season; stock is rather light and thin; fruit below an average; there is much improvement manifested in this section in removing the unnecessary road fences, and in clearing up the roadside brush and weeds.

Penobscot: An average yield of hay; late sown wheat good, early sown much injured, the best time to sow being June 1st; oats and barley light; a fine crop of fruit, but the specimens under size; potatoes and roots good; factories taking less milk than last year, and cheese selling from 11 to 12 cents; the Colorado beetle has been observed in the town of Dixmont.

York: Hay fully up to an average; grain crop below

the average; early potatoes an average, but late planted ones injured by the drouth; all kinds of fruit never better, although grapes suffered from the cold winter and spring; the Colorado beetle has been seen at Parsonsfield on the Early Rose potatoes.

The public session was occupied with the reading of a paper on the Capacity of Milch Cows, by Horace Bodwell of York county, published in full.

The afternoon was given up to an exercise by the students of the State College, and the church was completely filled, the students occupying the right and left wing seats. On the right wall had been placed large charts giving a history of the college, a statement of its equipments and property, the number of students, accounts of farm experiments, and the general results obtained since its opening. These were easily read from any part of the room, and were so arranged as to answer many questions which an inquiring mind would naturally ask. On the left wall was displayed a collection of drawings made by the students in the ordinary course of term work; of which the following is a list: Elevation of Brick Hall State College, Topography of North Part of College Farm, Trapezoidal Truss for Railway and Plan of the Orono and Stillwater Railway, by E. S. Sturgis; Side elevation and ground plan of Laboratory State College, Groined arch, Skew arch, Plate band and Cloistered arch, by A. D. Blackington; plan and elevation of Iron Planer, Plate band, Iron Planer in detail, and Muley drawn from a model, by S. Shaw; Elevations, plans and sections of Tail Stock, and Elevations of Foot-lathe, by J. W. Meserve; Plan and side and end elevation of Iron Planer, and detail of Iron Planer, by A. J. Elkins; Bridge over Penobscot river for E. & N. A. R. R., Groined arch and Cloistered arch, by J. C. Lunt, and details of Iron Planer by J. W. Weeks. These drawings were closely examined by a large number of interested persons, who expressed the highest satisfaction at the degree of proficiency attained by the students in architectural and mechanical drawing. On calling to order, President Shaw invited Rev. Dr. Allen, President of the State College, to the chair, who made a brief statement of the aims and purposes of the college and the training specially given to its students. He then announced an exercise in the Elements of Agriculture, which was conducted by Mr. Farrington, Farm Superintendent. The exercise embraced the character and composition of soils, and the action of manures, and was highly satisfactory. At its close several questions were

asked by farmers in attendance, which were promptly answered by the students. Following this was an exercise by the Junior and Senior classes, which consisted of the reading of several essays, selected from about thirty papers, written by the students to show the relations of science to the different branches of agriculture, and how farming may be aided by an intelligent application of scientific principles: The following essays were read: Value of Chemistry to Farmers, C. C. Chamberlain, Foxcroft; Use of Mechanics to Farmers, J. W. Weeks, Castine; On Under-draining, I. E. Webster, Orono; Book-keeping, G. E. Sturgis, Riverside; Value of a Knowledge of Entomology, F. P. Stone, Livermore Falls; Market Gardening, A. S. Elkins, Oldtown. They were very creditable, and the exercises were satisfactory to the large audience present. In the evening, at the request of a large number of the citizens of Fryeburg, Dr. Allen repeated his lecture on the Conditions of Successful Agriculture, given in a previous volume of the Agriculture of Maine.

The third day was largely devoted to the purely business matters of the Board, assignment of topics for the next session, &c.; and to an excursion, by invitation of the citizens of Fryeburg, along the beautiful intervals of the Saco river in that town. In the evening a lecture was delivered by Prof. H. Carmichael of Bowdoin College, one of the Members at Large, on What Science may do for Farming. It was attentively listened to by a large audience, was highly instructive, and I regret I have not been favored with a copy for this report.

The State College has closed a most successful year, and, I am happy to know, is beginning to be better understood and appreciated by our people than at any time in its history. Its classes have been large, the instruction efficient and faithful, and when its somewhat limited appropriations and the requirements of the institution are compared with its actual work and results, it will be found to present a satisfactory exhibit to the people of the State. It is of course an easy matter to tell what should be done, to point out wherein it is deficient, to say that certain improvements or additions should be made to this or that department,—but it is quite another matter, *with the same means at hand*, to do any better. The Trustees have long seen the need of making some of the instruction more completely practical, as in the department of mechanics; and of giving greater prominence and

efficiency to the agricultural feature of the course. These views are also entertained by the entire Faculty, who would hail such an improvement with satisfaction—but it is impossible to say to what extent the Legislature will coincide with these opinions of the Trustees, or how far they will enable them, by appropriations, to put them into successful operation. It is safe to say, that should the Legislature in its wisdom, appropriate the needed funds to carry out the scheme which will be presented to them for consideration, the Trustees will endeavor to place these departments of the Institution in a position to command the confidence and support of every friend of industrial education in the State. The report of the Trustees and accompanying papers will be presented to the Legislature at an early day, and will, I hope, be generally circulated among our people. Its reading can but strengthen the good opinion in which the College is held by every intelligent person in the State.

The reports from the cheese factories in the State during the past year, show a considerable falling off in this department of farming, or a failure to make returns to this office. In part it is no doubt owing to the former, and in part to the latter cause—for as there is nothing to compel factories to make returns, being really private corporations, many may object to having their doings made public. However this may be, I have reports from but thirty-five factories this year, against sixty in 1875—although I cannot believe that the interest in this branch of farming as represented by these returns, has depreciated to the extent indicated. The cheese factories should on no account be neglected, and I counsel a steady, constant, determined attention to dairying and cheese making as one of the sheet-anchors of Maine farming. A two or three years' trial of the system is not sufficient to determine its adaptability to our State: it must be diligently followed for a term of years, before its highest advantages can be obtained. It is a system which, well followed, cannot but result in improved agriculture—but to accomplish this it must not be followed in an intermittent manner. On no account should the cheese factories be neglected the coming season. I present herewith condensed reports of those factories from which returns have been received:

INTRODUCTION.

xxiii

RETURNS FROM THE CHEESE FACTORIES IN MAINE, FOR 1876.

NAME OF FACTORY.	Opened.	Closed.	Greatest No. cows.	Average number.	Total lbs. of milk most for one day,	Lbs. cheese made.	Averge weight of cheese—lbs.	Lbs. milk to one of cheese.	What part of cheese is sold.	Where marketed.	Lbs. cheese obtained per lb.		
					Sept. 10...	Sept. 1...	Sept. 2...	Sept. 3...	Sept. 4...	Sept. 5...	Sept. 6...	Sept. 7...	
Aroostook Valley. (Presque Isle.)	June 14...	Sept. 10...	96	167,211	2,835	16,610	50	10.05	All.	At home, Portland.	11 ¹ / ₂		
Andover.	—	—	80	45,750	—	4,583	—	—	All.	Portland.	11 ¹ / ₂		
Burnham	June 14...	Aug. 26...	80	111,790	2,100	11,179	45	10	All.	At Factory.	11 ¹ / ₂		
Canton.	June 5....	Aug. 28...	140	126	184,347	2,621	20,128	40	9	Bangor.	10 ¹ / ₂		
Coonlith.	June 5....	Sept. 22...	230	180	337,178	4,609	33,608	48	10.03	Two-thirds.	10 ¹ / ₂		
Dixmont Mountain.	June 12...	Aug. 31...	130	120	209,811	2,994	19,807	47	10.25	At home.	11		
East Sangerville.	June 8...	Sept. 2...	—	175	190,314	3,161	20,588	40	9.25	One-half.	10 ¹ / ₂		
East Jefferson.	June 5...	Sept. 2...	180	—	147,601	2,394	14,034	33	10.08	All.	Portland.	11	
East Orrington.	June 5...	Aug. 31...	150	125	222,457	3,114	22,926	47	9.75	Three-fourths.	12 ¹ / ₂		
Elm Dale. (Montville.)	July 19...	Aug. 26...	150	125	159,363	2,669	15,936	48	10	Two-thirds.	11 ¹ / ₂		
Baeter.	June 12...	Sept. 9...	175	125	223,797	3,397	24,918	38	9.35	Four-fifths.	11 ¹ / ₂		
Etna.	June 12...	Sept. 3...	—	—	177,279	2,730	16,784	43	10.50	Three-fourths.	11 ¹ / ₂		
Freedom.	June 12...	Sept. 8...	120	110	140,744	2,066	14,936	35	—	All.	At home.	11 ¹ / ₂	
Hormon.	June 14...	Aug. 31...	115	75	141,100	2,300	14,110	44	10	Three-fourths.	Bangor.	12	
Houlton.	May 29...	Oct. 14...	150	120	293,501	3,299	30,986	54	9.66	All.	Boston.	12 ¹ / ₂	
Kenduskeag.	June 15...	Sept. 2...	—	—	146,506	2,200	14,114	44	10.38	All.	Portland.	12	
Livermore Centre.	May 6...	Sept. 3...	75	—	98,391	—	9,615	32	10.05	All.	—	—	
Morrill.	June 6...	Sept. 4...	100	80	117,322	1,600	11,349	42	10.03	—	At home.	11 ¹ / ₂	
North Turner.	May 29...	Sept. 9...	260	150	215,329	3,350	28,367	34	10.50	All.	Portland.	11 ¹ / ₂	
North Livermore.	June 2...	Sept. 2...	150	125	196,174	2,995	19,118	35	10.25	All.	Portland.	13	
North Jay.	June 6....	Sept. 13...	160	100	191,302	2,544	18,564	34	10.03	All.	Portland.	12	
Phillips.	Aug. 2...	Aug. 30...	—	86	77	34,510	1,466	3,211	45	10.75	All.	Phillips.	12
Stetson.	May 29...	Sept. 12...	220	150	326,125	4,329	32,239	47	10.13	All.	Boston.	10 ¹ / ₂	

RETURNS FROM THE CHEESE FACTORIES IN MAINE, FOR 1876—(Continued.)

NAME OF FACTORY.	Opened.	Closed.	Greatest No. cows.	Average no. number.	Total lbs. of milk received.	15 lbs. Most for one day,	Lbs. cheese made.	Averagge weight of cheese—lbs.	What part of cheese is sold.	Where marketed.	Price obtained per lb.
Searsmont and Montville.....	June 25...	Aug. 20...	67,510	1,416	6,096	40	11	All.	All.	At home.	12c13
Sandy River. (Strong.).....	May 22...	Sept. 9....	310,000	3,800	31,000	40	10	All.	All.	Portland.	12c13
St. Albans.....	June 12...	Sept. 1....	162,470	2,890	18,333	40	9.50	All.	All.	At home.	11
South Paris.....	June 1...	Sept. 4....	285,000	3,500	30,000	40	9.50	All.	All.	—	12 $\frac{1}{2}$
South Newburg.....	May 22...	Sept. 15...	344,892	4,500	34,483	47	10	All.	All.	Bangor.	12
Union.....	June 12...	Sept. 12...	166,973	2,264	16,451	37	10.05	All.	All.	At home.	12 $\frac{1}{2}$
Unity.....	June 5...	Sept. 3....	150,000	2,400	15,000	45	10	All.	All.	Boston.	11
Winthrop.....	June 1...	Sept. 16...	253,365	—	26,889	50-25	9.42	All.	All.	At home.	10a14
Wilton.....	June 12...	Sept. 6....	122,481	2,100	12,029	35	10.05	All.	All.	Portland.	10
West Minot.....	June 20...	Aug. 30...	114,159	2,023	11,490	33	9.13	All.	All.	At home.	12
Winterport.....	June 26...	Sept. 2....	89,766	1,670	8,986	50	10	All.	All.	At home.	12
Waldo.....	June 12...	Sept. 2....	95,86	111,632	1,645	12,552	46	8.89	All.	Belfast.	10

SECRETARIES OF CHEESE FACTORIES IN MAINE—1876.

<i>Name of Factory.</i>	<i>Secretary.</i>	<i>P. O. Address.</i>
Aroostook Valley.....	G. A. Parsons.....	Presque Isle,
Andover	W. H. Talbot.....	Andover.
Burnham.....	O. S. McAlister.....	Burnham.
Carmel.....	John Harvey.....	Carmel.
Canton.....	Otis Hayford.....	Canton.
Corinth	Charles Megguire	East Corinth.
Dixmont Mountain.....	John Whitcomb.....	Simpson's Corner.
East Sangerville.....	H. L. Leland	East Sangerville.
East Jefferson.....	J. J. A. Hofses.....	East Jefferson.
East Orrington.....	A. N. Lufkin.....	East Orrington.
Elm Dale	J. C. Carey	Montville.
Exeter	L. D. Butters.....	East Exeter.
Etna.....	J. E. Friend.....	Etna.
Freedom	D. B. Johnson.....	Freedom.
Hermon	G. W. Moore.....	Hermon.
Houlton	Francis Barnes.....	Houlton.
Kenduskeag	F. D. Jenkins	Kenduskeag.
Morrill	D. O. Bowen.....	Morrill.
North Turner.....	J. H. Quinby.....	North Turner.
North Livermore	E. A. Weld.....	North Livermore.
North Jay.....	N. L. Phinney.....	North Jay.
North Pownal.....	Charles E. Fogg	North Pownal.
Phillips.....	A. L. Bradbury.....	Phillips.
Stetson.....	John Rogers.....	Stetson.
Searsmont and Montville...	Alexander Woodman.....	North Searsmont.
Sandy River.....	A. J. Norton	Strong.
St. Albans.....	A. J. Bonney.....	St. Albans.
South Paris.	S. R. Parsons.....	South Paris.
South Newburg.....	J. J. Dearborn.....	Newburg.
Union	F. A. Seiders.....	Union.
Unity.....	B. B. Stevens.....	Unity.
Winthrop	J. H. Moore.....	Winthrop.
Wilton	E. Bridges	Wilton.
West Minot	John B. Atwood	West Minot.
Winterport.....	J. H. Carter.....	Winterport.
Waldo	Joseph L. Chase	Waldo.

The returns from the local agricultural societies have been duly received at this office, in accordance with the Statute, and the same will be found in full in the second part of this report. They show a good degree of interest and success attending their efforts the past year; and a table compiled from these returns, giving their dates of incorporation, number of exhibitions held, financial condition, &c., is herewith presented:

BOARD OF AGRICULTURE.

COMPILED FROM RETURNS OF AGRICULTURAL SOCIETIES IN MAINE—1876.

SOCIETY.	When Incorporated.	How many Fairs held.	Number of Members.	Amount received from State in 1876.	Amount raised by the Society in 1876.	Whole amount of Premiums Disbursements.	Value of Property belonging to Society.	Liaibilities of Society.
Androscoggin	1852	23	No.	\$358 83	\$739 45	\$789 75	\$625 25	\$961 25
Aroostook	1846	-	No.	236 00	105 50	415 25	188 10	-
Cumberland	1832	41	No.	100	-	1,200 00	1,000 00	-
East Somerset	1832	18	Yes.	200	88 71	717 04	403 00	805 75
Eastern Kennebec	1868	8	Yes.	175	70 00	225 00	58 00	\$2,500 00
East Oxford	1861	16	Yes.	335	92 44	297 50	297 50	3,000 00
East Piscataquis	1873	4	No.	75	40 00	66 51	112 00	2,500 00
Franklin	1840	37	Yes.	320	150 20	713 45	873 70	2,214 67
Franklin Central	1876	2	Yes.	106	-	103 00	166 43	110 51
Kennebec Union	1860	4	Yes.	100	88 56	223 15	70 00	89 75
Kennebec	1818	45	Yes.	500	132 00	672 28	60 00	3,500 00
Knox	1866	10	No.	800	154 11	-	585 00	110 51
Lincoln	1852	22	No.	691	255 97	310 30	675 00	25 00
North Penobscot	1852	23	No.	250	84 48	61 60	234 12	80 00
North Knox	1869	7	No.	1300	154 11	211 50	561 10	125 00
North Kennebec	1847	19	Yes.	462	119 54	462 60	73 6 50	475 00
North Waldo	1861	16	No.	100	69 40	62 68	615 75	-
North Aroostook	1855	21	Yes.	60	60 00	137 64	278 40	187 27
North Franklin	1850	25	Yes.	250	70 86	355 30	438 55	323 00
Oxford	1841	34	Yes.	574	150 00	-	891 25	728 85
Portland Horticultural	1860	42	No.	100	-	-	-	3,912 09
Penobscot and Aroostook Union.....	1853	20	No.	100 00	80 00	125 00	86 96	1,269 64

Piscataquis Central.....	1853	23	Yes.	135	127	30	357	65	371	50	353	33	500	00	141	03		
Penobscot Central	1874	3	No.	120	88	30	100	70	453	00	350	31	500	00	-	-		
Sagadahoc.....	1854	22	Yes.	1150	257	00	2,653	19	1,794	75	1,234	95	-	-	5,000	00		
Somerset Central.....	-	-	Yes.	100	137	00	407	77	-	650	00	-	-	1,000	00	-		
State Penological..	1873	3	No.	-	500	00	612	65	1,080	00	637	00	-	-	100	00	329	22
Sharpleigh and Aetton	1867	11	Yes.	250	125	23	210	80	276	78	324	60	364	20	3,540	00	-	-
West Somerset.....	1818	-	Yes.	125	120	29	136	89	419	25	303	25	376	55	1,000	00	253	25
Western Piscataquis.....	1869	9	No.	37	32	85	69	15	101	20	69	60	99	50	-	-	44	14
West Penobscot.....	1855	22	Yes.	290	186	12	619	72	735	00	306	70	-	-	5,000	00	1,400	00
West Oxford.....	1851	26	Yes.	150	92	44	743	03	576	25	374	10	612	47	1,500	00	775	00
West Washington.....	1860	17	Yes.	890	200	00	419	54	616	65	536	85	684	18	-	-	-	-
Washington.....	1841	34	Yes.	400	200	00	836	18	724	00	574	50	892	55	1,800	00	200	00
Waldo.....	1847	29	Yes.	200	-	-	993	15	-	-	-	-	-	-	-	-	-	-
Waldo and Penobscot.....	1860	8	Yes.	60	130	00	670	25	612	25	499	25	703	95	1,200	00	100	00
York.....	1841	-	-	-	274	77	668	50	1,373	00	1,038	00	1,035	00	-	-	1,000	00

So far as can be gathered from the returns of the county and local agricultural societies, and from the reports of the same which are generally published in the local press, they seem to be doing a good work in stimulating farmers to a healthy competition in their business; while through the guidance of the Board of Agriculture, so far as relates to the disposition of a portion of the State bounty granted to agricultural societies, they are stimulating improvements of a positive and enduring character. By offering premiums for permanent farm improvements, for thorough drainage, for the introduction of pure blood stock, for the establishment of home nurseries, for the culture of wheat, for the encouragement of Farmers' Clubs, and other matters affecting the real prosperity and advancement of our agriculture, these societies are doing a most useful and important work.

By reference to the table just given, it will be noticed that from a very early date agricultural societies have had an existence in our State, and in districts where they have longest existed, there we find to-day agriculture is in a more advanced and prosperous condition than in sections beyond the immediate influence of such societies. In Kennebec county, for example, an agricultural society was organized so early as 1787, and as early as 1818 it was incorporated by the State of Massachusetts, and which has continued to the present day—having been the parent of all similar societies in Maine. When this pioneer society was organized by a few intelligent and far-seeing farmers, there were but half a dozen similar societies in all North America, and the good results of its labors in behalf of improved and enlightened husbandry in our State can never be over-estimated. Through its labors an agricultural journal was early established in Maine, and with this, other agencies for the advancement of improved agriculture have been carried forward, until it seems not too much to say that to this one society we are largely indebted for the character of our agriculture of to-day.

The present year has witnessed the completion of the first century of our National existence, celebrated by the holding of the great International Exposition at Philadelphia, to which thousands of our Maine people went as visitors. It is safe to say that our people did not fully come up to a proper appreciation of the importance of this exhibition, and that notwithstanding the creditable display made by residents of Maine, it was not half what it

would have been had they realized at the outset the great value our State would have received from a full exhibit of its products at Philadelphia. The report of the State Centennial Commission will soon be published, which will give a full account of the part Maine took in this great World's Fair. Meanwhile, as being of general interest, I place on record here, a list of contributions from Maine, kindly furnished by Hon. Enoch Knight, Secretary of the Maine Centennial Commission :

IN GENERAL. Hon. Warren Johnson, Sup't of Common Schools, Augusta, collective educational exhibit; T. J. Whithead, South Paris, furnaces; Paris Hill Manufact'g Company, children's carriages and sleds; Joseph Russell, Portland, sleighs; Hugh Smith, Gray, sleighs; A. B. Morrison, Portland, specimens of manufactured goods; Ara Cushman & Co., Auburn, boots and shoes; Evans Rifle Company, Mechanic Falls, case of rifles; J. W. Munger, Portland, detergent; A. G. Schlotterbeck, Portland, thermometers; L. F. Pingree, Portland, artificial limbs; Androscoggin Pulp Company, wood pulp and its products; Joseph Wood, Bath, specimen of newspaper printing; A. H. Merrill, Brownville, slate; T. H. Dinsmore, Skowhegan, slate; C. H. Chandler, Brownville, slate; Knight & Whidden, Portland, ground and calcined plaster; Davis Tillson, Rockland, specimens of wrought granite; Red Beach Granite Company, Red Beach, specimens of red granite; Bodwell Granite Company, Hallowell, display of granite monuments; Hallowell Granite Company, display of granite; W. R. Chase, Bluehill, granite pedestal; F. O. Morton, St. George, granite block; (specimens of granite were also exhibited from nearly all the quarries in the State, including Gouldsboro', Jonesport, Spruce Head, Fox Island, &c.); Katahdin Iron Works, Bangor, specimens of iron ore and products; Fred. H. Patten, Bath, feldspar and quartz varieties; Harry Brown, Portland, oil painting, "The Giant's Causeway"; P. C. Holmes, Gardiner, oil painting, "New England Autumn Scene."

TEXTILE FABRICS. Lewiston Falls Company, Bates Company, Hill Company, Androscoggin Company, Baker Company and Continental Company, Lewiston; Farwell's Mills, Lisbon; Laconia Company, Pepperell Company, Biddeford; York Company, Saco; Newichawanick Company, South Berwick; Worumbo Company, Lisbon; Knox Company, Camden; Sanford Mills, Sanford; Westbrook Company, Saccarappa.

AGRICULTURAL. Maine State Pomological Society, collective

exhibit of orchard fruits; Hall C. Burleigh, Fairfield Centre, herd of Hereford cattle; S. L. Goodale, Saco, food extract from fish; William Thorp, Cape Elizabeth, preserved haddies; J. Winslow Jones, Portland, hermetically sealed goods; Burnham & Morrill, Portland, vegetable and animal extracts; Portland Packing Company, Portland, preserved extracts and sweet corn preserved; Dunn Edge Tool Company, West Waterville, scythe blades, grass hooks, &c.; Hiram Holt & Co., East Wilton, hay knives, &c.; A. J. Mosher, Portland, bag holder; Ansel Stevens, Gorham, centennial mower.

MACHINERY. Hardy Machine Company, Biddeford, grinding machinery; Saco Water Power Company, Biddeford, mule spinning, drawing and roving machine; Lewiston Machine Company, Lewiston, Thomas' power looms and warping machines; G. S. Follansbee, Lewiston, steam pump; John C. Getcheil, Machias, capstan; E. W. Barker, Portland, car coupler; S. N. McGilvery, Belfast, ship's model; L. R. Palmer, Belfast, stave jointer; Howard Manufacturing Company, Belfast, mitering machinery; Burgess Proof-Press Company, Belfast, proof-press; Andrew Morse, Skowhegan, models of machinery; F. Lyford, Augusta, clothes dryer; A. W. Decrow, Bangor, smoke conductor; William Flowers, Bangor, boat lowering apparatus; J. P. Bass, Bangor, photographic burnisher; Elisha Newcomb, Portland, car replacer; C. B. Harrington, Bath, miniature yacht; W. Thompson, Gardiner, road scraper; J. W. Stockwell & Co., Portland, cement pipe machinery; J. H. Snow, Bucksport, ship's model.

From the accounts that have been received from different parts of the State, it appears that the Colorado potato beetle (*Doryphora decemlinata*) has been noticed quite generally throughout the State the present year, and may be looked for in abundance another season. While it may be true, as some Western writers of authority are inclined to believe, that the potato beetle is born of heat and multiplies more rapidly in a dry climate, and from this cause may not become so destructive in our State as it has proved further West--yet it will be well for us to prepare ourselves for a visitation from them in large numbers the coming year, and by an acquaintance with their habits and the modes of destroying them, be ready to deal them effectual blows. The means used to keep them in check are hand picking, and the use of Paris green; the former, it is claimed, may be done at a cost of \$5.00 per acre;

while the latter mode, although on some accounts objectionable, is more effectual than any other agency that has been tried. Prof. Chadbourne, of the Massachusetts Board of Agriculture, sums up the treatment of this matter as follows; (and for those who wish additional information, I recommend the perusal of a treatise on Potato Pests, by Prof. C. V. Riley, published by the Orange Judd Company, New York, and sold for 50 cents):

- “ 1. Plant a few potatoes in your field as early as possible, and destroy the bugs as they appear on them.
2. For the main crop, plant at good distance between the hills, and manure well with ashes or such manures as do not specially promote the growth of vines.
3. Pass through the field after the potatoes are up, once a week until the time of blossoming, picking all bugs, larvae and eggs that appear.
4. If for any reason the bugs get beyond the hand picking, use poison till every bug is destroyed, if not for your own crop, for the benefit of others.
5. As bad as the potato bug is, remember that no other injurious insect can be more securely kept in subjection and destroyed than it; and those who are determined to raise potatoes can raise them at an extra expense of not over five cents per bushel, in spite of the bugs and their allies—the indolent farmers who feed them.
6. Do not wait till the second crop of bugs appear, and then try to demonstrate that hand picking is powerless against such an army; because it is conceded in the beginning without waste of words.
7. If you are not determined to kill by hand or poison, every bug that appears on your crop, then do not, as a good neighbor, plant at all.”

It is impossible now to tell to what extent the present interest in the beet sugar industry will take practical and tangible form with the opening season; but I am persuaded if mills for its manipulation could be started at an expense of not more than twelve or fifteen thousand dollars each, it would prove a profitable business for our State. The culture of the beet would certainly be a beneficial crop, for it would involve deep plowing, heavy manuring and thorough weeding, while the increased amount of manure secured from the cattle fed on the pulp, combined with the thorough culture, would put the land in splendid condition for

raising wheat and corn, and go far towards settling the question of redeeming and improving our worn-out farms. The direct profit is large; for a crop of twelve or fifteen tons per acre, at a value of four to five dollars per ton, would pay better than any cash crop now raised, aside from the indirect advantages of cattle food, mellow and improved land for future crops. It would give employment to increased field labor during the summer culture, and in the manufacturing department during the winter months. It would supply a new branch of industry, establish new centres of trade, develop new fields for inventive skill, save millions of dollars to the country at large in foreign cost of sugar and transportation, and enhance the value of every farm in the vicinity of the factory. It is a subject of national importance; for, with a demand for two thousand tons of sugar a day from abroad, what would be our position in case of war with a maritime power? Imagine the increased prosperity if we could add to our annual national production even fifty million dollars' worth of sugar. It would induce superior methods of culture, better home markets and greater prosperity for the people.

It seems to me that the farmers of Maine need to turn their attention more to the saving and composting of farm manures and home fertilizers, obtained from every source possible; to the growing of sheep and neat cattle, and to the production of those great food crops, Indian corn and wheat. The hay fed upon the farms will give manure of the best quality, (if there is fed with it meal and shorts it will be so much the better,) and this applied to the land will keep up its fertility, and yield good paying crops. The selling of hay, and the purchase of corn, flour and commercial fertilizers, is a somewhat questionable system of farm management, and I believe has too long been practiced by many of our farmers. The change indicated would contribute largely to the advancement of our agriculture in its truest sense; and with the opening season a strong and united effort should be made to put it in practice.

Respectfully submitted.

SAMUEL L. BOARDMAN,

Secretary of Board of Agriculture.

AUGUSTA, December 28, 1876.

MAINE BOARD OF AGRICULTURE.

PAPERS AND DISCUSSIONS,

AT THE ANNUAL MEETING AT

BRUNSWICK, FEB. 8th, 9th, 10th, 1876.

FENCES AND FENCING.

I. Introduction to the Subject.

By Z. A. GILBERT, EAST TURNER.

A small part only of the labor expended on and around our farms is devoted directly to production. Take as an example an average farm as we find it at the present time in any section of the State, where the principal energies of the proprietor are devoted to the farm itself, and consider for a moment how little of the labor expended contributes directly to production. A full comprehension of the facts in the case will render a solution to certain perplexing problems which the proprietor of such a farm has frequently presented to him. It will plainly show why the harvests of the farmers here are not heaped as high as are found in some other sections of our broad country. While our soil is sufficiently productive to give us acreable returns almost equal to any other State in the Union, at the same time we are able to work but few of those productive acres, hence the number of acres bearing a harvest are few in comparison. A rough estimate would be safe in saying that of the year's work not over one-fourth is employed directly in production and in harvesting the

product. The corn grower and the grain farmer of the West devotes almost his entire labor to the production of his corn or his grain. Why should he not then heap high the golden corn in autumn when it represents his year's labor?

It should be our aim more than is now the case to devote our labor largely to production. We should study to do away to a greater extent with the fancied or actual requirements which now draw so largely upon our time, and turn that labor to production itself. It would be equivalent to the saving of just so much time—and time to the farmer at all seasons is money. When we apply business principles in preparing for our productions, as the manufacturer applies them in preparing for his products, we shall find an immense saving of labor. A little capital many times judiciously invested will save labor to the farmer as well as to the manufacturer; and capital costs nothing but its six per cent.

Among the outlays of labor which draw so heavily away from what otherwise might be productive industry—and the only one proper to introduce here—is the labor required to build and keep in repair the numerous lines of fences found at the present time on the farms in this State; and not only is there a large outlay of labor expended in this direction, but there is also a large expenditure of *money* which labor devoted to other purposes had laid by as a profit from the outlay.

It is believed by many thoughtful, progressive farmers, and by some members of this Board, that much of this outlay—that a large part of it in fact—may be averted, and the money and the labor now expended be turned to better account. For the purpose of drawing the attention of farmers and other land owners to the matter, it was deemed best to devote a portion of the time of this convention to its consideration.

For the purpose of understanding in the outset what we are driving at, what we are aiming to reach by introducing the subject as we do, let us take a view of fences as we find them over the State, and then set forth our claims. We shall then start in with a fair understanding, and can the more understandingly discuss the subject.

A large part of the farms in this State—and the same statement will apply to other of the New England States as well—are divided and subdivided by costly fences, till they present in many cases a net-work of lines enclosing small areas like the lines on a checker-board, save that, instead of regularity, we find them run-

ning through all points of the compass, and the enclosures entirely without form, plan or system. The fields are fenced up into small areas, the pastures are divided, the highways carefully fenced in—hedged in we might say in many cases—the garden is fenced up, and the back yard and the door yard. In the villages spacious grounds and seven by nine lots alike are fenced in, picketed, palissaded, cribbed up, choked and stifled by the irresistible fence. All taste, beauty and convenience is sedulously fenced out. Most of these fences on the farm and in the village are costly, and those whose first cost was light are expensive to keep in repair. Many valuable farms may be found, in good condition, and on which are good stands of buildings, which are worth little more at the present time than the fences on the same have cost.

Now it is claimed—it is believed—that many of these fences are useless. Yes, more; it is believed they are an *incumbrance to the land*. Many of them were not needed as permanent structures when they were built, and others have become useless which might for a brief time have been needed. A vast saving in the aggregate to the present occupants of these lands would be made, were these useless fences removed where they would no longer occupy valuable land and be an obstruction to the economical working of the farm, or were they placed in a condition where there would be no further outlay for their repairs. In expressing these views, it is not claimed that we who entertain them have grown wise above those who have preceded us. Much of the fence now claimed to be worse than useless was believed by those who built them to be necessary. Indeed, to them, with the manners and customs and ideas then prevailing, they were necessary. The laws of the land may not have required all the outlay then made, but an unyielding custom which is stronger than law demanded it. We are living in a different age and generation, and the customs and usages demanded of our predecesors do not hold good on us. We are looking from a different stand-point to day from which the same field of vision was observed by our fathers. We are, too, *living* from a different standpoint. We are surrounded by different usages which have gradually come upon us. What was once necessary and desirable under the then existing usages and customs may not and quite likely is not best in our day and generation. It was once thought necessary to enact laws against witchcraft, and even to hang the witches. It was,

no doubt, then necessary, not only to have the laws, but to enforce them. Now all will claim that such laws are not needed upon the statute books. We have so far advanced into a new order of public opinion that no one is so wild as to believe that there are any witches now, or ever were. Many other of the early New England laws would now be quite as useless and uncalled for as the laws against witchcraft. Public sentiment has been and is now gradually changing, and we should not expect the customs and usages of the past to govern and control the present. Farmers are strongly inclined to retain old usages and follow practices handed down from former generations. This is the case in regard to fences and enclosures. We occupy farms which have been laid out, divided and fenced by former owners. Those owners gained their ideas of fencing and fences from the conditions by which they were surrounded, or adopted those handed down from others.

The ancient idea of a fence was as a *defence* to garrison against danger to person as well as to property. Hence the ancient cities were walled—fenced—against the encroachments of enemies. In Jeremiah we read : “And they shall eat up thine harvest, and thy bread, which thy sons and thy daughters should eat: they shall eat up thy flocks and thine herds: they shall eat up thy vines and thy fig-trees: they shall impoverish thy fenced cities, wherein thou trustedst with the sword.”

This idea of a fence was transported to America, and here applied to the farms and their appurtenances where each farmer's house was his castle. It is true, surrounding circumstances from time to time modified the idea as the surroundings of the settlers changed, still the primitive idea of a fence as a defence was handed down from generation to generation, even to the present time; and now we find the farmers all over the State building and supporting numerous costly lines of fences to defend their property from the encroachments of their neighbor's stock. There is not the shadow of a law, and never was, to compel them to do it; yet the idea prevails and the custom corresponds with it. The party of the second part accepting the custom which defends his stock from damaging trespass upon his neighbor's property, transgresses the spirit of the law by depending upon the neighbor's fence to keep his stock out, while the law requires him to depend upon his own to keep them in. We can all easily understand how, in the early settlement of the country, these customs and usages became established. The country was sparsely settled,

the people were poor, communication from town to town and between individuals was difficult, and the inhabitants were more dependent upon each other than is the case at the present time. Hence grew up a sort of mutual consent that each should protect his own crops. The stock was allowed to run at large in the highways, and this necessitated the building and maintenance of road fences.

It is quite probable that the custom of impaling the garden and cribbing the front yard, handed down to the present time and still by many rigidly adhered to, originated from the necessity of defence from roving stock. So fully established was the custom of making public pasture ground of the highways that it was adhered to down to a recent date. It was but a few years ago that towns decided by vote, at their annual meeting, whether cattle should run at large or not, and it was still later before the fact was generally received that the rights of the public to the road were limited to its use as a highway for travel. Had this enlightened view been entertained by the early settlers it would have saved to productive industry a vast outlay of labor.

In looking over the division fences of our farms a man of taste and judgment is seriously puzzled to know what ideas of arrangement were entertained by the former proprietors. Large and otherwise unobstructed fields are cut up into small enclosures by tumble-down stone walls, to the modern farmer of no earthly use, and serving only as unsightly obstructions to profitable tillage. Field boundaries are crooked and irregular apparently for no other reason than to try the skill of the plowman in turning crooked furrows, or the skill of the teamster in driving the mowing machine. These are conditions which have been handed down to us from a less enlightened age, and are allowed to remain to disfigure the landscape and embarrass the operations of the farm—are endured without apparent effort at removal, solely from that indifference to taste, neatness and good order which may too frequently be chargeable to the farmer. The early settlers gave their attention to the removal of the stately forests. To this their chief energies were necessarily directed. The forests were the great incumbrance, and so closely were they absorbed in their removal that little time was given to a cultivation of the beautiful; and even the useful and convenient were by many sadly neglected. The fences were generally constructed of logs from the felled trees, and were built where it could be done the easiest, without

regard to the arrangement. Material was plenty and division fences, under the custom then in vogue of feeding the fields in autumn, were deemed convenient, so the clearings were divided into enclosures. After the stumps had decayed and the plow was taken to the fields, it became necessary to remove the rocks from the surface. These were heavy to draw, the oxen were light, and it was the most natural thing in the world to dump them down into a cheap wall just where the old log fence was rotting down, and just where in too many cases we find the old tumble-down walls to-day. There was no laying out of the farm into fields—no calculation about it. These arrangements, or rather lack of arrangement, grew naturally out of the conditions by which the early farmers were surrounded. We now occupy those farms, and having become accustomed to the arrangements, are indifferent to their inconvenience, and apparently do not realize that their beauty is in any way marred. We are far more at fault than were those who did the work for us. In these matters, as in much of our farming, we adhere to that which has been handed down to us from a former period. It is extremely hard for us in any direction to break away from the old ruts. We can hardly tell why this is so, and in many cases do not know that we are controlled by any such influences.

The laying out and dividing of farms is a subject which may well claim the careful attention of every land holder; and this Board can do no better service than to direct some of its talent to its consideration, that the attention of farmers may be called to it. There is a wide field for influence, and the beauty and value of our farms might thereby be greatly enhanced. Our farms have been reclaimed from the forest—the fields for the most part have been cleared and smoothed. Now, shall improvements stop here? If we intend to live and labor upon the farm during life, let us fit it for the purpose by attention to matters for which our fathers had not the time. It was theirs to reclaim and subdue—it is ours to beautify, adorn and arrange. Thus each generation would leave its heritage better fitted for that which is to follow. It is largely a matter of education, and to whom does it more fittingly belong to introduce the first principles of this education than to this Board of Agriculture, to whom are intrusted the wants, present and prospective, of the agriculture of our time?

Gentlemen, the part assigned me in the general topic of Fences and Fencing in the published programme was denominated the

"History of Fencing." Instead of pursuing the subject—or that branch of it—therein named, I have aimed only to give a brief *introduction* to the general topic, and my "history of fences" will no doubt remind you of Mark Train's lecture on milk, in opening which he said, "The richest part of milk is the cream," and omitted to make any further mention of milk during the lecture. I say I have only intended to introduce the subject. The general topic is not only an important one, but it is a broad one—too broad to be comprehended in one single paper. It was therefore divided into the several branches designated in the programme, and each branch assigned to a different individual. That the subject is of incalculable importance will be made apparent, if you are not already cognizant of the fact, as the discussion progresses.

The cost of supporting the *necessary* fences of our farms is immense. The cost of supporting what we now have is a still greater tax upon us. It is believed that with us in fences, as with Brigham Young and his followers in matrimony, we are too much fenced. It will be claimed that the progress we have made has brought us to a time and to a condition wherein all the fences that were once deemed necessary are not now needed; that we can without serious inconvenience dispense with much of our costly fence and correspondingly reduce the heavy tax in this direction now levied upon us. Yes, more than this, it will be conclusively shown that much of our fence is not only useless, but that it is also a serious burden to us aside from the cost of repairs. These facts, as we believe them to be, will be brought out by those who have the matter in hand. These are matters which claim our most serious attention. Practical farming—the manipulations of the soil and the care of crops, are not all of the important questions which may properly be considered. If we can in any way reduce expenses by reducing the amount of unproductive labor on the farm, we practically increase the productiveness of the farm, and this, too, without any greater draft upon the fertility of the soil.

II. The Statistics of Fencing.

By IRA E. GETCHELL, NORTH VASSALBORO'.

The part assigned me in the discussion of this question is largely statistical, and I have made use of many facts and figures from the last United States Census Report, as being more reliable than perhaps can be obtained from any other source.

Our State has a total land area of twenty million acres, a little less than one-third of which is devoted to agriculture. In other words, we have six million acres occupied and improved for farming purposes, as distinguished from the wild and timber lands of the State. The same report gives the average size of the farms in the State as ninety-eight acres—the report of 1860 as one hundred and three acres. The number of farms that exceed three acres in size is sixty thousand. Taking these figures as a basis from which to make our estimates, we have sixty thousand farms of one hundred acres each, which law and custom require shall be enclosed with a good and substantial fence. To inclose a farm of one hundred acres—dimensions 100 by 160 rods—requires 520 rods of fence, one-half of which each proprietor is required to build and maintain. This multiplied by 60,000, the number of farms in the State, gives 15,600,000 rods of fence required to build our boundary or line fences. For the partition or internal fences of the farm we have no data upon which to form our estimate, excepting observation and the opinions of intelligent farmers with whom we have conversed. They include the enclosures of the flower and vegetable gardens, orchards, farm yards, lane and pasture fences, (excepting such as are enclosed by road or boundary fences.) I think it a low estimate to call the internal fences of our farms as equal to one-half the circumference or boundary fences. This divides them into fields of twenty-five acres each, requiring 260 rods of fence per farm and 15,600,000 rods for the State.

To assist me in my estimate of the road fences of the State, I have taken several agricultural towns, with the roads of which I am familiar, as a basis from which to estimate the whole. My own town, (Winslow) which is nearly the average of the towns of

the State both in area and population, an agricultural town with no villages and no surplus of roads, has about sixty miles of road, requiring one hundred and twenty miles of fence. Deducting from this twenty per cent. for the small portion unfenced, leaves in round numbers one hundred miles of road fence per town. But considering that city and village fences are excluded, and all the sparsely settled sections of the State included in this estimate, we make a further discount of twenty per cent. from the above figures, which gives 80 miles of actual road fence per town. This, multiplied by 420—the number of towns in the State—makes 33,600 miles, or 10,752,000 rods of road fence in the entire State. Accepting these estimates, we have of

Division or line fences.....	15,600,000 rods.
Partition fences.....	15,600,000 "
Road fences.....	10,752,000 "
Making a total of 41,952,000 rods, or 131,000 miles.	

I will also mention, although not being an actual direct tax upon the farmer, that there are about one thousand miles of railroad in the State requiring two thousand miles of fence. Admitting that this great amount of fence has to be repaired every year, and rebuilt every generation—imposing a large annual tax upon every land owner for labor and material—the question forcibly presents itself to us: Cannot a portion of these fences be dispensed with? We do not present the "no fence" system as being new and better than the good old ways of our fathers, but rather that our present wants and resources demand a change in the direction of economy.

With the pioneer farmers of our State fence material cost nothing. With farms to clear of stumps and stones and wood, it was rather an incumbrance to be got rid of. Since their day all material has increased in value many fold, and farm labor increased in price and deteriorated in quality. The number of improved acres has increased in much greater proportion than our farm stock; our cattle remain in the stable a greater portion of the year than formerly, and are more domestic in their habits. These and many other facts go to show that the time has come when the system inaugurated by the pioneers of our State, and followed since their day with little or no change, should receive such modification as our changed condition and circumstances require.

Admitting that the legitimate use of a fence is to confine our farm stock and prevent our farm crops from injury, we will give a few more statistics. The whole number of neat stock kept on farms in the State—reducing the number of sheep to their equivalent in cattle—is 500,000. To pasture these requires 1,500,000 acres of pasture lands, and to fence this it will take 7,800,000 rods of fence. Add to this the amount for lanes and farm-yard, eighty rods per farm, making 4,800,000 additional. These amounts make thirty per cent. of the fence we now have. We will add to this ten per cent. more for gardens and orchards and other necessary fences, which makes the whole amount 16,795,200 rods. Thus we find we have our pastures and lanes and farm-yards, our gardens and orchards fenced, and we still find we are supporting more than twenty-five million rods of fence beside, some of which may be desirable; but it is a growing opinion among a large class of the intelligent farmers of this and other States that the supporting of this large surplus of fence costs more than the benefits to be derived will warrant.

DISCUSSION OF THE ABOVE SUBJECT.

Mr WASSON. I will simply occupy a moment, hoping that I may be able to open the door of discussion a little wider, and that as usual there will be plenty of volunteers. One of the great difficulties that meets the farmer of Maine is the cost of production. To make myself understood: If I am a grower of hay as a main crop, and hay is worth \$12 per ton in the market, and it costs me \$12.50 to grow a ton of hay, I shall not as a matter of economy grow hay for a long time, and so of any other crop. I believe that this question of cost is the great one which presents itself to-day to the farmers of Maine, and I believe that the reason why the West presents greater attractions to the working men than the East, is because the cost of production is less in proportion to the market value. I believe that Maine any time since 1870, can show a greater yield of wheat per acre than any of the wheat-growing States. Yet the farmers think it won't pay to grow wheat in Maine. Why not, when wheat is worth three or four times as much as it is in the West? Because it costs \$1.55 to produce the wheat which sells for \$1.50. I put these down not as accurate statements, but to illustrate my position. I say then that so far as there is a want of success in farming in Maine, it

is due to the fact that it costs too much to grow our corn, wheat and hay.

Now one of the great costs of production bearing so heavily upon the agriculture of Maine, lies in its fences. We can produce statistics of a character which no man can doubt, showing that to-day we are maintaining in Maine four or five thousand miles of useless fences. Now reduce that number of miles to rods, and put these at \$1 per rod. Take this to the farmers of Maine, and show them what they are taxed simply to support useless fences.

I notice that in this town the fences are largely board and rail. In our section fortunately we have some cedar. When I became the owner of a farm I could buy the best cedar rails at from \$8 to \$10 per hundred. Now the railroads can come in and pay prices the farmers cannot afford to pay; and now second growth cedar rails cost from \$12 to \$14 per hundred. Now what will it cost to fence a farm twenty years hence? We have a right to suppose that prices of fencing materials will continue to increase and that it will cost double what it does at the present time. Now this is a question that comes home and addresses itself to the farmer. Here we have a burden that is bearing like a dead weight on the prosperity of Maine; it is yearly increasing, and is doing more than any other one agency in driving our young men to people the west. More than once members of this Board have presented this question to the legislature with all the ability that they could command, and asked for a remedy; but we have failed to impress upon that august body its importance. This very winter the question has been presented in this form: Will you rid us of the useless line fences? and after a full examination and recommendation of the Committee we have received the cold response of a "right to withdraw."

PRESIDENT ALLEN. A few years ago the fences spoken of as unnecessary were removed from the College farm at Orono. A few facts are worth more than all our theories in regard to the consequences which result from taking this step. The cost of fencing I suppose will be presented hereafter. There are some considerations, such as the cost of having more or less land on each side of our fences producing weeds, thistles and all these other things which are a detriment to the farm, and which require so much labor to exterminate them; and the cost of breaking out our roads in winter, which are filled with snow drifted in in consequence of the road fences. Many things are preserved for their beauty as

matters that minister to higher wants of our Natures than merely feeding the body. Now if so many of these fences are not kept for their utility we want next to inquire—Are they objects of beauty? Take our fences as you see them as you ride along—the Virginia fence, the stump fence, the log fence, the pitch-pole fence and the post and rail fence—are they such objects of beauty and taste that we need be at this heavy expenditure to maintain such ornaments on the farm? I must confess that I am so deficient in taste in this respect, that, though little accustomed to see fields extending to the road, I love to view a cultivated field without these classic fences with their accompaniment of brambles.

The neighbors about the college farm are beginning to dispense with their useless fences. We find no difficulty with our neighbor on the south. I don't know that he has trespassed on us. I think we can mow about straight. I see no disadvantage thus far. The only objection likely to be brought up is this: "We want our fields fenced because we want the fall feed." It seems to me this is one of the great advantages in not having fields fenced—because you can't feed in the fall. It is not only our immediate neighbors that are doing away with these fences, but I find every season as I pass over our roads in every direction, that the farmers are removing their fences from the road-side, and boundary fences where fields come together. We have not yet experienced the inconveniences that are urged as reasons against the doing away with this expenditure, and I am thoroughly convinced that the pasture fences and the fences about the buildings are all the fences needed on a farm.

MR. JOSEPH R. FARRINGTON of Orono. I wish to criticise one or two statements made in the papers. Mr. Gilbert says in his opening paper that the old fences are allowed by the farmers to remain solely through want of taste and want of ability to see that the beauty of the landscape is marred by them. President Allen has just said that we have removed our useless fences at the College farm. I wanted to throw in a word there and say—abandoned. We have abandoned our useless fences, but the work of removal is not the work of a day or a month or a year. We have some of these tumbling, tumbling stone walls, not laid up of such stone as might be moved with a small team, but such as the lumberman farmer who occupied land before us hauled with his six or eight yoke of seven foot cattle. We have them there, abandoned but not removed, a disfigurement on the farm, but we

cannot remove them I wish to say a word for the credit of my brother farmers. We have it thrown upon us that we are stupid, have no taste, are careless and indifferent, and go about with hay-seed in our hair, and leave the stumps in our fields from sheer ignorance. It is not so; we do it from sheer poverty, for which we are not to blame, in which we do not propose to remain, and out of which we are slowly and surely working. We do appreciate the fact that these things are a disfigurement to our farms, but we cannot remove them to-day nor to-morrow; but the day is coming, and it is not for distant, when farms are not to be disfigured with stumps and stone walls, and when they will present a view to the passer-by that will be a credit to the taste of our farmers, and though our eyes for a time may be closed by the pressure of poverty, as soon as we gain strength we mean to get our eyes open.

Another criticism. I think the gentleman who gave us the statistics of fencing, in reckoning the rods of line fences took for his illustration a farm of a hundred acres, and supposed the fences to run entirely round it. The truth is bad enough, let us not make the burden larger than it is. How many farms in the State are all arable land? Isn't there a large wood lot not fenced? By reckoning the amount of fencing at five hundred rods don't we make a statement greater than the facts will bear? Now the practical point in regard to the useless fences is, how can we get rid of them? I am glad to hear that the law requiring these fences on the farm is all imagination; and it seems to me that if the Board could make this fact known to all the inhabitants of the State it would do a work of incalculable value to the farmers. Why, when the law of the State provided that cattle should not run in the road you have no idea of the obliquy, I might say the curses, that were heaped upon us who claimed that we were not obliged by law to keep up our fences by the public highway. We were held up as oppressors of the poor, who would take away from the widow her last chance to pasture her cow; but I am happy to say we were successful.

It is not only an expense to build and keep up these fences, to break out the roads, and keep down the weeds they harbor, they are not only a blot to the landscape and a disfigurement to the farm, but they are useless, and we are under no obligation to make them and keep them in being. We have no right to make anything but pasture fences, because they are not only an expense

but an injury to the community. Now here I think I present a practical point. You can each one of you, if you have not already done it, remove your roadside fences, and leave your fields open to the gaze of the passers-by, and make them not only a source of pleasure to the looker-on but a source of pride to yourselves. Will you not do it, and show that the farmers of Maine are doing something for their own betterment and credit?

Mr. BAILEY of Bath. I suppose I shall be called an old fogey and I have no doubt I am. I am in favor of having my land fenced. I don't like to see a pasture fenced for twenty rods, and then the field all open. I don't like to travel on a road of that kind. I presume you will say my eyes are not straight. I would inquire why those who wish to leave their land open in this way, don't leave their houses open at night? There is beauty and system to my eyes in a farm that is fenced, and with regard to its cost, the "almighty dollar" isn't the only thing to be taken into consideration. Gentlemen speak of useless fences, but they don't tell us what useless fences are. Would the owner of a field that cuts sixty or eighty tons of hay call the fences round that field useless? I do not call fences round my farm or by the road useless. There are cattle that get out unexpectedly, and if they get into your corn it will cost more than the fences would. I see before me a gentleman who has a farm not far from where I live, and he has taken pains to build good road fences along his lot. I think he is to be commended for it. It shows that he is industrious, and I should recommend to all my friends to fence their farms and be at peace.

Mr. TENNEY of the *Brunswick Telegraph*. I am as much of an old fogey as my friend Bailey, and I will quarrel with any man who wants to fence me in. Statements have been made that the cost of fencing in New York is more than the cost of building. Mr. Bailey says he would build road fences; if I understand aright the law does not require that I should fence out my neighbor's cows. We have had more trouble in the village of Brunswick from stray cows than there has been anywhere else, I venture, on the face of the earth. The proprietors of Brunswick about the middle of the last century conceived the idea of giving to the town 1,000 acres of this sandy land. Some gentlemen appropriated 150 acres of it, so that the town of Brunswick now holds 850 acres of it, and I think the general idea prevails that the common can only be used as pasture land, and the consequence is that all the cows in the

village have been pastured on the town common and the farms about it. But now the cows instead of being turned loose have herders, and are brought home at night, and don't climb four story college buildings, and get milked on the college grounds. The idea has come to be accepted that the owners of cows must take care of them, and that is a great improvement.

Let me cite the case of a farm at New Meadows bought by two stable men who of course have an abundance of dressing. The land was very much impoverished. They hauled rock-weed and brought up the crop of hay from one and a half to three tons per acre. The land sloped to the river and was drained cross-wise. They took down the stone-walls and drained towards the river. I know other places where they are taking their fences down. So far as beauty is concerned, I see nothing more charming than an open field. The marked improvement which has been made in this town has been brought about under the most adverse circumstances, and if Brunswick can throw down its road fences, other towns can do the same. What is the use of doing work which the law does not ask us to do?

PROFESSOR CARMICHAEL. It has been assumed here that those who advocate the removal of road-side fences take a new position. I maintain that the good old custom is not to have fences, and that the custom of maintaining them is an innovation, and one peculiar to this country. You may land upon the English coast and travel from Liverpool to London, and then you may cross the channel and travel to St. Petersburg and not see a fence on the whole road. In Germany they have no term for a fence. Now the question with us is whether it is cheaper to fence in cattle or to fence them out. In regard to the question of beauty, we see these little white fences about our buildings. They are intended for ornament, but any man of artistic taste will tell you that they are blots. I point to the town of Cheneyville, Conn., as an example of a village beautified by planting trees, and by other improvements the work done by association directed by cultivated taste. I defy any one to bring forward so beautiful a village as that made from so slight material. It has not any remarkable scenery, and yet it has become a popular place of resort. We have become so accustomed to ugliness that we don't know what beauty is; but to any one who has looked at such a place as this there is no comparison between the trees and lawns and our fences. As to the profitableness or unprofitableness, that is a question of statistics,

but of course it is cheaper to remove the fences. I wish to give an illustration of what might be done. You know in Germany there were a great many old Lombardy poplars along the highways. They shaded the land so as to be injurious, and their roots ran out and injured the fertility of the soil. The Prussian government issued a mandate that they should be cut down and apple trees planted in their stead, and it was done within two years, and it is found that the revenue from these apple trees pays the whole cost of maintaining the highways.

Mr. L. L. LUCAS of St. Albans. The owner of cattle is under obligation to take such care of them that they will not annoy his neighbors, and in order to do so he must have protection of some kind to keep them on his own premises. The question has been discussed whether he will fence them in, or fence them out. Whether we fence them out or not we must fence them in, and if we do both it makes two fences to build and keep in repair. If every one fenced his cattle in there would be no need for any one to fence them out. As to the road fences, for at least four months in the year, in a large part of New England, they are an expensive nuisance. The highways through a great many of our towns are blocked up with snow so that it is expensive to clear them out, and many of them are shut up three or four months in the year because there is not sufficient travel on them to pay the expense of breaking them out. We asked in our town a few years ago for a legislative enactment making it imperative on a town to have the fences that could be, taken down before the snow came, and put up again in the spring, at the expense of the district. They said that surveyors had the right to do that now, and so "legislation was inexpedient."

One argument against leaving down the roadside fences is the inconvenience of driving herds of cattle and of driving cows to pasture over these roads. The herds are driven more generally during the last part of the season than any other time, and then the crops are taken off and the bars left down, and it makes more trouble and is more expense to get sheep by the fields than it would be if there was no fence there. There are just gaps enough to make trouble. These fences are a nuisance for the collection of weeds and briars, and are not of any use when you want a fence, for there is not one in fifty of them that will stop cattle if you want them to. Now if we can make a change and get rid of these useless fences, or apologies for fences, and apply the mate-

rial to the pasture fences, and have the line fences, where they are necessary, good ones, (for poor line fences make a good deal of trouble.) If we can do this we shall have taken a step in advance, worth more than anything we have done for the last five years.

HON. C. J. GILMAN. I should like to inquire of Professor Carmichael whether all the fences in England, Ireland and Germany are simply for ornament. I have an impression that their hawthorn hedges are almost impervious.

PROF. CARMICHAEL. They find from the experience of centuries that it is unprofitable to have fences—that it is easier to take care of cattle than to keep up fences. There are many fences in England, but to mark the terminus of land I saw but few. There are no lines of demarkation except such as the crops give, and these lines run with mathematical accuracy. So far as I have seen in Germany and in England there are no fences, as such. You may see a beautiful prospect from the top of Mt. Holyoke, in the neighborhood of Amherst, and the example set by taking down the college fences, followed as it has been to a great extent, has had much to do with making it what it is. Village associations are taking hold of this matter of improvement, and they see that the fences are in the way. It is like buttons on the coat tails. Formerly coat tails were made so long that they had to be buttoned up. There is no longer any necessity for the buttons, but we keep them there. I say that any unprejudiced person, passing through those villages where attention has been given to beautifying the landscape, and where the grass can be kept cut by association, without expense, will say that they are much prettier.

Mr. GILBERT. I am glad that the discussion has taken the course it has. It has proved to me that advanced ideas are prevailing and that we are taking steps forward. I speak from a farmer's stand-point, and many of the speakers have spoken from the stand-point of the villager, and we are agreed in the main, although the distinction has been made. Now as to the uselessness or usefulness of these road fences on the farms, the practical working of their abandonment, as I know from experience and from a somewhat extended observation, is this: If you wish to protect your farm from your neighbors' cattle take down the fences; when you do that, your neighbors feel compelled to take care of their cattle. All over the State they are practising this,

and I defy any man to find the case where they do not enjoy better protection after doing it than they did before. I had it proved on my own farm. Unfortunately for me, there are three miles on it where once was old fence. Of course some of that land is remote from the residence of the proprietor ; and occasionally these fences were not in repair, for, as the gentleman from St. Albans says, they are not kept up if they pretend to keep them up. Some of the neighbors liked to have their cattle crop the luxuriant herbage by the roadside, and coming into possession, I found that the cattle were not always satisfied with what was on the roadside. I did not feel myself able to keep up these fences, and so I just removed them ; the consequence was that not one of these fields was trespassed upon, and the harvest upon them is as valuable as those raised about the buildings.

MR. HIGHT. In reply to the criticism of the gentleman from Orono, I would say that I went to the Census Report for my information. The census return says that the number of acres of occupied land in the State is 6,000,000. We are not obliged to fence our roads, but we are obliged to fence our occupied lands ; and if, as he says, we don't fence entirely round them, it is making a bad matter worse, for if we don't fence them we are liable for the consequences.

HON. C. J. GILMAN. In relation to driving herds of cattle ?

MR. GILBERT. The road leading past my premises to Lisbon, following down the river, is a leading highway through the county, and one on which nearly or quite every week during the season cattle are driven to market. Many of the proprietors along that highway are removing their road fences and no inconvenience whatever has ever been experienced from the removal on that account. The cattle can be easily driven provided they are properly cared for, and if there are fences the cattle are carelessly driven. Every day in the summer I drive my herd of cattle, varying in numbers, past a field which borders on the highway, where no fence has been maintained since I came there. Of twenty head of cattle driven there not once during the summer did one of them step over the ditch or inside the field.

III. The Cost of Fencing in Maine.

By PETER W. AYER, FREEDOM.

You have had this question of fences so ably handled in the two papers preceding me, that I would not present my efforts in this direction, did my duty demand more than some statistics and estimates of cost which have been obtained largely by the assistance of intelligent land-owners.

The total area of the State is 31,760 square miles. Estimating three-fourths of the same, including lakes and ponds, as unimproved, leaves 7,940 square miles, or 5,080,600 acres of improved occupied lands. This if fenced into thirty acre lots will require nine rods per acre, but inasmuch as more than one-third of this is line or division fence it is reduced to a trifle less than seven rods per acre actually built by the owner. This estimate of the size of lots is made up by comparing large farms with small ones in widely different localities, and makes an aggregate of 40,644,800 rods of fence in the State—not considering ornamental fence at all. From the Report of the Seventh Census and other data, I find about one-fourth to be highway fence—at least seven-eighths of which only separates fields from roads harboring all sorts of weeds, and helping to perpetuate the pernicious practice of pasturing them, thus becoming worse than useless; the other eighth cannot be dispensed with, enclosing pastures as it does.

I have said there are 40,644,800 rods of fence for all practical purposes in the State, and it is divided nearly as follows: Highway fences, 10,161,200 rods; line or division fences, 15,288,000 rods; partition, (including lanes and orchard) 15,195,600 rods. Estimating the cost of this fence at one dollar per rod, shows \$40,644,800 to be the first cost of fences now on our farms. For line or division fences, \$15,288,000; for partition fences, \$15,195,600; for highway fences, \$10,161,200. Now add to this as the annual cost, interest at six per cent., \$2,438,688; repairs or deterioration, six per cent., \$2,438,688; taxes, two per cent., \$12,896; snow bills about one-tenth of the municipal taxes—\$360,000, is fairly chargeable to cost of repairing highways in winter. Here you have the sum of \$6,050,272 as the annual cost of our fences

which divided among the seventy thousand farms of the State, make the average first cost \$677, and the annual cost of keeping in repair, &c., \$100 each.

In my estimate of cost I shall assume that the land occupied by useless fence is quite an item. Let us see how much. The same authority quoted several times before, viz: farmers in different sections, uniformly allow that *ten per cent.* of their partition fences can well be abandoned. Adding this to the seven-eights of road fences which ought to be removed, and we have 10,410,610 rods of fence not needed, occupying or destroying the utility of soil eight or more feet wide. But for convenience we will call it half a rod wide, equal to 5,205,305 rods, or 32,533 acres, worth certainly on an average \$30 per acre, or \$975,990 in round numbers. I deem no recapitulation of the above necessary, as my figures are all very plain, right or wrong.

I may be allowed to digress a little here. In yesterday's discussions very little of anything was said in relation to the manner in which these useless highway fences may be got rid of. Now it is well known that quite a large part of such fence is composed wholly or in part of stones, and I suggest that the practical way, in fact the only correct way to dispose of them, where drainage will be a benefit, is to put them into well made drains, where they should have gone in the first place, thus giving the owner several acres of new or virgin soil. One more suggestion and I am done. Some exceptions were taken to the statistics presented yesterday by the gentleman from Kennebec, (Mr. Getchell). Now the more I examine this matter the more I am convinced that my figures are not large enough, neither are his; or, in other words, although our estimates look large, they are inside the facts.

IV. Anomalies of Fence Law.

BY SAMUEL WASSON, EAST SURRY.

Fence laws, like the fences to which they relate, are full of defects. Of fence laws, we have too much, and of fences, too many. Of the many anomalies now existing in our fence law, the pure logic of justice is quite incapable of explaining.

The present law, in its best estate, is a "double and twist" of usages and enactments, ancient customs and modern decisions; a compound of common and statute law. Its first official act was the recognition of all farm property as being either *locomotive* or *stationary*, or that which could, and that which could *not*, pass its "metes and bounds;" and for the benefit and protection of all concerned, the law enacted that *fences*, as a "line of obstacle," should be maintained between them.

The next link in the legal chain was how, when, and by whom such barriers should be erected? Equity and justice say, that class of property which could not astray needed no restraint, for it could neither make an encroachment nor do an injury. So said Common Law; and to make its saying heeded, it attached a "peril" to locomotive property when it escaped beyond its bounds. As if to "moor" this declaration of common law "with two anchors," written law declares (R. S. c. 23, §. 4,) that "any person injured in his land by cattle, etc., may recover his damage." Thus far every declaration of law and justice is, that fences are for the protection of crops and the restraining of cattle, and that the fence burden is to be borne by the latter.

The first irregularity of Statute Law, that "Americanism" for *fraud*, comes to the light in these words: "by proceeding, as hereinafter directed," (R. S. c. 23, § 4,) "one injured in his lands may recover his damage *by proceeding as hereinafter directed*." It is this "proceeding as hereinafter directed," which has become a "Felix waiting for a bribe," throughout the whole fence law. The chief anomalies for which it makes way, are found in the laws which relate to DIVISION FENCES, ROAD-SIDE FENCES, and the PERILS. Bear in mind that the underneath inferential of law is, that fences are not for the restraining of crops but of cattle, and that fences,

or "lines of obstacle," are lawfully required of those only who may be the owners or occupiers of cattle; yet in the face of this time-honored law our statutes declare (c. 22, § 2,) "That occupants of lands * * * shall maintain partition fences in *equal shares*," irrespective of the use to which either of the "occupants" may put that land. Suppose the enclosures adjoining to be a pasture of A's and a field of B's—then by this twist of law B must build one-half or an "equal share" of A's pasture fence. Suppose A's land be a common, then B must build both shares, or the whole, so that the cattle of the neighborhood may go at large upon this common. If this is not an anomaly of a finely knit character, tell me what its cunning is?

Again, says this astute statute, (c. 23, § 4,) that if there be a defect in B's half of the division fence between himself and A, and the cattle of A's enter his field and destroy his crops in consequence of such "defect," no damage can be recovered of A. Even if A's cattle break through where no defect is and do damage, as a matter of economy, B better pocket the injury than to resort to coercive measures to replace the loss, for the whole course of "an action of trespass" runs counter to swift justice and results in adding insult to injury. This phase of the statutes which requires division fences between grass and grazing lands to be maintained in "equal shares," shipwrecks that whole principle of law which imperils the owner of cattle, unless he fence them in and upon his own land. This muscle of the law's anomaly is more powerful than the law itself.

The next in course, of the law's deviations, is that which relates to roadside fences. It is supposed to be written in the law that roadside fences are not required. If so written, let the eagle-eyed find it. By the spirit of the fence law road fences are not required; but by its administration they are an anomaly of law, deeply freighted with vexation. Suppose the *divide* between the fields of A and B to be an *unfenced* highway. The lawful line between lots is the center of such highway. Either or both have a lawful right to occupy to the road-center line. They may crop or de-pasture up to such line. If either elects to de-pasture and his cattle pass over such unfenced line—that is, cross over the highway into and upon the land of the other, what is the remedy for the party thus trespassed upon?—for the same law which is *supposed* to grant the removal of road-fences, indisputably enacts (c. 23, § 4,) "that if the beasts were lawfully on the adjoining

lands and escaped therefrom in consequence of the neglect of the person suffering the damage to build a fence, the owner of the beasts shall not be liable." Gehazi begging gold, begs the leprosy. One begging for fenceless roads, begs for *lawful* encroachments. This is one of the "beatitudes" of our fence law. Say you, "that beasts at large, without a keeper in the highways, may be impounded?" Say I, that one's cattle upon his own land, be that land without or within the limits of a highway, are not at large, and being lawfully there, need no keeper and cannot be lawfully impounded. There may be redress in an action of trespass, but he who appeals to it will be quite as likely to find some things in its delays which are not of regular orthodox standing.

But suppose stray cattle, unlawfully in a public way, pass therefrom into your garden or corn-field—what protection is by law afforded? Why, as a law-abiding citizen, you must house, water, feed, and otherwise care for the comfort of such invading beasts for the space of ten days, waiting for an owner to "turn up;" nor during those days of probation can you lawfully advertise. Let the owner find his stray cattle as best he can, the law's command to you is to keep "mum." If no owner calls before or at the expiration of the martyrdom-days, the beasts must be committed to pound, or you forfeit one per cent. on their value for each week. Joy go with him who attempts to impound an estray, for with such an attempt comes a swarm of vexations, petty yet powerful as the wasps and hornets of Canaan. Here an inspection of the accompanying diagram is invited.

By the diagram is represented a field of A's, 130 rods square, his pasture on the south, 70 rods, a strip of common between the pasture and village lot; B's pasture on the east, C's on the north, D's common on the west, and a road 183 rods crossing the field diagonally. For the security of the field, with a law without defects, A need build but 130 rods of fence, (the division line between field and pasture,) while to protect his field, as required by the defects of law, he must build the 130 rods between his field and pasture, 65 rods of B's pasture fence, 65 rods of C's, 130 rods of D's, and 366 rods of highway fence. For A to keep his cattle out of his field requires 130 rods of fence, while practical law requires him to build 626 rods, for no other earthly reason than to keep out the cattle of B, C and D. At common law, as per diagram, A must build 390 rods to fence in his cattle, but

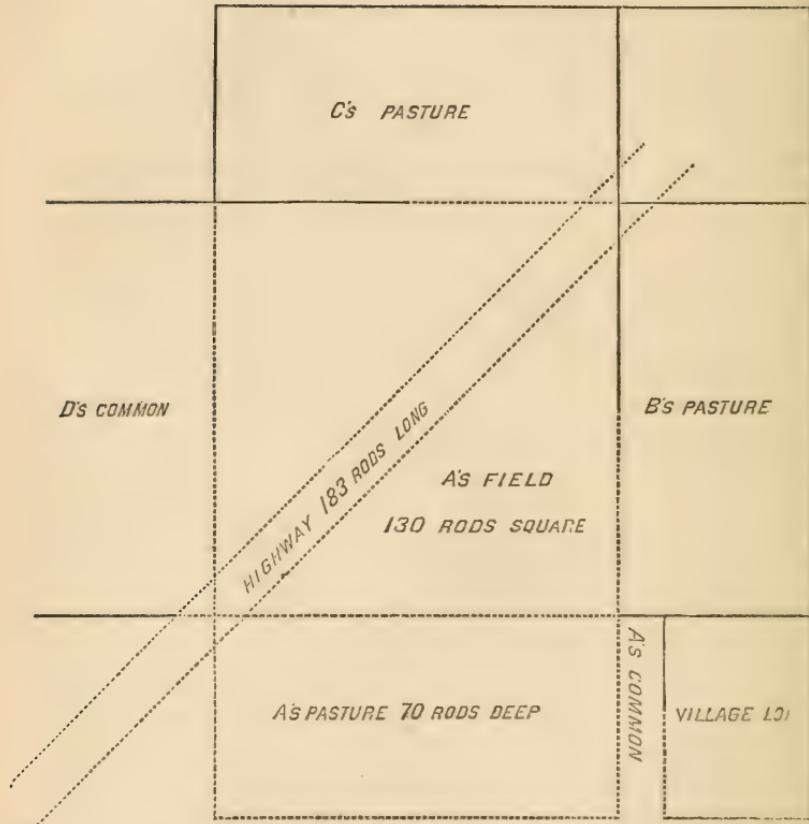


DIAGRAM ILLUSTRATING FENCE LAWS.

by the anomalies of statute law, additional to the 390 rods, he must build one-half of the village lot fence adjoining his strip of common, half of B's, half of C's, the whole of D's, both road fences, or 1,051 rods in all. Thus it is how the anomalies of fence law oppress, an oppression which comes to every farmer having fences to build.

Suppose one to be blessed (?) with neighbors who won't take care of their cattle without the thumb-screw of law, the statutes provide a choice of ways to torture, one by impounding and the other by an action of trespass. Impounding is like a bridge of boats, broken and tossed by the angry sea, while the pinch of an action of trespass is best expressed by this epitaph, (written by one having a spite against a deceased neighbor :)

"Here lies his body. For his soul
You'll have to search a deeper hole."

So one searching for redress in the deep-hole of law's delay must invoke the aid of meek-eyed patience. The perils, the motors of law, have become little else than wordy blows, or so slow and uncertain as to incur no dread. It is not excessive severity, but swift certainty, which deters crime. If the hot breath wasted over the "death penalty" was turned scalding hot on law's delays, either gallows or prison would have fresh terror. The swift certainty of peril has clean gone out of fence law, by the impounding process at least. Its road to justice is intensively crooked and full of judicial escapes. Says the law, "every beast found at large, or injuring any person in his land, may be impounded till the forfeiture and all fees are paid by the claimant." This has an enticing look, but the "look" is all there is of it. When one distrains the beast of another and proceeds to impound it, he exercises a naked and statutory authority. The course plotted upon the chart of the law must be followed without deviation. Each and every step, from first to last, is a separate and independent fact. All of these facts must exist and be in place. Every form required must be observed; any departure from the statute made is contrary to the genius of judicial law. The "steps" which must "toe in" and "toe out" with statutory precision are, 1st, That the beast was unlawfully upon the land from which it escaped. 2d, If rightfully there, that it did not escape through a defect in his share of the fence. 3d, That there is a pound. 4th, That there is a pound keeper. 5th, That he

was legally chosen and sworn. 6th, That the certificate of oath, in due form, is recorded. 7th, That he gave bond with satisfactory sureties. 8th, That the bond was properly sealed, signed and witnessed. 9th, That the bond show municipal approval. 10th, That the pound keeper has a *legal* record book. 11th, That there is a certificate of the impounding. 12th, That food and drink were furnished, as required. 13th, That the pound keeper *did not blunder*. With such a brigade of *thats*, impounding will "stick." Be it remembered, that many technical dicta are interwoven in each step, and the falling out of *one* essential dictum lames the proceedings in each step. If one is "pierced with pains" for a fence-law suit, let him resort to an action of trespass, a penal part of fence law, said to be "brimful" of peril. If one would see everything of law's delays, from the "alphabet to the diploma," and the questions of fact to be put into the lottery-verdict of a petit-jury, let him try his hand in an action of trespass against one schooled in the intricacies of law.

The procrastination of penal law with its quirks and quibbles and subterfuges, is doing more to thwart the ends of justice, multiply offences and foster crime, than all other causes combined. The law is so lax in laying penal hands upon rowdies, roughs, and rogues, that a *vigilance* magistracy may be required to preserve the peace. With all the threatenings of penal fence law, experience finds after digging down through the dead stuff of that law, that the only safeguard is in a good and sufficient fence. This, however, is a digression.

The "equal shares" of line fences, may be determined by mutual agreement, assignment or prescription. The point we make is, that division fences be upon division lines. That American weakness of ours to annex territory, retracts when a fence is pushed over the line, for it loses its chattel character and becomes a part of the reality. The land holds it. Here is another of law's anomalies, for while land may hold a division fence, a fence within the limits of a road may hold the land. To sum up:

We call for the repeal of a law which is *fencing in* by its declarations, but *fencing out* by its penalties.

We call for the repeal of a law which puts the saddle upon the wrong horse—grass, not grazing land.

We call for the repeal of a law which is a Babel of technical pesters, which no man can name or number.

We call for the repeal of a law whose "anomalies" give it a career of "victorious villainy."

We call for the repeal of a law which oppresses at every turn, and encumbers every estate.

We call for the *enactment* of a law which will shield the crops and restrain the cattle.

We call for a law which shall take counsel of equity, speedy and even-handed justice.

We call for a law which shall speak the things it means, and means what it speaketh.

We call for a law which needs no "boiling down" to extract its judicial essence, but which shall be simple, concise and efficient, and without perplexing ingenuities.

To this end we would repeal existing laws relating to pounds, impounding, actions of trespass, and equal shares of partition fences—those between adjoining pastures excepted—and create a new statute power, simple, direct, decisive, which could be exercised with vigor and success, without any of the trammels of the old law, or any of its technical fetters or judicial enigmas; a law with perils, which would not "delay its coming" until an offence had mossed over with age. It is this phraseology of the R. S., c. 22, § 2, which is so mischievous in the matter of division fences: "The occupants of lands enclosed with fences shall maintain partition fences between their own and the adjoining enclosures, in equal shares, while both parties continue to improve them." Blot out the words "improve them," and add, *use them for pasturing, otherwise, in severalty by the party so using,* and the thing is done.

Again: Make it lawful for any person to seize and take into his custody and possession any animal which may be running at large or may be trespassing upon his premises, such beast to be sold by a trial justice, and out of the proceeds thereof costs and any and all fines and profits to be paid, unless the owner make payment before the advertised time of sale. Such a law would have the merit of brevity. It would not be a web of words, requiring a lawyer to interpret. It would *bar* the perforating of law terms to let offenders out. It would not be a "pudding-stone" of anomalies like the present fence law, an epic of meaningless fables, empty as the inarticulate wind.

DISCUSSION OF THE SUBJECT.

DR. TUCK of Farmington. I would inquire what is covered by dividing fences between pastures? In my section there is hardly a farmer but pastures his whole farm some time during the year. I can see that this proposed law if applied would materially change the status of the land owner.

MR. WASSON. In answer to the question, I will avail myself of the Yankee privilege, and inquire of the Doctor if in his judgment the Legislature could do a better thing than to pass an act whereby it would become impossible to pasture mowing fields?

DR. TUCK. I have had the idea that there is a surplus growth of grass on the mowing fields in September and October, and that both the soil and the crop are improved by having it fed off.

MR. WASSON. The Doctor will agree that physicians make mistakes sometimes.

HON. C. J. GILMAN of Brunswick. In regard to the point made by Mr. Wasson as to the liability of the owner of cattle in an action of trespass for damage done to the property of another, our statutes and the decisions of our judges, as embodied in our reports, leave it in great obscurity. It is to my mind about as clear, well-defined and perspicuous, as the definition which Rufus Choate once gave of the boundary line between Massachusetts and Rhode Island. He said that according to the rule laid down by the opposite counsel, that line might be defined as the flight of a jay-bird or the tracks of ten thousand foxes with fire-brands tied to their tails. I think that the manner in which the fence question has been treated is an insult to the intelligence of the State, and I cannot doubt that all classes of our people would rejoice in the passage of a reasonable and clearly expressed law which should determine the rule. Whether it would be reasonable to require the owner of a pasture to make all that fence between his pasture and his neighbor's field, as our friend proposes, I am not ready to say. It involves considerations on which I should want to reflect before expressing an opinion.

In relation to the other question, as to the liability of A for damage done by his cattle on the land of B, the one owning land on one side of the road and the other on the other, it is one which involves several questions. B says the cattle are his, Why does he not prevent their passing over? A says that he did, by his fence. Then the question arises whether A was bound to exer-

cise ordinary or extraordinary diligence. But on the question of what constitutes ordinary and what extraordinary diligence a jury would very likely disagree.

With regard to the law in relation to road-side fence where the adjacent land is field, there has never been any absolute repeal of the old statute, yet the declaration of the Legislature that stock shall not be allowed in the highway repeals it inferentially, and I suppose the court would take that view of it should it ever be brought before our highest judicial tribunal. The Legislature ought to make a law on the subject so that the farmers of the State may know exactly how to govern themselves in the premises, and so that there may be no misapprehension as to the meaning of the statute.

MR. BAILEY of Bath expressed his dissent from the views of Dr. Tuck, as to the expediency of feeding fields in the fall, holding that if there were such a thing as a surplusage of grass it was better to mow fields than to feed them, as in feeding the animal tears up the grass roots.

GEN. MERROW of Bowdoinham. Tradition has handed down to us these road fences and let us adhere to them. If I go through the country and see the fences down it looks bad to me—like a drunkard's house with hats in the window. I want to know when I go to bed that my field is safe, and if I have a good fence it is safe. If your fences are down and a wild cow gets in your field it takes three or four hours of your time to get her out. Good fences make good neighbors. There are a great many miles in our town where there are stone wall on both sides of the road. It would be more work to move them than they are worth, and where are you going to put the stone?

MR. TENNEY of the *Brunswick Telegraph*. As to road fences making good neighbors, if I can't live peaceably with my neighbor without a big fence between us, he or I has got to move. I know of people who fence themselves in with fences as high as their windows, but they are not the right kind of people, and don't make good neighbors, citizens or anything else that I know of. Look at the fences by the side of the road in this town. They are most abominable,—stump fences, and Virginia fences, and stone walls out of repair. Now I don't think that there should be road-side fences, but there should be something as a guide in the winter, and that brings to mind the statement made by Prof. Carmichael yesterday in regard to the apple trees planted by the

road side in Germany by order of the government, which not only afford shade to the road but yield a revenue. The rock maple tree is a pretty shade tree for the road side, and is valuable for making sugar. The surveyors might be authorized to set out trees and shrubs, which would beautify and shade the road, and serve too to show where it is in winter.

The following resolution was offered by Z. A. GILBERT of the Board, and unanimously passed :

Resolved, That it is the sense of this convention that a large portion of the fences in this State, both in country and in town, are useless, and a serious incumbrance, and that we will use our utmost endeavors to encourage the further diffusion of the enlightened views which have been expressed before this convention.

ON PLANT NUTRITION.

BY PROF. LEVI STOCKBRIDGE, OF THE MASS. AGRICULTURAL COLLEGE.

As has been announced in your programme, I am to speak to you this evening upon the subject of plant nutrition or the feeding of plants, a subject which has attracted the attention of the scientific men of both Europe and America, and which as matter of pure scientific inquiry and investigation, is one of utmost importance. But to the farmer, to the practical man, to him whose business it is to make plants as crops, it is a great deal more than this. For as he is enabled to apply the principles of plant nutrition right or wrong, whether he knows those principles or not, depends the result in his life work which may be success or failure.

We agree that the investigation of the principles of plant nutrition is a subject altogether of modern inquiry, and the opinions of scientific men for forty years have been in a sort of transition state in regard to it.

The time was when it was believed that to afford food for plants there should be a large percentage of organic matter in the soil, and that the value of all land depended on its quantity of organic matter. But when the chemist got at his work and showed that some soils were wonderfully fertile with but two or three per cent. of organic matter, and others very infertile with from ten to fifty per cent., the old organic theory was driven to the wall never to be revived.

Again the theory was advanced, and supported too by the highest scientific authority, that for the development of plants the mineral elements were required, that the ash constituents of the soil were first exhausted, and that to maintain it in perennial fertility it was only necessary that these should be returned. This theory, however, was met by the counter one that nitrogen was the essential element, and between the advocates of these two theories the contest went on year after year, and I am sorry to say it was sometimes an acrimonious one. On the one side

were such men as Liebig, Bossingault, Ville and Way, on the other such as Lawes and Gilbert, and Voleker, and finally it was found that both were right and both were wrong. No plant can be brought to perfection without nitrogen, no plant can be brought to perfection without its ash constituents, both are absolutely indispensable.

Again the theory was advocated that if the farmer would know what was needed for the nutrition of plants, it was necessary that the soil should pass under the eye of the chemist and be analyzed, that he might know its wanting elements and have them supplied. But it was soon discovered that the chemist with his strong acids could wring lime out of a soil when the plant, that nice chemist, would starve to death because it was unable to obtain lime from a soil that contained it in abundance. Thus when the method of analyzing the soil was tested it was found that it could not be made available in agriculture, and there are hardly any two specimens of soil from the same field that would show the same analysis, and thus chemical analysis for this purpose was discarded.

Thus for forty years the opinions of scientists have been in a transition state in relation to the subject matter of plant nutrition. Theories have been advocated only to be disproved by the discovery of new facts. Step by step scientific men have advanced, until to-day I think we can say with truth that scientific men are practically in accord as to the principles of plant nutrition. Practically we agree that the scientists know what they affirm when they say they know what are the requisites for the food of plants. It may not be time thrown away if we state what these principles are, and what the principles of practical men as shown by their practice.

In the first place we say that the plant which to us practical fellows is a profound mystery, a sealed book, is perfectly open and plain to the eye of the scientific man, because he has read it through and through beneath the microscope. Now pardon me while I say that while I cannot endorse all that has been said in regard to the ignorance of the farmer, I may be treading in the same path when I say that the farmer when he drops a seed in the soil knows little of the result which is to follow in the growth of the plant. Topsy "supposed she growed," and that is about the beginning and ending of many a practical man's knowledge in relation to that most wonderful structure the simplest seed or

plant. The scientist knows that in that seed, however diminutive it may be, there is the embryotic plant. Nature has stored along with that plant the best possible food for it in the endo-sperm of the seed. When that plant starts into activity it finds prepared for it by nature the best food it could have in the form of that endo-sperm, and on that it is nourished, growing by the simple process of adding on cell after cell until it develops the organs by which it may live—its roots to permeate the soil and gather soil food, its leaves hanging pendant in the air to gather air food, and in that cell formation the scientist knows precisely what kind of plant he has—the manner and conditions of its growth, its organs and their functions, as well as we know the most familiar objects that pass beneath our hands. And one noticeable thing in relation to the structure of a plant is this, that he who has examined one plant—a wheat plant for instance—and found out its structure, knows absolutely what was the structure of every wheat plant that ever grew and what will be the structure of every wheat plant that ever will grow on the earth's surface. The wheat plant of to-day is in its structure precisely like the wheat plant that grew five thousand years ago, and such as I hope will grow on the soil of Maine five thousand years hence.

Again, the scientists are all agreed not only as to the structure of the plant but as to the composition of the plant. There is no guess work about it, gentlemen. They know what a plant is made of just as much as the builder of a house knows what that house is built of, and not only do they know of what the plant is made, but they know absolutely the proportions in which the elements that go to make up a plant enter into its composition. Every plant grows by fixed laws made by Omnipotence—law controls it, law made it for a specific purpose, and when the scientist has examined a fully developed plant, it may be an Indian corn plant, and found out how it is made, he knows precisely of what elements and in what proportions every Indian corn plant has been made that ever was made. No plant has been produced by accident, but all have been made by the design of Omnipotence to accomplish certain results, and when we want to make a plant we may be sure that we know just what we have got to have to make it of. More than this, the scientists know in just what form the food of a plant must be presented to it in order that its organs may use it in constructing the plant.

Passing on to detail, the scientists are agreed that so far as the

plant is concerned there is no preference whatever for one class of matter over any other class of matter; that is, so far as the plant is concerned, the organic matter of which it is made is just as important as the inorganic matter. No plant can be made with the one, and no plant can be made without the other. Every plant that ever was or that ever will be made, has been and will be made by the use of both.

Now we come to classes of matter. If we take the organic material of which plants are made it is equally true that neither of the organic elements, oxygen, hydrogen, nitrogen or carbon, is supreme in importance so far as the plant is concerned. No plant can be made without all four of them; leave out which one you will and it will sicken and die. You must have them all and in the right proportions or no plant can be made, and so far as the *plant* is concerned they are equally important.

Turn now to the inorganic elements that enter into the composition of plants. We have some eight or ten of these, and neither of them has the preference over the others. No plant can be made without lime, no plant can be made without potash, no plant can be made without phosphoric acid, and so on through the whole list. Every plant that grows must have every one of these elements, and the quantity of the crop produced on any acre of land will depend upon the quantity of these elements that is available in the soil. All are equally important.

Turn now to the farmer. It makes a wonderful difference with him who shall supply these elements—who shall furnish the material of which the vital forces will construct plants. It makes no difference to the plant, but as I have said it makes a wonderful difference with the farmer. For Nature is a helpmate and co-worker with the farmer. He alone of all workmen is assisted by the material with which he works, and while the plant must have all the elements, the farmer can ask Nature, "What will you provide, and what must I provide for the structure of my plants?"

Now, coming to the organic matter. Nature will supply anywhere, under all circumstances, whatever oxygen the plant wants—the farmer never need supply any of that. The same with hydrogen—there is enough of that in water and in air. We need never manure our land with oxygen or hydrogen.

Precisely so with carbon. There is a large percentage of carbon in the soil, and in the water that comes down through the air there is also an abundant supply of it, and Nature has fitted

the leaves to take it from the air, and the roots to take from the soil all the carbon that the plant wants. We need not feed plants with carbon.

Now we come to the other organic element—nitrogen. This enters largely into the general structure of plants, and is available in Nature only in small quantities. There is plenty of it in the air, yet scientists are agreed that plants get little nitrogen from the air. They get some from it—more from the decomposition of organic substances—yet all scientists agree that the farmer must supply nitrogen; the plant cannot get enough of it, and he may supply it any form he please, provided it is available.

Turn now to the mineral elements. What will nature do in the way of ash constituents, and what must I do? Now, with a full knowledge of the fact that I may be in error, I say, that on the average of our soils the farmer need never apply lime to *feed* his plants. I know that you are in the habit of applying lime to your soils; keep on doing so, you are doing right, but I repeat that on our New England soils the farmer need not apply lime for plant food, except in certain cases, as in the production of tobacco—and the same is true of magnesia. He need never apply soda, he need never apply sulphuric acid, he need never apply chlorine, nature has supplied abundant material to afford all these, save in exceptional cases.

There are only two things left. One is potash, the other is phosphoric acid. It is true that all granitic rocks contain more or less potash in their feldspar. Plants take out of the soil so much potash in their structure that the supply that is available in the soil soon becomes exhausted, or nearly so, and of this the minimum quantity will measure the maximum quantity of the crop; so the farmer is obliged to furnish potash.

The other element is phosphoric acid. Phosphoric acid exists in the soil in small quantities, obtained from the disintegration of phosphoric rocks. Seed bearing plants, especially, take up large quantities of phosphoric acid, and the consequence is, that it must be applied, for the minimum quantity will measure the maximum quantity of your crops.

You will bear in mind that I am speaking of feeding plants. I am saying nothing about the construction of the soil; I am constructing plants, and for the construction of plants on the average soil of New England it is needful that the farmer shall supply nitrogen of the organic elements, and potash and phosphoric acid

of the inorganic elements, and if he does supply these elements he can make plants at will.

Scientific men are also agreed that the amount of material that thus enters into the composition of plants is very minute in quantity : that for the production of the most magnificent crops that any of our fields can be asked to produce, it is only necessary to use one, two, or three hundred pounds of material per acre, for it is not necessary that the elements should be contained in a large bulk, since they are themselves exceedingly small in quantity.

These, gentlemen, are the principles upon which scientific men are fully agreed in regard to plant nutrition, stated as briefly and simply as I can give them.

Now, to show the contrast, we will turn to the other side of the case—the opinions of practical farmers, as expressed in their practise, for I fear that they have no opinions to express in any other way. Now, then, I am one of you, gentlemen, and I say that as a general rule among the farmers of the country, and the farmers of Maine are the peers of any others, barn-yard manure is king. It has no peer; nothing can be substituted for it, and nothing can take its place. The farmer says, “Do you tell me that two or three hundred pounds of material per acre can be made to take the place of barn-yard manures? When you say that you publish yourself as a fool, for I know better.” He believes in quantity, in tons, cords, bulk, and he cannot be persuaded that anything else will nourish his plants and make his fields fruitful. If I were to tell him that I could take a basket on my arm, and carry into the field what would not weigh more than twenty-six pounds, and in it there should be more plant food than he could draw there in the form of the best barn-yard manure with a yoke of oxen, he would say he knew I was a fool then, and yet I will pledge myself that I am able to do it.

Don’t you know, gentlemen, that when you use barn-yard manure you often fail to get a crop? *Why* don’t you always get a crop? I know what you will say—that you are dependent on the weather. Though barn-yard manure is such a wonderful thing, and has in it all the manurial elements, you cannot get crops by the use of it unless the Almighty gives you sun and rain. Now here I want to ask you one question. What is the influence of the weather on plant nutrition? That is the very thing you need to know. If you give your plants barn-yard manure, why don’t

you make crops? What has the weather to do with it? The answer to this question is very simple. It is this. You have given to your land the material, you say, to produce plants. You gave it in a raw, crude, unfermented state. Now no plant ever did or ever can feed on barn-yard manure as barn-yard manure. I don't care how rich your soil may be, the plant may stand there and starve there unless the weather comes in and produces food for it. The weather then has this to do with it. You fed your plants with barn-yard manure, and there wasn't an atom of food in it. Nature comes in with her sunshine and rain, the manure passes through certain changes, is dissolved, its parts are chemically united, and thus food is produced, and the plant is able to take it.

The weather then makes your crop large or small accordingly as it is favorable or unfavorable to the decomposition of the material for plant food in the soil. When we have one of those cold seasons, so that the air cannot get into the soil with its oxygen, or the sun penetrate it with its heat, it is dormant so far as decomposition is concerned, and we have the plants waiting for the sun and air to develop food. Suppose it is the other way—there is no water; then the plants stand and wait for water to develop the food that is in the soil. They wait there until decomposition takes place, and then they get their food. That is all that nature has to do with it. This is a good corn year; last year was a bad one. What is the difference? A little too much water, or not quite water enough, and the food wasn't developed.

Now, gentlemen, if you will prepare your food before you put it in your ground, if you will take your crude manure and make it into absolute plant food, suppose you take the chemical elements that are absolute plant food, do you believe these ordinary variations will affect your crops? You may think so, but I know they will not. If you give the plant its food in proper variety the plant will grow without being affected by the ordinary variations of the seasons. Then your crops will not be controlled by the weather—they will not be controlled by anybody but yourself; and if you have done your duty intelligently they will hardly vary from year to year or from generation to generation.

Now I have drawn these pictures on the one side and the other, have stated what I believe to be the true method of feeding plants examined from a scientific stand-point, and I have stated

what is the method adopted by farmers as shown by their practice. Now I am one of those who don't believe in eating the pudding bag to find out whether the pudding is good. Many a fine-spun theory turns out to be nothing in practise, and it is fine to spin theories here on the rostrum, but can you carry them out on the farm? We must come down to the hard pan, to the soil, and see if we can make our theories work. Science made practical is what we want. Will it speak out like that on the land? Now, then, to prove this thing, which seemed to be so remarkable, we went to the land seven years ago and tried an experiment, and we have followed it up straight along for seven consecutive years. Within the last year the thing has broken away from us like a wild colt, and run over all the farming community. We couldn't hold it. If you will bear with me I will tell you something of our experiments.

Believing that the principles of plant nutrition as stated are true, the first thing to be done in the series of experiments was to find out what elements the farmer must use in feeding his plants. We began on the soil about Amherst, where the college is. I went to various localities and gathered soils, and in these soils we put plants, and commenced to feed them with one substance and another. Four years we nourished these plants in the hot-house and in the open air to find out what we must use, and after four years Nature seemed to say—Give me potash, nitrogen and phosphoric acid and I will do the work. She said this with reference to such soils as we had gathered from different localities. That seemed to be reasonable.

The next step was this: Chemists know that the different parts of plants require different materials for their nutrition. If I examine an Indian corn plant, I shall find that the roots are made of certain elements in one proportion, and the seeds of the same elements in a different proportion. Now I must find the natural relation between the stalks and the corn. "Humbug!" says somebody. "Don't you know that some corn is cared very differently from some other?" Yes; and that is the very thing I am after. I want to know what is the material that nature must use to make the stalks, and then if I put that in, I shall get just what the corn needs in the way of stalk and no more. So I must know the proportions that exists between the stalks the roots and the corn. That was the next step we had to take, and that was

gone through with for four years, and we kept correcting and revising until December, 1875. Having ascertained this thing, the remarkable statement was made and supposed to be justified by the facts, that you can make plants in any given quantity by supplying to the soil nitrogen, potash and phosphoric acid, in the proper quantity and in the given proportion. In other words, if you give to the soil as much of these three elements as would be contained in fifty bushels of corn and the natural proportion of stalks, you will get that. It is as if I were to ask you how many boxes so long, so wide, and so high, you could make from such and such a pile of boards. You would say so many, according to the number of feet in the pile. So I said, if you give me the material that is required to make fifty bushels of corn, in the form in which the vital forces must have it, cannot I make the fifty bushels of corn? I went to the land to find out. I will not weary your patience with the details of my various experiments. Suffice it to say, that in 1873, in three towns, in more than twenty different places, there wasn't a failure in a single instance with corn, oats, wheat, rye and tobacco. In a single instance there was a failure with potatoes, but not of five bushels less than the amount pledged. In the production of Indian corn we promised fifty bushels per acre more than the natural production of the land, and in no case did we ever run under more than two bushels. On more than three hundred acres of Indian corn all over the State of Massachusetts, from the Berkshire hills to Boston, the underrun, so far as we have been able to ascertain, has been on the whole less than ten bushels. We got almost exactly the quantity we said we would get, sometimes a little more and sometimes a little less, but approximating as nearly as the mechanic would to the boxes from the pile of boards, without knowing the exact number.

Now if you believe these things (and if you don't I can't help it) I have given you some practical information in respect to it so that you can make plants. I will surmise that you will ask certain questions that will be practical. "If you can do these things what will you use to do it with?" "You say, 'certain chemical elements,'—how will you obtain them?" For nitrogen it makes no difference to the plant what you use, provided that the nitrogen is available. You can provide nitrogen in the form of sole leather, and it will take about ten years to render it available. You can provide it in the form of barn-yard manure and it

will take three or four years. You will get but a little touch of it the first year. The best form in which to get it is in the form of sulphate of ammonia. You would better take it in that form rather than undertake to get it in the form of nitrate of soda. You may get it in the form of fish guano, or in the form of Peruvian guano. You need only to have the required quantity of nitrogen, and if you buy it, for instance in the form of Peruvian guano, you must know how much nitrogen you have got. But as I have said, the simplest form in which to obtain the nitrogen is in the form of the sulphate of ammonia.

Now your phosphoric acid. I do not speak of superphosphate, nor of phosphate of lime, I mean soluble phosphoric acid. Ground bone treated with sulphuric acid in certain proportions will make a superphosphate which will contain this soluble phosphoric acid. You can buy your superphosphate as you please, or you can make it as I do, by mixing at the rate of one hundred pounds of fine ground bone with fifty pounds of sixty-six degree sulphuric acid. Mix them well with a hoe, and it will give you a superphosphate that shall contain from seventeen to eighteen per cent. of soluble phosphoric acid.

Now comes the potash. I don't care in what form you get it, but my formulas are based on actual potash in the form of a salt of potash. You may get it in the form of wood ashes if you can. That farmer is a happy man who can get all the wood ashes he wants. But in most sections of the country the farmer cannot get wood ashes, and he can obtain potash in the form of German potash salts; these are imported into the country, and you can get them almost anywhere. For root crops, &c., get them in the form of sulphate of potash; and for all the grain crops, in the form of muriate of potash, for you can get it in that form much cheaper, the muriate containing fifty per cent. of potash. It answers every purpose for corn and forage crops, and you can get a large crop of potatoes with it, but they are fit for nothing but to sell. These are the forms in which I would get the articles. Though a new thing, they are quite extensively imported, and any farmer who wants to do so can get the materials and try them.

I wish to draw a few deductions from the remarks which have been made to see whether we are tending if these things are so. If we are not completely befogged—if one-half that has been said is true, where are we tending in this matter of feeding plants? We have turned the world upside down, so far as the long

accepted views and opinions of farmers in relation to farming are concerned; for if this be true, it is no longer needful to keep a single animal to make barn-yard manure to keep up the fertility of the farm. We have all felt that we could not sell our crops off the farm,—that the man who sells his hay and corn is selling his farm, and will pretty soon have only the subsoil left. That has been our theory and we have all believed it, but if half that I have been telling you is true you don't need to keep this stock. If with a few pounds of materials you can grow crops anywhere and keep up the fertility of the farm to any point you choose, you need not keep cattle on your farm *for that purpose*.

Now I want to meet an objection right here. "Why," says the farmer, "do you mean to say that we don't want any barn-yard manure on the farm? Do you mean to say that barn-yard manure isn't good for anything?" Not a bit of it. I never said anything of the kind. Barn-yard manure must still be king. I only said that it wasn't necessary to keep cattle for the express purpose of keeping up the fertility of the farm, and to make crops. In ordinary culture we are obliged to have animals on the farm,—for the dairy, and for beef. We are obliged to keep animals on the farm, and the farmer must be a consummate fool who would let the waste product of these animals run to waste. You need all the barn-yard manure you can get. Utilize it and save it in every available way. Save all the waste of your fisheries, the waste of the different kinds of your manufactories, save all your waste of every kind and from every source, and apply it to your field in the best way that science can teach, and after you have done all this there is a vast waste to be made fertile that you can never make fertile by barn-yard manure, and the waste products that you have worked up from every nook and corner of the land.

One point more. If one-half that has been said is true, then we can make the old hills of New England, these worn-out plains, and these fields that are becoming depopulated by the removal of our sons, we can make them bud and blossom as the rose. We can cover them with the grandest, most luxuriant, and most profitable crops. We can make ourselves richer; we can make the whole country richer; and we can enjoy here privileges of which the emigrant to the West must be deprived. Stay at home, boys, on the hills of New England. If I were a young man, with the light that we all possess, I would make my home somewhere in the Atlantic States. You can make more money here, and you can

do more good by staying here, than you can by going anywhere else in the territory of the United States.

I am done, but this subject is a great one, and I have passed over it hurriedly. It is full of detail—full of special points. To me they are all familiar, and if there are any crooked things about them, anything that is not perfectly understood, I will answer any question in relation to it which gentlemen may wish to ask.

QUESTION. Is there not plant food enough wrapped up in our soils if we could only unlock it?

PROF. STOCKBRIDGE. The gentleman asks a question which leads on another track. I have not said a word about the physical condition of the soil, though that is very important. I assume that no man will think of such a thing as feeding plants, using a costly fertilizer, unless he has secured the proper physical condition of the soil. What! put a manure that costs from \$10 to \$80 per ton on land that is so saturated with water that the roots will not take it up, and it must lie dead and dormant? Is there any man who is such a fool as that? Why, you can control the physical condition of your soil, and don't talk to me about feeding plants until you have put the soil in the proper physical condition. Do that and then use your barn-yard manure and your chemical fertilizers, and you will get well paid for your labor. If you don't do it you might as well put them in the fire.

QUESTION. In what condition is the land left for the culture of grass or grain?

PROF. STOCKBRIDGE. It is in better condition than before it was worked. I know somebody will say that if you raise crops in this way you will ruin your land. Not a bit of it. Your land will be better the second year than it was the first. Land manured in this way in 1874 bore 98 bushels per acre of potatoes, and planted and manured in the same way in 1875 made 51 bushels more. Corn planted and manured in this way in 1874 made 104 bushels to the acre. The same land planted in 1875 without manure made 30 bushels of corn in excess of the natural production, as the second result of the manure.

QUESTION. What is the cost of the materials?

PROF. STOCKBRIDGE. They will cost enough in Maine. The sulphate of ammonia and the potash salts come from abroad, and the prices vary with the fluctuations of gold. The variation wouldn't be perhaps more than \$3, \$4 or \$5 per ton. Last year the

materials cost something less than \$70 per ton. Sulphate of ammonia is about \$100, potash from \$30 to \$40, and phosphoric acid from \$40 to \$60 per ton. The material is dear, and yet after the supply of barn-yard manure and compost made on the farm is exhausted, I consider this the cheapest manure that can be bought. A ton of the material is enough to manure four or five acres in a way which is equivalent to the use of six or seven cords of barn-yard manure to the acre. I have said it was the cheapest manure. Let us see. Last year it cost us \$21 to make 50 bushels of corn with the natural proportion of stalks. It may cost a little more or a little less this year. You say at once that is 42 cents per bushel. But when I harvested my 50 bushels more than the natural yield, I harvested 94 bushels of shelled corn from the acre, and the stalks are worth \$8 per ton. I can make money at that rate with corn at present prices, and stalks at \$8 to \$10 per ton. The soil will produce something of itself, and it ought to produce enough to pay for the cost of cultivation, the taxes, and the interest on the land. If it won't do this the farmer has no business to own it. The amount produced by the fertilizer is the amount above this natural production. In our experiments the natural production was ascertained in each case by planting a piece of unmanured land of like size and quality.

MR. LYMAN H. WINSLOW of Nobleboro'. Suppose you had a piece of land that you intended to plant with corn, and had manure carted on it which you regarded as sufficient dressing, would you apply this fertilizer to that land?

PROF. STOCKBRIDGE. I would do this: Plant the land as you have proposed, getting if you like a little sulphate of ammonia to start your crop; then plow up some of your worn-out land that won't bear anything and raise from seventy-five to one hundred bushels of corn to the acre, by the use of chemicals.

PROF. STOCKBRIDGE'S FORMULAS.

The following are the formulas of Prof. Stockbridge for the preparation of his various special fertilizers: Column 1 gives the quantity of the crop, including the natural proportion of roots, stalks, leaves, pods, &c., to be produced in excess of the natural production of the soil. Column 2 gives the quantity of nitrogen necessary to produce this given quantity, and 3 the form in which it may be obtained; 4 of the second element, potash, and either 5 or 6 the form in which it may be obtained; 7 of the third ele-

ment, phosphoric acid, and 8 the form in which it may be obtained. The formulas are based on the supposition that the sulphate of ammonia contains 24 per cent., the sulphate of potash 35 per cent., and the muriate of potash 80 per cent. dry salt, and the superphosphate 13 per cent. of soluble phosphoric acid. Of course, should the articles vary from this standard in quality, the amount used should be proportionally diminished or increased as the articles are stronger or weaker. For example, if the superphosphate used contains 18 per cent. soluble acid, divide the number in column 8 by 18 and multiply by 13.

C R O P .	Nitrogen.	Sulphate of Ammonia.	Potash.	Sulphate of Potash.	Muriate of Potash.	Phosphoric Acid.	Superphosphate.
100 bushels Potatoes per acre.....	21	105	34	225	-	11	85
25 " Oats (32 lbs to bushel) per acre.	23	115	20	-	40	12	90
50 " Indian Corn per acre.....	64	320	77	-	154	31	248
20 " Beans "	53	265	30	198	-	20	160
25 " Buckwheat "	37	185	50	-	100	15	105
20 " Winter Rye "	25	125	24	-	48	16	128
25 " Wheat "	41	205	24	-	48	20	160
2 tons Fodder Corn "	20	100	66	-	132	16	128
100 bushels Ruta Bagas on a given area....	11	55	18	118	-	8	63
100 " Beets " "	11	55	25	155	-	6	50
100 " Onions " "	11	55	9	54	-	4	32
1 ton Green Cabbage " "	9	45	15	90	-	6	48
1 " Mixed Hay per acre	36	180	31	-	70	12	95
1 " Red Clover Hay per acre.....	43	215	40	-	80	11	85
1 " Herbs-Grass Hay "	24	120	27	-	54	10	80
2 " Rye Straw "	10	50	31	-	62	8	64

The mixture is purely mechanical, but the more thoroughly the ingredients are mixed the better. Apply the mixture to the surface after plowing, and cultivate or harrow it in. If you feel a little "ticklish" about it, strew it along the line of the furrow, and then go along and plant your crop, but never do such a thing as drop it in the hill.

The following questions were put to PROF. STOCKBRIDGE, and answered as follows :

QUESTION. Do or do not plants derive benefit from the ammonia escaping from barn-yard manure in the process of decomposition?

ANSWER. Barn-yard manure has in it a large percentage of nitrogen. I have already stated that nitrogen in the form of sole leather was good for nothing, because it was not developed. In the form of barn-yard manure it is good for nothing until it is developed. Now I understand the question to be, if this decom-

position takes place in the soil, in what stage of decomposition is that nitrogen most available? I don't care where it decomposes, only to make it immediately available for plants you must decompose it before it is put in the soil. If you do that there should be some material applied that shall absorb the ammonia—as loam, muck, sulphate of magnesia or sulphate of lime.

QUESTION. Is it better that this decomposition should take place before it is put in the soil or that the manure should be applied in a green state and the decomposition take place in the soil?

ANSWER. I suppose the gentleman wishes to start this question—Which is best, a quick or a lasting manure? I say a quick one. No man can afford to use a lasting manure if it is a high priced one. Your plant cannot afford to wait—our summers are short. The better way for the plant is that the manure should be decomposed before it is put in the soil, and then your plant gets a quick growth.

QUESTION. What effect does the decomposition of manure in the soil have on the soil itself?

ANSWER. I am one of those who believe that when the Almighty made this earth—ground up the rocks and made the soil—that he made it with a capacity of being all converted into plants, from the surface to the bed-rock. Of course it would take some time to convert it all into plants. Now, then, the lime, potash, phosphoric acid and the rest, must be developed. If you put into the soil green manures, or anything of that nature, they develop carbonic acid, and insoluble matter is gradually made soluble. There are other changes, but this is the main one.

QUESTION. Does not potash alkali have a tendency to decompose very rapidly?

ANSWER. The effect of wood ashes or potash in the soil is both chemical and physical, and if it is put into the soil a round of changes is started which moves on and on, and does not cease for a long time.

HON. C. J. GILMAN. It is very well known that the porgy fishery is an element of wealth along the coast of Maine, and that we have quite a large amount of what is called porgy-chum. I would like to know of Prof. Stockbridge what is his experience or knowledge as to the mode of applying that manure—whether composted or in a raw condition.

PROF. STOCKBRIDGE. I have seen porgy pomace, or fish guano as we generally term it, used in various ways on the farms of Massachusetts. It is quite generally used there as a compost. The farmers there like to kill two birds with one stone, and the porgy pomace will develop the muck, and the muck makes a valuable compost. I have seen the pomace sown broadcast on the land and plowed in, and harrowed and cultivated in, with good effects in all cases. From my stand point I should never use it alone. It is one of the best practical sources of nitrogen. I think it must be cheaper than sulphate of ammonia. If you put potash with it, it will be more valuable than in any other form I know of.

MR. PETER W. AYER of Waldo county. I am mortified to think that our pasture land in New England has deteriorated so badly. In my section the farmers adopt a mixed method, and feed their pasture with sheep as well as cattle and horses. It has been our practice to have our pastures in several inclosures, and feed with sheep several years, then change to cattle, and do the same over and over again. Now under that system of pasturing our pastures have not deteriorated in the manner spoken of, though I know that they are not so good as those in the valley of the Kennebec, of the Sebasticook, or of the Sandy river. I know very nearly the size of many farms and the stock they carry, and reducing the sheep to cattle as to the amount they require, I think with us it takes about three acres of land to carry a cow. Now why is it that pasturing with sheep enriches the land? Do they return more nitrogenous matter to the land in their manure than cattle, or does the carcass of the sheep require less of these essential elements to built it up? Also what would be the effect of top-dressing with gypsum?

PROF. STOCKBRIDGE. From the stand point of the gentleman, the manure of sheep is no better on a pasture than that of cattle.

MR. AYER. I know that sheep will make a pasture miserably poor for themselves in making it rich for cattle.

PROF. STOCKBRIDGE. The question cannot be answered fully in a moment. I said that in Holland an acre of land will carry a cow and a sheep. Why not a cow and a calf? Because the cow and the calf would seek the same plants for their food, and a cow and a sheep wouldn't, and so if we pasture these two on the same land they will not interfere at all with each other. But if you pasture land heavily with sheep alone, they will bite the plants

which they require so closely that they will finally destroy them, and leave the plants that the cattle want, to grow, so that the pasture is improved for cattle. The question was asked why the manure of sheep is better than that of cattle? The difference is in its physical condition. The manure of cattle and sheep fed on the same substance is about the same.

Plaster is used everywhere and for all crops, and you will hear wonderful stories of its effects. Should there be a very great want of sulphur in the land, or a great amount of decomposition going on, the application of plaster would produce chemical changes, and very marked results would follow. If there is nitrogen or ammonia being formed it would convert the volatile gases into soluble salts. Again, if there is organic matter to be decomposed decomposition in that soil would set the lime free and a round of changes would go on that would develop plant food. On a light soil where no decomposition is going on you would not get that result.

SECRETARY BOARDMAN. Will you give us the proportion for the compost of porgy scrap with ashes and lime for a top-dressing for pasture or mowing lands?

PROF. STOCKBRIDGE. I should use them on pasture lands of the second class, for on the steep side hills they are not easily drawn. Take two hundred pounds of porgy pomace, containing about seven per cent. nitrogen as I remember, and mix it with twenty bushels of wood ashes and three casks of lime. I would rather, myself, have the porgy pomace made fine and sow it on, and then sow on my ashes, and not take the trouble to cast on the lime. I should get twenty pounds of potash for the mineral element, and that would make a good top-dressing.

TAXATION.

BY PROF M. C. FERNALD, MAINE STATE COLLEGE.

In the history of very ancient times we read of the payment of tolls, of tributes, and of customs. More than six hundred years before the Christian era, land was taxed,* and silver and gold exacted from the people for Pharaoh the Egyptian king.

From high authority,† we learn that as early as the fifth year of the Christian era, "there went out a decree from Cæsar Augustus that all the world‡ should be taxed. And all went to be taxed, every one into his own city."

The general decree of taxation has never been repealed; but in recent times, could the record be made by the inspired writer, instead of saying, "and all went to be taxed, every one into his own city," he would be forced in truthfulness to say, "and as many as possible *fled* from their own cities to escape taxation."

Of more recent origin, however, is the scheme of taxation now existing in the United States. It has been derived in all its essential features from modern Europe, having its origin in the decline of the feudal system. According to this system the lands of a country were held as *fiefs* or grants of the crown. These grants were allowed on condition that their possessors should perform certain stipulated services, among which, by far the most important was the supplying of the sovereign, when he took the field, with a body of retainers equipped and maintained at their own expense.

The slow but sure advance of civilization brought about the overthrow of the feudal system, and on its decline a system of money payments was gradually substituted for personal services, a system which has extended to different governments, until the method of pecuniary contribution may now be regarded as universally established.

It is not material whether we regard a tax as a contribution of the individual, made necessary from his relations as a social being

* 2 Kings, 23-35.

† Luke, 2-1.

‡ Roman Empire.

to society—a contribution which the law of his own well being requires—or an assessment made in consequence of the protection which the State affords and guarantees to the citizen in his person and his property. Whichever or whatever view we take of the theory upon which taxation is based, the stern facts with which we have to deal are still the same. The right of a government or State to raise needful revenue, either by direct or indirect taxation, or by both methods, is not a matter of controversy.

Given in our own State a property valuation of two hundred and fifty-five millions of dollars, and an annual direct tax of approximately six millions of dollars, the problem for solution is, to determine in what way this sum shall be apportioned so that every citizen sharing its benefits shall bear his just proportion of it. A does not so much complain that he has a tax to pay, as that B, considering his ability, should not be required to bear his full proportion of the burden, if it be deemed a burden.

It must be admitted that no system of taxation has ever yet been devised, nor is it within the range of human skill to devise a system which will reach with perfect equality every member of society. The scheme which is perfectly adjusted to one set of circumstances may work great injustice when applied under other circumstances.

An examination of the Maine statutes reveals the fact that this problem has received the thoughtful and careful consideration of our legislators, and that the greatest inequalities in taxation arise, not from the nature of the laws, but from their application, or rather their non-application, in individual cases, whereby a large amount of property, by law taxable, escapes the notice of inspectors. We apprehend the nature of the problem in our own State more fully from the following considerations:

In the First Annual Report of the "Wealth and Industry of Maine," by W. E. S. Whitman, Esq., we learn that the average percentage of taxation in fifty-seven cities and towns, in 1870, was .027, while in 1873 it was .024. Assuming the mean, or about .025,* to represent the average percentage for the towns and cities of the State, and the valuation reported in 1873, viz. \$242,808,688, as the true valuation, we find approximately the annual revenue raised by direct taxation to be \$6,070,217. This

* The State Treasurer, Hon. S. C. Hatch, estimates the average percentage of taxation in the State between .025 and .0275.

amount divided by 626,915,* (population in 1870) gives \$9.68 for every man, woman and child in the State

That we may justly recognize our own position in this matter with relation to that of the citizens of other States, it may be of interest to compare the taxation per capita in Maine with that of some of our sister States. The following exhibit of taxation in several States is taken from the "Report of the Commissioners to Revise the Laws for the Assessment and Collection of Taxes," for the State of New York, in 1871:

"Vermont.—Population (census 1870,) 330,552; aggregate taxation, 1870, (State, county and school taxes official, town taxes estimated,) \$1,750,000; taxation per capita, \$5.29."

"Ohio.—Population (census 1870,) 2,662,214; aggregate taxation, 1869, \$22,232,877; taxation per capita, \$8.72."

"New York.—Population (census of 1870,) 4,364,375; aggregate of taxation, \$50,328,684; taxation per capita, \$11.55."

"Massachusetts.—Population (census 1870,) 1,457,351; aggregate taxation, \$21,922,569; taxation per capita, \$14.35."

The above States undoubtedly represent the extremes and approximately the mean of per capita taxation of the different States. It will be perceived that the direct taxation per capita in Maine is less than the average for these four States. A per capita tax, however, of \$9.68, represents only about one-half the actual tax per capita of our population, provided the people of this State pay proportionally with the people of the other States to the revenues of the federal government. As these revenues, however, are derived chiefly by indirect taxation, they do not enter into the problem of revenue to be raised annually by the different States, and hence for the present purpose may be disregarded.

Notwithstanding the high rate of taxation to which our people have subjected themselves during the last decade, it is gratifying to note the constant and substantial growth of wealth and prosperity. In 1860, the valuation of Maine was \$162,158,581; in 1870, \$224,822,860; and in 1873, \$242,808,688. During the decade from 1860 to 1870, the increase in valuation was about $35\frac{1}{2}$ per cent.; from 1870 to 1873, about .08 per cent. Carrying forward the rate of increase proportionally, the valuation of the State cannot be less than 255 millions, and is probably greater than 260 millions of dollars, conceding the method of determining

* Very nearly correct for the present date.

the valuation to be correct. In this estimate no allowance is made for a temporary shrinkage of values; and, on the other hand, the under-valuation of property for purposes of taxation is not taken into account. Were the latter element considered, and were all the forms of "invisible" property which should contribute to the public charges brought into the estimate, it would be swelled by more than one hundred millions of dollars.

Of the average percentage of tax, which has been assumed to be about .025, from .004 to .005 are appropriated for State tax, about .001 $\frac{1}{2}$ for county tax, and the remaining portion, or from .018 $\frac{3}{4}$ to .019 $\frac{3}{4}$, for town purposes; or, in other words, of an estimated revenue of \$6,000,000, about \$1,000,000 or \$1,200,000 are required for the State, about \$360,000 for county purposes,* and not less than \$4,440,000 for town and municipal purposes.

It is not to be expected that these several sums can be materially reduced within the next decade or during the period of cancellation of (what are termed) our war debts. While the rate may gradually diminish in consequence of increasing wealth and prosperity, it may fairly be assumed that the aggregate revenue from taxation will increase with each decade, so numerous and necessary are the objects to which this revenue is devoted. Welcome as are all honest and well-considered efforts at retrenchment, yet the thoughtful tax-payer would hardly welcome any *very large* reduction of the aggregate revenue, since he would see involved in it a sacrifice of interests which the people of the State could ill afford.

This point will be more fully elucidated by transcribing from the report (before referred to) of the New York Commissioners: "But although taxation is deprivation, or the taking away of a portion of one's wages or income for other than personal purposes, it is not by any means to be argued that taxation, in itself, is necessarily an evil. On the contrary, it can probably be demonstrated that there is no one act which can be performed by a community which brings in so large return to the credit of civilization and general happiness, as the judicious expenditure for public purposes of a fair percentage of the general wealth raised by an equitable system of taxation. The fruits of such expenditure are general education and general health, improved roads,

* The county estimates transmitted to the House of Representatives by the Secretary of State for the ensuing year (1876) aggregate \$383,221.

diminished expenses of transportation, and security for life and property. And it will be found to be a general rule, that no high degree of civilization can be maintained in a community, and indeed, that no highly civilized community can exist, without comparatively large taxation; the converse of the proposition, however, at the same time not being admitted, that the existence of high taxes is necessarily a sign of high civilization. Thus, for example, observations made" "in the German States, which, since 1866, have been forcibly incorporated with Prussia, show that, notwithstanding the former have been subjected to a greatly increased burden of taxation, they have at the same time enjoyed a greater measure of prosperity; the same being mainly due to an improved administration, of which the increased taxation was a necessary incident. In short, taxation in itself is no more of an evil than any other necessary and desirable form of expenditure; but it is an evil when taxation is rendered excessive through injudicious or wasteful expenditures, or when by reason of ill-adjustment the levy of the tax is made an occasion for the collection from the people, through the enhancement of profits and prices, of a far greater sum than is requisite to meet the public expenditures."

It is hardly necessary to say that the large revenue deemed needful for the purposes of the town, the county and the State, is chiefly realized by a direct assessment upon real estate, upon polls and upon personal property. The manner of its distribution and adjustment is a proper subject of examination, and will be briefly considered in some of its prominent features

Real Estate.—Sect. 2, chap. 6 of the Revised Statutes of Maine, defines taxable real estate in the following language:

"Real estate, for the purposes of taxation, excepting as provided in section six," (relating to exemptions,) "shall include all lands in this State, and all buildings and other things erected on or affixed to the same, and all townships and tracts of land, the fee of which has passed from the State since the year one thousand eight hundred and fifty, and all interest in timber upon any of the public lands derived by permits granted by the State of Massachusetts; interest and improvements in land, the fee of which is in the State; and interest by contract or otherwise in land exempted from taxation."

The real estate constitutes by much the larger proportion of the property that is taxed in the State, the farms alone in 1873 representing a cash value of \$105,021,000, or more than forty-three per cent. of the reported valuation. This form of property being open to inspection cannot fail to bear its full burden of taxation. As regards the method of appraisement of both real estate and personal property, it is questionable whether a fallacious and mischievous policy has not been adopted by a majority of the towns in the State, a method which, it is true, has the sanction of adoption by towns in other States, but not on this account worthy of imitation.

The idea has obtained in many towns that an under-valuation of property, as compared with that of neighboring towns, would secure a corresponding reduction of State tax. This policy is fallacious, not to say dishonorable. The State commissioners on valuation are sure to *doom* a town, and rightly, which seeks thus to gain an unfair advantage. In part at least, as a result of this notion, the method of appraising property for taxation at a certain percentage of its actual value very generally obtains. This would manifestly not be attended with special disadvantage if all the towns of the State were to adopt the same percentage, but as matter of fact the rates range from 25 per cent. to 100 per cent. Of 97 towns whose percentages of valuation have been examined, seven are found to be at 100 per cent., one at 25, three at 33, but the larger number ranging from 50 to 75 per cent. The average for the 97 towns is 69 per cent. Regarding this as an approximately correct average for the towns of the State, it is worthy of attention that the assumed tax of two and one-half per cent. on a valuation (of the property in the State) at the average rate of 69 per cent. is really a tax of only about one and three-fourths per cent. on the actual value.

The advantages of uniformity in the methods of taxation are too many and too great to be disregarded, nevertheless the history of taxation hitherto justifies the assertion that uniformity can be secured only by assessment on actual value and not on a percentage value, whatever be the property real or personal. By this method alone would the timber lands and other unsettled lands in the State contribute proportionally with other property to the revenue raised by taxation. The percentage system runs down to its minimum limit in the case of such lands, and hence they are largely under-valued for taxation, while their actual

value appreciates rapidly, as is shown by the fact that many of our wealthiest citizens have made the rise in value of such property the basis of their accumulations.

From events which have recently transpired in our State, it is evident that such lands are still regarded by capitalists as desirable forms of investment. Such property, however, let us not forget, will never bear its just proportion in assessments, so long as the percentage system is maintained. Is it not surprising that in consequence of the fallacious notion of abatement of State tax, or from that *singular* quality in human nature which leads it to underestimate its own possessions when under the inspection of assessors, or from whatever other cause, towns should adopt and maintain a practice so clearly adverse to their own interests, disregarding the principle that property gravitates to localities of low rates of taxation, whereas by the percentage system the rate is unnecessarily high! It is true the amount of revenue would be neither increased nor diminished by assessment on actual value, but the *rate* of assessment would be *real*, would be *uniform* under like conditions, and would have the very decided advantage of always being lower than by the percentage system. Moreover this method would be in accordance with constitutional requirement regarding assessment by State authority. Article 9, section 8 of the Constitution of Maine, reads thus: "All taxes upon real estate, assessed by authority of this State, shall be apportioned and assessed equally, according to the just value thereof." According to the *just* value, it will be observed, and not according to a percentage value.

Poll Taxes.—In chapter 6, section 40 of the Revised Statutes of Maine, it is provided that in the assessment of all State, county, town and plantation taxes, the assessors "shall assess on the taxable polls therein one-sixth part, as nearly as may be, of the whole sum to be raised; but the whole poll tax assessed in one year upon an individual for town, county and State purposes, except highway taxes separately assessed, shall not exceed three dollars."

The outcome of this regulation is, the poll tax in most towns is a fixed sum, viz., three dollars. A moment's examination of the relation between the entire poll tax of the State and the *whole* amount of tax will show that it cannot be otherwise. In 1870 the valuation of the State was \$224,822,860. Assuming the percent-

age of taxation to be .025, which will be conceded not an overestimate, the entire tax, State, county and town, was about \$5,620,572; one-sixth of this amount is \$936,762. The number of taxable polls in 1870 was 143,195. Reckoning these at three dollars each, we have for their value \$429,585, a sum less than .46 of one-sixth of the entire tax, or in other words the aggregate poll tax at three dollars for each poll is about one-thirteenth the whole tax.

An objection to an invariable sum as poll-tax arises from the fact that the percentage of voters assessed for poll-taxes only, is really large—in many places this class of voters outnumbering all the rest. The majority, in each case, have no check in voting away money for extravagant expenditures, inasmuch as their own tax is not thereby increased.

Of the various plans which have from time to time been proposed for remedying this evil, there is none which seems better to meet the requirements of the case than that suggested by the Assessors of Marblehead, Mass., and endorsed by the Commissioners appointed by the Governor and Council of that State, "to inquire into the expediency of revising and amending the laws relating to taxation and exemption therefrom," in their report of January, 1875.

This system provides a minimum and a maximum limit for the poll-tax, and makes the tax increase with the increase of expenditure, and diminish with its reduction. To use the numbers proposed by the Assessors of Marblehead, the minimum limit would be fixed at two dollars, and "when the amount of town tax to be assessed" should exceed "one per cent. of the valuation of the previous year, the poll-tax would be increased twenty-five per cent., or to two dollars and fifty cents. When the amount to be raised should equal or exceed one and a half per cent. of the valuation of the previous year, the poll-tax would be increased fifty per cent., or to three dollars, and when the amount to be raised should equal or exceed two per cent. of the valuation of the previous year, the poll-tax would be increased one hundred per cent., or to four dollars, and thus with increase of the amount to be raised the poll-tax would increase in like ratio up to the maximum limit."

By this method every voter who pays a poll tax only, would have a direct pecuniary interest in keeping down expenditures, and yet would not be so heavily taxed as to endeavor to limit

unduly, needful appropriations. That system of taxation is faulty which does not make every voter feel in some degree the burden of expenditure which he would not unwillingly allow others to bear, and which by his vote he can place upon them.

It is submitted also, that by the present method the polls of the State bear an inadequate proportion of taxation.

Personal Property.—In the Revised Statutes of Maine, chap. 6, sect. 5, we read that “ Personal estate for the purposes of taxation, shall include all goods, chattels, moneys and effects, where-soever they are; all ships and vessels, at home or abroad; all obligations for money or other property; money at interest, and debts due the persons to be taxed more than they are owing; all public stocks and securities; all shares in moneyed, railroad and other corporations within or without the State; all annuities payable to the person to be taxed, when the capital of such annuity is not taxed in this State; and all other property included in the last preceding State valuation for the purposes of taxation.”

Equitable taxation of personal property can hardly be expected. The taxing of real estate presents no serious difficulty, but the taxing of personal property is attended with so many and so serious difficulties that conflicting opinions exist in regard to the expediency of this assessment. There are those who claim that it would be better to avoid all “inquisitorial” methods and levy assessments only on real estate or “tangible property and fixed signs of property;” thus exempting a large portion of the wealth of every civilized community.

There are decided objections to such a method; among which may be noted the most obvious, viz: disproportionate taxation, in that those possessed of “invisible” property, who are generally best able to bear the burdens of taxation, escape them most largely. A full discussion of this method would transcend the limits set for this paper, and may well be omitted, since any radical change of State law in regard to taxation of personal property is not at present to be expected, if indeed to be desired. A rigorous enforcement at the hands of assessors, of the law as it now stands, touching “all goods, chattels, moneys and effects, where-soever they are; all obligations for money or other property; money at interest and debts due the persons to be taxed more than they are owing,” would distribute the burdens of taxation

and reduce its percentage in a manner that would be surprising even to the assessors themselves.

It is said that custom makes the law, but custom does not make the statute. The statute exempts household furniture "not exceeding two hundred dollars to any one family." The law of custom in many towns exempts household furniture to five times this amount. The statute demands a tax upon a gold watch; custom generally exempts the watch. The statute in exempting "farming utensils, mechanics' tools necessary for carrying on his business," "mules, horses, neat cattle, swine and sheep less than six months old," discriminates in favor of the man in limited circumstances, and with propriety. Custom discriminates, by permitting larger exemptions in favor of the wealthy; not designedly so, let it be understood, but so difficult is it without a most rigorous "inquisitorial" system to keep trace of invisible property, as money, notes and mortgages, that assessors are wont to allow large amounts of this class of property to evade taxation.*

Massachusetts has pressed the taxation of personal property more vigorously, and perhaps with greater success than any of her sister States; and yet her commissioners on taxation (referred to above) admit the complete impossibility of reaching *all* the property subject to assessment. They say: "That personal property in Massachusetts, declared by her laws to be subject to taxation, does in some degree escape assessment, it is impossible to deny. The most vigilant of assessors cannot find it all, and there are not wanting those in every community willing to invoke the name of their Creator to the truth of a statement which is a falsehood and a fraud. There are not wanting officers who shut their eyes to the facts they have sworn to observe, in the supposed interests of the locality of which they are residents, and help the possessors of wealth to act the lie they dare not utter."

The Maine statutes, chapter 6, sections 65, 66 and 67, furnish to assessors essentially the same method of ascertaining the per-

* A gentleman, who is a shrewd observer, and who has given much thought to this subject, furnishes the following statement:

"The aggregate value of personal estate is largely underestimated. The amount in bonds, bank stock and fire risks shows this to be the case. Now the personal property of the State is estimated at about fifty per cent. of the taxable value of the real property, whereas reliable data show that the two are equal, so that at least \$70,000,-000 of personal estate escape taxation."

This difficulty is by no means limited to our own State, but obtains wherever such property is subject to taxation.

sonal property of individuals as do the Massachusetts statutes. The system of "listing" is the one required by law in both States.

If those subject to taxation fail to make and bring in to assessors, after due notice, "true and perfect lists of their polls and all their estates, real and personal, not by law exempt from taxation, which they were possessed of on the first day of April of the same year," they are barred from the right of application to the county commissioners for abatement of taxes, unless it appear that they were unable to offer such lists at the time appointed. Moreover, assessors may require those presenting lists to take oath to their truth; and thus, if lists be not furnished under oath, assessment can be made according to the best information assessors can obtain.

If a man is "doomed" heavily by the assessors, he simply pays for the luxury of not furnishing requisite information. Only by the persistent practice of "*dooming*" heavily, in case sworn lists are refused, can invisible property be made to bear anything near a just proportion of taxation.

It is a question of alternatives with the inhabitants of towns, whether they will inaugurate a vigorous policy and elect officers with the understanding that they shall vigorously apply the law and force a tribute from invisible property which now largely escapes taxation, or allow so large an element of wealth to evade its proper proportion of the common burden.

In connection with this subject it may be well to consider the propriety of a change in the tenure of office in the case of assessors or selectmen of towns where *they* are made assessors. By not a few has the suggestion been made to choose selectmen for three years, as school committees are chosen, one going out of office each year, so that it will become the duty of each member of the board to make himself familiar with the duties of the position—a task generally devolving upon the chairman. It is claimed that a more rigid enforcement of the statutes could thus be secured, than is secured while the members of the board expect their places will be taken by others at the end of the year.

In treating of personal property subject to taxation, there is no more perplexing topic than that of the disposition of mortgages in relation to assessment. It is conceded that real property should be taxed wherever found, but it is claimed by many that if the property is taxed, and also a mortgage upon it, it is double taxation.

If A buys a farm worth \$10,000 and can pay \$5,000, and mortgages the farm to B for the remaining \$5,000, evidently A's ability in this transaction with reference to assessment is \$5,000; B's ability with reference to the same is also \$5,000, for he holds a note and other security for that amount. Now to tax A for only \$5,000 would be in violation of a principle generally accepted, that real estate has an ability with reference to taxation, represented by its value, however owned or encumbered. In the State of Connecticut, it is true, A would be allowed an "off-set" or "deduction of the amount of the mortgage, upon making it certain that the mortgagee shall be taxed in the State for the amount deducted;" but in most of the States A would be required to pay tax on the entire property notwithstanding the mortgage. The question at once arises, shall B be taxed for the amount of the mortgage? If taxed, is it not a case of double taxation? If not taxed, does B bear his part in the scheme of taxation in proportion to his ability?

Again, if B is taxed on the mortgage will he not in consequence obtain a rate of interest for the money loaned, which will virtually impose the tax on A, and thus make A with an actual ability of \$5,000, pay a tax upon \$15,000? These are questions often argued, but never settled. Like Banquo's ghost, they will not "down" at our bidding. Whatever view be taken, we find ourselves between two horns of a dilemma. If deductions are allowed in consequence of mortgages, the door is opened for an infinite amount of fraud and deception. A practical difficulty arises also when the land is in one town and mortgage is held in another town, in consequence of the different rates of taxation. The case is still worse if the land is in one State and the mortgage is held in another State. Considerations like these have induced most States to levy the tax upon the full value of the land in the town where it is located. But what shall be done with the mortgage? Shall it be taxed or shall it be exempted? The answer to this question given by the Massachusetts Commissioners on Taxation, (1875) which is but an endorsement of the Massachusetts system in relation to this subject, seems eminently wise and just. The system which they recommend does not tax mortgages as such, but as credits. A mortgage may be given to secure against a contingent liability or to insure the performance of a certain act, and would not be taxed to the holder, until "by some breach of con-

dition there becomes an obligation or credit due to the holder of the mortgage."

In the case supposed the mortgage or note which the mortgage secures, held by B, is a credit for \$5,000. He is taxable upon it as a credit. Should A prove insolvent and B take possession of the property, the mortgage and note still held by B are worthless as a credit and hence cease to be taxable. He is now assessed "upon the land of which he is in possession and in respect to which he has ability." By this method the assumed basis of taxation is the value of property held—a principle in itself *just*, and its application *practicable*.

Income Tax.—Political economists generally agree that the true theory of taxation is that which derives all revenue for public purposes by an assessment upon incomes rather than upon property real or personal, inasmuch as the net income of individuals is an exact measure of their ability to contribute to the public expenditures. There may be practical difficulties in the way of adopting such a method of taxation as a whole, but it does seem as though it ought to supplement any other method, otherwise many persons escape taxation whose ability is equal to that of their neighbors, who in consequence have more than proportional burdens to bear. A earns \$5,000 in a year and invests it in a farm, on which he afterwards pays annual taxes; B earns \$5,000 in a year and invests it in United States bonds, exempt from taxation, and thus evades a contribution to the common charges. A tax on income secures a contribution from each individual according to his ability. Such a tax should not be limited to money earned by a trade or profession, but should apply to all incomes from whatever source.

The objection on the ground of inequality, to taxing incomes derived from business requiring capital which is taxed as property, is met by allowing a deduction from the gross income of a certain per cent. (six per cent., for example) of the assessed value of property from which the income is derived. An exemption of perhaps a thousand dollars, or at least an amount sufficient to cover the ordinary living expenses of an average family, would be in accordance with the theory upon which exemptions in general are made. The "inquisitorial" system obtains not more in the taxing of incomes than in the levying of a tax at all on invisible property. Unless the system of taxing personal property be

dispensed with, there is no valid reason for excluding an assessment on incomes, while there are the best of reasons in the equalizing of the burdens of taxation in favor of such an assessment. The assessment and collection of the tax present no greater difficulties in the one case than in the other.

Railroads.—The real estate of railroad corporations is taxable in the towns where located, but the track of the road and the land on which it is constructed is not for this purpose deemed real estate. Until recently no franchise tax has been required of the railroads in this State. In accordance with the recommendation of Governor Dingley, a legislative enactment was made in 1874, and approved March 4, 1874, requiring that "every railroad company incorporated under the laws of this State, or doing business therein," "shall annually pay a tax of one and one-half per cent. upon its corporate franchise," as determined by the Governor and Council. A portion of this tax when paid is to be credited to towns where shareholders reside and the remainder to be retained for the use of the State. From the report of the State Treasurer for 1874 we learn that, "The total amount of the tax assessed upon the several railroad companies for 1874 was \$105,059.23. About \$40,000 of this amount, when paid, will, under the act, be placed to the credit of the cities and towns where the shareholders reside, the balance accruing as revenue to the State." The report of the State Treasurer for 1875, (received since writing the foregoing statement,) does not furnish occasion for material change in the above figures.

The levying of this tax has given rise to cases of litigation, but when these are once settled it may doubtless be depended upon as a source of increasing revenue to the State. Many of our sister States raise a portion of their revenue from a tax on corporations, and there are equally good reasons why a part of the revenue of this State should be derived from the same source.

Insurance Companies.—By legislative enactment, approved March 4, 1874, foreign insurance companies doing business in this State are required "annually" to "pay a tax upon all premiums received, whether in cash or in notes absolutely payable, in excess over losses actually paid during the year, on contracts made in this State, for the insurance of life, property or interests therein, at the rate of two per cent. per annum." The revenue from this source may not be large, but it is eminently just, and to the extent of its amount will relieve direct individual taxation.

Savings Banks.—The original design of these institutions was to furnish places of deposit for the savings of persons of limited means, where the money would be secure and would make a moderate gain for the depositor, thus favoring habits of thrift and economy. In this regard they have undoubtedly accomplished a beneficial result.

In view of their design the privilege of exemption from taxation was practically accorded (although not by legal enactment) to all deposits in the savings banks of this State until 1872. From the fact that to a limited extent, at least, these banks came to be regarded as also places of investment for the funds of the capitalist, or a cover to shield them from the burden of equal taxation, the propriety of exemption was no longer conceded, and in 1872 a tax of one-half of one per cent. was imposed upon all deposits, and in 1874 this tax was increased to one per cent., one-half of which is devoted to the common school fund and the other half directly to the use of the State. From this source in 1875, a revenue of more than \$300,000 was derived. The growth of these institutions in this State is indicated by the following facts and figures: In 1867 the amount of deposits was \$5,598,600.26; * in 1868, \$8,032,246.71; * in 1869, \$10,839,955.26; * in 1874, \$31,-051,963.73; † in 1875, \$32,083,314.28. †

In 1869 the number of depositors was 39,527, giving an average amount to each depositor of \$274.24; in 1875 the number of depositors was 101,326, and the average amount to each depositor \$316.63. The large number of depositors indicates the important work these banks are doing, and the average deposit shows either that a large majority must have stored in them only small sums, or they are but little used in this State by capitalists and for screening money from local taxation. Nevertheless, so long as only limited amounts deemed justly taxable really escape local assessors, they serve as occasions for complaint, and help more and more to loosen the hold of assessors upon invisible property. Two plans for their assessment are more or less discussed. The argument for the plan in favor of local taxation is of the following character: Notwithstanding the very considerable revenue which accrues to the State from the tax on deposits, it is a question worthy of careful consideration, whether more satisfactory results

* Report of Hon. A. W. Paine, Bank Examiner, 1869.

† Report of Hon. W. W. Bolster, Bank Examiner, 1875.

would not be secured by furnishing to local assessors the means of taxing all deposits by one individual above \$500, whether these deposits be in one or several banks.

By exempting \$500, it is claimed, the original design of favor to those in limited circumstances would be preserved, while the large deposits, where such exist, would bear the assessments they have been seeking to escape, or be driven from the banks, leaving them, according to the original intention, for small deposits. It is also urged that the revenue from the State assessment on deposits is of an unstable and uncertain character. In 1872, the tax was one-half of one per cent., in 1874 it was increased to one per cent., but it is now proposed by the Bank Examiner to reduce the rate to three-fourths of one per cent. What changes are in store for the rate in the future cannot now be foretold. It may be increased to two per cent., and may be entirely remitted.

When these deposits above a fixed sum are open to assessors for taxation, they will then bear this burden in the different towns and cities in the same proportion as other forms of property, and thus satisfy the very just demand for equal taxation, and furnish to different localities the precise revenue from this source, to which they are entitled.

This result could be practically secured by enactment requiring the officers of savings banks to make returns to local assessors of the names of depositors in the different towns and cities of the State and the amount of their deposits. On the other hand, it is claimed that the plan of municipal taxation of these deposits would devolve a vast amount of labor upon the bank officers, that from the variable rate of taxation in different towns that tax would be inequitable, that the system would inevitably be brought into confusion, in a word, that the whole scheme is impracticable, whereas the plan of State assessment is simple, the money easily collected, and the revenue from it vastly greater than would be derived by the other method were an exemption allowed, inasmuch as such exemption would cover the greater part of the sum invested in these banks by most of the depositors. It is also claimed that by devoting this revenue to the public schools, and to an allowance on the State tax, the poorer towns having no deposits in savings banks receive the benefit of a portion of this tax at the expense of their more prosperous neighbors. The arguments on both sides are pointed and forceful, and the two plans by widely different methods are far reaching in their results.

From the limited examination it has been my privilege to give to this part of the general subject, the conviction impresses itself more and more fully upon my mind, that if the present rate of one per cent. on all deposits, or one more nearly approximating the average rate of taxation in the State *can be maintained*, it would not be advisable to change the present method,—but rather than admit any abatement of the present tax, it would be better to open the deposits, either with or without exemption, to local assessment.

Discount for prompt payment.—In many towns the custom prevails of discounting ten or more per cent. for the payment of taxes on or before a specified date—generally the first of August. The advantages claimed are, low compensation for the collector and a large percentage of the tax in the treasury at the specified time; and it cannot be denied that these are real advantages provided they have not been too expensively purchased. On the other hand, it is worthy of note that “the allowance of the discount works inequality between the tax-payers who can avail themselves of its provisions and those who cannot.” Where a discount is to be allowed, an increased assessment must be made, and the unfortunate feature of the case is the fact that those who are least able have proportionally the larger burden to bear. It is in the nature of such a discount that the wealthy can avail themselves of it while the poor cannot.

On the ground of economy the practice cannot be defended, since a discount of ten per cent. for payment within four months (from April 1st to August 1st) is virtually the payment of interest at thirty per cent. per annum. Money can be hired by towns at a lower rate of interest. Moreover it is a questionable policy, that of bestowing a money reward for the discharge of a duty. The demand upon the tax-payer is a just demand for a certain sum known by him, and the “power of the State is behind the tax-gatherer” to insure its collection, hence the practice of discounting is unnecessary.

If a charge of twelve per cent. interest were made after the specified date the conditions of the case would be entirely changed, with equally good prospect of bringing a large portion of the tax at the required time into the treasury. Those who would avail themselves of the discount under that plan would not incur the payment of a high rate of interest, and those who should be

obliged to pay interest would have before them a constant motive to make payment at the earliest day possible; whereas on the discount plan, after the specified date, the only incentive is to put off the day of payment as long as possible. Again, the payment of interest would be in the nature of a penalty for the neglect of duty, and hence consistent with all our other relations to the State, which visits with punishment wrong doers, but does not offer money bounties for right doing.

Exemptions from Taxation.—The propriety of exemption in the following cases is generally conceded, or at any rate seldom opposed. Household furniture, not exceeding two hundred dollars to one family, wearing apparel, farming utensils, mechanics' tools; mules, horses, neat cattle, swine and sheep less than six months old; the polls and estates of Indians; the polls of persons under guardianship; and the polls and estates of persons who by age, infirmity and poverty are unable to contribute toward the public charges.

The matter of exemption of manufacturing establishments is under the control of towns, and hence need not be considered further than to remark, that a wise economy will not unfrequently dictate the exemption of such property for a term of years. The principal exemptions remaining to which attention is directed are the following:

1st. The property of the United States and of this State.

2d. The real and personal property of all literary institutions, and the real and personal property of all benevolent, charitable and scientific institutions incorporated by this State.

3d. All houses of religious worship, and the pews and furniture within the same, except for parochial purposes; and all tombs and rights of burial, and property held by a religious society as a parsonage.

Over the property of the United States the commonwealth has no control, and hence neither the power nor the right to tax it. If the National Government exempts from taxation its securities, the State has no alternative but to accept the condition. Just occasion for complaint arises, however, when in the use of these securities they are made to extend their exempting power to other classes of property; as when a merchant or manufacturer, just before the day of assessment, invests his surplus funds in United States bonds, and directly after the assessment disposes of the

bonds and reinvests the funds as capital in his business. A high morality, if not common honesty, would dictate that investors in these bonds should be content with the exemption accorded to them, and not attempt to make them the instruments by which larger amounts of property than they represent may evade taxation. As regards the propriety of exemption in the case of the bonds themselves, it cannot be forgotten that at the time they were authorized, their acceptance by the people involved questions of patriotism, and faith in an imperilled government.

It may be a source of some satisfaction to taxpayers, to remember that the government securities are largely held in foreign markets, and that five hundred million dollars' worth of these bonds have recently been replaced by securities bearing a lower rate of interest. Exemption extends to the property of the State also. The fallacy of the State's taxing itself is one not likely by any one to be seriously argued.

The eminent fitness of exemption in case of benevolent and charitable institutions is not a matter of controversy. Literary and scientific institutions have been regarded as equally entitled to this privilege. "A general diffusion of the advantages of education" was deemed so "essential to the preservation of the rights and liberties of the people" that the framers of our State Constitution did not fail to require that provision should be made "for the support and maintenance of public schools," as also for the encouragement and endowment of "all academies, colleges and seminaries of learning within the State." This fostering care of her educational facilities has been extended through her history as a State to the present time; and no small degree of her prosperity, her advance in wealth and the comforts of life, the intelligence and sterling virtues which characterize her people, can be traced to this cause.

In 1874, the tax levied for her public schools amounted to \$1,387,998,* and whether large or small this sum be considered, she will not be so far neglectful of her own high interests as not to make liberal provision for the education of her people. It must not be forgotten, that in the main her higher seminaries of learning have been endowed and maintained through private munificence, and that the money thus devoted to public uses is forever removed from the opportunity of reproducing itself, except in the intelligence, the graces and higher culture of her citizens.

* In 1875 the amount was nearly as large.

This property deserves very different treatment, as it holds very different relations to the State, from that which is controlled by private parties for individual ends.

The State will be slow to repress, by taxing such property, the liberality of any of her people who by their generous gifts relieve her of a part of the burden which otherwise her own best interests would demand that she assume. As regards local assessment no injustice is done, as is shown by the fact that towns will give large sums to secure in their midst the location of a literary institution.

It is easy of demonstration that the loss from exemption in such towns is more than ten-fold made good in the enhanced value of surrounding property, and in the direct and reflex advantages from such institutions to their citizens. Not until the State can afford to double her prisons, to double her jails in every county, and her poor-houses in every town, can she afford to tax the generosity which through these institutions contributes so largely to her highest interests.

The argument in favor of exempting the property of literary institutions applies to a certain extent with increased force to the property of religious institutions. Whatever religion may do for or teach in regard to the future life, the State has to do with it with relation to the present life,—and she cannot afford to do without so potent an auxiliary in the conservation of social order, in freedom from crime, in the preservation of moral purity, and in all that relates to her own sure and high prosperity. Every civilized nation and state in the history of the world has evoked its aid and more or less prominently contributed to its support and extension.

So far, however, as the purposes of the State are concerned, a church edifice costing from \$10,000 to \$20,000 contributes as effectually to the end in view as one costing \$500,000, and perhaps more effectually. On esthetic principles the more costly building may be the more desirable, but that is not the immediate purpose to be subserved, and hence need not be considered. The argument for exemption, therefore, applies only to a certain amount of church property, and that, the amount by which the interests of the State may be directly subserved.

It may be said that railroads and steamboats, and telegraph lines, likewise subserve the interests of the State. It will be answered that railroads are established, steamboats built, and telegraph lines constructed, to subserve private interests, the

public good not being the chief consideration, and the money invested in them serves for private gain and emolument, whereas the money devoted to benevolent, literary and religious institutions, is all a tax, devoted wholly and purely to public services and for the general weal, and is forever removed from conditions of private gain or advantage.

No one is more conscious than the writer that many topics, as domicile, the taxation of consigned goods, of property in transit, of bank shares, revenue from licenses and fees, which might properly be treated of under the general subject of taxation, have been necessarily omitted. Moreover, the discussion of several topics under consideration, has been too brief to be complete. In the treatment of them, it has been designed that this paper should be suggestive rather than exhaustive.

In the way of recapitulation, it may be well to bring before us in brief review the several specific points which have been favored.

1st. Assessment at *full value* (and not at any percentage thereof) of all property, real and personal, subject to taxation.

2nd. The taxing of polls at a sum made dependent upon the rate of taxation in the different towns, with perhaps fixed minimum and maximum limits.

3d. A vigorous application of all honorable methods, to the end that personal estate, especially "invisible" property, shall bear its full proportion of taxation.

4th. The taxing of mortgages when they represent credits.

5th. The election of assessors for three years; one each year.

6th. An income tax on the amount of income above one thousand dollars. When the income has been derived from business requiring the use of capital which is taxed, a deduction to be made from the gross income of six per cent. of the assessed value of the property from which the income is derived.

7th. The tax continued on corporations, including railroads and insurance companies.

8th. The taxing of deposits in savings banks above five hundred dollars, (or without exemption,) like other property, in the towns or cities where the depositors reside, rather than any abatement of the present tax of one per cent. on all deposits.

9th. No discount for prompt payment of taxes, but the substitution of interest in case of neglect, after a specified date.

10th. The exemptions now authorized by law, with perhaps the exception of church property above fifteen thousand dollars.

During the preparation of this paper, whenever farmers have been asked what class of our population is taxed most heavily in proportion to property, they have invariably answered, *farmers*. Whenever manufacturers have been asked the same question, they have invariably answered, manufacturers; and thus it is, each class regards itself most heavily burdened.

So far as the positive requirements and exemptions of the statutes are concerned, it is safe to say that there is no very material favor of one class above another. In the usual application of the statutes, however, that class whose possessions in the line of vocation are most open to assessors under the present constitution of society, is at an immense disadvantage, a disadvantage which must continue until effective measures be adopted to secure a due proportion of revenue for public purposes from "invisible" personal property.

The arguments of this paper, however imperfect in other respects, have not been directed too earnestly and emphatically toward the policy of equalization of taxation, by insisting upon the importance of bringing the valuation of all property to a common standard, that of actual value, and of distributing the assessment over the largest possible amounts, real and personal, visible and invisible. Perfection in this, as in all things human, is practically unattainable, and the nearest approximation to it can only be had by that toning up of public sentiment which shall visit the man who defrauds his neighbor by false returns for taxation, with merited punishment; which shall require at the hands of public officers the most conscientious and impartial discharge of duty; which shall recognize truthfulness and honesty as among the highest virtues in public as well as in private transactions, and which shall inspire in every citizen a readiness and willingness to bear, according to his ability, his full proportion of the common burden. Toward such a condition of society let it be our endeavor to direct our efforts, remembering that under wise laws, faithfully administered, the State and her citizens attain their truest and highest prosperity; that the blessings we enjoy, of protection, of opportunity, of social advantages, of good government, of civil and religious liberty, can only thus be maintained in their integrity and fullness, and be transmitted unimpaired, in long succession, to all the coming generations.

THE MANAGEMENT OF PASTURES.

By PROF. LEVI STOCKBRIDGE OF THE MASS. AGRICULTURAL COLLEGE.

As you remember, I had the honor last evening of addressing you on the subject of plant nutrition. At that time I honestly *thought* that that subject was a very important one. To-day I am to address you on the subject of pasture land and its improvement, and now I *know* I am speaking on one of the most important subjects that can be brought to the notice of New England farmers. Not only is it an important subject to the individual farmer, but it is a question of national importance. We shall see that it is such when we consider the pecuniary value of the grass and hay crop. In stating the value I shall not pretend to be exact, but I think the value of the annual hay crop of the United States is something more than \$300,000,000. If we had the value of the pasture grass it would swell the aggregate value to more than \$600,000,000, more than the value of any other single crop. Corn, in the best corn year we ever had, reached the value of \$600,000,000, and the average crop of grass in the United States is equal to that enormous sum.

But aside from its pecuniary value the hay crop of the New England States has a value that cannot be estimated in dollars and cents. In maintaining the fertility of our mowing lands, and in its general influence on agricultural prosperity, there is no crop which can compare with the grass crop. And yet we are obliged to come together to-day and say that the pasture land of New England has gradually deteriorated from its original condition in its power to produce grass, until to-day it has not the nutritious grasses which alone can make good animals, good butter, good cheese, but hardly more than brakes, brush and brambles. These are the prime crops so far as my observation has extended. Now it is utterly futile for a man to call a piece of ground a pasture, turn animals into it, and expect them to make good meat, butter or cheese, where the animals live on browse.

But these pastures were not always as poor as they are now. Formerly that wasn't considered a good pasture that wouldn't support a cow to every two acres, but now it takes about eight acres of the average pasture land of New England to support a cow, and then the cow comes home at night looking disappointed, as if she had found nothing to manufacture milk from. What is to be done? Here we are getting a little milk and the products of the dairy decreasing. The question forces itself on us—what is to be done? In discussing the question from this standpoint I shall have to go into practical details which, however important, are not always interesting.

In my humble opinion the corner-stone in regard to the improvement of pasture land must be put in the head of the farmer himself. To improve the pasture land of Maine, the chap I should go after is the farmer. While I am not prepared to endorse what has been said about the ignorance of the farmer, it is so far true that in seeking to make great reforms on the farm you must first seek to reform the farmer.

Now farmers of Maine, judging by your practice, what is your opinion of your pasture lands? Do you prize them as valuable property? How do you treat them as compared with your tillage and mowing lands? The farmer seems to think that the pasture is waste land—outside of all husbandry, outside of all tillage, outside of all manuring, thrown out to be pastured by the cattle, and taken care of by the Lord. That is about the general idea which prevails among the farmers of the community. The pasture land may be a piece of swamp—it is all right, it is nothing but pasture. As to going to work on it, and embracing it in the system of tillage of his farm and increasing the production of it, *that* is entirely outside of the farmers thought, as exhibited in his practice. Now the farmer is the fellow I am after; he is all wrong, and the pasture land will never be improved until he is set right.

Now contrast if you will our general idea of the management of the pasture with the idea of the farmers of Holland. There the pasture receives the same or better care and attention than the land from which they get their hay, and in so high a state of fertility do they keep it, that on the average, an acre of land in Holland carries a cow and a sheep—and a cow in Holland means a cow; it don't mean one of your little scrawny, half-fed animals, that we see on our New England hills, but a great, sleek, splendid Holstein. The pasture land there is better cared for and has

more done to maintain its fertility, than any other part of the farm. If we cannot attain to that point here, let us approximate to it. When we have learned the farmer to prize his pasture land, we are prepared to go a step further, and, taking these pastures as they are, see if we can find a way to improve them. The pasture lands of New England were once among the richest lands in the country. They were once fertile, they are now sterile. In tracing the process from fertility to sterility, we ought to find out what we must do to bring about a return to the state of fertility. Now let us trace the process through from the top downward.

The time was when this pasture land was covered with wood. The soil was rich with the accumulation of leaf mould. The farmers unwisely swept off these forests as with the besom of destruction. When they did, that they took the surest course to destroy the agricultural prosperity of the country. They were destroying the climate. The forests were needed to protect alike from flood and from drought. When the forests were destroyed they next did the surest thing to destroy the soil itself. When they burned the refuse wood and timber, they burned not only that, but the top soil itself to ashes. They destroyed all that material which should have developed nitrogen, and that which gave the soil its power to absorb and retain water when they thus burned up this organic matter. Then there was only left a rich mineral soil. The ashes gave it fertility for a time. But if you destroy its absorbing power no soil can long retain its fertility. For a short time the wood ashes gave a slight absorbent power. The land brought into pasture yielded abundantly for a series of years. Then nitrogen failed to be developed in the soil, and that is an element essential to the production of flesh and milk.

Now for the next step downward. A large part of the pasture land of New England is hillsides. These are subject to tremendous freshets. The organic matter having been destroyed by burning, there is nothing to hold the mineral matter, and it is washed away, down into the brooks and rivers. Here then we have another cause of the deterioration of the pastures.

The next cause is that you have put animals on your pasture land, and during a series of years you have built animal carcasses out of the soil. Now a word or two about this. If I grow an animal from the products of my soil I have constructed an animal structure out of the soil of my field. For every full grown ox you raise you have taken from the soil 130 lbs. of phosphate of lime

and 150 lbs. of nitrogen. And so with potash and the other elements of the animal carcass. That animal is a soil product. We are apt to think otherwise. If we grow an acre of corn, *that we know* is a soil product, but an animal, why, that is like Topsy—it is something that growed, that is all we know or think about it. But it grew from the soil as much as did the corn. All flesh is grass. Now the growing of animals year after year and sending them away has been a great source of deterioration to our pastures. Not in one year, but in the course of 150 years, has there been a great drain.

The next source of deterioration of which I shall speak is the production of dairy products. The great farm crop of New England has been the products of the dairy,—cheese, butter, milk. In the vicinity of all our large cities the supply of milk sold from the pasture lands causes an immense drain upon them. Now, then, I say the milch cow, for the pasture, is the worst animal that ever trod it or ever can. A milch cow that gives a large quantity of milk is an enormous feeder. You could not, with all your Yankee ingenuity and skill, devise a machine that could deplete your pasture lands so fast as does this machine for producing milk which you drive into them empty every morning and drive out full every night. Assume that your cow gives 15 quarts of milk a day for five months in a year—they often give from 22 to 26 quarts a day, but call it 15—she has carried away in the milk 30 lbs. of nitrogen, 8 lbs of potash, and 10 lbs. of phosphoric acid. But this machine cannot produce milk unless you keep the machine in order, and provide for its wear and tear. There is a waste in the system that must be supplied, and this supply comes from the pasture. Then there is the indigestible part of the food—the refuse, which we call manure. Now in these three—in milk, in waste of the system, and in manure—your cow carries off every year, 70 lbs. of nitrogen, 20 lbs. of potash, and 40 lbs. phosphoric acid. How many years have you been running this machine at that rate? Through how many generations of cows have the farmers followed this practice in New England? Multiply and see what is the whole amount of which your milch cows have robbed your pastures. In 30 years each cow has carried away 2,100 lbs. of nitrogen, 600 lbs. of potash, and 1,200 lbs. of phosphoric acid. I am well aware that during this period your tillage and mowing fields may have been improved by the manure that has been robbed from the pastures.

Now you can look back and see what has been done by keeping milch cows, and fattening beeves upon the pastures without manuring them, by burning over the land, and depriving it of its absorbent power, and by cutting off the wood.

Now we have got to the bottom of the whole thing. So far as the pasture land is concerned, we are in the "slough of despond." I often hear it said, such and such a farm used to carry thirty head of cattle, but now the buildings have got bad, the lands have grown up to brush, and the inhabitants have left and "gone West;" and unless we take the back track we have got to give it up and go "out West," there to be the same scourge we have been to the hills of New England.

But let us stop here awhile and see if it is not possible to reinvigorate these lands, and if it is, let us try to go back up the hill. We all like to slide down the hill, but it is hard work to get back. If we are not afraid of the work, now comes the practical question—"What are the steps to be taken to get back?"

For the purpose of improvement, we will divide the pasture lands of Maine into three classes, each of which requires a different mode of treatment.

A large proportion of the pasture land of New England is hill-side and mountain slope. We have much of such pasture in Massachusetts, and I suppose you have in Maine, though being in Maine for the first time, I have been surprised to have seen, so far as I have gone, so little land of this character. These hill-sides are almost unapproachable, but sheep and cattle scale them. My opinion is that the Almighty, in his kindness and care for his creatures, never intended that such land should be swept of its forests. I believe he intended it to grow wood. I believe that the farmer has undertaken to turn the natural course of things backward—has undertaken an impossibility in undertaking to make these lands grow grass, and that he should give them up to grow wood every acre of them. Not that he should *abandon* them to wood, but that he should plant them with the seeds of trees adapted to the climate and locality, and sedulously care for them. I believe in the progressive idea of the abandonment of useless fences, but these lands set apart to wood should be kept fenced; the farmer should surely keep all cattle out, and, if possible, the partridges and rabbits, until these slopes are covered by forests. Not by accident but by design has the great system of Nature been determined; and if the farmers will conform to it in this

regard, the trees will grow up and break the wind currents, turn the courses of the atmosphere, and keep up the perennial flow of our streams. It will be profitable too as a crop, for the wood of course should be cut at maturity as should any other crop.

But there are immense stretches of pasture land which require different treatment. They are on what we call the foot-hills. They are not so elevated and precipitous as those we have been considering, but are too rocky to be plowed. "Why don't you plow your pasture lands?" asked a scientific agriculturist of a New Hampshire farmer. "Plow them?" was the answer. "I'd like to see you run a plow-share through them. Why, we have to sharpen our sheep's noses so they can get them down between the rocks." There is a great deal of this land in these little valleys between the hills upon which, if there is nutrition for it, any sort of grass will grow. What shall be done to renovate this land? Now here I come to tell you what to do. It is nothing but fun for me to stand here and carry on farming. I can grow almost any crop I want to, and I can renovate one of these old pastures as easily as I can do anything else, though it is a different thing, to be sure, when I go into the pasture and bring myself down to the work. Now be patient while I get the brush out of this pasture.

The first trouble is it is rocky. The second is that everywhere that a shrub can get hold it has taken root, and the land is full of bushes, briars, brambles, anything and everything but what you want. The first thing to do with such a piece of pasture land is to get the brush out. Now that means something with me. I can remember when on an old Massachusetts farm, it was every year the work for us boys to mow the brush in the pasture. Every year there were the same brush scythes to be wielded, the same brush to be cut, I verily believe the same bumblebees and yellow wasps to battle with, and the same boys to do it. If you want to educate a boy to hate farming, put him into an old pasture to mow brush and fight bumblebees, and you'll do it.

Now then, we want to get rid of the brush. If the owner of the pasture really means to get rid of it he won't put the boys there, but where the bushes are of sufficient size he will take the team and his best hired man, and when the boys see that he means business, they will take hold with a will. Pull them all out, pile them up, and burn them. There is work in it no doubt,

but I tell you it will pay. Most men think the work is done right there. But if you stop there you will find the brush will grow again. But if you sow grass seed and drag it in, and there is no land so rocky but you can run a drag over it, then you have made clean work of it.

There is some pasture land that hasn't got brush on it, but it is sterile. There is no nitrogen in it; there is very little phosphoric acid in it, because the cattle have consumed them in milk and bones. You cannot draw compost or barnyard manure on it. Is there anything you can draw on it which shall enrich this land on which you have done no burning? Do you say that your other fields require all the dressing you can get? If you can afford to make grass anywhere, you can afford it in your pasture. You can make it cheaper there than in your mow field, because your cattle will gather your crop for you.

You must absolutely top-dress it. You have robbed your land of its mineral elements and its nitrogen, and you must top dress it to make it bear a crop. Now what will you use? I have heard somebody say here in Brunswick, "I can buy all the wood ashes I want at twenty cents a bushel." Wood ashes at twenty cents a bushel, and you complaining that you havn't anything to put on your land, and talking about going West? Give me wood ashes at thirty-five cents a bushel, and I will take the poorest farm in New England and get rich. You don't want anything else if you can get that. That is just what you carried off; if anybody else is fool enough to do the same, go and buy them. You can richly afford them at twenty cents a bushel. But that is not enough. There is no organic element in ashes, simply mineral material. Sow 20 bushels of ashes, which at 20 cents per bushel will cost you \$4, with 50 pounds of sulphate of ammonia, which will cost you perhaps \$2, and for \$6 you have a dressing for an acre of land that will last you two, three or four years. I say, sulphate of ammonia. Here in Maine you make tons and tons of porgy pomace. I don't know whether porgy pomace is the best form, but what I know as fish guano—the dried pomace from the factories—you may use as well as sulphate of ammonia, and perhaps it is cheaper for Maine. Use that on your pasture land with wood ashes and I warrant that you will be the richer for your outlay, either in your dairy or in the growth of your animals. If you havn't wood ashes and wish to put on a compo-

sition somewhat similar, use the following materials for this class of pasture land of which I am speaking, which cannot be plowed but which can be worked. A mixture of

Sulphate of ammonia,	180 lbs.
Muriate of potash,	70 "
A good nice superphosphate,	100 "

Mix and put on to two acres and you will find it will wonderfully improve the quantity and quality of your grass.

QUESTION: Would you seed it?

ANSWER. Not if it was seeded. If there was no grass seed in the land, if it had all run to white-weed, I should want grass seed; I should use a mixture of the clovers, blue-grass, red-top, and a little, and but little, herds-grass.

In the third and last class of pasture lands, I place those lands that can be plowed, whether used for pastures exclusively, or used in rotation, one rotation being that for a season they are fed with cattle.

Now I believe in renovating land by plowing. I am an advocate of tillage, while I am an advocate of feeding plants. I tell you God's sunshine and air renovate the soil. Much of our pasture land we cannot plow, and now we have come to a class that we can plow. I would plow and pulverize it, and let the air into it, and break it clod from clod, and particle from particle. Twenty, thirty, forty, fifty years, it has been in sod. If there is any clay in it it has become impervious to water and air.

Some men say, "I never plow pasture land, I could never get anything from it afterwards if I should." Sheerest nonsense that ever was if you know your business. If you plow this land and work and improve it, every principle of tillage is on your side; and if you don't get a good turf, it is because you have sown too coarse grass, as will be the case if you have nothing but herds-grass. It is your fault if you don't give the soil good tillage and seed it with such grasses as it needs.

Till the soil thoroughly and manure it. Now the question comes—"What shall I manure with? I havn't any manure that I can spare." Be righteous and just. You have robbed your pasture land for years. It was fertile once; it is sterile now. Your milch cows have been driven on it hungry every morning, and have returned full at night. Be just. "But I havn't any manure." I suppose you havn't. After saving all you can, and using every available means to make it, there is still a great

deficiency. Here comes in the benefit of the discoveries of modern science in supplying additional means of fertilization after ordinary supplies are exhausted. I verily believe, yea, I know that the fertility of the class of lands I have spoken of can be restored.

I would make a composition like the one I have given here as a top-dressing. I wouldn't plant it and crop it. I would till it thoroughly and put on composition, and then I would sow some herds-grass, blue-grass, red-top, red and white clover, and then I would sow about two bushels of rye to the acre, and this I would do if I had but a single acre of such land on a twenty acre lot. I would do the work well, and then ask God's blessing on it, and wait for it. What would be the result? The rye would come up, the cattle would go on and eat the rye, the rye would protect the grass. In the second year the grass would be up, and I would have part of a crop of rye, and a well grown crop of grass.

Now, gentlemen, I have seen this thing done. I have seen land brought up from where it took five or six acres to keep a cow. I don't say that you can't make more doing it on some land than on others; but there is no land, unless it is like the driving sands of Sahara, that cannot be renovated.

Thus I have gone over the different classes of pasture, and prescribed a method of treatment for each. Now a word as to feeding your pasture lands. You put on the land a stock greater than your pasture is capable of bearing, and the grass is gnawed down so close that sometimes some of the soil is taken with it. The surface of the ground is left bare and the bulbous roots of the grass are exposed to the cold of winter. Put no more stock on the land than it will carry, and don't let a foot step on it after the fifteenth of October. Some one will ask—"Shall I turn them into my mowing land?" No; turn them into your barn or barn-yard. You cannot afford to feed pasture land, if you mean to do business on it, after the fifteenth of October, and for this reason: There should be sufficient growth of grass on the land after you have done feeding it for mulch to the new grass. You should be husbanding the resources of your soil so as to leave it strong and vigorous for next year's work. A stool of grass on your pasture land is the same as a stool of grass on your mowing land. Would you think it good policy to have the roots of the grass on your mowing fields all exposed to the frost of winter? If it would not be good policy there it is not good policy in your pasture. I

repeat, put no more stock in your pasture than it will feed well. Would you say it would be good policy to put twenty head of cattle in your barn if the feed you had in, it wouldn't carry but fifteen? For every animal that you put in your pasture more than it will feed well you sustain a loss, not only in the growth of the animal but in the quantity of your dairy products, for the extra animals do not begin to pay for the extra work they make.

Thus, gentlemen, I would attempt to improve the pasture lands of New England. I know it is a slow process, but if we would raise fine cattle and give the products of the dairy in profusion, we can only do it by restoring to our pastures the fine, succulent grasses that alone will produce them. In improving my pasture I would like to select my stock. There must be some stock and there must be somebody to raise it. I would like to let somebody else manufacture the animal carcass and let me have it to fatten. Then the animal will only take away from my farm carbon, which I can afford to have him do. So I will reach out to New York or to the West, and buy cattle from somebody whom I don't know and whose farm I shall never see. I will let him furnish these other elements and I will furnish the carbon. But if I cannot fatten cattle to advantage I must come to the next best thing, and here I don't know what to do. Next to fat the best product that was ever carried from a pasture is butter, for in selling butter I sell nothing but carbon, and this depletes the soil less than anything I can sell. But in selling butter I am stealing from Peter to pay Paul, and that I don't like to do. While I am selling from the farm only carbon, I am taking the elements of fertility from my pasture and putting them on my field; but let me be honest, and if I can do no more I can at least top-dress all my pasture lands every other year.

In conclusion, gentlemen, I will say that I believe that, taking these two classes of pasture land, clearing and top-dressing the one, and plowing, tilling, manuring and seeding the other, and by care of the ground and the stock we put on it, being sure to return what we have taken from them, I am very sure that we shall yet see the grass grow in the pastures of New England which our fathers grew there a hundred or more years ago.

BEET SUGAR.

BY GEORGE E. BRACKETT, BELFAST.

The prominence given to the subject of beet sugar, in the inaugural address of Gov. Connor, and his recommendations and suggestions in regard to the feasibility and advisability of the culture of the beet in Maine for the manufacture of sugar, is my excuse for calling the attention of the Board of Agriculture to the matter at this time.

While I am not yet prepared to fully agree with our Executive in so heartily and fully recommending this comparatively new industry to the farmers and citizens of Maine, yet I would not be one of those factious spirits who oppose a movement or project simply because it is new. No doubt the Governor had all the data before him, deductions from which warranted him in his recommendations. I confess, I am not fully read up in the progress and condition of the beet sugar industry during the past few years. I understand from report that an attempt was made to introduce the business into Maine years ago, but where and with what general results I am not advised.

But it is undoubtedly a fact that the beet sugar industry is an important one in the old countries, although yet in its infancy in the United States, and being such we cannot afford to ignore or overlook it in our agricultural economy. If the State of Maine is specially adapted to beet cultivation and the manufacture of beet sugar, we desire to know it now or as soon as may be, and *vice versa*; in either case discussion and consideration of the question will soon inform us.

The advocates of beet sugar manufacture claim the advantages of its introduction would be: To insure superior methods of agriculture, increased crops, more remunerative prices, home markets and enhanced value of farms. It would also tend to create industry, diversify labor, reduce the price of sugar and bread, and render us independent of foreign countries. Greatly to be desired results are these I grant, and such as towards the attainment of which it is our bounden duty to strive.

The great sugar producing plants of the world are, in their order, sugar-cane (*Arundo saccharifera*), the beet (*Beta vulgaris*), the date-palm (*Phenix sylvestris*), and the sugar-maple (*Acer saccharinum*). According to statistics of a few years ago, which no doubt still hold good in ratio, the total production annually of sugar from these plants is about in the following proportion:

Sugar-cane.....	71.42	per cent.
Beet.....	22.50	"
Palm.....	5.00	"
Maple.....	1.08	"
	100.00	

It will thus be seen the beet furnishes nearly one-quarter of the sugar produced in the world.

France and the German States are the great beet sugar producing countries of the globe, their production being nearly, if not quite, equal to their consumption. There are over 2,000 beet sugar manufactories in Europe, of which France has over 600. The German States and Russia include the bulk of the remainder.

Several attempts to manufacture beet sugar on a small scale have been made in the United States, but if California be excepted, and perhaps some trials in Illinois, I am not aware that they have been crowned with commercial success, although they have proved that the best quality of sugar can be made from the beet. As long ago as 1839, the "Northhampton Beet Sugar Company," located in the rich tobacco growing soil of the Connecticut valley, proved this beyond a doubt. But it was not a financial success. They manufactured sugar of an excellent quality, 100 lbs. of beets producing seven pounds of sugar and three and one-half pounds of molasses. In 1864 the "Germania Sugar Company" commenced operations in Illinois, but I do not learn they were so successful as to make the enterprise a permanent one. They cultivated 600 acres of beets in one season which produced from 8 to 9 per cent. of sugar.

The beet plant adapts itself very readily to climate and circumstances, although a first-class soil is absolutely indispensable to its successful cultivation. The deep, rich, argentiferous soils of California are no doubt the best adapted to its production of any in this country, and the black, greasy, prairie soils of the western States, come next. Whether the farmers of Maine can compete

with them, except at large cost for special fertilizers, is a question for consideration. That we can grow the beet to perfection in our State is a fact proven by repeated experiment, as also that large crops can be obtained, and thus the question is one of comparative cost.

The variety of beet required for the manufacture of sugar is that which is richest in sugar and contains the smallest percentage of alkaline salts, and the white Silesian or white sugar is the kind in general cultivation. Colored beets are objectionable. The special qualities desired and which seem to be united in a greater degree in the white Silesian than any other variety are a pear shape, no lateral roots, smooth, white surface, white, hard flesh, and must grow beneath the soil. They also do not grow too large, five to eight lbs., being most desirable.

According to Prof. Payen's analysis, the average beet contains:

Water	83.5 per cent.
Sugar in solution.....	10.5 "
Albumen, caseine and nitrogenous matters...	1.5 "
Cellulose and pectose8 "
Miscellaneous	3.7 "
<hr/>	
	100.00

The average percentage of sugar in the French beet is $11\frac{1}{2}$ and the American and German about 13. In France the average per cent. of sugar extracted from the beet by the machinery used is 7 per cent., though improved methods in many cases produce 11 per cent.

As to the cost of raising beets in Maine, any farmer on this Board can probably give an intelligent answer. The Department of Agriculture estimates they can be raised at a cost to the manufacturer of \$2.60 per ton. This, it is presumed, refers to wholesale production under most favorable circumstances. The average price paid by European manufacturers is \$3 per ton. A western writer on the subject says the factories there can be fully supplied at \$4 per ton, outside price, and western farmers contract them at \$3.50 per ton.

The yield per acre is of course variable, depending largely upon the soil and cultivation. In Germany, the average production is 17 to 20 tons per acre; while 50 and 60 tons are not uncommon. Twenty tons per acre is reported as the average in our Western States.

One of the strongest arguments in favor of beet culture is, that to be successful, it leaves the soil in an improved condition, especially for a grain crop to follow. Being a "hoed crop," the soil must necessarily be kept mellow and free from weeds; and to produce a paying crop, it must be very highly manured, which leaves it in fine condition for a crop of wheat. Another reason is, that the growing of beets is specially adapted to secure the retention upon the farm of nearly all the elements removed from the soil by the plant. The sugar which is extracted from the beet is drawn largely from elements present in the air. If, therefore, the beet refuse or residuum left after manufacture is returned to the soil, it loses but little of its fertility, and the next crop in rotation finds ample sustenance. Again the forage is of great value as stock food. The leaves are highly prized, especially for feeding to milch cows, and the pulp or refuse of the rasped beets after the juice is expressed is claimed to be a very rich food for cattle, sheep, swine or fowl. The average amount of pulp or beet refuse is some 20 per cent. of the original weight of the beet, and at the beet sugar mills in Europe it sells at \$2.50 per ton.

Taking into consideration our present national condition, our pleasant relations with sugar producing countries, and the cheapness and facility with which cane sugar is produced and sold, I am not sure as to the desirability or practicability of entering upon the cultivation of beets and the manufacture of beet sugar in Maine. If a change from our amicable relations with other nations was imminent or even in the near future, it might become a matter of more specific importance.

It occurs to me that we have already with us and in our midst in Maine, an industry productive of the same immediate results which is worthy of encouragement. I refer to the manufacture of sugar from the sugar maple, which according to the figures above given, yields only a little over one per cent. of the total sugar products of the world, but which it seems to me is capable of being largely improved, enlarged and extended, especially in our own State. The crop is a permanent one, no annual planting or cultivation being required, only the harvest and the manufacture of the product, and the market has never yet been overstocked. We may safely predict that maple syrup and maple sugar will command a remunerative price for years. I think this industry worthy of more attention than has been bestowed upon it.

Briefly, in conclusion, allow me to say these remarks are presented only in a suggestive sense, and in no wise recommendatory or argumentative, but it has seemed to me, from the prominence given the subject by our Chief Executive, not only appropriate, but in some degree obligatory on us as a State Board of Agriculture, to at least refer to and call attention to the subject at this time, that it may be more fully examined and discussed at future sessions, and by this means the attention of our citizens called to the matter, so that if it be of practical value to the agriculture and well-being of Maine, we may be prepared to take the proper and necessary action in the premises.

DISCUSSION ON FEEDING DAIRY COWS.

The Discussion reported below, occurred on the forenoon of Wednesday and afternoon of Thursday, but is here put into connected form for better reading.

HON. C. J. GILMAN of Brunswick. It seems to me that we in the State of Maine, are to do more with our dairies in the future than we have in the past. I think the indications on that point are very decisive. We have the very richest of feed, and I have no doubt that the production of butter and cheese is to be a source of great income. The animal that is to produce our butter and cheese is the cow. Now how shall that cow be fed so as to produce the most at the least cost. [The speaker here read an article from Prof. Arnold of Rochester, N. Y., in relation to the well known experiments made by Mr. Miller and Mr. Laselle in feeding dairy cows with corn meal, with and without hay, and continued] Now, I don't propose to recommend the supplanting of hay by corn meal, but it does seem to me that most of us having stock, have been somewhat negligent in regard to this matter. If we can take three quarts of corn meal, weighing 4.68 pounds, and get out of that $3\frac{2}{3}$ pounds of absolute food, and if you can purchase that and cut down your hay one-half or two-thirds, and have your cow in better condition, it seems to me we ought to look at the points of economy presented thereby. Call it 200 days a year that you have to keep your cow at the barn. Feed ten pounds of hay per day, and in 200 days your cow will consume a ton of hay. Three pounds of meal per day at the rate of 75 cents per bushel, would be $4\frac{1}{2}$ cents per day for 200 days, or \$9.00. Now, assuming that the average price of hay is \$14 per ton, you will have \$9 for concentrated food, and \$14 for hay. I think I hear some one say—"It is impossible to carry a cow through on a ton of hay." But have you, gentlemen of the Board, given the thing a fair trial? Have you examined it personally? If you feed three pounds of concentrated food per day at 75 cents per bushel, you carry your cow through for \$23. If you feed three

quarts, of course the cost will be increased. If we can carry a cow through for \$25, I think we can demonstrate that there is profit in the dairy system. But how can you carry a cow through the winter on one ton of hay? I acknowledge that you can't do it by feeding in a helter-skelter way. The feeding must be regular, and you must have your arrangements to know that you feed just so much per day. It has been demonstrated by Prof. Arnold that much of our hay is not digested, and does not become available to stock. If you take the best hay, that which is of good quality and thoroughly cured, I acknowledge that you can keep an animal well on it; but when we have many acres to cut we cannot always secure this crop in the best condition. Therefore it is fair to assume that a large percentage of our hay crop, cut in the last of July and August, is not the best product, and so I say that a great deal of the hay fed out to our stock is not thoroughly digested. Now, is there a well defined idea among our farmers as to the best method of feeding stock? I am of the opinion that it is the best way to reduce the bulk of hay, and exchange it for concentrated food; that the animal will do better, that the manure heap is better, that the yield of milk will be greater and richer. There may be a question whether it is best to furnish this concentrated food in the form of corn meal, oat meal, or shorts? I suppose the best product to give cows would be oat meal, but we cannot always do it.

Mr. WASSON being called upon by Mr. Joyce of Brunswick, in reference to porgy chum as food for stock, stated that as food for dairy stock it should be ground fine; that while he did not know as it would increase the yield of cheese, it would make a marked increase in the yield of butter; and that after a cow is dried up, he believed that more fat could be put on her by feeding porgy chum than anything else. In reference to general feeding, Mr. WASSON said:

It is conceded as a fact that the agricultural future of Maine is largely in its dairies. I want to supplement that statement by saying, that I don't believe that among the best farmers of the State, that man lives who has developed the full capacity of his cow for producing milk, butter and cheese. By the census returns of the State we find that the average annual production of butter per cow is less than 100 lbs.; among the best farmers of the State we find that it is from 200 to 450 lbs.; and we occasionally see in the columns of our agricultural papers the statement of an instance

in which the high figure of perhaps 600 lbs. has been reached. I think my friend, the farmer of the Agricultural College, has done and is doing good service to the State by his experiments in feeding stock; and when we give these gentlemen there the means and opportunity to complete their experiments, we shall find that there is a golden chain that attaches the college to the State, and we shall attach more importance to the Institution and its results than we do at present.

A few years ago, when our hay crop was cut off, the farmers were obliged to feed meal in order to bring their stock through the winter. The consequence was that in the months of February, March and April, the farmers and farmers' wives were saying: "What is the matter with the cows?—they are producing more than they ever did before." They were astonished to find that they were producing in flavor and grain a summer butter in winter. It was because sheer necessity, mother of most of our inventions, had compelled them to feed meal. A few years ago a neighbor of mine was driven into ascertaining on a small scale a fact which my friend (Mr. Farrington) is learning on a broader scale. For the sake of ascertaining the comparative product of three cows, he put the best cow on the best hay, and the poorest on hay and provender, part oat-meal and part corn-meal, and the result was that with these different kinds of food the poorest cow made more than double the butter that the best did. Now I believe that we must investigate this question of the capacity of our cows, and ascertain what treatment and what feed is necessary in order to develop their full capacity, before we can realize the net gain which it is possible for us to realize from our farms.

DR. TUCK of Farmington. I don't understand that the gentlemen who propose to drive their cows in winter to give the utmost quantity of milk, propose to continue their rations of concentrated food through the summer; but that they will turn them out to grass during that season and let them get their living there. Under that treatment I think the more meal the cow gets in winter the less will be the income derived from her during the summer. If you continue the meal through the summer, I have no doubt you will get a large quantity of milk; but the idea is prevalent in my section, that the tendency of very high feed is to make a cow gargety, short-lived and sterile. My observation shows me that the more concentrated food fed to sheep in winter

the less they will gain in summer. I cannot state as a certainty that that applies to a cow, but I think it does.

Mr. WASSON. Poultrymen tell us that the hen has the capacity to produce a certain number of eggs, and that when she has produced that number, she stops. Is it not, in like manner, true of the cow, that she has the capacity to produce a given quantity of milk? Suppose that capacity is a thousand pounds; the point is, that we are too long in getting that thousand pounds. Might we not as well obtain it in two years, and when we have reached the limit of production, give the cow to the butcher?

Mr. A. L. BRADBURY, Member from Franklin. My experience in feeding milch cows is quite limited. I think for any stock the winter feed should be no better than the summer feed. Of late I have adopted the plan of feeding a poorer quality of hay, or straw if I have it, the first thing in the morning, and following, before they have quite finished that, with a better quality, and following that with a better still. In this manner I can educate my cows to eat all kinds of fodder that I raise on my farm. I find that I can get my cattle to eat more hay in this way than by feeding them exclusively with poor hay, and that they will eat it cleaner. I find if I take about one-quarter straw I can make my cows do about as well as if I feed all hay. For provender, I feed shorts if I want quantity of milk, and meal if I want butter. Straw contains but a very small quantity of nitrogen, and to make amends for the want of it, I feed shorts, or oats and peas. Why I say oats and peas, is because we can raise them in our climate anywhere and don't have to go abroad for them. Oats and peas contain nitrogen, and a small quantity of oat and pea meal will give the nitrogen required to make up for the straw. If I am feeding clover hay, I feed but a small quantity of the oat and pea meal each day. This method I find so far very satisfactory. I adopted this plan last winter, not before. I water twice a day.

Mr. FLINT, Member from Somerset. I have had some experience in feeding dairy cows. I think that the sugar beet is a valuable article of food for cows, and indeed for all stock, and where potatoes cannot be raised to advantage, the beet so far as tried does well. I know of eleven tons having been raised on a quarter of an acre. I think cows should be fed in winter as you propose to feed them in summer. There is no reason for feeding them any better, and there is every reason for feeding them just as well.

MR. REYNOLDS, Member from Oxford. I have a small dairy, and intend to keep more cows than I have for the past few years, for I am satisfied that it is very profitable. My mode of feeding is much the same as Mr. Bradbury's. Potatoes, in my experience, are good to give a flow of milk, but you want meal to go with them, to give a better quality to the butter. Roots I find to be an excellent provinder, and perhaps the beet spoken of is better and sweeter than the potato.

MR. GILMAN. I would like to know whether the practice of feeding concentrated food, like Indian meal, or meal and shorts, has been found to be injurious to stock where it has been continued for a series of years—whether it has a tendency to produce garget?

HON. TIMOTHY WILLIAMS, Member from Knox county. I have been in the habit of feeding my cows in the winter on hay and fine feed. I get the best quality of fine feed, that which has the most flour in it. I cut the hay in the morning, heat the water, pour it on scalding hot, and mix the fine feed with it. I never knew it to injure a cow. I give about four quarts per day to a cow. I calculate to keep my cows in winter in the same way always. I never turn out my cows in the spring until there is plenty of grass. I never had any gargety cows. I have always had a good flow of milk from my cows, and made a good quantity of butter. A year ago last June I had two cows, and the neighbors wanted to know how much butter they would make during the thirty days of June. We kept an account of it, and besides the milk used in the family they made $135\frac{1}{2}$ lbs. of butter, or $2\frac{1}{4}$ lbs. apiece per day. We called that pretty good, until I went up to the State fair and saw a man who told me that he did a good deal better. Since that I havn't told my story. To feed a cow about as high as you can and not injure her is, I think, the true idea of feeding.

MR. D. M. DUNHAM of Bangor, Member at Large. When we met at Waterville, some of you will recollect that Mr. Percival told us that he made some 900 lbs. of butter from two cows. We wanted to know how he had kept them; and one part of it was, that he allowed them to drink no cold water in the winter. Mr. King had some good stock at our fair one year. I was inquiring in March about some steers, and he told me they were seven inches larger in girth than when he showed them at the fair. He said he had given them what good hay they wanted to eat, and what warm water they wanted to drink. If I wanted my cows to

do well in the winter, I would take care to provide them with water as warm as I should wish them to have in the summer.

Mr. STARRETT of Warren. I know of a very successful farmer who built a shed over his well, and set a boiler so that he could heat water to use in feeding his stock, and to take the chill off the water that his cattle drank. He considered it a decided advantage.

Mr. MALLETT, Member from Sagadahoc. I wish to say that we want to arrive at something definite in this discussion about feeding cows; we want to know not only what to feed to make the cow a milk producer, but what to feed to make her a butter producer. We have present with us Mr. Work who is a milk producer and Mr. Gowell who is a butter producer, and each feeds his cows with reference to this point. I think we may hear from them with profit.

Mr. WORK. I would say in reference to feeding cows for milk that I have never used any science, and have never tried to determine which is the best way. I have been in the business about eighteen years, and for the last eight or ten years I have used shorts or bran and Indian meal—one quart of meal and four quarts of shorts a day. I don't know that it has made much difference whether I have used warm water or cold. I have given them both, winter and summer. I give my cows about all the good hay they can eat. I change the hay occasionally, and if they get a little cloyed I put them on coarser hay. I have thought that for all the grain I have fed, my cattle wanted as much hay as though I had not fed it; it would seem just to give them an appetite for the hay. I have kept cows until they were twenty years old, and I never knew of any of them being injured.

Mr. GOWELL. I have a small butter dairy of five cows—Jerseys and grade Jerseys. My pasture is stocked with sheep up to about its full capacity, consequently I feed one quart of Indian meal daily, or the amount of shorts which is equal to it. I save the manure at night, and feed what hay they require during the season. In its season they receive fodder corn. The butter production is a little over two hundred and fifty pounds per year to a cow. I fear that if I were in the habit of feeding my cows as heavily as Mr. Work does, I should in time ruin them. I have constructed a tank under my tie-up to hold both the solid and liquid manure. I feed some four tons of shorts during the winter. I think a ton of shorts to be more than equal to three tons of hay.

I hope that in future there may be something that will save the farmers the expense of Western shorts. If there is to be a new departure, I believe it will be in this direction.

Mr. W. W. HARRIS of Portland. I am a little interested in the milk question. I keep a few cows and sell milk. I sell to the retailer, who sells again to the customer, and so I only get about half the money. My cows are natives, and the way I keep them I average a fraction over \$100 per year from them. I use a car load of shorts a year—twelve tons—have it delivered on the car at my farm. I keep six or seven cows. I feed some meal and some beets. I feed shorts liberally, and think they pay. My idea is, that if you mix your concentrated feed with your hay for cows giving milk, you want about as much hay as the cows would eat without it.

Mr. WORK. I have ten grade cows, some of them pretty high grades. I find they will bear more grain than any other class of stock I ever kept, and do better. The best cows I have are half or three-quarters Jersey. I feed liberally. I feed an old cow more than a young one, and a cow in milk more than a cow that is dry.

Mr. MALLETT. I was thinking, while listening to the remarks made, how things have changed within the last ten years, in regard to cows. We have thousands of acres of meadow land in this vicinity; we are of rather a lazy nature, and I don't know but it is superinduced by this meadow hay. I think at any rate we don't raise as much English hay as we should if we had not relied on the meadows. This meadow hay was poor fodder for milch cows fifteen or twenty years ago, and we never thought of milking through the winter a cow that was to calve in the spring. If we wanted to have milk in the winter we had to have a farrow cow. There is just about as much difference in the cows to-day as compared with those of that time, as there is in the feed. There is no necessity of keeping a farrow cow now; the cows give milk through the winter by giving a little provender. A portion of my cows I don't dry up at all. I have a cow that I suppose there is not provender enough in Sagadahoc county to make her give milk all winter if with calf. There is that difference in cows.

Mr. WORK. If I am a little short of milk I add a few shorts to the four quarts, but don't vary my one quart of meal. I can't tell how much hay I feed, but what the cows will eat. I have four cows in my stable that have not been dry for four years.

Mr. GILMAN. The farmers ought to know how much hay they are feeding to their cows, and they ought to find out by experience whether they are feeding too much or too little.

Mr. WORK. When I used to feed three quarts of shorts a day, I got nine quarts of milk. Now, if I don't get fifteen quarts I think the cow isn't a good one. [In answer to questions.] I water twice a day in cold weather. Almost any breed of cows will give milk the year round; there is a good deal in the training. I should prefer to have a cow go dry two months before calving. I don't use the milk for four or five weeks after calving.

Mr. GILBERT WOODWARD. I have never done much in the dairying business. I agree with what these gentlemen have said about feeding cows. I prefer to have my cow go dry about two months. I don't think it profitable to have cows give much milk in winter. It is a good deal of work to attend to it. I keep a small number of cows, preferring to sell my hay rather than manufacture it into butter. I have good facilities for dressing—use marine dressing mostly, and some commercial manure, and I can sell three-quarters of my hay and keep my farm up by so doing.

DR. TUCK. There is a question whether the same rule is applicable to the keeping of all dairy cows. I have seen a great deal of difference in the effects of the same kinds of feed on different cows. I have seen cows that fed on corn meal would dry up milk and take on flesh. I had a cow that yielded twenty-nine or thirty pounds of milk per day without meal. I commenced to feed three pints of meal, and not getting the increase I thought I should have, I thought I would try shorts. I dropped one pint of the meal and fed two quarts of shorts without any increase in the quantity of milk. That set me to thinking that my cow didn't dispose of her feed very well, and I think if that was the case with that cow might it not be with many others? Why doesn't each cow require a particular food?

Mr. FARRINGTON of Orono. I heard a man say once, that the best thing he could get for his cow was hemlock boards. Pretty hard feed—but of course he didn't mean to be understood literally. Three years ago, when we kept the cattle in the old barn at the college farm, we used to give a heavy feed to our cows. We felt obliged to because lots of people go there, and unless our cattle are in good condition, of course they find fault with us. We fed three quarts of meal and shorts. Last winter we kept the cows in our new barn—doubtless you have heard of that barn. The

barn is tight and close, and we could keep it as warm as we pleased. Last winter we fed half the grain we did the winter before. Our cows came out in good condition, but not as good as we thought they ought. This winter we have fed a little more than half what they did last, and the cows are in splendid condition. The treatment in other respects was the same. Now, I believe that the nourishment required to compensate for the poor condition of the barn was so much, that when the cattle were put into comfortable quarters, one-half of the concentrated food to which they had been accustomed was too much for them, and one-third or one-fourth of it keeps them in good condition now. One point more I wish to bring out. A good deal of fault has been found with the trustees of the college for expending so much money on the barn. Now, in keeping thirty or thirty-five head of stock, if we can save three or four quarts of feed a day for each animal, are we not saving the interest on the cost of that barn?

Mr. LYMAN H. WINSLOW, Member from Lincoln. I am not a dairyman, though I keep a few cows. The reasoning of some of the gentlemen reminds me of a little incident. A man bought twenty gallons of cider of one of my neighbors. He put three gallons of brandy, four pounds of sugar and three pounds of raisins in it, and sent it to a friend of his. His friend put four gallons of brandy, three pounds of sugar, and four pounds of raisins in it, and sent back word to him that it was the best cider he ever saw. Now, you can experiment in cheap food if you want to, but if you want to get good milk and make good butter, put in your brandy and sugar, and raisins. I don't believe in giving a cow dry food altogether to digest; and I would raise some roots to give my cows in winter. I would experiment a little in the details of feeding, and then I wouldn't have to ask anybody for advise.

ON CO-OPERATION.

By D. M. DUNHAM, BANGOR.

There is within the breast of every one a desire to be independent. This desire in itself is right, and tends to elevate society. It is only when it drives us to commit frauds against our neighbor, to pull down his property or character in order to build up our own, that it becomes a dangerous element. Were it not for selfishness, or a desire to be independent, there would be no accumulation of property. The forest which once covered our hills and valleys, would never have received the sturdy blows of the settler's axe, and given place to cultivated fields, orchards and gardens; the beautiful villages which everywhere dot our land, and the cities which teem with manufactures and commerce, would never have been known; no vessel would ever have been placed upon the ocean for the exchange of the commodities of different climes; no railroad would have spanned the continent or telegraph encircled the globe;—nor with all the desire for independence would any of these have been accomplished, were it not for co-operation. We all like to be independent, and yet how little one man can do towards independence can only be realized when we place ourselves in imagination outside the pale of civilization, and plan with our own head, and create with our own hands the necessities and comforts of life. Placed in this position, we should soon tire of ourselves and our independence, and say "Place me back where I may co-operate with my fellow man, and receive not only the benefits of the present generation, but the inventions of men for thousands of years gone by." No great achievement has ever been won by any man independent of others. The great inventions and enterprises of the day, although many of them bear the name of one man, have really received the co-operative study and experiments of many men for many years.

It is a law of our being, that we must bear each other's labors, joys, and sorrows, if we would reap the golden harvest of peace on earth and good will toward man.

Thus we see that a desire to be independent begets co-operation, and co-operation brings the necessities and luxuries of life. "Live and let live," is a saying trite as true, and when we strive to pull down another's occupation, character, or property to build up our own, we find that we pay more attention to pulling down than building up, and our building is of poor material and shabbily done; but when we set about any enterprize and seek the co-operation of our fellow-men, the combined wisdom secures results not otherwise obtained. The mechanic co-operates to build houses, mills and machinery; the engineer co-operates to build railroads and canals; the capitalist co-operates to form banks, insurance companies and other means of investment which it would not be practical for one man to do alone. So we see that other pursuits, although needing co-operation less than farming, actually co-operate more. Most other pursuits and occupations do not require so much general knowledge as that of farming. To be successful the farmer must understand the nature of his soil and the adaptation of different crops thereto; he must study the analysis of each, that he may tell what crops to grow in rotation to secure the best results; he must know the nature and requirements of domestic animals, so that he can tell which is best adapted to his wants, and yield the most profit. The various experiments that must be made to enable the farmer to carry on his business to advantage could not be crowded into the longest life, but by a system of co-operative experiments, more can be done in a single year for his benefit than he could learn alone, should he live to the age of a thousand years.

In view of the great need of co-operation among farmers, let us look and see how the matter really stands. Although farming is the oldest occupation on the globe, and one in which more than half the people in the civilized world are engaged, yet in no branch of industry is it so hard to fill one's shelves with textbooks adapted to their wants, as in that of farming. While we see co-operation to form numerous schools adapted to the wants of the professions and see them liberally endowed and supported, we see but a single school in the State which may be called a farmers' school, and the co-operation in this case seems to be rather against than for it—an agricultural school in name—but how many of our farmers know whether it really is such? It should be visited, if not by every farmer in the State, at least by a representative from every town, who should make himself

familiar with its work, and report to the farmers of his locality the result of his investigation; and if it be found that the present managers are not fitted for the place, or are recreant to duty, the farmers have it in their power to right the wrong, and make it in reality what it is in name, the Farmers' School. They must insist that this school shall be well sustained, and that its studies shall be such as will fit its students for industrial pursuits and dignify labor, and in no way can this be brought about but by persistent co-operation among farmers.

There should be a co-operative effort among farmers to induce other industries to locate in their midst, at least to an extent sufficient to supply home consumption; for the nearer one can bring a market to his own door, for the products of his farm, the better he will be paid for tilling the soil. We have in Maine co-operative dairying; and the result has been not only an advantage to the individual but to the State, for any productive industry benefits not only those directly interested, but indirectly the whole community in which it is located.

The farmers want to co-operate to get out of the old ruts in buying and selling; but in getting out of the old ruts and leaving the snares of the speculator, they want to see to it that they do not get into the quicksands of the capitalists, and thus find their last state worse than the first.

Labor and capital should go hand in hand, each is dependant upon the other, and for the good of the community there should be no strife between them; but selfishness in the advocates of each, too often taking a narrow view, become jealous of each other and stir up strife between them, and it is generally the case, when the two come into a contest alone, that capital wins, and when capital has gained absolute power in any place it reduces the price of labor to the lowest living point. Here comes in credit as a competitor with capital, and in a government like ours, where the people are king, with credit and labor on one side, and capital on the other, there need be no fear if credit and labor co-operate; but when capital sees credit and labor co-operating it becomes jealous, and strives to throw in questions that will stir up discord and dissolve co-operation. Thus we see the Patrons of Husbandry, a co-operative body calculated to elevate the farmer socially, morally, intellectually and financially, as no organization ever has since the world began, met by capital, who trembles for fear the rates of interest may be reduced, and plays the part of

Satan when he took our Saviour up into an high mountain and showed him all the kingdoms of the world, and the glory of them, and said "all these will I give you if you will fall down and worship me."

So when capital sees the Patrons of Husbandry organized to co-operate in all that pertains to the welfare of the farmer—as Satan quoted scripture, so it quotes agriculture, and in the shape of the money lender says : " Your mission is a glorious one :—if the farmers will do away with credit and make money king, even I will bow down and worship at the shrine of the farmer." In the shape of the railroad king it says to the farmers of Maine : " If you will stop raising bread and buy it all in the West, so that I may receive tithes on all you eat in the shape of freights, I too will rise up and worship the farmer." In the shape of the professions, it says : " If you will keep your sons and daughters from a desire for education, and grind them down to hard, uneducated labor, so that all the money appropriated for schools may be used for our benefit, we will sing pastoral songs in praise of the farmer, that shall resound from the Atlantic to the Pacific coast."

Were the competition of credit with capital done away, money would be king, and such a king as would not strive to dignify labor. Were the credit system done away, in twenty years we in Maine would be a community of lords and serfs. There is perhaps in Maine, an average amount of property among farmers ; and yet, should we adhere strictly to the cash system the coming season, a very large amount of land prepared for a crop would lie idle for want of seed. The young men, instead of buying land, and becoming tillers of the soil, would have to commence a life of servitude, at the number of hours per day, and rate of wages, dictated wholly by capital.

Thus we see, that however desirable individual cases of the cash system may be, the great business of the world, in order to bring general prosperity and protect labor, and the productive industries from the tyranny of capital, must always be done very largely on credit ; and just so far as the farmers co-operate to do away with the credit system, they co-operate against general farming and in the favor of landed estates and capital.

THE DEMANDS OF AGRICULTURE ON VETERINARY SCIENCE.

By B. M. HIGHT, SKOWHEGAN.

Maine has a fine reputation for good stock. Our horses are celebrated all over the country, and we need only to glance at the pages of Mr. Thompson's "Maine Bred Horses," to realize or be convinced of this fact. The cattle of Maine are yearly becoming more and more desirable in all that pertains to good breeding. At any county fair one may see fine horses, cattle, sheep, hogs, and improved breeds of the feathered tribe. The farmers in every town vie with each other in friendly rivalry to produce the best of the several classes. Very great advancement in the past has been made in the direction of improved stock, and while much has been accomplished much more remains to be done. But while the farmers of Maine are not backward in efforts to improve the breed and blood of stock of every class, there is one thing in which they are backward; they are indifferent in the matter of health of the animals in their care, and which they are seeking to improve in respect to breed and development. We can suggest this neglect by reminding you that there are very few Veterinary Surgeons in Maine. There are none in the smaller towns and villages. There is a thought of importance connected with this matter: all animals common on the farm are subject to disease and accident. The horse has a very sensitive organization and hence is liable to frequent and dangerous illnesses. Cows have various ailments; sheep and hogs come in for a share in the common portion, and even the egg producer is not always well.

In 1873 the epizoötic passed through the whole State; many valuable horses died from the attacks, mainly because its nature was not understood, and the village "horse doctor" found his usual panacea entirely powerless. Now the farmers have learned that care in the matter of taking cold, clean stables, proper food, and the other things that belong to general health, with kind attention, will carry a horse safely through common attacks of

this disease. It is but fair to assume that if in our small towns veterinary surgeons had been available, many cases that proved fatal might have been cured. But farmers and horse men were obliged to doctor their horses themselves, and thus grope in the dark, or else employ a so-called horse doctor who probably knows less than themselves, and who, if striking in the dark, were quite sure to hit the horse a death blow ; curing the attack by killing the patient. I could mention a number in my own town, including a good one belonging to myself, sacrificed to a lack of knowledge of their ailments. These horses were drugged or fed on lobelia and other nostrums, until the medicine for the horse was worse for them than the disease. Very many are called upon to doctor the horses or cattle of neighbors because the owner is not posted on their diseases. Cattle owners or farmers will run for a neighbor when any disease shows itself among their stock ; or will send for a bogus cow doctor with his box of secret medicine, whose knowledge of animal pathology in nine cases out of ten is mere pretence. Stable men usually keep nostrums by them, but there is this truth to all their operations : they can generally only *guess* when to use and what to use in a given case. Apothecaries are often asked to prescribe for sick animals, and for the accommodation of the farmer and horse men they keep a book of some kind on veterinary surgery by them. But though we have so many who either from choice or the force of circumstances, prescribe for sick animals, still it is a just cause for complaint that we have so few available educated, trustworthy veterinary surgeons in Maine. Every reasonable and rational man with diseased stock, would gladly employ a capable doctor if he could be obtained. But as it now is we are obliged to shift for ourselves in the best manner we can ; and this often a very poor one. All who are stock owners or raisers will acknowledge the correctness of the thought already suggested. The evils hinted at are patent to all. What and where is the remedy ? We certainly have no right to sit down and fold our hands, calling it an evil which cannot be remedied and hence must be endured. It is one of those things which cannot and ought not to be endured, and hence *must* be cured. Farmers of Maine it is in your hands to endure or cure. You can if you will, have men in your community who understand the care and condition of sick animals. Your young men, and even you yourselves can be instructed in much which pertains to the theory and cure of diseases in cattle and horses. And it is a business in

which the right man can make money. It can some day become a profitable business to many a farmer's boy. It may be said that this is the selfish or money side of the subject. Grant it; but it is a very necessary aspect of the subject to be considered, for it is no use to urge the claims of any calling unless that calling will supply the means of support.

Brother farmers, I have said that it lies with you to provide a remedy for the evil suggested, and felt in a greater or less degree by all. You will no doubt ask me, "How can we provide a method of cure?" As a means to this end, I believe there should be a professorship of veterinary surgery established, and made available in this State; and it would seem that the most suitable place is in connection with the college of agriculture at Orono. Let a reliable, well educated and practical man be secured, whose duty it shall be both to give lectures and hear recitations upon the theory and practice of veterinary medicine and surgery. Let him teach the normal condition of animals in respect to both anatomy and physiology, as well as the diseased condition to which animals are subject. As said before, we need a practical man, who has seen diseases among animals, and can impart to others both what he has been taught and what he has seen, as well as one thoroughly educated. It is a most interesting and important study to the farmer, or one intending to be a farmer, to learn of the normal structure and pathological condition of the animals of the farm and stable.

Now let there be a professorship of Veterinary Science established at the college at Orono, and then let every young man who intends to be a farmer go and study under such professor. Let the farmers go for a week or two in the winter seasons, when the farm work is dull. It would not require a long time to become convinced of their ignorance of correct information on the subject, and they would go back ready to discard the bogus cow doctor, and be earnest to demand a trained and educated doctor for sick animals on the farm. If any young man desires to become a veterinary surgeon, the way will thus be opened to him to go and fit himself, at a comparatively trifling expense, for a useful work, and one giving pecuniary profit. There are men in every town who have a taste or an aptitude for such study and work, but hitherto they have quite generally been unable to study and graduate at a Veterinary College, because such an institution is far off and the expense heavy. By providing in our own State

for their education, and thus giving these young men a chance, they will acquire their profession and settle down in Maine; will become your neighbors and friends—men in whose skilled hands you can safely trust the lives of your sick animals—men from whom you may learn how to keep those animals well, and how to make them thrive best.

Let me once more enforce the necessity for young farmers to be instructed upon the structure of animals. Even among horsemen the ignorance is great in respect to the structure of the horse. One man who had owned and handled horses for years, laughed at a friend of mine for his ignorance of the anatomy of the foot of the horse. My friend told him there was but one bone—the pastern bone—extending from the leg joint and widening in the hollow of the hoof. He at once made the assertion, and believed it too, that at that part of the ankle there were a number of small bones. Now, in that part of the leg many horses are lame, and if a man does not know how the bones are placed, or how many there are, how can he intelligently doctor the lameness? Instead of curing may he not aggravate the trouble?

I believe that the farmers of Maine are beginning to realize the importance of such a calling. I am well aware the time has been when this department of the healing art was not sought for by the people at large, as it is to-day. I believe our intelligent farmers feel, both in a sanitary and a financial point of view, the need of such a knowledge. There is a large amount of capital invested in live stock in this State, which needs the better security which such a knowledge would give it. I believe the only way to guard ourselves against the financial losses in this direction, from the invasion of diseases, is to educate the people in the general principles of veterinary science. The spread of contagious diseases throughout the country should therefore receive attention at every hand, and thus be made a leading feature in agricultural education.

Dr. Loring says: "In discussing the questions which come before an assembly of farmers, it is highly important that vague theories should be avoided, and crude speculations should be laid aside, and that the opinions expressed should be based upon the best experience or upon the most intelligent understanding of well established theories. The investigation of unimportant matters, the attempts to reply to unnecessary questions, the desire to fix and establish a traditional notion, have occupied too much time and labor of the agricultural student, and have served to confuse

the practical farmer. Any indication that the time of misdirected energy is passing away, is gratifying and encouraging to all who lay aside mere prejudice and seek to investigate in an intelligent and profitable manner. If our agricultural schools and colleges shall do no more than this, they will have abundantly compensated the community which has invested its money in their foundation."

There is much that might be said on this subject, but I will leave it in this imperfect condition, saying that the prime object of this brief paper is to call forth thought, and if you see fit, discussion, and thus awaken attention to a subject which is second in importance to none that the farmer is called upon to deal with. Let the farmers of Maine see to it that some methods are speedily adopted to supply the lack pointed out, and thus provide for the better protection of our farm stock.

THE BEET SUGAR INDUSTRY.

During the past few years a new interest has been developed throughout our country in the manufacture of beet sugar; and recent attention has been called to it in our State through the message of His Excellency, Governor Connor, and from its having formed the subject of two papers presented at the annual session of the Board, held at Brunswick. One of these papers has been given in previous pages, and the other, from the pen of Prof. H. Carmichael of Bowdoin College, has not, in consequence of pressing College duties, been yet placed at my disposal. I hope it may be received in season for its publication in a subsequent part of this volume. Wishing to give all the information that can be obtained on this subject, I devote a few pages to a re-publication of a series of useful and practical papers originally published in the SCIENTIFIC FARMER, Boston, Mass., by Mr. E. H. Libby, one of its editors. The several chapters well cover the points taken up, and are worthy of careful reading.

I.—IN GENERAL.

Slowly, gradually, an interest is being awakened among thinking farmers and capitalists, to the importance and resources of the beet sugar industry as practiced in Europe. It has already gained a foothold in this country, and, if we read the agricultural weather signs aright, is destined to rank, within a few decades, among our foremost farm industries.

The fact that this country pays annually over *seventy-five million dollars* to other nations for sugar, ought to be sufficient to arrest thought and turn it into this channel. Sugar from the beet root is identical in composition with that from the cane, and can in no way be distinguished from it. Of the direct profits of the industry,

there need not be the slightest doubt, as we shall show in a subsequent paper. But the indirect benefits to be derived from it are even more weighty. The scientific investigations instituted in Europe, into this beet sugar question, are of wonderful interest, since they were the key note to the great advances in agricultural science and practice on the eastern continent. Now the industry stands in the front rank among the agricultural industries of France and Germany, and has gained a strong foothold in England and Ireland. Wherever introduced, it has improved the general agricultural condition, to a marked extent, and is said to have doubled the products of French farms. It enables the farmer to keep much more stock upon the same area, on account of the enormous amount of fodder resulting. The pulp remaining after expressing the juice from the roots, is excellent cattle food in a small bulk; likewise the tops, which may be preserved fresh, in properly constructed pits. The land is continually growing more fertile, for in the sugar sold no fertility is removed from the land, and what little goes off as beef and dairy products, may be easily replaced by means of the profits accruing therefrom. The soil is improved by the deep and thorough tillage practiced, and, by the rotation adopted, other profitable crops are produced.

The earlier efforts in this country in Wisconsin, Illinois and California, were failures, from a lack of capital, and inadequate knowledge of the causes which govern success and failure. Factories at Freeport, Illinois, and several in California, are now meeting with marked success. It is stated that a movement has been begun in Delaware, for the introduction of the business upon an extensive scale. And for several years the question has been agitated in Canada, with a view to its ultimate establishment there. Now and then a pamphlet on the subject appears, and occasionally an agricultural lecturer takes it for his theme. A book on the sugar beet is promised before long, from the pen of an able, Oswego, New York, gentleman. We look with interest upon the Delaware project; for but let success crown the efforts made in this direction in a single instance on the Atlantic coast, and it will be the signal for a score of factories to spring into existence in the Middle and Eastern States. There need be no doubt of the success of this industry, if entered upon intelligently, and with the right men controlling it.

The investigations of Professor Goessmann, at the Massachusetts Agricultural College, in 1870-71, prove conclusively that the

successful cultivation of the sugar beet, in the Northeastern States, is possible, and not attended with very great difficulties. And its cultivation once an assured success, the manufacture of the sugar is but a matter of capital, and the employment of a few skillful men, educated for the business, who may be had almost without number from France or Germany. A series of trials were made in various parts of New England and New York, in connection with the investigations of Professor Goessmann, and under his direction, and the beets were subsequently examined by him, with most satisfactory results. To these investigations we shall make frequent reference hereafter.

Much depends on seed, soil, manures, tillage, locality, and climate, for the successful cultivation of the beet for sugar making. And it is only by trial and experience that the farmers of a certain section can learn whether their conditions are adapted to the business. We believe it would be for the interest of many of our readers to devote a little land, labor, and thought, to this crop the coming season. Then have the crop examined after harvest by competent chemists for the content of sugar in the roots produced. By comparing results next winter in the *Scientific Farmer* a great deal will have been learned about the business; and a decided advance made toward its introduction, as a sugar enterprise. But as an inducement to engage in this culture to a limited extent, as an educational effort, the reader should bear in mind that sugar beets are among the very best of roots for stock food, and the production of rich milk. Such a course will teach whether a particular soil and section is adapted to this branch of farming, and preclude failure. When, years ago, in France, the business was found to promise such large returns, factories started up in many localities, where it was soon discovered that the beets could not be grown profitably, or failure resulted because some condition of success was not previously considered with reference to the case in hand, but especially because of unfavorable climatic and soil conditions.

A few words in regard to the cultivation of the beet for sugar, and we will postpone further remarks until next month, when we will go more into particulars, and treat the subject systematically. The *variety of the seed* greatly influences the amount of sugar in the roots produced, so much have varieties changed through cultivation. The varieties that have given the most satisfactory results in this country, thus far, are the Imperial, and Electoral,

of Saxony, Germany, and may be obtained of the leading seed-houses, but with greater safety from the factories already in operation. The ordinary sorts of sugar beet seed sold by seeds-men for stock food are worthless for the production of sugar. *Nitrogenous manures* should be avoided, on account of their diminishing the percentage of sugar in the juice, and tending to produce an over-abundance of tops. The sugar beet is decidedly a potash plant, hence the German potash salts are a specific manure for this crop. It is recommended to apply 250 lbs. each of sulphate potash (high grade) and superphosphate lime, per acre. Sugar beets do best, in rotation, after a well manured grain crop. A light soil, well drained, is best suited for this crop. Large size should not be sought after, either for sugar or stock food; roots weighing one to two pounds are more solid, nutritious, and contain most sugar. The land should be plowed early and deep, and planted as soon as the soil will admit, before the winter moisture has dried up, to avoid the danger of drought.

II—THE SEED AND THE SOIL.

Having premised that locality, climate, seed, culture and manures greatly influence success in this business, and advised our readers in every section to try the growing of sugar beets as an educational effort, as well as a source of immediate pecuniary profit, it remains for us to consider more carefully the various points involved. But so intimate are the relations of pocket and practice in farm economy, perhaps we can start farmers to thinking more interestedly on this subject by the statement that the easily attainable receipts per acre of sugar beets are upwards of \$250. Allowing a large estimate, 50 per cent., for expenses, we have a surplus greater even than from a 150 bushel corn crop costing 20 cents per bushel. And the surety of success is scarcely less than with that good old crop in which the *Scientific Farmer* is striving to create a new interest for the benefit of a "profitable agriculture."

Although no book of seed pedigrees has yet appeared—save the seedsman's catalogue—the matter of selection is quite as important in the vegetable as in the animal kingdom; and the results of growth are dependent upon ancestry with equal force. The successful cultivator can almost

" — look into the seeds of time,
And say which will grow and which will not."

"Whatsoever a man soweth that shall he also reap," is especially applicable in this case. The sugar beet is a lineal descendant of the wild beet, *Beta maritima*, of the Mediterranean sea coast, and by change of soil and climate, by selection and cultivation, has got to be a very different plant from its progenitor.

The difference between the sugar beet of to-day, and its cousin the wild beet, is well illustrated by the ash analyses of the roots:

	Sugar beet.	Wild beet.
Potash	48.9	30.1
Soda	7.6	34.2
Lime.....	8.8	3.1
Magnesia	5.5	3.2
Chlorine.....	6 5	18 5
Sulphuric acid.....	2 0	3 8
Phosphoric acid.....	7.6	3.5
Silicic acid.....	13.1	3.6

The table shows that though the wild beet may be called a soda plant, the sugar beet is decidedly a potash plant. And in similar proportion does the content of sugar differ in the juice of the two varieties. The sugar beet is very susceptible to change in cultivation, and under improper treatment or neglect soon deteriorates. And the several varieties differ nearly as the localities in which they are grown and the treatment they receive. Professor Goessmann found the sugar in the juice of the various sorts tried in his experiments on the Agricultural College farm to range from 5.035 to 8.004 per cent. in common mangolds, and Vienna red, yellow, and white globe beets, to 15.50 per cent. in the best sugar beet. Lane's Improved Imperial sugar beet, for stock feeding, yielding 6.67 per cent. of sugar in the juice. By careful selection and cultivation, Vilmorin, originator of the sugar beet of that name, succeeded in producing roots that yielded 21 per cent. of sugar, a higher percentage than is contained in the sugar cane. But while the Vilmorin beet has yielded the highest percentage of sugar, it is rather more susceptible to variation. The Imperial and Electoral of Saxony have succeeded best in the hands of cultivators in this country. These results have been attained by selection, close attention to "pedigrees," study of soils, climates, and manures, and careful cultivation.

The soil for sugar beet cultivation should early engage the farmer's attention. The best soil for this purpose is a deep, mellow, sandy loam, with a comparatively light and permeable subsoil, and somewhat rich in thoroughly decomposed organic matter. A clay

soil becomes hard and compact in a dry season, particularly after heavy rains, and seriously retards the growth of the fleshy roots. Wet lands tend to produce coarse, watery beets, with little sugar, and a proneness to early decay. The best sugar beet root is smooth, compact, of rather small size—as size is measured in the root family—but must have room to grow without being stunted. Beets of this sort, containing a large amount of sugar, approach the nearest to perfection when grown in the soil above described.

Proper physical condition is the first requisite for a good beet soil. As for most root crops, deep plowing and thorough pulverization is a desideratum in this case. But when deep plowing is undertaken on a field for the first time, it should be done in fall, to secure the benefit of the action of winter frosts on the fresh subsoil. Old tillage lands in fine condition are better adapted to this culture than new soils; for the latter, during the first few years, usually produce coarse roots of inferior composition, on account of the undecomposed organic matter.

III—MANURES.

There is no phase of this subject so full of interest as that of the effect of manures upon the development of the root. For out of its study, in Germany and France, arose the experimental researches which led to much that is known to-day in regard to the effect of manurial substances upon plant growth.

Rapid growth in plants is seldom associated with early maturity. The fruit tree which is remarkable for luxuriant growth is not an early and abundant bearer, because of the lack of maturity in the fruit-bearing twigs. In the so-called root crops, luxuriance and rapidity of growth is not accompanied by an equally rapid development of those features which produce solidity and maturity in the substance of the root, but rather by coarseness of texture, and a watery and saline composition.

While a heavy crop may seem to be desirable, to produce which large roots are necessary, it should be remembered that a large root is always of inferior quality. From analyses of small roots weighing $1\frac{1}{2}$ lbs., and of large roots weighing $5\frac{1}{4}$ lbs., it is shown that ten tons of the small roots contain as much solid matter as 13 tons of the larger roots. The cause of this may be looked for in the fact that the seasons are not long enough for the roots to ripen. How the composition of the sugar beet varies in the

various stages of growth is indicated by the following results obtained by Lotmann :

	July 19.	Aug. 17.	Sept. 1.	Sept. 21.	Oct. 4.	Oct. 12.
Water.....	86.1	85.2	84.4	84.8	83.9	83.5
Cellulose and Pectin.....	8.1	7.4	6.7	5.6	5.7	5.9
Sugar.....	2.5	4.5	6.5	7.1	8.8	9.1
Albuminoids, etc	2.4	1.9	1.4	1.3	.7	.7
Ash.....	.9	1.0	1.1	1.3	.9	.8

As the percentage of sugar mainly depends on the maturity of the root, the cultivators of the sugar beet plant early and avoid so-called stimulating manures. Nitrogenous manures tend to produce a rapid, luxuriant growth, hence especial care is exercised in their preparation and use in this culture. But as such manures are at the base of the whole system of manuring, and commercial manures only relied on as an aid, it were useless to attempt to argue them away. In order to get the full benefit from yard manure, without any of its bad effects, it should be applied in autumn, and plowed in deep—the beet is a deep feeder. If it is necessary to manure in spring, use only well rotted compost. When stable manure is largely used, sugar beets are usually raised in a rotation after a heavily manured grain crop; thus allowing for the thorough disintegration of the dung. The same remarks apply to the plowing in of green crops for manure. On account of the highly beneficial effect of green manures on the physical condition of the soil, and the fact that the beet feeds largely on the atmosphere, and that proper mechanical condition increases the power of the beet to draw nutriment from the air, such manures have special value; the only precaution necessary being to apply them a sufficiently long time before the beets are planted, to become thoroughly disintegrated. (*Goessmann.*)

An interesting point in regard to size of beets employed in sugar manufacture, is shown by the different systems of taxation in France and Germany. In the latter country the weight of roots is taxed, and the system results in all efforts being directed to the production of small roots and a high percentage of sugar. To this end the systems of manuring are particularly adapted. While in France, the taxation is upon the amount of sugar produced, and here spring manuring is more freely practiced, resulting in a smaller percentage of sugar but a larger yield of roots. The

sugar percentage is 6 in France to 8 in Germany. The same objections to the use of green manures on sugar beet land, apply to prairie soils, and recently cleared woodland, which are full of undecomposed organic matter. The truth of this has a practical illustration in the difficulties attending the first few years of sugar beet cultivation at Freeport, and Chatsworth.

As previously stated, the sugar beet is decidedly a potash plant. But we venture to assume that the failure to perceive beneficial results from the application of potash to English soils may be attributed to the presence already of a sufficient amount of that substance. Comparative analyses indicate this as a natural characteristic of that soil. Its further presence is probably also due to previous, direct application. Enough is enough in any soil. Dr. Goessmann's investigations show that the application of 250 to 300 lbs. of sulphate of potash (kainite) per acre was very beneficial on the college farm at Amherst. It frequently happens in practice, in many sections, especially in beginning this industry, that the exclusive use of commercial manures may be advisable; then it will be found that the potash salts come first in importance. Potash (the sulphate always on roots) tends to produce solidity, early maturity, and to increase the amount of sugar in the root.

The position of the potash in the soil has a marked influence on the product. The beet sends its roots deeply into the sub-soil, and exact investigations demonstrate that the potash must descend to the lower strata of soil before its beneficial effect will be noticed upon this class of roots; which explains the fact that potatoes and sugar beets, though both potash plants, have been raised alternately on the same soil with good results. The potato feeds on the surface soil, the sugar beet largely on the sub-soil.

IV—RESULTS OF EXPERIMENTS.

In the manufacture of sugar from the beet, much depends upon the composition of the juice, aside from its content of sugar, any considerable quantity of foreign matter serving to render the separation of the sugar difficult and expensive. The juice of good sugar beets should not contain more than 18 to 20 parts of foreign matter to 100 parts of sugar. So the cultivator must not only seek a large percentage of sugar, but also adopt those methods of culture which will lessen the cost of manufacture. And in no way can this be done save by proper selection and application of

manures. The investigations of Prof. Goessmann at the Massachusetts Agricultural College have a direct bearing on this point. The following table explains itself:

Kind of Fertilizer.	Per cent. of sugar.	Proportion of foreign matter to 100 parts of sugar.
1. Green stable manure.....	7.37	45.86
2. Phosphatic blood guano.....	7.80	41.02
3. Rotten sheep manure	10.97	27.62
4. Stable compost	11.70	28.20
5. Rotten stable manure	9.50	26.31
6. Unknown.....	11.00	22.72
7. In rotation, second year after stable manure (a)....	15.10	19.20
7. In rotation, second year after stable manure (b)....	9.70	45.26

Those marked *a* weighed from $1\frac{1}{2}$ to 2 lbs. each. Those marked *b* were from the same field, but weighed from 10 to 14 lbs. each.

The above results were obtained by Prof. Goessmann on the College farm (1), and from roots furnished by the New York Agricultural Society (2 to 7), raised on the farms of different members of the society. It will be seen that No. 7 (*a*), where the conditions are those previously recommended in the case of using nitrogenous manures, is the only one that comes within the limits, as regards the proportion of foreign matter, while also in this case the percentage of sugar is the largest. Undecomposed nitrogenous manures increase the amount of foreign matter in the juice, and seem to hinder the development of sugar; while potash acts the reverse in both cases. We abstract further from Prof. Goessmann's report of the various trials, in explanation of the table:

1. Four acres of a sandy loam were taken on the College farm, which was well manured with common stable manure for a crop of fodder beets, and planted May 23d. Percentage of sugar, 7.37. Roots collected last of September.

2. On a farm at Sing Sing, N. Y.—The soil was loam, two feet deep, resting on clayish hardpan, and had been seeded to grass for many years; 500 lbs. of phosphatic blood guano were applied per acre. Percentage of sugar, 7.8. Some Vilmorin sugar beets from the same farm yielded 9.53 per cent. of sugar. Harvested last of October.

3. On a farm at Washington, Dutchess Co., N. Y.—Soil, a clayish loam, plowed seven inches deep. Rotten sheep manure was applied in trenches, and then covered with the plow, and the

seed sown upon the ridges. Sugar, 10.97 per cent. Harvested 6th of November.

4. On a farm at South Hartford, Washington Co., N. Y.—Soil, a gravelly loam, richly manured with stable compost, and plowed twice previous to planting. Harvested middle of November. Sugar, 11.7 per cent.

5. On a farm at Greenwich, Washington Co., N. Y.—Soil, a sandy loam, underlaid by a fine sand. Seed planted on ridges covering trenches containing a little rotten stable manure. Harvested last of November. Sugar, 9.5 per cent.

7. On a farm at Albion, Orleans Co., N. Y.—Soil, a dark, reddish brown, rich, deep, sandy loam. Clover had been raised on the land previous to a crop of carrots which preceded the sugar beets. Twenty loads of horse manure had been applied the autumn previous to the crop of carrots, which made the sugar beets the second crop after the application of any manure. Harvested November 13. Sugar, 15.1 per cent. in the small specimens (*a*), and only 9.7 per cent. in the large specimens (*b*).

Except in the last case mentioned, the roots examined were of a uniform size, from 1 to 2 lbs. each.

In another series of experiments to test the beets from various seed, some raised on the College farm, and the effect of several manures on the development of sugar in the roots, a field 287 feet by 157 feet was taken, and divided into six plots of equal size. The plots ran east and west across the field, with a two feet space between. The manures were applied at the same time to the different plots—about two weeks previous to planting—except No. 6, which, with the rest of the field, had been well manured two years before with stable manure. The following table shows the results:—

Kind of Fertilizer.	Amount of fertilizers per acre.	Percentage of sugar in juice of roots raised from following seeds:			
		Freeport, Illinois.	Sutton's English.	Electoral, College Farm	Vilmorin, College Farm.
Fresh stable manure.....	14 tons.	11.96	9.71	9.42	7.80
Blood guano, without potash.....	1200 lbs.	10.99	9.17	10.10	10.20
Blood guano, with potash.....	1200 lbs.	12.55	10.01	13.24	10.50
Sulphate potash and superphosphate.....	300 lbs. each*	13.15	10.91	12.16	10.50
Sulphate potash.....	300 lbs.†	14.52	12.42	14.32	12.78
No manure; second year after stable manure.....	—	13.90	—	12.78	12.19

* The Kainite contained 15.2 per cent. potash.

† This contained 29.3 per cent. potash.

These results plainly indicate the effect of the different fertilizers; that fresh nitrogenous manures are injurious; that when well decomposed in the soil their effect is good; and that potash has a marked influence on the product of sugar. As we shall show hereafter, potash also aids in the separation of the sugar in manufacture. But of course these experiments do not show that where potash is in plentiful supply in the soil, it is necessary to apply more, but simply that its presence is very important. Stable manure always contains considerable potash, and after a year's decomposition the potash in particular is ready for assimilation, and descended probably into the sub-soil, where it is most beneficial.

The beet sugar industry in this country is looking up. In California it has attained great importance. The amount of sugar manufactured at Sacramento alone exceeded 3,000,000 pounds in the season of '75-'76. Twelve thousand tons of beet roots have been worked up at Sacramento, which yielded 13½ per cent. of sugar. There are several other factories in the State, but still there is not enough to supply the home demand. In Maine a lively interest is being awakened, and a company near Portland have sent a man to the Centennial Exhibition, to Freeport, Illinois, and to California, to study up the methods of operation, etc. The Governor, in his last message to the Legislature, deemed it of so much importance as to devote much space to the subject. In Southern Maine the farmers will doubtless readily take hold of the enterprise, having been engaged for several years furnishing immense quantities of sweet corn, peas, berries, tomatoes, etc., to the numerous packing establishments of that section. Rhode Island is stirring in the matter, too, and men who mean business are carefully considering the pros and cons. Repeated reports come from Canada of their intentions. Of the possibilities of Canada in this line we shall have something to say soon. The factory at Freeport, Illinois, is reported in a prosperous condition. And doubtless the Centennial Exhibition will do much toward showing up the possibilities of the industry, as we understand there is or will be a fine showing of the products, which must open the eyes of all interested parties.

V—PROSPECTS FOR CANADA—CLIMATE.

In Professor Goessmann's series of investigations, he tested several samples of beets from Canada, raised for this purpose, with the following results:

	Weight.	Per cent. of Sugar in Juice.
A fodder beet		4.3
A fodder beet		5.8
Electoral	4 to 6 lbs.,	9.7
Uncertain variety from Echaillon de Mon- treal.....	2 to 2½ lbs ,	11.38
Uncertain variety from Riviere du Loup....	2 to 3½ lbs.,	10.2
Uncertain variety from Chamby.....	2 to 2½ lbs.,	9.02
Uncertain variety from Maskinonge...	2 to 3 lbs.,	8.83

The Secretary of the Canadian Department of Agriculture has shown great energy and interest in the investigation of the capabilities of Canada in this direction, which bid fair to be crowned with such success. Canada is not too cold for this industry, the season being long enough for the perfect maturing of the roots. Indeed, it may even be true, that the climate is specially favorable to this end. It is even held that warm countries are rather adverse to its successful prosecution; among other reasons, because of the coarser roots produced, the fermenting of the juice in high temperatures during manufacture, and also, perhaps, that other profitable special crops already have a strong foothold. The results of investigations so far are as favorable to Canada, as to New York. A proper and systematic method of cultivation would doubtless result in a higher and more satisfactory quality of beet and yield of sugar, in both localities.

INTRODUCTION OF THE ENTERPRISE.

The first step has been taken; it has been proved by careful investigation, that the soil and climate, especially of the older sections of the Northern States and Canada, are suitable to the production of beets for sugar making. And in several localities it is already in successful operation; in others it is being agitated with prospects of action. Before steps for actual establishment are taken in any locality, careful experiments should be tried for testing the means for producing roots of the right quality. If from seed of the best varieties, with proper cultivation and manuring, mature roots of medium size and fineness of form, yielding from 8 per cent. and upwards of sugar are produced, then, other requisites being provided, proceed boldly. When capital has been secured, of which from \$100,000 to \$300,000 are necessary for the manufacturing branch, the matter of location must be prominently considered. Facilities for transportation, and plenti-

ful supplies of water from September till spring, are of prime importance. For the practical operations of the factory, a good foreman should be obtained from some existing establishment, and the services of a good chemist, *having experience in this business*, should at once be called into requisition. The factory sometimes depends on surrounding farmers for a supply of roots; in this case a certain number of acres (500, more or less, according to capacity) should be guaranteed at the outset, and knowledge of the best methods of culture be freely disseminated among the farmers, by discussion, by pamphlets, etc. But perhaps the best way, when practicable, is for the manufacturers to produce their own roots, to a large extent at least. By proper management in rotation of crops, feeding of the refuse to stock, etc., a considerable profit may be realized from this method. Under ordinary circumstances, the system of having the roots furnished by the farmers will be found the easiest to manage. The compensations to the producer of the roots, should always be according to the amount of sugar, and never be regulated by the bulk of roots furnished. For the aim should always be to the production of the best of roots, with the highest per cent. of sugar attainable, which is for the benefit of both cultivator and manufacturer.

One excellent feature of this business, which should commend itself to rural communities, is the fact that the manufacturing season is mainly during the fall and winter months when farm operations are usually at a comparative rest, which admits of the employment of the farm help in the factory, to a certain extent. This plan will tend to retain in the district a set of permanent farm employes, so desirable to secure. What was mentioned at first should be urged again in conclusion,—the general influence of beet-sugar production on the agriculture of the section. With a rotation of grain, grass, and sugar beets, and all the beet pulp for fodder, and other refuse for fertilizing, a high state of culture may be reached. In the sugar, the money crop, no fertility is removed from the soil, its constituents all coming from the atmosphere. Beet pulp in connection with hay, etc., is excellent cattle food. By its utilization, and the feeding of the other crops on the farm, stock-raising enters into the system as a profitable feature: the only manures necessary to purchase being an equivalent of the mineral matters carried off in the carcasses of the animals.

VI—APPENDIX. ENGLISH EXPERIMENTS.

As an appendix to the foregoing, I re-publish from the same source, as the above, a letter from J. B. Lawes, the veteran experimenter of Rothamstead, Herts, England, which from the source of high authority from which it comes, entitles it to great weight and careful study :

The field upon which the sugar beet has been grown has been under experiment for thirty-three years, and during the whole of this period, except for two or three years, root crops have been grown, and the produce carried away from the land. Also with very few and trifling exceptions the same manures have been applied to the same spaces of land. Without attempting to give a complete explanation of the figures, one or two points of interest may be alluded to.

The plot manured with mineral manures alone gives the lowest produce in the series—five tons, sixteen cwt. of roots. It also gives the highest amount of dry matter, the highest per cent. of sugar, the lowest per cent. of nitrogen and ash of the series. The addition of nitrate of soda to these minerals increases the produce from five tons sixteen cwt. to fifteen tons. The percentage of dry matter and sugar is lower, and the nitrogen and ash is higher than in the last plot. Sulphate of ammonia containing the same amount of nitrogen as the nitrate of soda, gives a less gross produce, higher per cent. of dry matter and sugar, lower per cent. of nitrogen and ash than the nitrate. The 2,000 lbs. of rape cake which also contains the same amount of nitrogen as the nitrate and salts of ammonia, gives a produce resembling more closely that of the salts of ammonia than of the nitrate. The dung, which supplied more than twice the quantity of nitrogen supplied by the nitrate, gives very little more gross produce. In the dung and rape cake large quantities of organic matter is supplied, with the nitrate and salts of ammonia none ; nor has any organic matter been applied to the land during the whole experimental period. We may therefore assume that sugar is a product obtained by the plant from the atmosphere, by the decomposition of carbonic acid.

A similar law appears to be followed by the cereal crops in the production of starch. No more carbon has been given by wheat manured with fourteen tons of farm-yard dung per acre for thirty-three consecutive years, than there was on another plot manured during the same period by minerals and nitrogen.

One of the most important and interesting questions for scientific agriculture to answer, is: In what state of fertility do we leave the land for the growth of plants of a different character after growing one species for a number of years? For instance, the root crop in Great Britain is generally considered to be a restorative crop; that is to say, when land was exhausted by corn [English for grain] growing, a crop of roots is said to restore fertility.

Many reasons might be assigned for this. Roots do not take up silica. Silica is known to form compounds with ammonia, and this or some other compound beneficial to corn and not required by roots, might accumulate in the soil.

As at Rothamstead we have always land under continuous corn crops, it was easy to test this important question by taking corn upon the land under continuous roots. It was therefore decided to do this, and three successive crops of barley were taken. The result showed that not only was there no accumulated fertility, but that the land upon which roots had been removed year by year was less capable of growing barley than the land which was growing barley every year without manure.

Subsequent results and recent analyses of the soil, prove that roots rob the soil of more fertility than any of the ordinary crops of the rotation. This is by no means inconsistent with the commonly accepted idea that roots restore fertility. In the common practice of agriculture, roots are consumed on the farm, and the bulk of the manure elements are returned to the land. In the five years given in the table the manures were applied only the first three years. The last two crops were taken without manure in order to ascertain the quantity of manure remaining in the land.

It will be found on calculating the amount of nitrogen taken up in the five crops of sugar beet bulb grown by the nitrate of soda, deducting first the produce grown by the minerals alone, that the quantities approximate nearly to the quantity supplied in the nitrate of soda, which would be in the three years about 260 lbs. Assuming that both the cereal and root crops take a large portion of the mineral food, and the nitrogen which they require near the surface of the soil (as is probably the case) the reason why root crops can take up more of the nitrogen supplied as manure, and that they exhaust the soil more completely than the cereals is due to the different period of growth, and in the modes of treatment employed in the cultivation.

The cereal crops when sown in the autumn or spring do not begin actually growing until the middle of April in this country, and they begin to turn yellow and cease to assimilate force in about ninety days. The root crops which are sown about the same time, continue to grow and assimilate force for about twice the period. They are moreover aided by the constant stirring of the soil which they receive throughout this period, fresh matter being constantly oxidated. During this period, too, the rain-fall is hardly sufficient to carry the soluble salts beyond the range of the roots. I think, therefore, these circumstances fully explain why in our experiment, a larger percentage of the supplied nitrogen is recovered in our root than in our cereal crops, and also why a root crop is more exhausting if removed from a soil, and at the same time more restorative if consumed on the land, than a cereal crop can be.

EXPERIMENTS ON SUGAR BEET, BARN FIELD, ROTHAMSTEAD.

Average produce of 1871, 2, 3, 4, 5. The average produce per acre and the average percentage of sugar are, in all cases, for the five years. The average percentage of dry matter, of mineral matter in the dry matter, of the roots are, in all cases, for the first three years. The percentage of nitrogen relates to the first year only; but the percentage of nitrogen has been determined in the juice in selected cases each year, and these results confirm the indication of the nitrogen in the roots in the first year. The average percentage of dry matter and mineral matter in the dry matter in the leaves are for the first and second years only.

ABSTRACT OF RESULTS. AVERAGE OF FIVE SEASONS—1871, '72, '73, '74, '75.

	Mean of plot, 1; 14 tons per acre; farm-yard manure, first three years, none afterwards Series 1. Dung only; no cross dressings		Series 2. Dung as 1; cross dressed with 550 lbs. of nitrate of soda per annum for three yrs. 1871, 2, 3; none afterwards.		Series 3. As 1; cross dressed with 400 lbs. of salts of ammonia for three years; none afterwards.		Series 4. As 1; cross dressed with 2,000 lbs. rape cake, and 400 lbs. of salts of ammonia for three years; none afterwards.		Series 5. As 1; cross dressed with 2,000 lbs. rape cake for three years; none afterwards.	
	Cwts. of 112 lbs.	Cwts. of 112 lbs.	Cwts. of 112 lbs.	Cwts. of 112 lbs.	Cwts. of 112 lbs.	Cwts. of 112 lbs.	Cwts. of 112 lbs.	Cwts. of 112 lbs.	Cwts. of 112 lbs.	
Average produce per acre:										
Roots.....	308	412	397	444	435					
Leaves.....	83	146	143	169	117					
Average composition of roots:										
Dry matter.....	17.49	16.11	16.56	16.23	16.66					
Mineral matter (ash) in dry matter.....	5.00	6.11	5.83	6.55	5.61					
Nitrogen in dry matter.....	0.83	1.24	1.53	1.52	1.24					
Sugar in juice.....	12.70	11.58	11.71	11.35	11.93					
Sugar in roots, if 95 per cent. juice.....	12.07	11.00	11.12	10.78	11.33					
Avg'ge composition of leaves:										
Dry matter.....	10.56	10.58	9.01	8.47	9.43					
Ash in dry matter.....	23.25	23.96	24.81	25.39	24.99					

MEAN OF PLOTS 4, 5, 6. SUPERPHOSPHATE OF LIME WITH OR WITHOUT POTASH, SODA AND MAGNESIA.

	Without dung or cross dressing.	With nitrate.	With ammonia.	With rape cake and ammonia.	With rape cake.
	Cwts. of 112 lbs.	Cwts. of 112 lbs.	Cwts. of 112 lbs.	Cwts. of 112 lbs.	Cwts. of 112 lbs.
Average produce per acre:					
Roots.....	116	299	234	278	337
Leaves.....	26	79	89	68	127
Average composition of roots:					
Dry matter.....	18.53	15.93	17.43	17.66	15.93
Ash in dry matter	4.30	5.73	4.81	4.50	5.98
Nitrogen in dry matter	0.84	1.20	0.87	0.83	1.52
Sugar in juice	14.06	11.95	13.28	12.98	11.84
Sugar in roots, if 95 cent. juice.....	13.36	11.35	12.62	12.33	11.28
Avg'ge composition of leaves:					
Dry matter	14.51	10.16	10.98	10.70	9.84
Ash in dry matter	23.57	22.34	23.30	22.41	21.51

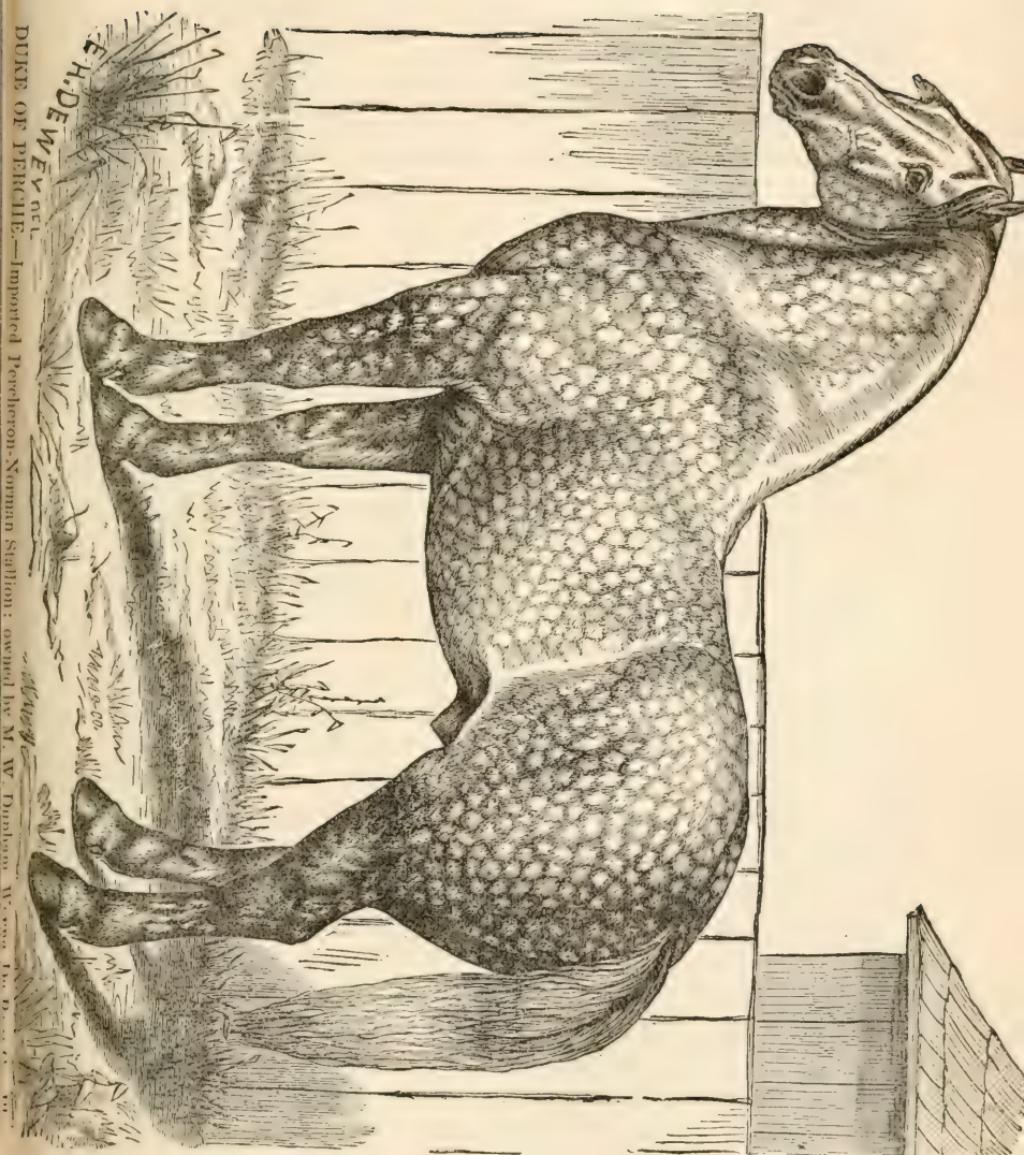
THE HORSE AT AGRICULTURAL EXHIBITIONS.

Concerning the origin of the horse the Arabs have the following tradition :

"When God wished to create the horse He said to the south wind, 'I wish to form a creature out of thee, be thou condensed,' and the wind was condensed. And God formed a chestnut horse, saying, 'I have called thee horse; I have created thee an Arab, and have given thee a chestnut color. I have bound fortune on the mane which falls over thine eyes; thou shalt be chief among animals; men shall follow thee whithersoever thou goest; good for the pursuit as for the retreat thou shalt fly without wings; riches shall repose in thy loins and wealth shall be made by thy intercession.' Then he marked him with the sign of glory and of happiness, a star shining in the middle of his forehead. After the creation of Adam, God called him by name, and said 'Choose now between the horse and the borak.' Adam replied, 'The more beautiful of the two is the horse.' And God said, 'Excellent, thou hast chosen thy glory and the glory of thy sons; while they exist my blessing shall be with them, because I have not created anything that can be more dear to me than man and the horse.'"

The beautiful imagery in the above extract contains a highly figurative description of the noble qualities of the horse--an animal of greater service and higher use to man than any in the whole range of animated nature; and yet it is not too highly drawn nor too extravagant in statement. The horse is indeed chief among animals. "Without wings, he fairly flies, and wealth and riches grow out of his intercession; fortune rests upon his flowing mane, and men follow him whithersoever he goeth." Endowed equally with strength, beauty and docility, he also possesses wondrous powers of speed and of endurance, has faculties susceptible of a high order of education, and perceptions which catch the spirit of man's intentions. Under the saddle or in the harness, attached to

DUKE OF PERCHIE.—Imported Percheron-Norman Stallion; owned by M. W. Dunham, W. 100th St., N.Y.



the road wagon or the dray, he is the obedient servant of man, doing his bidding cheerfully, often receiving therefor neglect and not unfrequently positive cruelty. His service in all the arts of peace is so important, that no greater public calamity could come to the nation than a plague which would render our horses unfit for work—a brief experience in which, a year or two since, fairly interrupted the business and commerce of metropolitan centres, interfered with the transmittal of the mails, the various departments of the Government service, and even prevented the proper burial of the dead. In war, too, notwithstanding the curious inventions and improvements in our engines of destruction, what could take his place? Well did old Job say of him, “The glory of his nostrils is terrible. He paweth in the valley and rejoiceth in his strength; he goeth on to meet the armed men. He mocketh at fear and is not affrighted; neither turneth he back from the sword. He swalloweth the ground with fierceness and rage. He smelleth the battle afar off, the thunder of the captains and the shouting.” In commerce, too, the horse has in the past acted an important part, towing boats laden with the golden grain of the great wheat producing sections, to the Atlantic seaboard, through important water-ways—which even with our more speedy means of transportation in recent years, still act an important part in the business of the world. Indeed, so infinite are the variations of his uses to man, in all parts of the world, on the farm, on the road, in the workshop—that his capacity has formed the only standard for the correct measurement of steam engines, which, in so many kinds of work have entirely taken his place—the ability to raise 33,000 pounds avoirdupois one foot in height in one minute of time—being everywhere adopted as the actual capacity of one horse, and the standard for estimating the power of the largest engines ever constructed. Moreover, the wide range of country which the horse inhabits, and his adaptability to conform to various circumstances of situation, is one of the most valuable qualities which he possesses, and goes far towards rendering him the serviceable beast which he is. While other animals which man in various parts of the globe has trained to become his servant, are useful only within limited range—the horse, not only lives with man wherever he can furnish him with a supply of food, but by his peculiar characteristics of speed and strength, renders him a service which is inestimable. The reindeer, the camel, the elephant, are worth nothing out of their small range. The horse exists in

excellent condition from the frozen snows of Iceland to the scorching plains of Africa.

Now without going over the ground covered by a consideration of the antiquity of the horse, and the various types of the animal which have existed or may now be found in the different countries of the globe—it is more to our purpose to come at once to the horses of the present day, and the part they fill in our business, industries and pleasure. But it may be said in passing rapidly to this point, that the different types of the modern horse have been the work of judicious selection and breeding in a given direction for a long series of years. Thus have been produced the hunter, the runner, the cab horse, the trotter, the cart horse, the dray horse, and numerous other fancy varieties, so common in England, and on the continent of Europe. In our own country, where the people have not adopted all the customs and ways of our relatives over the water, fewer types are found, and a classification of our horses would embrace but three, or at most four distinct varieties—the trotter or the American thoroughbred, the horse of all work, the gentleman's driving horse and the heavy horse used exclusively for purposes of draught. But though we have fewer local distinctions in our breeds of horses, and breed less for fancy uses than do the people of the Old World, we have so bred the horse in this country within the past twenty or thirty years, as to command the attention and merit the applause of the best breeders and best judges of horses in the world. What nation of the Old World can show better samples of horseflesh that has been produced in the States of Kentucky, Ohio, Mississippi, Illinois, New York, and many others;—what nation can show finer style and action, better breeding, greater endurance or a faster step than can be shown by the horses of these same States? Our private studs, and our famous trotters, almost surpass the world, and the achievements of Flora Temple, Dexter, Goldsmith Maid, American Girl, Smuggler, Fullerton, Occident, Lula and a host of other famous trotters, have made the people of the Old World fairly stare with wonder; while in the matter of breeding, private citizens in our own country have performed, what in other nations is only carried out under the patronage of Government. This interest in the breeding, training, handling and trotting—if you please—of horses, has been growing and increasing and developing all over our country, during the past dozen or twenty years; and has now in its various interests sub-divisions and

bearings reached enormous proportions. Now I have a sort of theory that while the horse was regarded as of prime use to man, was bred and kept for his real service, and was an actual necessity in the performance of the chief business of the country—his useful qualities were developed and held in high esteem, and he was bred and trained almost solely for these purposes—but when other agencies for the performance of business began to be employed, then men began to keep horses for sport and fancy, to develope qualities outside of those belonging to genuine service, and to put them to the performance of tasks for which they were not previously thought of. For instance: before the days of railroads, when horses were employed on famous stage lines, and for the transportation of merchandise long distances—what magnificent horses we had all over this Eastern country, which was, forty and fifty years ago, all that was of much consequence in the then American nation. How enthusiastically that great writer on the American horse, Frank Forrester, describes the horses which formed the teams on the through line of “flying coaches” between Philadelphia and Portland, from 1825 to 1836—going nine miles an hour, including stoppages—equal to eleven hours on the road—and making the time as punctually as on the best English mail routes, at a time when the English mail service was the wonder of the world—these eleven miles an hour over the American roads of that day being equal to fourteen over the English turnpikes of the corresponding period! Or take, too, the same horses attached to the great teams which transported the supplies of remote places from the great centres of distribution—which carried their monstrous loads up hill and down over dangerous roads, at a fast rate for the time and the kind of business performed. While these were the uses of the horse, the horse was bred especially for them—and the present generation of breeders, in our own State at least, will not soon see such horses as were then used in the business of the country, and which the demands of the country called for. “And these horses,” says that great authority just quoted, “were obtained from the northern part of Massachusetts, Vermont, and some portions of New Hampshire—and from those quarters is the origin of the horse of Maine, almost without admixture.” To go back now and finish the comparison on which I started in stating my theory of the rise of the American trotter:—When railroads begun to be built, stage coaches were superceded as a mode of travel, and the transportation of heavy merchandise

was no longer carried on by means of "tote teams;" and as this agency began to be employed for these purposes, men began to train their horses to trot and run. The locomotive was a fast team, and men tried to see if their horses could not out-do it:—and it is an interesting fact, which I think has some connection with the theory being put forth, that the building of railroads in this country and the origin of horse racing or trotting, have their date at very nearly the same period, the year 1827 witnessing the building of the first railroad in Massachusetts, and the same year, or possibly a year earlier, the establishment of authorized trotting in New York.

Now, all that has been said (and there is more of it than has perhaps been necessary), is somewhat gratuitous, and may be thrown aside by you as fast as I have read it. It has little connection with, although it may be regarded as a sort of introduction to the real topic which this Board at its last annual meeting assigned to me for treatment, viz: that of "horse racing at fairs, in regard to its influence both financially and morally upon the community." In performing this task, I have nothing to do, as you will see, with the breeding of horses, with the importance and magnitude of the interest which the horse represents, nor with fast or slow horses, except such as are found at our fairs and agricultural exhibitions. And while I was charged with preparing a report upon this subject with direct reference to our own State, I was also directed to open a correspondence with horse men, breeders and Agricultural Societies in other States, to get their views, opinions and experiences upon the subject. So I may be pardoned, if in what is to follow I may allude incidentally to some points of breeding, and to the practices of some societies outside of our own State, where it has seemed to me such things have a close bearing upon the matter in hand.

In Maine, as in all other States, horse trotting has become quite generally, if not somewhat permanently, established as one of the sports of the people, and one of the leading features of fairs and so-called agricultural exhibitions. I say somewhat permanently established—and the statement is borne out by the fact that we now have in this State over fifty tracks or race courses, an average of more than three to each county. While in some instances these tracks have been built by private driving associations, in more they have been built wholly or in part by regularly incorporated agricultural societies, as a legitimate accessory to them, or a

legitimate means of encouraging the interests which they have been established to promote. These tracks have been built upon the principle that the horse is, purely and simply, a legitimate agricultural production; that speed is a legitimate and one of the most valuable qualities which he possesses; that in order to show this quality to the best advantage, and to the least injury to himself, a proper and suitable place is necessary—such a place being a smooth track or course, where in his legitimate trial he may have every chance in his favor. Now this principle is fair, and is in accordance with the best judgment of some of the best men in the country. Further than this: eminent authorities (and if I were to mention some of their names they would carry attention if not belief to the minds of all unprejudiced persons who hear me; names which stand high in the scale of moral worth and scientific acquirements, and which belong to characters above the suspicion of personal ends), who united in the conviction, that with suitable preparation and management, a healthy horse suffers no injury or distress from trotting a moderate distance at the utmost capacity of his speed. Speed, therefore, being a quality of positive value in the horse, the horse being a direct product of the farm, how can trials of speed, properly regulated and conducted, be regarded as other than a legitimate part of agricultural exhibitions? Take the strength of oxen, the wool product of sheep, the milk of dairy animals, and in their several bearings place them in comparison with this prime quality in the horse. The ox is bred for size and strength, and in the trials of his capacity to draw large loads, is, for a short time, frequently put to his utmost powers—and the loads some yokes of oxen are made to draw are simply monstrous. Who objects to this? The dairy cow is specially fashioned for milk production, and has been bred for years with special reference to the development of certain functions in her organization. So, in its particular line have breeders developed and encouraged the promotion of certain desirable qualities in the different breeds of sheep. This has been done in each instance with a view to obtaining the most perfect animal, the best product, and the highest profit. Is not this legitimate? Are not the agencies employed and the ends sought completely in accordance with common sense and high-minded action? Then why deny in the one case the right to judicious breeding and proper development necessary to reach a certain honorable end—and in an exactly parallel case allow that the same course of breeding and training, is just and proper? If

the comparison is not a fair and candid one, let me stand corrected now and here. But, says one, the trials of speed at fairs bring in their train a long array of evils; they lead to drunkenness, to foul speech, to low associates, to betting and gambling, and to numerous vices which curse society, and which it should be the object of all good men to help banish from among us. That these do follow in some instances cannot be doubted, even by the best men and the most ardent lover of the horse—that they follow invariably, and as a matter of course, must be emphatically denied. Is it so hard a matter, as many would try to make us think, to conduct an agricultural fair without in some way countenancing these evils, or winking at their presence? I will endeavor to answer if you will bear with me a few moments.

In this State there are thirty-three local agricultural societies from which returns have been received during the past year. Nineteen of these societies show by their returns that they have awarded premiums for trials of speed; three say emphatically they have not, and the blanks from ten others would indicate either that they did not offer any or that none were awarded. One society which paid a total of \$17,760 in premiums, paid \$1100 for trials of speed; another, which paid \$239 for trials of speed, paid \$4 for milch cows; and a third, which paid over \$100 for speed, paid \$5 for milch cows. Generally, it appears from the returns, that those societies which have awarded no premiums whatever for trials of speed, have awarded the highest premiums for milch cows. These figures are suggestive and appear in quite striking contrasts—but if the whole list could be gone through with in detail, I think it would appear that the statement often made by opponents of trials of speed, that it receives an undue share of the premiums awarded, would not be sustained. It might, however, enforce upon the mind the wisdom of that clause in our statute which gives to the Board of Agriculture the direction of the expenditure of one-half of the sum given by the State to local societies. In Massachusetts—where the State Board exercises no such control—there was awarded by its agricultural societies in 1874, \$2,373 in premiums on all classes of live stock, and \$12,545 for trotting horses alone. In that State all but six of its thirty-one agricultural societies show an individual indebtedness of from \$100 to \$36,000—the greater part of them ranging up among the thousands. Of the thirty-three local societies in this State, but fifteen, or less than half, are carrying any liabilities whatever, and in most of these

cases it is very small in amount—so that our comparison with the mother State in this respect is largely in our favor.

To ascertain the just influence, “financially and morally,” of trials of speed upon these societies, or upon the communities in which they are located, is not an easy matter, because so contradictory. One or two instances may be cited: The secretary of one society which has abandoned the plan of giving premiums for trotting, says it is working well and the society has no wish to return to the former method. Perhaps it should be mentioned here, however, that in the town where the exhibitions of this society are held, is a Driving Park owned by parties interested in horses, on which trials of speed take place two or three times in a year. Another official manager of one of our county societies says, “Every dollar we get from the horsemen,” as he terms them, “costs us two;” and a third says: “It would be impossible for us to run our fairs without trials of speed.” These represent the general tone in which the matter is regarded—the sum of them being, if I mistake not: “trials of speed are costly, but the public seem to demand them, and the problem is how to conduct the matter so as to divest them as much as possible of their objectionable features, and render them as far as may be, self-sustaining: or in other words prevent them from becoming a financial burden to the societies.”

No question has perhaps been more thoroughly discussed by the agricultural and turf journals during the last few years; or by managers of State and local agricultural societies, than this one of speed at fairs. A heap of writing has been given to it, many arguments have been presented on one side and the other, and a good deal of good natured wrangling by fair managers, has resulted from it:—but I cannot possibly see the difficulties to it which many do. I do not believe it is so hard a matter to control, I believe it may be easily, satisfactorily and fairly handled. To begin with, no fact is plainer than that our people need and must have recreation and amusement:—the community which does not tolerate them in a legitimate way, and the heart which does not rejoice in them to a proper extent, must be a poor, benighted community, and a glum, cheerless heart. Among recreations of a public nature, a well conducted contest of speed, is to most persons a pleasant and attractive spectacle, and I am very safe in saying, experience proves that nothing affords more satisfactory or harmless amusement, provided always, and every-

where, the associations are proper and the whole thing conducted honorably and fairly. Last fall, I saw upon the fair grounds of your society, an exhibition of family horses upon the track, for the somewhat small premium offered by the society for this class of horses, and I am sure those who witnessed the trial will bear with me that the twelve horses, driven by their owners a half mile and repeat, formed a feature in the exhibition which gave as much general satisfaction to the large crowd present as would a more closely contested race by noted trotters. The usual accompaniments of the race-course—where pure racing so to speak, or racing alone, is carried on—quarrelling, profanity, intoxication, gambling and public betting—may, and should always be everywhere forbidden and prevented in connection with fairs of agricultural societies. The morals of the community are of more value than all the 2,300 horses in the country. I abhor and detest from the bottom of my soul all these vices in every form, and have not command of words sufficiently forcible to express my contempt for them. They are mean and low, they lead to other forms of iniquity, and are debasing in all their influences. But I still insist there is no more occasion for immorality in any of these forms, in connection with a trial of the speed of horses, than in connection with an exhibition of the strength of oxen, or the skill of skaters upon an ice rink. Bad men will, notwithstanding the force of law and the public sentiment against it, manage somehow to ply their nefarious business; they should not and they need not do it upon an exhibition ground or in sight or hearing of any one—and there is or may be law enough to prevent it. If a race is to take place on the ice of this river to-morrow, or on a fair ground any time, what is to prevent a number of men from getting together in a room at a hotel, in a corner saloon or other out of the way place, and selling pools on that race? This they may do on the price of greenbacks, on the result of an election, on the state of the weather, or a hundred similar occurrences—and it is done every day—but would this fact, if known, be likely to stop a man from voting, or prevent him from taking a sum of money that was honestly his due? Probably not. Furthermore, I know, and you all know, scores of gentlemen who may perhaps be termed "horse men," who love a good horse, who don't like to take the dust of a fellow traveller on a public turnpike, and who, perhaps, are proud of a horse that can trot well down in the "thirties"—who never in all their lives had a dollar up on a race, and who detest the

gambling and betting accompaniments with genuine contempt. These gentlemen are not to be classed with the rabble of a crowd. To their energy, and intelligence, and skill in breeding, we owe much of the improvement in this important class of farm stock—and when the State shall strike its great “general average,” who shall say they will not be entitled to high rank as good citizens, if not as public benefactors?

But are there not agricultural societies who give no premiums for trials of speed, who allow no trotting upon their grounds? Yes, there are two or three in our own State who hold good exhibitions without trotting—and who are well satisfied with the system—but because they do not allow it is no evidence that it does not flourish in their very midst, and perhaps with greater force and attended by greater evils than would be the case if they allowed and controlled it. Without the State there are two or three honorable examples of societies which have never offered a premium or paid a purse for trotting. In New York, the State Agricultural Society has held thirty-six annual fairs, and has never had a horse trot in connection with one of them. It is to-day the highest type of an agricultural society in existence in this country, and has in its treasury more than \$26,000. The Essex county society in Massachusetts, having a history of nearly sixty years, uninterrupted by the sound of a trotter’s hoof—save those of its squadron of elegantly mounted Marshals at its aristocratic fairs—has by judicious management, and, as it is termed, “purely legitimate premiums,” salted down under its treasury pad the snug little sum of \$30,000. This last named society is one of the most useful in the Commonwealth, and embraces upon its roll of members some of the most distinguished names in the State. I am under obligations to its officers for kindly attentions, and shall not soon forget the sight of its magnificent dinner, at which six hundred persons sat down to elegantly decked tables, after which grand speeches were spoken by some of the most eloquent men in the “Old Commonwealth.” But after all, my impression was that its exhibition ranked low as compared with many in our own State, (aside from its one grand feature of a well conducted plowing match); and I came away from Danvers at the close of two happy days saying to myself: “The managers of Old Essex are gentlemen, they go in for a good time, they pay their own bills, and with \$30,000 in their pockets they can have horse trotting or not, just as they

please." These societies are cited by all opposed to trotting at fairs, as showing the success attained without resorting to horse races to draw a crowd ;—but I am persuaded their success is due to other causes quite as much as to the absence of trials of speed. Nor must it be forgotten that in the State of New York, there are more than two hundred and fifty driving associations and race courses, with all their questionable accompaniments ; and that in connection with the exhibition of this single society in Massachusetts, I saw more drunkenness and fighting than I ever saw in Maine at all the fairs I have ever attended in all my life. It is not true that the trials of speed of horses embodies all the evils in connection with our system of agricultural exhibitions ; there are others from which we in Maine are happily free ; and in comparison with which the well conducted race at a county fair can but be regarded a legitimate pastime.

Now, recognizing the need for pure amusements for the people and the value of speed as an element worthy of encouragement—whether is it better, for our agricultural societies to banish trials of speed from their exhibitions, leaving it to driving associations and jockey clubs with all the iniquitous systems with which they clothe it ; or take it into their own hands, keep it under their own control, offer reasonable premiums for its encouragement, allow no betting or gambling in connection with it, and, recognizing it as legitimate, by their good management keep it so ? In what community is society better and purer :—that in which an agricultural society allows and controls trials of speed—as does yours in this place [Topsham]—or that where such a society gives it over completely to gambling horse men who maintain their private club and race course, and with it all the evils upon which it feeds ? And while these societies boast of paying no premiums for trotting, and draws its garments about it for fear of impure contact, is it not true that illegal racing, gambling, betting, and drunkenness are at their flood tide in their very midst ? Of course we as a Board of control, have nothing whatever to do with societies not receiving the aid of the State—but as we all have at heart the good of all its agencies for the improvement of our agriculture—I can hardly refrain from saying that at the last State fair, no feature was so disgraceful in connection with its entire management, as the countenance which it gave to open and public betting, before all spectators, upon the races for which it offered premiums—and to express the hearty contempt I have for such a

course—notwithstanding that among its managers are your friends and my friends. What decent man at Presumpscot Park in 1875, did not receive a shudder of disgust at the noisy bawling of the pool-seller, within sight and sound of young men and boys, mothers and daughters, gentlemen and ladies! I appeal to the executive officers of this great society, which is capable of uniting the people of the State upon its annual fairs, to pronounce the sentence of banishment beyond the limits of its control, upon the pool-box and all its belongings. If this be not done, would a prediction that its coming days will be crowded with evil and disaster—be not in order?

I would not be unmindful of the fact, however,—to speak for a moment of a point in breeding—that speed in horses has assumed a fictitious value, and has by many been greatly over-estimated. It is true that it is a quality both useful and attractive—a horse, however, possessing speed alone has little to recommend him to general use. But to a horse possessed of other good qualities, speed gives additional value. The trouble has been with us here in Maine, and to a great extent all over the country, that without the requisite class of mares from which to breed, and without the requisite skill in breeding—men have been infatuated over the success of some one who has raised a fast colt, and they have all been trying to do the same thing. I don't know what there is to breeding fast horses that renders it so contagiously attractive—other than the excitement and intoxication which men feel over a life of bustle and push in any department of business, as compared with one slow and moderate—but I do know it to be an evil to a community to be filled up with a lot of fast horse men; and I think if any class can be spared from Maine it is those young men, who with a fast colt, a second-hand sulky, an orode watch, an empty cigar case, and a wallet empty of honestly earned money, spend most of their time lounging at corner saloons and stable offices, talking of nothing better than races and pools, and doing nothing better than playing “poker.” Without wishing to afflict any part of our country with the presence of these useless young gentlemen, my advice to them would be the advice we see printed on the great railroad posters, “Go West young man, go West.” But, as I just remarked, the one great mistake of horse breeders among us has been, that with material unfitted to make a trotter, they have been continually trying to make trotters—and have failed. The standard trotter is now a 2.30 horse, and 2.30

horses are not common. There are in Maine, to-day, but three such horses; and in all we have bred in all the past their number is but thirty-nine—three of which have trotted in better than twenty, viz: Hopeful, $2.17\frac{1}{4}$; Lady Maud, $2.18\frac{1}{4}$, and Camors, $2.19\frac{3}{4}$. Now if a man sets out to raise a 2.30 horse—taking the ratio of the past as a standard of his success—he has only to raise 2,383 ordinary colts before he will make a strike and get one that can compass his mile in two minutes and a half—but I am inclined to think he will become tired and discouraged before he has bred half this number. Even in the United States, with its 7,145,370 horses, but 567 have a record of 2.30—a proportion of one to 12,425 of the whole number. In view of such figures, would it not be infinitely better to confine our efforts at breeding a class of well proportioned, stylish, good moving, kind, serviceable horses, of good weight, good for the road and for the farm, with good speed, if you please—rather than to waste so much energy in the endeavor to raise a two-thirty horse, out of material that will hardly produce a three minute step?

It seems to me, in summing up the matter which I have gone over somewhat hastily and imperfectly, that no one can fail to acknowledge speed as a quality of legitimate value; but while legitimate and useful, it is not the only quality to be recognized and encouraged. Fairness demands that we accord to speed and its display at our exhibitions, the same opportunities we afford to the exhibition of the animal's other qualities, and offer the same premiums for speed according to its value, that we do to roadsters, draft, saddle, and breeding horses. Let no enormous premiums be offered to any quality in a horse, to which a fictitious importance attaches. If in testing the quality of speed it is thought best to have a public trial of different horses, let every incorporated society conduct such trials in accordance with square and manly rules; allowing no gambling, no betting, no ungentlemanly language or conduct. Then elevate to equal importance with the noble qualities possessed by the horse, all the other departments of our exhibitions—especially all our live stock interests—and I am sure one great cause of embarrassment and dissatisfaction will be done away. On this ground I believe our societies may firmly and squarely stand, because I believe it good, honest ground; and the position a good, honest position.

PAPERS AND DISCUSSIONS,

AT THE SEMI-ANNUAL MEETING AT

FRYEBURG, October 31st and November 1st, 2d, 1876.

CRANBERRY CULTURE.

BY C. L. WASHBURN, PEMBROKE.

Knowledge, labor and skill, judiciously and persistently applied, will ensure the accomplishment of any undertaking, within the capacity of man to achieve. The once quite prevalent opinion that successful farming depends upon advantageous location, depth and fertility of virgin soil, favorable weather and money capital, has long since given way to the more radical and sensible view, that success depends upon the fibre of the man. Misapprehensions with regard to the requisite conditions, cannot alter their nature, nor their bearing upon the case. Like the laws of the Medes and Persians, they change not. Common sense, education and "push" are the farmer's proper credentials, and having these, he may go forward, taking due advantage of circumstances, but placing no dependence whatever upon "luck." Indeed, persistency of application is the crowning need of the hour, and the want of it has shipwrecked more enterprises upon the farm than all other causes combined. The possession of this trait is as indispensable in conducting the operations of the farm as in managing an International Exhibition, or removing the obstructions at Hellgate. The present is also emphatically the day of close competition and small profits; hence the still greater need of a determined will in order to succeed. Time was when a live New England farmer could start a new branch of farming industry and follow it by himself, year after year, without fear of molestation, but in these days of Yankee shrewdness and keen observation, he who steps out of the beaten track to begin a new and paying branch of the business, is soon aware that some lynx-eyed neighbor, on the alert for anything that promises better returns, is on

his trail, and the monopoly, but briefly enjoyed, ere long gives way to sharp competition, and the new enterprise becomes in its turn like all the rest, the most that can be said of it being, "small gains, but sure." According to the farmer's code, monopolies of this kind are not consistent with the spirit of the maxim, "Fair play."

It has been supposed by many that there is money in cranberries, that the cranberry meadow is the paradise of fruit-growers, the *ne plus ultra* of the capacity of Mother earth to enrich and bless the yeomanry of the land. But the truth is, cranberries, as a cultivated crop, will not grow until we learn the method of culture, and then *work* to make them grow. As regards the site, methods, success, &c., various opinions have been expressed. Mr. E. W. Crane, who is considered a competent judge, says: "The best locations for the cranberry are peat or muck bottoms, with adjoining banks of pure sand for covering, before the plants are set, and so situated that they can be flowed in winter and spring, and drained at all other seasons of the year." Mr. Phinney of Barnstable, Mass., writes: "Successful culture means that the crops, including present value of meadows, have more than repaid the original cost, interest and incidental expenses of cultivation, gathering and sending to market."

But to come nearer home. Conspicuous among the cranberry growers in this section of the State, is Mr. Benjamin Shattuck of Red Beach, who may be regarded as the foremost of the pioneers in this business in Eastern Maine. Located in a region naturally rough and forbidding, surrounded in part by small mountains of the superb red granite which is destined to make the locality famous, he and his two sons, Benj. and Geo. C., availing themselves of the marshes and lakes which partially occupy their territory, have achieved success in the culture of the cranberry. Some twenty-five or thirty years ago the elder Mr. Shattuck noticed near the edge of a bush swamp, three acres in extent, a few small patches of cranberry vines, bearing fruit. Conceiving at once the idea of enlarging the area and product of the vines, he soon after began to remove the bushes, pulling them up by the roots; using the hands, and a team when occasion required. The plants, but few in number, were then set at wide and varying distances, often more than a rod apart each way. They spread rapidly, soon covering the whole ground, and producing, after the plants had become well established, fifty to two hundred bushels per acre from year to year.

By the use of a dam at the lower part of the meadow, it is flowed in the spring to prevent the "fly" from depositing its eggs, the worms from which injure or destroy the fruit. This purpose is fully accomplished by a complete submersion of the plants for ten days just previous to the 1st of June. Flowing from November to March is sometimes resorted to for the purpose of preventing winter-killing, of which in severe seasons there is some danger. The damage by frost to the crop of 1875 was so serious that the Messrs. Shattuck determined, if possible, to devise some adequate means of protection against this drawback. They accordingly invented and constructed a covering, consisting of strips of wood four feet long, five or six inches wide and three-eighths of an inch thick, nailed crosswise to thicker strips, three in number, twelve feet long, the whole forming, when completed, a covering piece about the size and shape of a large single barn door. A sufficient number of pieces in this portable shape were taken to the meadow just before the season of frost, and placed so as to extend lengthwise in a direction north and south, and covering the vines entirely. In the morning the south end was raised four feet above the meadow, supported by two props. This admits the rays of the sun, favoring the growth and ripening of the fruit. Whenever frost is apprehended, the boards are let down at night-fall, by two persons, the process occupying 40 minutes or a little more. The cost of this covering is about \$200 per acre. Near this meadow is a lake, embracing an area of 27 acres, which was partially drained many years ago to furnish water to a mill, farther down the valley. Upon the drained border of this pond, a few cranberries were afterwards found, and their cultivation forthwith commenced. The drain, four feet deep and forty rods long, was dug by Mr. S. himself, the labor requiring all the spare time of two summers for its completion. The portion of the lake's bed left bare by draining, comprises some six or seven acres of sandy, rocky soil, perfectly adapted, as has been proved, to the growth of the cranberry. In this their natural and congenial home, the plants were set, and here they have thrived, and borne fruit abundantly year after year. Flowing is easily accomplished by closing the gateway of the drain. The proximity of the water affords complete immunity from frost, the warm air above the surface of the lake being diffused over the border occupied by the vines; a phenomenon which the commonly received notions of the laws of the accumulation and radia-

tion of heat, will sufficiently explain. Referring to this important desideratum, natural protection from frost, Mr. S. says, that were he to begin again, he would go 200 miles to find a lake, were none available within that distance. The kinds of berries grown here are designated 'bell shaped' and 'cherry shaped,' and are identical with those raised at New Jersey and Cape Cod.

The pickers begin about the 20th of September, and gather from 1 to $2\frac{1}{2}$ bushels each, per day. Sometimes 50 or 60 persons, men, women and children, are employed. The ground allotted to each person is indicated by lines of twine stretched along the surface for several rods, and 8 to 10 feet apart. Compensation, 50 cents per bushel. At the Cape they receive but 25 cents. A fair yield is 200 bushels per acre. The crop this year is light, owing to an unprecedented drouth.

The Messrs. Shattuck attempt no abstruse philosophical reasoning, concerning the principles of plant growth and nutrition. They state squarely, as the result of their long practice and experience, covering a period of nearly 30 years, that the cranberry grows to perfection on lake shore soil, whether it be composed of sand, gravel or clay, or a combination of the three; that it thrives in peat or muck, in a word, that it grows wherever grass will grow, it being necessary only to keep down the bushes, and attend to flowing at the proper time. Further, it is not claimed on their part that cranberries can only be grown by strict conformity to their own methods of culture; they only state just what they have done. It is not the object of this essay to suggest how far the results obtained by these men should go to modify or correct the methods practised elsewhere, or to disprove the statements of other writers, some of them no doubt practical men, who assert that cranberries will not grow in what geologists call the "drift formation," that is, loam and clay; but it is certainly gratifying to know that the culture of this fruit need not be limited to the narrower range of soils in which, generally speaking, it has hitherto been grown, and so far as the idea is new, it will operate to encourage the grower, and induce a larger number to engage in the business. Finally, the results here noted abundantly prove that Maine embraces all the requirements for the successful culture of the cranberry, so far as the means and facilities furnished by nature therefor are concerned. Discouragements will of course arise, mistakes, blight, frost and sometimes unsatisfactory crops, but these are only circumstances, that eventually

give way before the magic power of a resolute will. Then let the worthless marshes and bogs that blot and disfigure our farms, be cleared up and transformed into meadows of cranberry vines, yielding in due time their ripe, ruddy fruit, beautiful, wholesome, and pleasant withal to the taste.

Thus can we improve our farms and our health, elevate our manhood, replenish the family exchequer, benefit our fellow-men, and vindicate our claim to the high social and moral distinction that rightfully belongs to every honest, intelligent tiller of the soil. Thus may we hasten and justify the long-deferred, but surely forthcoming and unanimous verdict, that, in substantial worth, and dignity of character, the educated, progressive farmer, free from debt, stands the peer of any man on the broad face of the earth.

DISCUSSION OF THE ABOVE SUBJECT.

PRESIDENT SHAW. In the town of Franklin, Mass., some ten or twelve miles from where I was born, there is a cranberry bog, which the owner prepared some thirty-five or forty years ago. There is a small stream of water that flows through it, and he put in dams occasionally so he could flow the whole of it. A thermometer is kept there, and when there is felt to be danger of frost, the man who has charge of the bog goes out at night and examines the thermometer, and if it is down to 40° he lets on the water. It can be drawn off as readily as let on. In that way they control the elements. In the vicinity where I formerly resided, quite a business is done in raising cranberries on the lower lands or bogs. They have no means to flood them, and they seem to come into vines naturally. They occasionally cart on sand or gravel, and spread it two or three inches thick; it seems to be what the vines need. They do it in the winter, on sleds if there is snow, if not, on carts.

QUESTION. Is it absolutely necessary to remove the surface grass before setting the plants?

PRES. SHAW. I do not, from my observation, consider that it is absolutely necessary, but if you get the grass and weeds out of the way the vines have nothing to overcome. If not, it takes a series of years for them to become master of the situation and produce crops; but they will do it finally.

MR. HIGHT. I have about an acre of land that is covered with muck to a depth varying from six inches to a foot, and then you

come to sand. It is not convenient to flow it. Would it be any use to set vines in such a place as that?

PRESIDENT SHAW. They do it successfully in many places. All you have to contend against is frost, but I think you would be successful in a majority of years. The soil they grow on naturally in Massachusetts, is a peaty soil. I think cranberry vines will not kill grass entirely, but they will overpower it so as to predominate. I think the quickest and easiest way to get a crop would be to take the grass off before setting. If I were going to set out vines without taking off the turf, I should haul on sand or gravel before setting. If I could plow I should do so, as it would be easier to plow than to take the turf off. In our town they set the vines about a foot apart.

QUESTION. Don't they sometimes chop vines up before setting them?

PRESIDENT SHAW. Yes; one of my neighbors told me that two or three years ago last summer he mowed over some vines, and would sometimes cut them. After dinner he raked the piece, and while raking when he saw a vine he would make a hole and stick it down, and he found that they invariably grew.

SECRETARY BOARDMAN. It may or may not be known to members of the Board, that Mr. Chase of Buckfield is one of the largest growers of cranberries in the State, that he has devoted years of time to it, and is very successful. I would like to hear from Mr. Reynolds, an account of his operations.

Mr. REYNOLDS of Canton, Member from Oxford county. Mr. Chase has three pieces of cranberries; one in Peru, one in Buckfield, and one near Bryant's Pond Station on the Grand Trunk. He has raised six and seven hundred bushels in a year. He always cleared the turf off, and always planted where he could flow. A brother of his has begun to raise them. He got seventeen bushels this year. Several persons in Peru have begun to raise them. A man by the name of Richards has just cleared off two acres, and got them ready for the vines. Mr. Chase says it is not much use to try to raise them where you cannot flow. Sometimes they have trouble by getting the vines frozen in the ice, and then a freshet coming and lifting the ice so that it tears them out.

QUESTION. Does he find it necessary after removing the turf to cover the piece with sand?

Mr. REYNOLDS. He does. It makes it a good deal cleaner picking. The muck is nasty in wet weather, and the berries are picked

by women chiefly. He does not use the cranberry rake much, it injures the vines. They could take them off faster with the rake. If it is wet, they have a piece of plank or of cloth to sit on, and in that way keep dry.

MR. LYMAN H. WINSLOW of Nobleboro', Member from Lincoln county. I am not an extensive cranberry raiser. I have raised two or three barrels this year. I have a low meadow, which is flooded in the winter time, and pretty late in the spring. A few years ago I came upon a cranberry patch by the side of the pond shore, and I took up some vines and tramped them into the meadow with my foot. In a few years I found I had quite a little patch of cranberries in the grass. A few years ago I took some of the turf off and set some vines out, and they grew a year or two, and then died. There isn't a root left now, while those set in the grass are all there. They will kill out the grass, and you will have no trouble if you only keep the bushes down. There are considerable many raised in my vicinity, and none of us can flood them. I never lost any but once. We sometimes pick them when green for fear of the frost. I think the flavor is not quite as good when picked green.

QUESTION. If a man has a small patch, and raises cranberries for his own use, instead of picking them green, wouldn't it be policy to cover them?

MR. WINSLOW. I should think it would be very good policy; and let me say that there are very few farmers but have some little place on the farm where they can raise cranberries enough for their own use. I get more profit in proportion from my cranberries than from any other crop I raise. My ground is soft. I can run a pole down 10 or 15 feet. Now I believe this matter of cranberry culture is one of great importance to the State. How many acres there are in every section of it that seem good for nothing but to hold the State together, and yet these same lands might be brought into cranberry fields and made to pay. Let me ask this question? If we could take our best fields, and by putting on a liberal dressing of stable manure could raise cranberries on them, who is there that would not raise enough so that he might have this delicious fruit on his table? There are some who won't try to raise them because they can't flood in the spring and in the fall, and so fear that they may sometimes lose a crop from the worm or the frost. But are we sure of a crop of corn? Don't the midge and the rust sometimes destroy our wheat? Can we

prevent the potato rot? There is risk in everything somewhere. Then why give up the idea of raising cranberries on the lands that cannot be flowed because one year in five, or one year in ten we may fail of a crop? I would advise every farmer to raise enough for his own use, and if he can have a few barrels to sell so much the better.

Mr. STARRETT of Warren. There are cranberries raised in my town. Quite an amount are taken from vines which grow naturally on the meadows and salt marshes. The crop has been very large this year. One man has sold over one hundred bushels from his meadow. They are cultivated to some extent on reclaimed swamp lands. When the turf is taken off the soil is sandy. Mr. Comery, the largest cultivator, began some fifteen years ago with a piece perhaps fifty feet square, planting them in the sod. That was the method generally practiced in the early days of cranberry culture, but it has been abandoned because it is a waste of vines, and because with the vines you transplant the grasses that you wish to keep out. From this piece he has picked forty-five bushels. He has gradually enlarged his area until he has now nearly an acre under cultivation, on the greater part of which, however, the vines are scattering and have but just commenced to bear. His entire crop this year is about seventy-five bushels. Eastwood, in his work on the cranberry, says it is essential that the cultivator shall be able to draw off the water, as stagnant water in summer is injurious to the vines, and I have seen an instance where a small portion of a cranberry patch could not be drained, and on that portion the vines were killed. The berries are generally raked from the vines on the marshes and meadows. The rakes do not take them off entirely clean, and it is desirable to have raked cranberries hand picked before putting them in market; by the use of the rake the crop can be secured quicker, and so there is less danger from frost. The cultivated cranberries are picked by hand, as the rake tears up the vines. Mr. Comery told me that he picked this fall three bushels in a day. He thinks his older vines will in a few years become so firmly rooted that they can be raked. He also thinks that the plants would root more quickly if sand were hauled on, as the sand would cover the runners and cause them to take root.

Mr. MALLETT of Topsham, Member from Sagadahoc County. There are some places in my town where cranberries grow spontaneously, and some few cultivated fields. There is a large

tract of meadow land which runs through the town and extends up into the town of Bowdoin, and scattered over it are acres where they grow naturally, and I dare say there has been hundreds of bushels picked from that meadow this year. This has been a great cranberry year with us, and must be taken as the exception, and not as the rule. Hon. Charles J. Gilman of Brunswick has gathered from a piece of cultivated land on the Androscoggins, 380 bushels. He has between one and two acres. They cost him nothing but the trouble of picking. I have a good chance and calculate to set out plants some time when I have time, and probably if I ever do it I shall have to take time. I have some thirty acres of muck land, where you can run a pole out of sight, no matter how long it is; and I have thought of trying that. While I am speaking, I will relate what a Massachusetts grower said to me about the preparation of the land for the reception of the vines. He told me to take the turf off and haul upon the muck sand or fine gravel to the depth of two or three inches, and the poorer the sand, the less soil with it, the better. Their manner of setting is to cut the vines in a hay cutter and strew them on the bed evenly and trample them into the sand. It is done very rapidly. He says there is no trouble but they will grow, if you just take a little trouble to get the grass out at the start, and once grown they are masters of the situation, unless some bushes should spring up. I believe the cranberry to be a very profitable crop, when once it has got so that it produces.

Mr. BODWELL of Acton, Member from York County. I am not a cranberry grower, but I live in a vicinity where cranberries are grown. One of my neighbors, who lives about three-fourths of a mile from me, had a piece of land similar to some that has been spoken of here, where, except same bushes on a part of it, nothing grew worth cutting. Some twenty years ago he discovered on the west side of this piece of land a cranberry bed, and after a while he picked cranberries enough from among the grass to supply his family. That bed still continues, and has extended until it covers about a quarter of an acre. In the centre of the piece there is a wet hole, where the water stands during the spring and fall to the depth of two or three feet. About ten years ago he commenced to cultivate cranberries on the east side. He plowed about half an acre, took the sod off and piled it up. Below this was a white soil, rather hard, and on that he put his cranberries—cut the vines up and sowed them over the ground,

and I think he said hauled on some sand. Two years ago I was on that piece of ground and he remarked to me that he had picked forty bushels of cranberries, the most of them on that part of the piece where the cranberries originated, which never was cultivated. I saw him about a fortnight ago, and he told me he had picked sixty bushels and was still picking. I don't know on which part the yield was greatest. These cranberries were what they call the Bell variety, and nicer ones I never saw. He told me that he labored under a disadvantage in not being able to flow his vines at will. If he could do so he could destroy the worm which is the enemy of the cranberry. He flows as much of his ground as he can in the fall, after taking off his berries, but he cannot flow all of it.

Mr. Gile of Alfred, about twelve miles from my place, is a large cranberry grower. He has twelve acres under cultivation; I think on some portions of it he took off the sod, others he did not. His land is so situated that he can flow it any season. He has been troubled with this worm, but he has learned the season when it is destructive, and by flooding at that season he destroys it. His present method of gathering his cranberries is to rake them off, and leaving them on the ground, to flow the meadow. The cranberries rise to the surface, and run by a flume into a house which he has built to receive them, and he has constructed a machine of his own invention, which separates, as they come down, the berries from all dirt, and the large berries from the small. It cost 20 cents per bushel to gather them in this way, and it formerly cost \$1.25. He raised about 120 barrels this year.

With regard to winter freezing, I have no doubt that if the water freezes low enough to get hold of the cranberry roots, and the ice is lifted by a freshet it would destroy the vines, but I don't think the frost itself will destroy them. When I was a boy, I knew a marsh where cranberries grew spontaneously, and I have gone many a time in the winter and cut out cranberries with an axe, and they were as nice ones as I ever saw in my life.

PRESIDENT SHAW. The remarks of Mr. Bodwell remind me of what I was told some time since by a cranberry cultivator, that in taking off the turf he had taken too much soil, and the vines were going to be a failure because there was not soil enough left.

HON. G. B. BARROWS of Fryeburg. It seems to me that this is a very interesting subject, and if the Board shall succeed in calling the attention of the farmers of the State to the possibilities in

cranberry culture, it will be one of the most important services it has rendered to our people. I believe that no acre of our grass fields can be made to produce as much value, in grain crop, or hay crop, or any other crop, as can be produced without any manure from an acre of these otherwise worthless lands in cranberries. Now, the Board may get together and talk about apple culture, and no new ideas be presented, no new suggestions be made. I know it is well that these suggestions be repeated, but here the attention of the people is called to new resources, and that is vastly more important. One of our assessors tells me that there are four or five thousand acres of waste land in this town; and here another man is telling us that these are the very lands for cranberries; and right here by Lovewell's Pond, where the battle was fought, we find the cranberry vine coming up. Our situation is a favorable one for cranberry culture. We are nearer Europe than any other State. The export of cranberries to Europe is just beginning; the people there are just learning that there is such a fruit, and they consider it a luxury. Now, why should we not cultivate them?

I have no practical knowledge of cranberry culture, but I am satisfied that two things have been brought out here to-day—that water is the best friend, and the worst enemy of the cranberry. You should have a place that you can flood in the spring, to prevent the spring frosts from killing the blossom, for you want to guard against spring frosts as well as against the insect and the fall frosts. In New Jersey, they have had trouble with what is called the scald, and the health of their vines was a matter of so much interest to them that they sent to Washington to the Department of Agriculture, and the microscopist connected with the Department was sent to examine the deceased vines and report the result of his investigations; and his report was, that the trouble was caused by lack of drainage. So you see, that while you need water to secure a crop, you don't want it when it will do damage. But if you can let on the water when you need it and let it off at your pleasure, you can grow the berries without trouble, and by adopting the plan that has been referred to, all you have to do to gather the fruit is to rake the ground and pick up your berries. Now we get this point from the paper that was read: That, while you need water, you may get the same advantage by planting on the borders of a lake, where you can have the benefit of evaporation, that in other situations you get by flowage and drainage.

It seems to me that we need direction ; but I think we have splendid opportunities for entering upon this business, and if every gentleman who has a chance would experiment—not dash out, but try a square rod by removing the top soil, another by plowing, and another by hauling on sand, in that way we should run no risk, and I am satisfied that in the end our efforts would result in success.

SECRETARY BOARDMAN. I want to endorse the views presented by Mr. Barrows, though I do not know as I can say a single word to give them greater weight. There are as we know, thousands upon thousands of acres all over the State, of such land as has been described. In many localities cranberries grow upon them naturally, but there are many more where they may be cultivated with profit, and it does seem to me, as Mr. Barrows says, that the subject is one of the most important that can be brought to our attention.

There are some things I think, that this discussion has brought out. While I do not doubt that my friend Winslow in his locality, can grow a small patch of cranberries without trouble and every few years get a nice return from it; I also believe that to succeed in cranberry culture *as a business*, it is necessary to remove the turf, and bring sand to put on your soil. The sand not only furnishes a food that the vines need, but it keeps down the grass. Again, I think it is best to set the roots. Of course you can cut the vines and trample them into the earth, but there must be a true policy, and I believe that policy is to set the roots and set them properly, and that you will find it the better and safer way if you propose to cultivate for profit. If you only want to raise a few berries for your own table you need not take so much trouble, and some years you will get a crop—others you will not. Again, I believe that water is indispensable, and that the best growers so say. I believe it is necessary not only for the protection of the vines in blossom from the frost and the fly, but for the better ripening of the berry in the fall before the early frost. It has been remarked that you can get along without it, but to make it a business, I believe that flowing is indispensably necessary. I think that about a week from the last of May to the first of June is the time of flowing, and if you flow constantly for ten days at that time, you prevent the frost from destroying and the fly from injuring the blossom, and of course you get a better berry by allowing them to remain on the vines till the fruit is perfected, and I think

it has been demonstrated that this can only be done where by flooding you can guard against the risk from freezing.

MR. BARROWS. At the meeting in Calais it was reported that some parties had successfully cultivated cranberries, but that on some part of their patch they had suffered from frost. Was it from spring or fall frost?

COL. WALKER of Fryeburg. It appears to me I am shut out, because I cannot control the water. Saco river will rise and fall, and I cannot help it, and at a time when we can't dip a pail of water we can't flow a cranberry bed. Would the gentleman advise me to undertake to raise cranberries when I can use the water only when it will come?

PRESIDENT SHAW. I would say, that in Massachusetts, where I am acquainted, cranberry beds are almost invariably on land which they can flow in the spring and fall and not by artificial means.

The subject was here laid upon the table, and was taken up in the evening, after the discussion on sheep husbandry, when MR. WASSON, who was not present in the afternoon, made the following remarks:

I know that turkey and cranberry make a favorite dish, but how cranberry and mutton may go together I don't know. I am not engaged extensively in cranberry culture, though I have cultivated them for some ten or twelve years, and I live in a vicinity where they have been cultivated for a number of years with the highest success. I was agreeably surprised to find so large a territory so well adapted to the culture of the cranberry as I find in your vicinity, and back many miles along the railroad. It would seem to me that you are more favorably situated for growing cranberries than for growing sheep.

But it is not every marsh, or muck-bed, or bog, over which the water may or may not be thrown, that can be successfully cultivated to cranberries. There are about as many failures as successes, and the reason is, that parties set out vines without knowing the conditions of success or failure. The principal element in the soil that produces cranberries must be sand, and undoubtedly you have some of it in your soil. The rocks should be quartz rock. If you have quartz sand or silex in your land, with or without muck, or with or without water, if proper care is taken in planting out the vines at the start, success is sure to follow.

There is no enterprise in which any of the good people of Maine are engaged in which the margin of profit is so large as in the growth of the cranberry. Let me give an instance. A neighbor of mine had in 1856, and has had for a number of years, a mortgage on his farm that had accumulated interest until it had got beyond his control and he had ceased to try to lift it. Lying right back of his buildings, in a soil made up almost entirely of quartz rock, and on the top of a hill where he could not flow it, was a piece of marshy land that measured just one-half acre. In the fall of 1856 or '57, he set that out to cranberries. The next year, the season of '58 I think, he sold from that a trifle less than \$90 worth of cranberries, and since 1859, for 16 years he has never sold less than 150 bushels in a year and from that to 300 bushels from that piece of land. He has long since redeemed his mortgage and fixed up round his buildings. He has gathered this year, I think, between \$600 and \$700 worth of cranberries, and how near he is to exhausting his soil I don't know.

In our section of the State, we have no difficulty in growing the cranberry in mowing fields. The only trouble is, they are in the way of the mowing machine. More than 1000 bushels are yearly grown in mowing fields, where there is no flowage at all. We cannot grow them as well because we cannot flow them in June, and that is the time that the fly lays the egg which produces the worm, and if we could flow them we could protect ourselves from the only enemy we have. I do not care for the frost, for I can protect myself from that by selecting the right variety. Here is the second mistake. Many want the vine that produces the largest fruit, and that is just the kind we don't want in Maine. I am now speaking of the Cherry cranberry, that is nearly round, showing two colors, red and pink. The Bugle cranberry, which is egg-shaped, is pretty safe from attacks of frost that destroy the Cherry. Another mistake, in my opinion, is, that in planting, people don't set one-tenth the number of vines they ought to, and if there are roots or seeds in the soil there is too much for the vines to contend with. The process in my section is this: If the land can be plowed we plow it, using a heavy team, and then harrow it; then furrow two feet apart and set out the vines. If I were to plant on your soil I wouldn't set vines, but I would cut them in a hay cutter and sow them. Every piece will produce a stock. In my section we have too many weeds to contend with, and it takes too long to get them started. One of our cultivators

told me that he had a piece that he could flow, but he wouldn't spend money for a dam, for he thought it wouldn't pay for the cost.

Now I come to the question—Does it pay? There is no preparation of the soil after the first year; no application of fertilizers; no weeding to be done. There is nothing to be done except to thin the vines once in six or eight years. They hand-pick in my section, this year, for 28 cents per bushel. They hire women, girls and boys; the boys make the best pickers. Last year I got a little avaricious, and will tell you what I made by it. When I harvested my cranberries they wouldn't pay but \$2.50 per bushel and I wanted \$3.50. I kept them till the latter part of February and sold for \$3.50, but to my surprise when we measured them I found they had shrunk so that I had lost more on my measurement than I had gained on my price.

THE POSSIBLE CAPACITY OF MILCH COWS.

BY HORACE BODWELL, ACTON.

The cow is of ancient origin, the female of the ox kind, and very noted for her usefulness, especially for her qualities in the production of milk for the support of the human family, and after these have failed, for her meat, tallow and hide. Persons proud, potent and wealthy, in the days of the prophets, were likened unto the kine of Bashan, to denote their stupidity, luxury and wantonness.

The seven fat kine which Pharaoh saw in his dream represented seven years of great plenty, and the seven lean kine as many of famine. Nations are likened to heifers, Egypt to a fair one and the Chaldeans to a fat one; and in like manner I might carry you along to the days of our Savior when on the earth, when the father said "bring hither the fatted calf, and kill it and be merry."

The first cows were brought into this country by Columbus, at the time he made his second voyage, in 1493. In 1610, Sir Ralph Lane brought cows from the West India Islands to Virginia, and in 1611 Sir Thomas Gates brought to the same place one hundred cows. In 1624, the ship Charity or Ann brought to Plymouth Colony three heifers and a bull. In 1626, twelve cows were sent to Cape Ann, and in 1629 thirty more were sent to the same place.

The best dairy farms in Rhode Island, in 1750, consisted of one hundred cows, producing 13,000 pounds of cheese yearly, besides a large quantity of butter, and it is asserted by good authority that seventy-three cows on one farm produced 10,000 pounds of butter in five months.

The cow has no superior to her as a producer of milk, both to quality and quantity, and its adaptation to individual wants, for there are but a few persons who do not use milk in some form or other and relish it as a food.

If we take into consideration the profits of the cow to the owner as a part of her possible capacity, we must have regard to

what age she ceases to be profitable, as many dairymen believe, especially in England and Scotland, that the younger the cow the richer the milk, that is, from three to six years old, taking into account both quantity and quality of the milk; while there are others who believe that from six to ten years old the cow yields the largest flow of milk, retaining its quality, and at that time, if judiciously fed, she will have ceased her flow of milk and ready for the butcher at a small expense. My experience and observation in the matter coincides with the latter, in good milkers, as a rule, although I have known the former most true, not doubting the older cow consumes the most food. Neither would I consider it advisable after she attains the age of ten years, as a rule, to retain her longer for her milk,—First, because her milk is failing both in quantity and quality; and second, she is becoming of less value every year; and lastly, which is an item too often overlooked in good cows and a point I doubt not I shall be sustained in by every good and observing feeder, that the older cow requires much more food than the younger one.

The dairyman, however, has his favorites in his herd, not only for her quality and flow of milk, but as a stock breeder, for you are aware that the cow best known for the greatest flow and quality of milk, is not always the best for the rearing of stock, although of the same breed; and much depends upon the capacity of the cow when turned out to pasture to shift for herself on the grazing lands. If the pasture has not been overstocked, the flow of milk will run very even for ten or twelve weeks, and whenever you begin to perceive a falling off in the flow of milk, then feed with some nutritious substance to make good that which the pasture fails to give; a change in the pasture as often as ten or twelve days tends very much to keep up the quality and flow of the milk, and this gives the grazing lands time to grow the grass, leaving it clean and sweet, and thereby creating a change as often as the herd is shifted, and a point worthy of notice, not only as regards the quantity, but as much so in the quality of the milk.

The first and important thing to be considered, when the farmer is about to stock his farm with cows, is the breed, both for dairy and stock. For dairy purposes the Ayrshire cow deserves a place in the first rank for her large yield and quality of milk; and perhaps, as many dairymen say, who have had long experience on this point, gives a larger return of milk on the whole for the feed

consumed than any other breed, and this is the very point on which the profits depend.

The Jersey cow, if not taking the first rank, most assuredly deserves a rank in the first class for the richness of her milk; so much so, that I find many of the farmers in our part of the State are keeping one or more of the breed to improve the quality of their butter.

The Shorthorn is quite a favorite with many of our farmers, perhaps not so much on account of the great flow and quality of their milk, as for their stock. For mixed, arable and dairy farming, as in our section of the State, where young stock is reared, they are not second to any breed for their yield of milk and capacity for large stock.

Very much depends upon the management of dairy cows; so much so, that it has now become a very important point with the dairyman, to see that his cows have both warm barns and regularity in their feed, as upon this, much depends the quantity and quality of their milk.

That a mixed system of dairying and tillage farming has long been practiced throughout this and other New England States, beneficial to those who have had proper care for their dairy cows, there can be no doubt. The dairy process of converting milk into butter and cheese is no new invention, but a very ancient discovery, and in common use in patriarchal and pastoral times. As with Abraham entertaining his guests with milk and butter while on their way to visit the cities on the plain, frequent mention of butter and cheese is made in scripture.

Among the New England and many other States, as with the European agriculturists, the root crops are grown and fed not only to the cow, but to the other stock upon the farm, as a nutritious food, and that they will yield more nutritious feed to the acre for stock than any other crop, be it for flesh or milk, has been to my mind proved beyond a doubt, both in this and the old countries. From the Agricultural Reports, we notice numerous instances, both in this country and Europe, where 1000 bushels of carrots and the same of parsnips have been raised on one acre, and as high as 1200 bushels of beets and the same of turnips to the acre. With proper care for our cows, we can usually obtain all the milk from the cow at the age of ten years as at the age of twelve years. And here let me say, by proper care is meant everything essential,

not only for the yield of milk, but for their comfort at all seasons of the year, in the heat and cold as well as in stormy weather—for you are aware that the changes in our climate are frequent and often very sudden, both in summer and winter. See that our stables have proper ventilation as well as warmth; dry floors at all seasons of the year, with bedding during the cold weather; kind and gentle treatment at all times; regular feed with a good supply of water and salt, and the same person milking the same cows as much as possible; and when turned from the barn to the pasture to shift for herself on the green grass, see that there is no lack of feed and good water, if there is, supply them at the stables with the amount required, in meal, shorts and such other nutritious substances as may come to hand; and during the fall months, when the feed is short and dry, feed with sweet corn fodder and roots, and if more is needed, add meal and shorts.

With this treatment to your cows, and I speak whereof I know, you may expect an average of ten quarts of milk per day for twenty-six weeks, making four hundred and fifty-five gallons; and for the next thirteen weeks, five quarts per day, one hundred and thirteen gallons, making, in the aggregate, five hundred and sixty-eight gallons in nine months, leaving three months, one-fourth of the year, for her calf. Allowing two and one-half gallons of milk to make one pound of butter, we have in the aggregate two hundred and twenty-seven pounds of butter, and the butter at thirty cents per pound you have sixty-eight dollars and ten cents; and with the calf at four weeks old at six dollars you have in the aggregate seventy-four dollars and ten cents; at twenty-five cents per pound, with the calf, sixty-two dollars and ninety-five cents; or the milk at three cents per quart, and the calf, you have seventy-four dollars and sixteen cents—this last leaving a better margin than when manufactured into butter at thirty cents per pound.

It is about a fair estimate to call the yearly feed of the cow at fifty dollars, twenty-two dollars for hay and the same for grain and roots, and six dollars for pasturing—leaving a margin of about twenty dollars, allowing her droppings and skimmed milk to pay for her care.

And here let me say, that a cow with this treatment from the time of her dropping her first calf, at three years old, will at the age of ten years, nearly, if not quite, cease her flow of milk, and

with a small amount of grain for from four to eight weeks, be in the best of order for beef.

I notice some dairymen rate their yearly milk from their herd of cows as high as six hundred, six hundred and fifty and six hundred and eighty gallons per cow, when fed in the manner I have mentioned, making in the aggregate the sum of \$81.60 per cow, allowing \$60 for feed and labor; showing a net profit of \$21.60 per cow yearly. Also, one dairyman in Illinois, from one hundred cows, averaged eight hundred and sixty gallons of milk and three hundred and fourteen pounds of butter per cow the past year. The butter was sold at 33 cents per pound, showing a yield of \$119.32 per cow, \$11,932.00 for the one hundred cows. These cows were fed freely on meal. Mr. G. S. Miller of Peterborough, N. Y., reports the milk from three Holstein cows, being about of equal weight, twelve hundred pounds for three years; their ages, four, five and six years, respectively, in 1870, commencing April, 1870, and ending April, 1873. The six years old cow, in 365 days, produced 12,681 pounds of milk, daily average 34 pounds; second year, 365 days, 11,528 pounds, daily average 31 pounds; third year, 257 days, 648 pounds, and a daily average of 25 pounds. The five years old cow, the first year, 293 days, produced 9,379 pounds of milk, daily average 32 pounds; second year, 258 days, 10,691 pounds, daily average 41 pounds; third year, 365 days, 11,766 pounds, daily average 32 pounds. The four years old cow, the first year, 327 days, produced 6,980 pounds of milk, daily average 21 pounds; second year, 245 days, 7,893 pounds, daily average 32 pounds; third year, 365 days, 8,588 pounds; daily average 23 pounds.

By the foregoing statement you readily perceive, that the first named cow, from 6 to 9 years old, was in milk during the three years 987 days, and in 108 days short of three years produced 30,689 pounds of milk; the second cow, from 5 to 8 years old, in milk 916 days, and in 179 days short of three years produced 32,836 pounds of milk, and the third cow, from 4 to 7 years old, in milk 937 days, and in 158 days short of three years produced 23,461 pounds of milk. From this statement, we have in 987 days, from the 6 to 9 years old cow, 30,689 pounds of milk; from the 5 to 8 years old cow, 32,836 pounds of milk in 916 days, and from the 4 to 7 years old cow, 23,461 pounds of milk in 937 days. The first cow, from 6 to 9 years old, gave a daily average of $30\frac{3}{4}$

pounds ; the 5 to 8 years old, a daily average of $34\frac{3}{4}$ pounds ; the 4 to 7 years old cow, a daily average of 25 pounds—making a daily average of the 5 to 8 years old cow over the 6 to 9 years old cow, 4 pounds, and over the 4 to 7 years old cow, $9\frac{3}{4}$ pounds. These cows were fed on hay the first winter after they were dried off, and during the two following winters they were fed on hay, giving each cow two quarts of grain daily, and when in milk six quarts of grain daily during the spring, and four quarts daily in the autumn and in the early part of the winter. The grain was composed of corn, meal, oats, barley and shorts, and fed to them dry, and they had the run of a common pasture during the summer months, with corn fodder after the first of September.

A correspondent from Litchfield county, Conn., in a report to the Commissioner of Agriculture, in 1853, says the average quantity of cheese per cow is 300 pounds ; of butter, from 200 to 250 pounds yearly. Another correspondent, from Castle county, Md., says their dairies consist of from fifteen to seventy-five cows each, and that one gentleman keeps two dairies of fifty cows each, which produce 15,000 pounds of butter yearly ; that the stipulated price is 25 cts. per pound, and that the net income from the two dairies is \$3,600 yearly.

That the farmer is giving more attention to his dairy and realizing larger profits than in the past, there can be no doubt—thus realizing the truth of the Saxon proverb, “The softer the food the more milk,” and I will also add, the richer the quality. Many of the yields above given are much in excess of a majority of the cows that compose most of the dairies of our State. Now, if some of our cows can produce such an amount of milk, can we not improve our dairy stock by judicious breeding and feeding, and an average be obtained which will match these figures ?

A correspondent of the *New England Farmer* of Sept. 30, 1876, who has of late been collecting some of the largest reported yields of dairy cows which had come under his notice—which shows what is possible for the cow to do—reports as follows :

In the *American Agriculturist* of Nov. 1874, is an account of the Ayrshire cow, Lady Kilbrine, owned by Sturdivant Brothers, Framingham, Mass. She gave, in one year, 7,429 pounds of milk, equal to 3,455 quarts. Her weight is 850 pounds. Also of the Ayrshire cow, Georgia, owned by same persons. Her weight is 890 pounds. She has given 7,127 pounds in one year, or 3,315 quarts of milk. The *American Agriculturist*, January, 1874, re-

ports a native cow, owned by F. M. Bassett, Independence, N. Y., which gave 57 pounds, or $26\frac{1}{2}$ quarts of milk per day, and made $14\frac{1}{2}$ pounds of butter per week. September, 1874, the same journal reports a three years old Jersey heifer, Mulberry, 2d, owned by Mr. McKee, which made $13\frac{1}{4}$ pounds of butter in one week, on grass alone. In November, 1875, it reports a Jersey cow, Myrtle, 2d, owned by Thomas Fitch, New London, Conn., which has made $15\frac{3}{4}$ pounds of butter in one week. In Flint's Abstract of County Agricultural Reports for 1867, Jersey cow May Day, owned by I. S. Munroe, Lexington, Mass., is reported as averaging, in June and July, 43 pounds of milk per day, which made 15 pounds of butter per week. Two Devon cows, reported by Z. E. Jameson, in the *Vermont Watchman and State Journal*, one of them, Helena 16th, made 15 pounds of butter in a week. Gem, owned by Gov. Hyde of Connecticut, has made $15\frac{3}{4}$ pounds of butter a week, and $2\frac{3}{4}$ pounds in one day. A correspondent of the *Ohio Farmer* reports a grade Devon cow, which gave 60 pounds of milk per day. The *Indiana Farmer* reports Thomas Hansell, Guilford, as having a cow that averaged 60 pounds of milk per day in June. This same cow and a heifer from her, made 15 pounds of butter each in a week. Mr. Scott of Shaftsbury, Vt., is reported as having a cow whose milk yielded 504 pounds of butter in a year. A. A. Moore, East Berkshire, Vt., reports in the *Vermont Farmer* a three-fourths Durham and one-fourth Ayrshire cow, that gave 60 pounds of milk per day and made 16 pounds of butter per week. The *American Agriculturist*, January, 1876, gives an account of the Jersey cow Maggie Mitchell, owned by M. T. Tilden, New Lebanon, N. Y. Her weight is 1020 pounds; she gave 7,500 pounds of milk in a year, and has given 38 pounds per day, and has made at the rate of $18\frac{3}{4}$ pounds of butter per week. Mr. Talcott of Rome, N. Y., reports a yield of 15 pounds of butter per week from some of his Shorthorns.

The celebrated Oaks cow was owned in Danvers, Mass. She made $19\frac{1}{4}$ pounds of butter in one week, and averaged more than 16 pounds a week for months. A Bates Shorthorn, Oxford Lass, owned by J. Talcott, Rome, N. Y., is reported as giving 50 pounds per day; Bates' Shorthorn Violetta as giving 60 pounds per day. A correspondent of the *Ohio Farmer* reports the Shorthorn cow Flora as giving 10,452 pounds of milk in one year; and the Shorthorn cow Rosa as giving 11,705 pounds of milk in 1863. Also another Shorthorn is reported as giving 58 pounds of

milk per day for ten days, and making butter at the rate of $14\frac{3}{4}$ pounds per week. During the season of 1874, she gave 12,875 pounds of milk and 513 pounds of butter. A cow is reported as kept by the county jailor at Servis, England, which gave in one year 10,578 pounds of milk, which made 540 pounds of butter.

In Flint's Abstract for 1874 is the statement of the seven-eighths Jersey and one-eighth Ayrshire cow Sybil, owned by Henry Saltonstall, Peabody, Mass. Her largest yield was 60 pounds of milk per day, or 28 quarts. She weighed 950 pounds. She gave in one year 13,065 pounds of milk. In Flint's Abstract, 1862, is a statement of the Ayrshire cow Jean Armour, imported by Mr. Peters, Southboro', Mass. She weighed 967 pounds, and gave for ten days in June an average of 52 pounds per day. Her largest yield was 58 pounds in a day, and $14\frac{1}{2}$ pounds of butter per week. By statement of J. R. Kendall, Middlesex county, Mass., of two Ayrshire cows, Minnie 2d gave $51\frac{1}{2}$ pounds per day for a week; Clover, $54\frac{3}{4}$ pounds per day for a week. By statement of S. Crosby, Lowell, Mass., his grade cow gave an average of 58 pounds of milk per day for thirty-one days in July, 1868.

By statement of M. C. Graves, Springfield, Mass., as given in Flint's Abstract, 1872, of nine cows entered for premium, three of them gave the second week after calving, respectively, 56, 54 and 53 pounds each per day. The *American Agriculturist*, November, 1873, page 407, gives an account of the imported Ayrshire cow Beacon Belle, owned by Wm. Crozier, Northport, L. I. She gave in Scotland 36 quarts beer measure daily, equal to 43 quarts of our milk measure, or $92\frac{1}{2}$ pounds per day. This is a large story, but it was proved before a justice in Scotland. Still larger is the statement in the *Agriculturist*, March, 1874, of the Ayrshire cow Old Creamer, owned by S. D. Hungerford, Jefferson county, New York. She weighs 1080 pounds, and has given 96 pounds, or 45 quarts per day, and an average of 94 pounds per day for the whole month of June. This is believed to be the champion cow of the world. Who will raise a cow that will beat her?

The census of 1840 shows the whole dairy products of this country to amount to only \$33,787,003, while that of 1870 shows the butter product of this country was 460,000,000 pounds. This was produced from 8,935,000 milch cows, an average yield of a little over 50 pounds to the cow. This butter at thirty cents per pound amounts to \$138,000,000. The increase of milch cows from 1850 to 1860 was 2,000,000, and from 1860 to 1870, during

the war, was much less. From all accounts since the close of the war, it appears that the farmers have been busily engaged in restoring their dairy herds, and the improvement in the dairy business has so much advanced that the Commissioner of Agriculture for the year 1873 reported that the whole number of milch cows in the United States was 10,705,300. Maine had 153,500; New Hampshire, 92,700; Vermont, 195,700; Massachusetts, 136,300; Rhode Island, 20,400; Connecticut, 106,800; New York, 1,410,600; New Jersey, 147,900; Pennsylvania, 812,600; Delaware, 24,900; Maryland, 96,900; Virginia, 234,000; North Carolina, 199,000; South Carolina, 157,800; Georgia, 157,400; Florida, 6,900; Alabama, 173,400; Mississippi, 180,100; Louisiana, 90,700; Texas, 526,500; Arkansas, 151,800; Tennessee, 247,700; West Virginia, 124,300; Kentucky, 229,400; Ohio, 778,500; Michigan, 350,600; Indiana, 448,400; Illinois, 725,100; Wisconsin, 442,700; Minnesota, 196,900; Iowa, 569,500; Missouri, 421,400; Kansas, 331,100; Nebraska, 49,900; California, 310,500; Oregon, 73,500; and the Territories, 258,700. So that now, in 1876, three years later, it may be safe to estimate the milch cows at 11,000,000. These figures, allowing the average of 100 pounds of butter to the cow, at 30 cents per pound, amounts to \$330,000,000 and 1,100,000,000 pounds of butter produced annually in this country. Now leaving out 15,000,000 pounds for our annual exportation, we have left 1,085,000,000 lbs. for our annual consumption, or about 25 pounds per capita. This estimate is made after leaving out one-third part of the new milk produced from the yield of the cow for family use throughout the towns, villages and cities of the whole country, thereby making in the aggregate \$495,000,000. At the meeting of the National Butter and Egg Association, held at Davenport, Iowa, during the past winter, it appears from the report that the people in this country annually consume for table and culinary use 1,400,000,000 pounds of butter. During the year 1870 we exported 60,113,090 pounds of cheese, valued at \$8,616,491; in 1871, 69,907,167 pounds, valued at \$8,027,754; in 1872, 65,459,462 pounds, valued at \$8,421,114; in 1873, 91,358,077 pounds, valued at \$11,911,541. Our export of butter during the same period was: In 1870, 2,072,751 pounds, valued at \$570,432; in 1871, 8,568,012 pounds, valued at \$1,606,239; in 1872, 5,044,227 pounds, valued at \$1,041,032; in 1873, 4,074,657 pounds, valued at \$947,968.

The dairy products of the County of York, for the year ending

June 1, 1871, were 1,122,636 pounds of butter, 30,495 pounds of cheese, and 147,342 gallons of milk. The butter at 30 cents per pound, would amount to \$336,790.80; the cheese, at 12 cents per pound, \$3,659.40; and the milk, at 12 cents per gallon, \$17,681.04. Making the total amount \$358,131.24, besides the milk used by the owners of the cows.

G. A. Willard of Springvale, Sanford, Maine, has a Jersey cow seven years old, from which he made 296 pounds of butter the past year, reserving during the time 178 quarts of milk. The butter, at 30 cents per pound, amounted to \$88.80, and milk at four cents per quart \$7.12, or a total of \$95.92.

Professor Willard estimates the annual yield of milk per head at 450 gallons, and valued at ten cents per gallon. At these figures, the milch cows of this country, in 1873, produced 2,567,365,000 gallons of milk, worth \$481,738,500; and at the same ratio it would be safe at this date, 1876, to estimate it at \$500,000,000.

The time is not far distant when, with the practice and improvements our farmers are now making, we may expect our butter export to be increased 200,000,000 pounds, and thereby add to the annual income of the country \$60,000,000.

DISCUSSION OF THE ABOVE SUBJECT.

Prof. M. C. FERNALD. The paper has brought to my mind a thought which has been expressed before, and that is that the farmer neglects a vital point in failing to consider what is to be his margin of profit. A certain amount must be expended to keep a cow, and a certain quantity of milk will pay for that keeping, and the farmer's profit must come in the produce beyond that point. From the statements made in the paper, as nearly as I can average in my mind the cases presented, the average yield would be about eight quarts of milk and the average cost of keeping he brings at about six quarts. That is a margin of profit of two quarts per day. Now, suppose the flow of milk could be increased by judicious care of the cow till she will give two quarts more—then the profit is doubled. A little while ago I made some inquiries in regard to a cotton mill which had just been started, and was told that the manufacture was 2000 yards per day, and that recently there had been an advance of one-half cent per yard. Now that is a small advance, but it means an increased profit of

\$300 per month—a very comfortable margin. It seems to me that the profit in keeping cows is to be secured by looking to these little things, and so increasing the profit. It is only when the yield is above a certain amount that there is any profit at all. I doubt not that there are thousands of cows in the State that don't pay their keeping. The expense of keeping a cow poorly, is pretty nearly as large as the expense of keeping one well, and the profit is a good deal less. Another point is, warmth of building. I think I can bring facts to show that by having a building properly warmed at least 10 per cent. in the cost of keeping is saved, and I am inclined to think the saving would be as high as 16 per cent. Now, if a margin can be saved in both ways we have a considerable chance for an increased profit.

PRESIDENT ALLEN. I received the day before I came here some statistical tables from the Department of Agriculture, which presented very clearly the comparative products of the different States, not by figures but by lines. I had just an opportunity to glance at them, and I looked to see the place which Maine held in the yield of milk. I found it not at the head where I wanted to, but below the middle. I am quite sure that why we don't produce more is because we don't have the right breed of cows, or don't take sufficiently good care of the cows we have. I am quite sure that if we did what we could do, taking the State as a whole, it would give us a high instead of a low place in that column.

Mr. FARRINGTON of Orono. I am very sure that many of our farmers are keeping cows and getting returns from them too much at random, and the question recurs to the individual farmer—How shall I be sure as to the amount of profit my cows are paying me—how inform myself whether my cows are being kept at a profit or a loss? I have made some experiments in that direction with a view of ascertaining what are the returns from our cows, and I will state how they have been conducted. We provide ourselves first with a piece of paper on which each cow's name is written one above another. Close by that is a spring scale, on which as we milk each cow we set the pail and put the weight of the milk against the cow's name. At the end of the week that paper is put by, and the results entered on a book. By that process, at the end of the year we know when each cow commenced to give milk; how much she gave at each milking; at what point the flow of milk began to fall off; how much it fell off, and at what time she ceased to give milk. By means of a per cent. tube,

at each season of the year we test the milk of the different cows. I had supposed that that afforded an accurate test of the amount of butter that would be obtained, until not long ago I noticed a paper in which the position was taken that the percentage of cream is not a test of the butter qualities of a cow. I have with a good deal of interest tested the milk of our cows in this particular. I saved for a week the milk of our best Jersey cow which showed 24 per cent. of cream, and of a grade Jersey which showed but 15½ per cent. of cream, and churned them separately, and I found that the proportion of butter to the quantity of cream shown was very much the larger with the grade. By thus saving the milk or cream from each cow and churning at the end of a given time, the dairyman can learn the butter quality of each cow. By keeping these three things, the daily yield of milk, the percentage of cream at different seasons, and the butter yield, we can tell accurately what are our receipts and what the comparative receipts from each cow. That is a thing that every farmer could do with small expense and very little care, and at the end of the year he would know whether his cows were profitable or not. It seems to me this would be a most desirable thing for our farmers to know.

SHEEP HUSBANDRY.

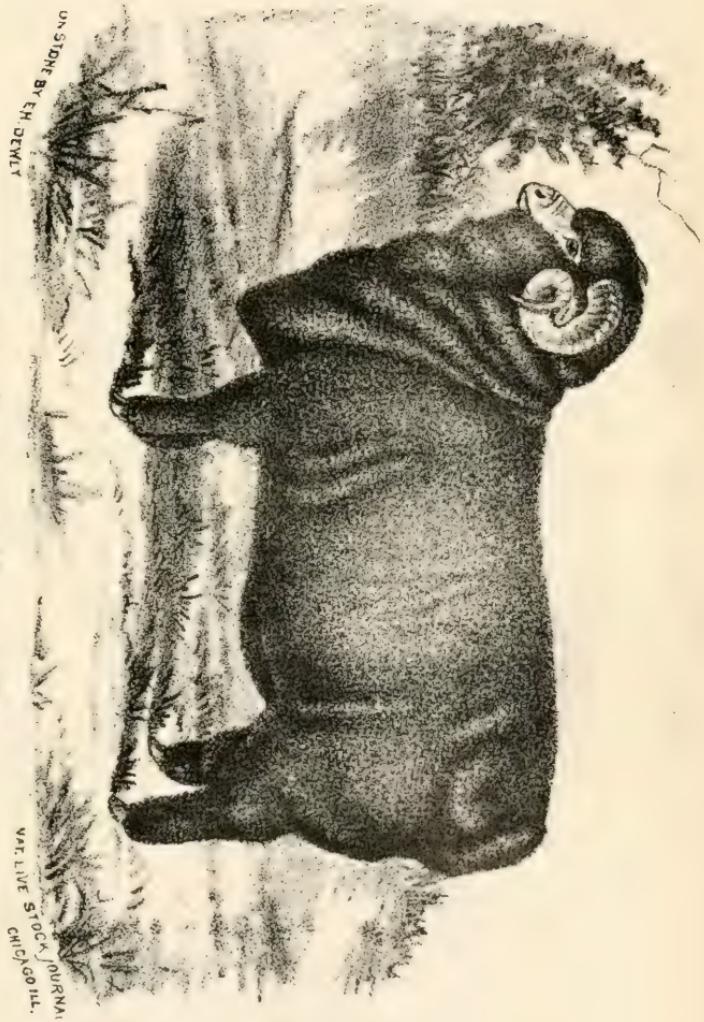
BY GEORGE FLINT, NORTH ANSON.

"It is justly admitted that of all domestic animals reared and fed for profit in Great Britain, sheep are of the greatest consequence, both individually and in a national point of view, and afford a better return than can be obtained either from the rearing or feeding of cattle. Sheep Husbandry deserves to be esteemed in all its different branches, and claims the priority of consideration among agriculturists."—*English Journal*.

In view of the superior advantages in markets and marketing facilities opening up on either hand in our State, we realize the necessity of a different system of farming from that practiced in years gone by when the soil was fertile, the country new, and transportation less easy. It is not optional, but a necessity forced upon us to adopt methods and means that will improve the soil and at the same time return a profit to the owner. In this the older States of the Union must look to England and Germany for their models.

By sheep husbandry and dairying, with a judicious system of farming connected therewith, must the average farmer of Maine solve the problem connected with profit and loss in farming. No animal possesses so great value in proportion to its average cost, or gives so quick returns for capital invested as the sheep. Finding food in nearly every plant that grows upon our hill-sides, mountains or plains, they become available stock for nearly every acre within our State. By experiments, it has been proved they will eat one hundred and forty-five varieties of plants that cattle refuse; keeping down and entirely destroying weeds and bushes that would in a few years drive cattle from their range.

Either the coarser varieties of mutton producers, or the fine-wooled Merino breeds should be selected, according to the object aimed at and number intended to be kept. If wool alone, or wool and mutton combined is the object, the Merino and their grades are admitted to be superior; more especially if large numbers are to run together upon the same farm. For constitutional vigor and



ON STONE BY EH. DEWOLY

NAT. LINE STOCK JOURNAL
CHICAGO

GOOD TYPE OF A MERINO RAM.

GENESEE, SELECTED FROM THE FLOCK OF HON. E. TOWNSEND,
PAVILION CENTRE, N.Y.

capacity to thrive when herded together in large flocks, no other breed can compete with them. Generally speaking, the South Down and Cotswold sheep do not thrive in flocks exceeding fifty, and I think the farmer should not attempt to keep the coarse-wooled varieties unless he has the means of giving to them good care and constant attention. As they come to maturity earlier and die younger than the fine-wool breeds, neglect tells quicker on the flock. Whatever the variety, one thing is certain, as in every occupation or profession, he who gives to it the best care and most judicious attention will reap the best results.

The size and price of the animal offers opportunities for investment of small capital, to be increased as means will allow. In this it is the poor man's friend as well as the rich man's source of profit—always paying their bills as they go, and they never die in debt to their owner. Whatever class of sheep can be most readily obtained will do to commence with, but the better at the start, of course the sooner a good flock will be obtained; yet they can be greatly improved in a few years by using judgment in selecting breeding animals.

The great want is not a particular class of sheep, but greater care in feeding, both summer and winter, to bring them to perfection and to realize all that is of profit. No animal should be allowed to run down and die of old age, and none sold, as a rule, except those in the best possible condition for the butcher, for herein lies the success to which all efforts must tend. It is impossible to improve a farm by selling *lean stock*.

Sheep are good feeders and readily digest and appropriate to flesh and fat any kind of grain or roots. The qualities of grain for stock, all understand; but the value of the turnip and beet for feeding is not understood by farmers generally. Especially are they valuable for fall and early winter feed, to be fed while the flock is in the pasture, or in connection with grain during the early winter; for it is only during fall and immediately after, that they can be fed to profit. Grain is lost if fed the latter half of the winter; and if the sheep have been allowed to run down and become lean, the digestive organs are weakened with the body and both fail alike, as is shown by the scours that follow any attempt to increase the feed to any great extent. A good sheep should pay its cost and keeping in wool, with a margin even at that, leaving the body for the butcher as profit.

I subjoin a few statements obtained of some of the best flocks of Somerset county. By more inquiry I might have obtained a higher average: Of fifteen flocks I find the following average, of washed wool where wool is mentioned: average number in flock, 147; average weight of fleece, 6 16-100 lbs; average increase per 100, 28; average cost of wintering, (estimated,) \$1.58; average cost of pasturing, (estimated,) 43c. These flocks included all ages and sexes, of Spanish Merino and high grades. In some flocks of the coarser-wooled varieties not figured in the above, I find a larger rate of increase and less weight of fleece, making the average sales about equal.

The great gain from sheep must be attained by close attention to the farm, and by restoring to the soil everything taken from it. Grain and roots should be raised with which to fatten, and in many places the sheep can be yarded and fed on the ground intended for crops the following year with excellent results. This is especially recommended by the English farmers as preparatory to a crop of wheat. It has been noticed in the old countries that the increase in the product of wheat has kept step with the increase of sheep.

Only when we cease importing corn, flour and pork, and depend upon our own resources for the staple products, will the farmers of Maine cease complaining of *hard times*. If the food consumed by inferior cattle and useless horses was fed to sheep, how different would be the result in the two-fold blessing of wool and mutton; and of greater independence to the farmer!

DISCUSSION OF THE ABOVE SUBJECT.

Mr. LEE of Foxcroft. There is one point in sheep husbandry I wish to mention, and that is the washing and shearing of sheep. Formerly I washed and sheared the first of June, but I have changed my method and now shear in the last of April before my sheep leave the barn. Then they become acclimated before they are turned to pasture, and do not suffer at all from the removal of the fleece. With us they make a quarter discount in the price when the wool is unwashed, and I am satisfied that making that deduction my wool brings me more money. Last spring I sold the next day after shearing for 27 cents. The farmers of Piscataquis county are generally adopting this method, and I hope it will be adopted by the farmers of the State. It is an outrage on sheep

to throw them into a cold brook to wash them. In some respects they are not unlike human beings; some are nervous, and in the aggregate thousands of them are lost in consequence of throwing into a cold brook every year.

Mr. FLINT. The gentleman evidently made a profit on dirt. If he is going to deal in wool he should sell the genuine article. His position is different from that of most of the farmers of the State; he is near a woollen manufactory. The trade of the bulk of our State is with Boston, and we must put our wool in the condition in which Boston buyers require it. I shear the first and second weeks in June, usually finishing about the 16th.

Mr. BARKER of Houlton. I have adopted Mr. Lee's plan of shearing early for a number of years, but for different reasons. One is, that if there are ticks on the sheep they get rid of them before they drop their lambs, and the lambs will not be troubled with ticks. I think it is better for the sheep, as I have a warm place and the wool starts before they go to grass, and they do not suffer from the cold. I cannot say, as Mr. Lee did, that I think I made anything on the wool. I certainly think there would not be a quarter discount, but I was compelled to make it.

Mr. WASSON. In my section of the State the shearing is done early in April and often as early as March, and those who have sheared early never would go back to the old method. I think, however, to lay this down as a general rule is unfair to the people and it certainly is to the sheep. If sheep are in a locality where they are exposed to cold winds in March or April, they ought not to be sheared so early, because cold storms are death to them.

The subject of sheep husbandry is one which has been much discussed by the Board, and much has been written about it, but one upon which it is necessary to give line upon line and precept upon precept. The great mistake that the farmers fall into is, that when wool is high they all rush into sheep husbandry, and when there is a depression, and wool isn't worth more than half what it was, those who bought at a high price are anxious to sell and get out of it. Now the time to buy sheep and build up a flock is when they are low, and the farmer who has a flock of sheep when wool is worth but about 17 cents, if he will hold on to them, increase his number and keep his wool for an advance in price, it will pay him better than anything else in which he can invest his money. Take the years 1864 and 1867. In 1864 there were more and in 1867 less sheep in the State than at any period since

1840, and the sheep purchased by hundreds and thousands at prices varying from \$5 to \$15 per head were with their increase sold at about \$2 50 per head; and men were as eager to sell as they had been to buy. Yet in three years afterwards sheep had again increased in value. This policy we have been pursuing for thirty years. We have nothing like the number of sheep we had in 1840, and our growth of wheat has fallen off in about the same proportion; there is something reciprocal between the two. I close by saying that this is something our farmers cannot think too closely upon. I believe if they will put money into sheep, stick to the business, and manage it with the same prudence that they would any other, in twenty years from this time the agricultural wealth of the State will be doubled.

MR. FARRINGTON of Orono. I have been astonished at the practice of the farmers, to which our friend has referred, to change with the changing times from one method of husbandry to another. If, for instance, for a few weeks butter brings a good price how many will enlarge their stock of cows, and if it sells a few cents short they will sell the cows and buy sheep at a high price. These changes inevitably come, and those farmers who follow them are always seeking for what they never find. I wish our farmers would heed the caution given by Mr. Wasson, and when they have once adopted the system of sheep husbandry they would follow it through evil report and good report—through high prices and low prices, and I believe as the years go on they would find in it a constant source of profit and prosperity.

GEN. JOHN MARSHALL BROWN of Portland, member from Cumberland county. I rise for the purpose of asking the question, why it is that as a matter of fact our people are not fond of mutton as an article of food? For the past year I have been trying an experiment of my own with a flock of 60 sheep, and I am told by the butchers that our people do not eat mutton. Of course some of it is eaten, but as a rule our people eat beef and pork, and mutton is sent out of the State. In other countries it is considered a delicacy. I consider it so myself, and I do not see why it is not more highly appreciated by our people.

MR. FLINT. It is a hard subject to throw light upon, but it is a fact that the descendants of the Pilgrim Fathers are opposed to eating mutton. The only reason I have ever heard given for it is that we have not raised choice, first-class mutton sheep. I do not know whether that is it or not. I think the time will come, and

is coming now, when mutton will be esteemed as an article of food throughout the whole country, as it is now in California and some parts of the West. I think mutton is most eaten with us in February, March and April, the months when people seem to require a light diet, but I believe our people would find it throughout the year more wholesome than beef. I believe the scientists who have examined the subject, state that it is more easily digested and that it is more easily assimilated by the system than beef.

Mr. WATERHOUSE of Fryeburg. I have kept 100 sheep, but now have but 60. I think the greatest lack in keeping sheep in this vicinity, is that the farmers do not feed them well enough. They do not keep their pastures in a sufficiently good condition. A good many people think that a sheep will live where nothing else will, but I am satisfied that it is a mistake, and that if we want to make a profit we must not only winter them well but must summer them well. My sheep have averaged eight pounds of unwashed wool. I have been in the habit of shearing about the first of June, but as the gentleman says, I don't know but it would be better to shear earlier. A poor sheep well kept will shear more than a good one poorly kept. I have been able to sell my lambs for \$5, when I have noticed that some were glad to get \$3. I kept them better, but I got enough better price to more than pay the difference in the cost of keeping.

NOTES UPON THE CULTURE AND MANIPULATION OF THE SUGAR BEET.

BY ALFRED B. AUBERT, B. S.,
Professor of Chemistry, Maine State College, Orono.

Previous to giving any rules for the selection and manipulation of the beet seed to be used for sugar manufacturing purposes, it may not be amiss to give a short description of the shape, structure and varieties of the sugar beet.

The sugar beet is of an elongated pear shape, generally free from forked roots, but sending out from opposite sides spirally disposed rootlets. The shape is not invariable; it is greatly affected by the nature of the soil as well as the source of the seed. If the soil be not well broken up and the root finds obstacles in its growth, it will develop with forked roots. M. M. Péligot and Leplay consider forked roots generally richer in sugar than the straight beet; but it seems more profitable to obtain the straight root as there is less liability of the root breaking when being washed, previous to use in sugar manufacturing.

Small beets are richer generally than large ones. Beets weighing from 1 to 2 pounds are better adapted for sugar manufacturing than those weighing 3 and 4 pounds. Mr. Hortschy of Hortschyeld, (Bohemia,) grows beets which are never to exceed one pound in weight, as stated in his contracts with sugar manufacturers.

The varieties at present cultivated are: The Vilmorin beet, which is very rich in sugar, but does not keep as well as other varieties. The Quendlinburg, of slender shape and pinkish skin, is considered earlier than other varieties. The White pear-shaped Silesian, known as the green ribbed beet. The Siberian or white ribbed beet, larger than the Silesian but poorer in sugar. The Electoral and Imperial are also recognized as good sugar beets.

STRUCTURE. If a section of a beet be made perpendicular to the axis, it will be found to consist of alternately opaque and translucent layers of vegetable tissue. The richest sugar beets contain the most opaque layers. From Bretschneider's investigations it appears that a relation exists between the number of leaves and the number of zones. There also exists a relation between the percentage of sugar, the number of leaves and the number of zones, as shown by the following table :*

	Per cent. of Sugar.	No. of Leaves.	No. of Zones.
Vilmorin Beets.	15.7	42	48
	14.8	39	36
	13.8	31	32

The percentage of sugar varies in different parts of the same beet, being greater near the bottom of the root than at the top.

CHOICE OF THE SEED. It becomes of vital importance to the beet grower to obtain seed from a good source. These can be at present obtained in sufficient quantities from France or Germany; but as our own agriculturists may wish to produce their own seed, some rules which have been laid down by long practice may be of value. In the choice of seed-beets, reject all specimens which grow out of the ground. Select clean growing roots of from $1\frac{1}{2}$ pounds to $2\frac{1}{2}$ pounds weight. These must be kept between layers of sand or in dry pits during the winter. The beets should be of a well proved variety, grown upon a soil which is neither too moist or clayey, nor too rich in vegetable mould. The densest roots are generally chosen for seed-beets, and formerly their specific gravity was determined by immersion of the roots in solutions of salt of known density; this gives fallacious results, as beets contain a small volume of gas in their cells. It is therefore best to determine the specific gravity of the juice as Vilmorin directs, and which according to him should not be less than 1.05—those beets whose juice has a specific gravity of 1.06 and over being of superior quality. M. Violette recommends the determination of the sugar in the juice by the use of titrated solutions.

Small seeds generally give smaller but richer beets than large seeds—as is shown by the following result obtained from Simon Legrand seeds.†

* Champion & Pellet. *De la Betterave, etc.*; p. 58. † *De la Betterave*; p. 28.

They were planted rather late in the season.

100 large seeds weighed..... 32 grammes.
 100 small seed weighed..... 0.425 grammes.
 (1 gramme = 15.43 grains.)

	Dates.	Average Weight of 4 Roots.	Sugar in 100 Grammes.
Large Seeds.	Aug. 11,	66 grammes.	
	Aug. 20,	75 do.	11.4 grammes.
	Aug. 31,	125 do.	
	Sept. 16,	375 do.	11.8 grammes.
Small Seeds.	Aug. 11,	30 grammes.	
	Aug. 30,	50 do.	12.0 grammes.
	Aug. 31,	75 do.	
	Sept. 16,	233 do.	12.5 grammes.

A more extended series of experiments upon this subject would seem useful.

Walkhoff says it is best to take the large seeds because they give more robust roots.

It is a noticeable fact that small seeds generally contain a somewhat greater percentage of nitrogen than do large ones, as shown by the following table :

Vilmorin Seeds.	Weight of 100 Seeds.	Per cent. of Water.	Nitrogen.	Ash.
Large,	4.130 grammes.	10.9	2.66	5.4
Small,	0.546 do.	11.0	3.07	5.3

The difference is not as great in the other varieties of beet seed as in the Vilmorin, averaging about .34 per cent. more of nitrogen in the small than in the large. The richest beets are produced from those seeds which contain most nitrogen and least ash.

It has been recommended to soak the seeds in water some hours, and to use them some time after they had been removed from the water. The following experiment will give an idea of the utility of such a treatment :*

	Roots pulled up	Average Weight of Roots.	Per ct. of Sugar.
Unsoaked Seed.	Aug. 31,	400 grammes.	16.4
	Sept. 16,	460 do.	13.4
	Sept. 29,	580 do.	17.0
Soaked Seed.	Aug. 31,	—	16.9
	Sept. 16,	500 grammes.	14.9
	Sept. 29,	580 do.	17.2

The blanks in the soaked seed patch were few, while there were many in the patch in which the unsoaked seed had been sowed.

Some of the soaked seed showed signs of germination after having been sown from six to seven days, although the soil was of

* De la Betterave; p. 33.

bad quality and had not been properly prepared. The beets produced by the unsoaked seed had many forked roots, owing to the fact that they were less advanced in growth than the soaked seeds, when the hot and dry weather rendered the soil hard and compact.

Water slightly acidified with nitric acid has been recommended for soaking seeds. Boettger discovered that the germination of seed is generally hastened by soaking for a few minutes in a weak solution of either potash, soda, or ammonia. Many other substances have been used.

Vilmorin thinks that beet seeds should retain their vitality for five years. M. M. Champion and Pellet had seeds which would not germinate after nine years of keeping.

SOIL. The best soil for sugar beet cultivation is a deep sandy loam, which may be somewhat calcareous; it should not however be clayey, as it becomes so compact in dry weather as to materially interfere with the growth of the root; in wet weather it leads to the production of a large watery beet of low sugar percentage. The subsoil should be freely permeable, or the land carefully underdrained. The land should be deeply plowed in the fall—the deeper the better—a foot to eighteen inches being none too deep. The manure is now also applied, plowed deep into the soil and thoroughly mixed with it. The soil should be carefully broken up and loosened before seeding.

The manure should be slow acting. It is advisable sometimes to plow again after the first frosts. The seeds are planted by hand or by a sower; from 12 to 18 pounds are used per acre. These seeds should be sowed as near together as possible; when sowed by hand, they may be dropped "fourteen inches apart, or, if sowed by machine, they are dropped eight inches apart in rows twenty inches apart, which allows one horse with implement to pass between."*

The influence of the space between the roots may be gathered from the following experiments of Champion and Pellet.

Influence of space upon the weight of roots:

Source of Seed.	Space between Rows.	Weight of Root.
Vilmorin Seed.	20 centimetres.	354 grammes.
• do.	30 do.	460 do.
do.	60 do.	1200 do.
(1 centimetre = 0.3937 inch.)		

* Prof. Goessman's Report on the production of beet sugar as an Agricultural Experiment in Massachusetts; p. 58.

Influence of space upon the richness of sugar :

Seed.	Space.	Sugar in 100 parts of Beet.
Vilmorin Seed. }	20 centimetres.	14.2 parts.
1st Experiment. }	30 do.	13.4 do.
Vilmorin Seed. }	30 do.	14.7 do.
2d Experiment. }	60 do.	13.6 do.

M. Leroy, on his farm, (Ferme Neuve, près Noyon,) has obtained the following results—the distance between the rows being forty-five centimetres, the space between the roots varying :*

Space between Beets.	Yield per Hectare.
50	64,100 kilogrammes.
40	68,800 do.
30	72,200 do.
25	72,600 do.

(1 hectare = 2.47 acres — 1 kilogramme = 2.2 lbs.)

The seeds generally give rise to more than one root; in this case, the strongest should be preserved and the smaller roots pulled out. It is well to keep some beets ready for transplanting as there may be blanks in the beet field, which can thus be easily made up; transplanting retards the plants however. In case the blanks be very numerous, seeding may be resorted to if the length of season permit.

As may be seen from the table on page 167, those beets having the greatest number of leaves are the richest in sugar, owing to the greater facility they possess for assimilating atmospheric food and forming sugar. While the beets are young, the soil around them should be loosened carefully, and this treatment continued until the leaves are fully developed. The maturing of the root is indicated by the change of the green color of the leaves to a more yellowish green; the roots are harvested when the outer leaves become yellow and dry. The percentage of sugar varies greatly at different times of growth of the beet, being greatest at the time of maturity.

INFLUENCE OF RAIN AT THE TIME OF RIPENING. If, at the time of ripening, the beet be exposed to rainy weather the result is a watery beet, which contains less sugar than it would had it developed in ordinary weather. The proportion between the saline constituents and the sugar is generally increased.

* Journal des Fabricants de Sucre. No. 37. 4 Mars, 1875.

The following table gives give the effects very concisely :

* Beets pulled up Aug. 31st.			Same kind of beets pulled up Sept. 16th, after some days of rain.		
Per cent. of Sugar in Juice.	Salino Quotient.	Average.	Per cent. of Sugar in Juice.	Salino Quotient.	Average.
16.8	3.8		14.4	4.7	
16.2	4.0		13.1	5.3	
14.7	6.1	4.8	12.7	5.4	5.2
14.7	5.3		12.0	5.3	

When beets are closely planted, the action of rains manifests itself principally in the development of leaves ; if the roots are widely separated, they enlarge greatly under the influence of rains while the percentage of sugar diminishes.

Some of the beet growers used to strip the roots of some of their leaves while they were growing, but this practice has no sanction in experience, for it has been proved that the percentage of sugar is greatly diminished by the stripping of leaves.

Walkhoff gives analyses of beets which had been cultivated without stripping the leaves ; they contained 13.72 per cent. of sugar, while beets of the same kind, cultivated in the same way, but which had the leaves stripped twice, only gave 8.34 per cent. of sugar. This practice, though detrimental to the beet for the manufacture of sugar, is sometimes resorted to for beets used for feeding purposes.

With a soil of good quality and strict attention to the details of culture, there is no reason why an acre should not yield at least 24,000 pounds of sugar beets, and even more than that.

In France, M. Simon Legrand estimates that, by properly manuring and planting the beets closely enough, one can obtain, per hectare, as much as 60,000 kilogrammes of beets, containing from twelve to seventeen per cent. of sugar.

QUANTITY OF MINERAL SUBSTANCES TAKEN FROM THE SOIL BY BEETS.
Prof. Goessmann states in his report (p. 74) that "a fair average crop of sugar beets abstracts per acre :

By Roots and Leaves.

Phosphoric acid	35	lbs.
Potassa	164	lbs.
Lime and magnesia	62.5	lbs.
Silica.....	15.9	lbs.

* De la Betterave; p. 65.

By Roots Alone.

Phosphoric acid.....	25	lbs.
Potassa	126	lbs.
Lime and magnesia.....	32	lbs.
Silica	6.5	lbs.

Returned by Leaves.

Phosphoric acid.....	10	lbs.
Potassa	38	lbs.
Lime and magnesia.....	31.5	lbs.
Silica	9.4	"

The following tables from Champion and Pellet, give a good idea of the quantity of mineral substances abstracted from the soil by beet crops of different richness in sugar.

QUANTITY OF SALTS TAKEN UP BY A BEET CROP OF 50,000 KILOGRAMMES OF ROOTS TO THE HECTARE.

	Beets averaging 10 per cent. of sugar—i.e., 5000 kilo- grammes of sugar to the crop per hectare.			Beets averaging 15 per cent. of sugar—i.e., 7500 kilo- grammes of sugar to the crop per hectare.		
	Leaves.	Roots.	Total crop per hectare	Leaves.	Roots.	Total crop per hectare.
	13000 k.	50000 k.	k	25000 k.	50000 k.	k
Potash	145.0	146.5	291.5	270.00	129.00	390.00
Soda.....	45.0	25.5	70.5	73.75	22.50	111.25
Lime.....	50.0	21.0	70.0	97.50	18.75	116.25
Magnesia.....	37.5	19.0	56.5	78.75	16.50	95.25
Chlorine.....	42.5	28.5	71.0	90.00	25.55	115.55
Sulphuric acid.....	20.0	11.0	31.0	45.00	9.75	54.70
Silica	5.0	17.0	22.0	11.25	15.00	26.25
Phosphoric acid	30.0	29.5	59.5	63.75	26.25	90.00
Other mineral constituents.	25.0	8.0	33.0	33.75	6.75	40.50
Total mineral constituents.	400.	306.	706	783.75	270.00	1053.75
Am't of nitrogen taken up.	41.9	125.	167.9	75.	200.	275.00

From the above tables it is evident of what immense manurial value the beet leaves may be if no other use is found for them. Also the press-cake, that is, the organic and mineral part of the beet left after the juice has been extracted, is of great manurial

value, if it cannot be used as fodder first. It is also seen from the tables that the greater the percentage of sugar, the greater is the weight of leaves, and the greater the quantity of mineral matters abstracted from the soil. The following table gives the proportions which have been noticed to exist between the percentage of sugar and the weight of the leaves :*

Per cent. of Sugar in Roots.	Weight of Leaves in 100 parts by weight of Beets.
15.4	58
15.2	63
14.1	52
14.7	62
13.1	31
13.8	26
13.5	36
13.4	25
11.8	26

The following table shows the comparison between the Vilmorin sugar beet and others.

Kind of Beet.	Leaves for 100 parts of Roots.	Per cent. of Sugar in Beets.
Vilmorin Improved,	56	14.5
Simon Legrand,	33	13.3
Ordinary sugar beet of manf'rs, 20		11.8

Special culture also has an influence upon the bearing of leaves as well as the richness in sugar, as is shown by the following example in which the same seeds were used :

	Roots	Leaves.	Per cent. Sugar.
Ordinary sugar beet of manufacturers, (special culture,) 100 kilos.	52 kilos.	13.3	
do. (ordinary culture,) 100 kilos.	28 kilos.	11.8	

After carefully comparing the amount of matter taken up by a beet crop, it becomes evident that judicious manuring or restoring the lost substances to the soil is of prime importance. This is generally done by the use of special manures, in connection with farmyard manure. Rotation of crops becomes a very useful adjunct in the cultivation of the beet, aiding, as it does, in fully bringing out the mineral resources of the soil, and avoiding any exhaustion thereof.

In Prof. Goessmann's report we find that " Well manured annual leaf crops for green feeding are considered the best crops to precede the beet; next in order follow well manured summer or winter grain crops; less recommended are perennial grasses and other fodder crops; directly objectionable are, if not specially

* De la Betterave; p. 43.

manured, potatoes and root crops in general, of which mangel is the worst. The sugar beet, on the other hand, is a good crop to precede almost any other farm plant. The succession of crops, adapted to the interest of sugar beet industry, has reference to two important objects, namely, an adequate supply of food to each crop and the production of the largest possible amount of animal manure. A fair crop of beet roots is of course more exhausting to the soil, as far as phosphoric acid, and particularly potassa, is concerned, than most of our farm plants; a judicious system of rotation divides that effect over several years, and thus enables the farmer to draw more efficiently on the natural resources of the soil, and so avoid a direct outlay of money. The following succession of crops is considered very satisfactory, viz.: green fodder, wheat, sugar beets, and, finally, a summer grain crop; or barley, sugar beets, barley, green fodder, wheat, sugar beets; and these are economical as far as manure is concerned. Two thousand three hundred pounds of hay, or its full equivalent in fodder value, are considered sufficient to replace the constituents which a fair beet sugar crop abstracts per acre, in excess of what refuse material, resulting from such crop in the course of beet sugar manufacture, will compensate for."

Rotation of crops not only has a very great advantage in preventing the rapid exhaustion of the soil, but it also keeps in check the development of the vegetable and animal parasites of the beet plant, which, under other conditions, would increase very rapidly and soon endanger the crops. A good rotation seems essential to the economical cultivation of the sugar beet, reducing, as it does, the expense which would have to be incurred for special manures, in case beets alone were cultivated, and also greatly removing the danger of ravages by parasites of the beet.

Farmyard manure is very generally used as a manure for beet crops; it is well, however, that the beets should be a second crop, as, by that time, the manure will have disseminated through the soil, and will be thoroughly disintegrated. The manure should be applied in the fall, if possible.

In the cultivation of the sugar beet special manures are often of great value, when used in moderation mixed with well decomposed compost. Manures, containing large quantities of nitrogen, are not at all advisable for the sugar beet, as they give rise to excessive leaf development, and increase the quantity of albuminoids in the roots, while, owing to excessive and rapid growth,

large quantities of saline constituents are absorbed from the soil. Potash and phosphoric acid are the special manures most needed by the sugar beet, and, when judiciously applied, well repay the extra expense attendant upon their use. Peruvian guano, Chili saltpetre, Stassfurt salts mixed with phosphate of lime in some form, give satisfactory results. Green manuring is highly recommended.

M. E. C., in the *Journal des Fabricants de Sucre*. No. 20, 1875, gives the following results of analyses of comparative trials in the culture of French and German sugar beets.

The method of culture adopted in these experiments was the following :

1. Space between the rows, 48 centimetres.
2. Space between the roots in the rows, 23 centimetres.
3. The seed was mixed with three times its weight of the following pulverulent fertilizer :

Superphosphate of lime.....	600	kilogrammes.
Nitrate of potash.....	100	do.
Nitrate of soda.....	100	do.
Plaster (to facilitate mixture)....	200	do.
4. From fourteen to seventeen kilogrammes of seed were used to the hectare—sowed by machine.
5. The quantity of artificial fertilizer varied from 500 to 800 kilogrammes per hectare, according to the nature of the soil. The fertilizer was thrown broadcast two weeks before seeding, and mixed with the soil.

Beets pulled up September 8th, 1874. Analyzed the 9th.

Name of Seed.	Source of Seed.	Aver. weight of Beets analyzed.	Patch sown in 1873, to	Kind of Manure for the 1874 crop.	Brix degrees	Polarization Test.	
						Sugar.	Not Sugar.
GERMAN BEETS.	Archersleben	Grannies,			18.29	16.02	2.27
		470	Oats	Stable manure	17.65	14.23	3.42
		470	Beets	Artificial manure	17.28	14.29	2.99
		540	do.	Farmyard manure	17.46	14.18	3.28
		630	Oats	do.	16.94	14.18	2.76
	Bobitz	690	Fallow land . . .	Farmyard manure and compost	17.33	14.13	3.22
		430	Beets	Artificial fertilizer			
FRENCH BEETS.	White with pink collar.	520	Wheat	Farmyard manure	18.27	15.49	2.68
		540	do.	do.	17.59	14.81	2.78
		950	Beets	Soil from defecating process	17.15	14.50	2.75
		640	do.	do.	15.90	12.27	3.63
		385	Oats	Farmyard manure	17.45	15.15	2.30
		615	do.	Compost	17.25	14.18	3.07
		560	Beets	Soil from defecating process	17.86	14.83	3.03
		1,205	do.	Artificial fertilizer	14.84	12.00	2.85
		410	Fallow land . . .	Farmyard manure	17.10	14.07	3.03
		690	Beets	Artificial fertilizer	17.20	14.75	2.45
		550	do.	do.	16.80	13.91	2.89
		690	do.	do.	16.70	13.55	3.16
		760	do.	do.	16.85	13.48	3.37
Average,	GERMAN	544	- - -	- - -	17.47	14.50	2.97
Average,	FRENCH	630	- - -	- - -	16.97	14.07	2.90

In Russia, beets have been raised upon good soil without any use of fertilizers. This has produced a very rich but small beet, and the yield has also been rather meagre : 12,000 to 20,000 kilogrammes per hectare. As a general thing, by judicious manuring a so much larger quantity of roots is produced, that the slight reduction in saccharine richness of the beet is much more than compensated by the increased yield. If our attention be paid to the closeness of the roots in well manured lands, beets as small and rich are produced as those grown on unmanured land, but separated by larger spaces.

Sufficient care is not generally bestowed upon the subject of spacing the beet, and that is one reason why the sugar percentage falls so low sometimes, when land has been rather richly manured. The influence of fertilizers on the quantity of beets produced and their richness in sugar, may be gathered from the following experiments of M. Pagnoul :

Years.	Manured with	Weight of Roots per hectare.	Sugar in 100 parts of Beets.	Total yield of Sugar per hectare.
1871-2.	Farmyard manure,	64173 kilos.	7.10	4556 k.
	Complete fertilizer,	70172	11.20	7926
	do. do.	64567	11.40	7370
	Nothing,	51520	13.90	7161
1873.	Nothing,	30358	13.03	4051
	Complete fertilizer,	40525	12.03	4984
	Nitrate of soda,	43164	13.02	6761
	Farmyard manure,	57876	12.02	7061

The roots were closely planted.

Manuring to excess must of course be avoided ; it is, however, a great auxiliary when carried on judiciously ; the nature and condition of the soil being taken into consideration as well as the closeness of the roots.

It is the purpose of the writer to present other reports upon this important subject, but he hopes to have shown already that many valuable experiments might be made in this State upon the best methods of cultivation of the sugar beet, including all details, such as choice of seed, spacing of plants, application of manures, etc.

REPORT ON THE SUGAR BEETS GROWN ON THE FARM OF MAINE STATE COLLEGE.

The plat upon which these beets were grown is a moist sandy loam. The following is the history of the patch as given by Mr. J. R. Farrington, Farm Superintendent :

"The plat of land on which the sugar beets were grown was broken from grass and planted to potatoes in the spring of 1872. The three succeeding years it was sown to onions. To enrich the land for each onion crop, a heavy dressing of manure from the cow stable was plowed under in the fall, and the following spring nitrogenous fertilizers, such as poudrette, hen and sheep manure, were spread in liberal quantities and worked into the surface soil. Ashes and superphosphates were also used in small quantity. The crops raised were not sufficiently abundant to exhaust the land, it rather increased in fertility."

In the autumn of 1875 manure from the cow stable was again plowed under. In the spring of 1876 a good dressing of like manure was spread and harrowed in. No other fertilizer was applied to the beets. The ground was sufficiently worked with cultivator and hoe to keep it in good tilth and free from weeds."

The beets were pulled up about the second week in October. Three or four light frosts had occurred previous to their harvesting, but had not been deep enough to affect the beets. The beets were of good shape and size, being generally clean and free from roughness. Most of them grew well under ground, the Vilmorin being especially well covered. It seems probable that richer beets might have been produced had the land been less charged with nitrogenous substances. The leaves of the beets were rather more luxuriant than is common in good sugar beets.

Analysis of Sugar Beets grown on the College Farm.

Name of Variety.	Seed obtained from,	Average weight of roots used for analysis.	Specific gravity of juice.	Per cent. of sugar in juice.
Improved French white sugar beet..	J. J. H. Gregory.....	585 grammes	1.070	12.68
Improved Vilmorin do.	Dept. of Agriculture..	450 do.	1.068	11.41
Carter's improved nursery do.	do. do.	589 do.	1.062	10.67
Silesian sugar beet	Illinois	519 do.	1.063	10.64
Imperial dc.	Dept. of Agriculture..	613 do.	1.059	9.44
Silesian do.	do. do.	575 do.	1.057	8.17
FODDER BEET.				
Lane's improved sugar beet.....	Kendall & Whitney..	-	1.050	8.07

The determinations of sugar percentages were made by myself with Fehling's solution. It is but just to add, that I owe many thanks to Mr. A. M. Farrington, a graduate of the course of agriculture of this college, for his kindness in preparing the juice of the beets for analysis. Had it not been for his valuable aid, I doubt whether I could have found time to do all the work.

WOOL INDUSTRY IN OUR NATIONAL ECONOMY.

Believing that our State possesses superior advantages for the production of wool and mutton ; that a well settled system of sheep husbandry, uniformly and persistently followed, would conduce to our agricultural prosperity ; that our farmers generally should give more attention to the growing of mutton and the production of wool, and that this end will be promoted by a careful reading of the same—I give herewith a most admirable article on the part of the Wool Industry in our National Economy, contributed to the Bulletin of the National Association of Wool Manufacturers by Hon. JOHN L. HAYES of Boston, Mass., Secretary to the Association and editor of its valuable quarterly journal above named. The points taken up cover the whole matter thoroughly, are most intelligently treated, and the discussion of the subject is not only interesting, but so valuable and complete as to form an important contribution to the subject : and I take pleasure in transferring it to my report :—

Great truths never become trite by repetition. The mountains have stood unchanged in every outline of their gigantic features since the primeval cataclysms which uplifted them from the abyss ; yet in winter and summer, spring and autumn, in storm and calm, in sunrise and sunset, how varying are they in aspect,—eldest of created forms, yet for ever new ! One sermon, pronounced eighteen centuries ago, embodies all that the ministers of the church have preached for succeeding ages. Yet the truths of Christianity will be always as new as the dawn of each day with the same recurring sun. In the political campaign just ended, the tens of thousands of speakers on either side have been effec-

tive only by repeating the few rallying principles of their respective parties, and eager audiences have never wearied of hearing again and again that which they most earnestly believed. The old lesson of line upon line and precept upon precept, the old illustration of the perpetual water-drop upon the stone, must always be borne in mind by those who become weary in impressing upon others their convictions. If we have been presumptuous in the illustrations of the work we have taken in hand, it is because of our conviction that the truths which lie at the foundation of a wise political economy are among the great truths which demand perpetual enforcement. In the considerations above suggested, we find an excuse for discussing a topic which is neither original nor novel, but which involves the whole mission of this journal; viz., *the Part of the Wool Industry in our National Economy.*

INTRODUCTORY DEFINITIONS. Economy means a well-ordered arrangement, and a national economy a well ordered arrangement of the material interests of a nation. We shall assume that the readers to whom we address ourselves, who are rather, in this case, the general public than specialists in the wool industry, will admit what is the universal instinct of intelligent nations,—that a wise national economy demands that a nation should fix upon its own territory all those branches of industrial activity which suit its soil, climate, and commercial position, or, in other words, whose acquisition is authorized by the nature of things; that the end of a nation, like that of an individual, is its own perfection; and that, as a means to that perfection, it should aim to develop the resources of its soil and the activities of its people until they become in all necessary things independent and self-sufficient. The accomplishment of these objects is the true national economy. By the wool industry, we understand every thing which relates to the production and manipulation of wool. We discard the distinction between wool growers and wool manufacturers as unsound, both performing an equally important part in converting the products of the soil into fabrics. The grower converts the raw material, grass and grain, into fibre. The wool scourer gives that fibre clean to the spinner; he furnishes the raw material, yarn, to the weaver; and the finished fabric of the latter is raw material for still other manufactures, as of cloth for the tailor, or felt for the paper-maker. The distinction, sometimes made between the

producer and consumer of raw material, is therefore fallacious. The producer in every stage of the wool industry is both a producer and consumer of raw material; and the occupant of every stage has an equal claim with any other upon the national consideration.

The relations of the occupants of the first stage in the wool industry—that of wool production and its incidents, mutton production and sheep breeding—to the national economy naturally come first under consideration. Although in this branch of our subject we are peculiarly oppressed by the consciousness of an inability to add so little to what we have elsewhere said, familiar facts may be more strongly impressed by a new statement.

SHEEP CULTURE NOT SECTIONAL. We are first struck by the fact that wool production, with its incidents, unlike the production of any other raw textile material, can be advantageously pursued in some of its forms in every State,—certainly within our own territory. Cotton can be grown only in the South; silk only in California and Kansas; but wool-growing is suited to every soil and climate except those of the tropics or extreme north. It would be difficult to find an industry more cosmopolitan, or to which national encouragement can be afforded with less risk of arousing sectional jealousies.

CHEAPENING OF ANIMAL FOOD. Chief above all the relations of the wool industry to the national economy are the benefits which it confers upon the State in the supply or cheapening of animal food. European economists manifest grave apprehensions on account of the increasing cost of animal food in the older nations. The *savans* of the Society of Acclimation in France have for years labored to conquer the prejudices against horse flesh, and have finally succeeded in establishing its regular sale in the markets of Paris. They even regard the seige of Paris in some measure compensated by the fact that its necessities reconciled the Parisian masses to the use of the flesh of dogs, cats, and rats for food.

Says the French Secretary of Finance, in reply to the allegation that duties on wool will increase the cost of clothing: "No matter: they will encourage the growth of sheep, and diminish the cost of food. *Alimentation is more important than vestiture.*"

Sheep, from the facility and rapidity with which they are matured, the rapidity of their increase, and their treble use for food, raiment, and manure, are the most available means of supplying a

deficiency of animal food. Nature and the art of the breeder have made the sheep the most perfect machine in existence for converting grass and grain into flesh. France is turning her merino sheep into flesh producing animals of equal weight with the South Downs, and maturing as early, yet retaining all the attributes of the merino fleece. Germany, less wise, but with the same object of increasing the supply of animal food, is abandoning her splendid merinos for the English mutton races. The superiority of the sheep as a meat-producing animal has been conclusively demonstrated by experiment. It has been proved that seventy-five pounds of food (be it hay, corn or turnips) will make as many pounds of mutton as one hundred pounds of the same will of beef, and that when ready for the butcher, the "fifth," or waste quarter,—the offal parts of the sheep,—will be three per cent. less than that of an ox or cow; so that, by this showing, the weight of food required to produce seven hundred and thirty pounds of beef would make one thousand pounds of mutton. When we consider the positive saving in the use of mutton over all other meat, its superior nutritiousness, and the facility with which it is digested, added to the fact that of all animals the sheep is easiest fed, we need not wonder that England, with its dense population and manufacturing cities, has been compelled to cultivate sheep up to the absolute capacity of her high-priced lands, and to attain the enormous number of 34,-532,000, yielding an annual produce of over £30,000,000.

In England the indispensable necessities of its people are sufficient to stimulate the production of sheep. In this country the increase of sheep has been aided by the protective duties on wool. Thus we are able to draw a supply of mutton from thirty-five millions of sheep. The supply of pure mutton sheep—those of English blood declining for a time by the free admission of Canada combing-wools under the Reciprocity Treaty—was revived by the protective duties on combing-wools, under the tariff of 1867, and is now having a rapidly increased extension. The quality of mutton in all our markets has improved. It is daily increasing in popular demand. Where hundreds of sheep were sold in the Brighton market twenty years ago, there are now sold thousands. In the markets of New York, where sheep, a few years since, were slaughtered solely for their pelts and tallows, more time is required of the butchers to supply the demand for mutton than for all other meats; and the returns of these markets show mutton to

be worth from two to five cents more than beef. The consumption of beef for our armies during the war seriously diminished the supply of cattle, which required years to repair. The sheep husbandry, so capable of rapid increase, stimulated by the extraordinary activity of the wool manufacture during the war, filled the void in the beef production, and kept the prices of animal food within reasonable limits; for the abundance of mutton kept down the prices not only of that commodity, but of all animal food. The benefits of this diminished cost of sustenance to every individual of our population has never been properly estimated. The cost of animal food to our population is certainly ten times that of wool clothing, which is but four dollars per head. Assuming that the whole duty on cloth is a tax on the consumer, and that the sheep husbandry, and consequent supply of mutton, are stimulated by protection, we may safely conclude that the whole duty on the cloth is reimbursed to the consumer by the diminished price of food resulting from the protection of wool. No legislation can wisely disregard this relation of the wool industry to the national economy.

SHEEP HUSBANDRY IMPROVES THE LAND. Next in importance are the relations of sheep husbandry to an improved system of agriculture. These considerations apply much less to the simply pastoral husbandry, like that of California and Texas, than to sheep culture pursued as a branch of a mixed husbandry. Sheep are the only animals which do not exhaust the land upon which they feed, but permanently improve it. Horned cattle, especially cows in milk, by continued grazing, ultimately exhaust the pastures of their phosphates. In England, the pastures of the county of Chester, famous as a cheese district, are only kept up by the constant use of bone-dust. Sheep, on the other hand, through the peculiar nutritiousness of their manure, and the facility with which it is distributed, are found to be the most economical and certain means of constantly renewing the productiveness of the land. Mr. Mechi, the most famous of the living scientific farmers of England, estimates that fifteen hundred sheep folded on an acre of land for twenty-four days, or one hundred sheep for fifteen days, would manure the land sufficiently to carry it through four years' rotation. In the counties of Dorsetshire and Sussex, where the Down ewes are fed in summer on the hill grass, during the day, and at night are folded on the arable without food, the value

of the manure is set down at one-fourth the value of the sheep. By the combination of sheep husbandry with wheat culture, lands in England which, in the time of Elizabeth, produced, on an average, six and a half bushels of wheat per acre, produce now over 30 bushels. For these reasons, the recent practical writers in the Journal of the Royal Agricultural Society of England pronounce that, while there is no profit in growing sheep in England simply for their mutton and wool, sheep husbandry is still an indispensable necessity as the sole means of keeping up the land. Fortunately, we are able to find recent illustrations at home of the point above asserted.

FACTS IN AMERICA. The eminent agriculturist, Mr. George Geddes of Onondaga county, N. Y., in an article written at our request, and published in the *New York Weekly Tribune* of September, 1876, has given the results of the sheep culture in mixed husbandry attained by the late William Chamberlain, of Dutchess county, N. Y.

In 1810, Mr. Chamberlain purchased a farm in Red Hook, N. Y., of three hundred and eighty acres, which had been used so long to raise hay for sale that it was worn out. The hay-crop of 1841 was seventeen loads; forty acres of rye gave ten bushels to the acre; twenty-five acres of corn averaged twenty bushels to the acre; the remainder of the farm was pasture, and proved equal to the raising of one span of horses, two pairs of oxen, and one cow. The land was so exhausted that it would not raise red clover. The so-called commercial manures were tried with but little advantage; and then Mr. Chamberlain resolved to test the Spanish proverb,—“The hoof of the sheep is golden.” By using sheep as manufacturers of grain, hay, corn-stalk straw, swamp mush, leaves, and weeds into manure, he had, in 1844, not only restored this worn-out farm to its original fertility, but made it so productive that its crops would be satisfactory even in Ohio.

The account of the crops in 1864 showed six hundred tons of hay; forty acres of Indian corn, estimated to yield fifty bushels to the acre; wheat, for which the land is not well adapted, but the best crop with which to sow timothy and clover seed, thirty acres, averaging fifteen bushels; thirty acres of oats, eight acres of roots, and the pasturage of three hundred sheep, with the teams, cows, &c., necessary to carry on the farm and to supply the families on it with milk and butter.

Mr. Chamberlain's plan, when he first commenced making manure by using sheep, was to spread it thinly, so as to go over all the surface he could, and have enough to make clover grow; and he said that when he had brought his land to where it would produce red clover, thenceforth improvement was easy and rapid. The sheep not only gave the first impulse, but were all the time depended upon as the chief manuring power.

Mr. Geddes adds his own experience in raising sheep for many years in connection with grain. He says, "With about one sheep to the acre of cultivated land, pasture and meadow, we raise more bushels of grain on the average than we did when we had no sheep to manufacture our coarse forage into manure, and to enrich our pastures to prepare them for grain crops. While producing more crops on less acres, and at less cost than we did before we kept sheep, and, at the same time, constantly improving our land, we have the wool and mutton from our sheep in addition." These facts are conclusive as to the superior profitableness of sheep in mixed husbandry, and especially as an adjunct to wheat farming. We may add that these considerations have recently attracted serious attention in some older States. The Maine State Board of Agriculture have discussed the subject with great earnestness; and, in their last report, have published elaborate articles showing that an extension of sheep or mutton growing is of the first necessity to the agriculture of that State.

PROMOTES THE HIGHEST ARTS OF AGRICULTURE. Sheep husbandry in its higher branches is eminently promotive of the individual culture of those who pursue it, and is thus conducive to the intellectual advancement of the nation. It is well recognized that the simple culture of a single crop, whether of corn or cotton, is the lowest form of agriculture; but, when combined with the culture of animals, farming assumes a higher phase. The culture of sheep, especially connected with wheat-growing, has distinct advantages over other forms of stock-raising. One advantage, though not directly bearing upon the immediate point in question, is that the ewe gives two dividends each year,—her fleeces and her lambs. The males give larger fleeces, and go to market earlier. The beef-producing animals give no dividends, and the grower must go on adding his expenses till the end of their lives, when in one gross sum he must find his compensation if he can. To this may be added that, in mutton production, the capital invested may be turned over two or three times

during the same period that the same capital is employed in beef raising. This, however, is beside our subject. We have heard a striking advantage of wheat and sheep growing over dairy farming commented upon by practical farmers. In dairy farming there is an unvarying routine of providing food for stock, selling the dairy products, and shovelling manure. There is no let up, no vacation to the farmer. In wheat and sheep farming combined, there are two short periods of excessive activity,—the harvesting and lambing seasons; in the intervals, long periods for other pursuits or intellectual culture. Hence this has been called the aristocracy of farming.

The breeding of animals is now recognized as among the greatest of the creative arts. Professor Agassiz says enthusiastically of the stock breeders of the present day: "The practical realization of a theoretical acquisition has led them to make science the foundation of their business. From very empirical workmen they have raised themselves to be a class of thinking workers, who, as regards mental range, will very soon surpass every other industrial class, and before long will give society a totally new impress."

No class of stock-growers have done so much to merit this high praise as the breeders of sheep. This species being so plastic in its character that the breeder, according to Lord Somerville's celebrated saying, "may chalk out upon a wall a form perfect in itself and then give it existence," presents the most signal illustrations of the modern doctrine of evolution. The breeder has become a veritable creator. The products of his art have the permanency of primeval species. There are convincing reasons for believing that the precious merino was converted by the art of man from the coarsest of the primeval sheep, the hair being dropped, and the underlying down, found still in the rudest of the ovine races, having been developed into fine wool. All the most valuable long-wooled races of England, so distinct in their characters, have been developed by human agency. The merino of Spain has been converted on the one hand to the electoral race of Germany, and the sheep Naz of France; producing fleeces of the utmost fineness, but weighing not more than a pound and a half, and with a length of fibre of less than an inch; and, on the other, to the Rambouillet sheep, producing fleeces of thirty pounds weight, with a length of five inches. New and unexpected qualities appear from time to time through accident,

which the breeder turns to advantage, such as the silky Mauchamp wool, rivalling the cashmere, or even modifications of the skeleton form of the animal, as in the Ancon or *otter* sheep of Rhode Island, with limbs so formed that it cannot jump fences. A new attribute attained by the breeder's foresight, or his judicious application of happy accidents, may be of priceless value. Thence the immense money value of the best stock sheep,—a value enhanced by the rapidity with which the regenerating influence of the male propagates itself. The influence of one buck in three or four years may raise the wool product of a flock of a thousand sheep from five to ten pounds for each individual. There are cases which justify this statement. Thus, even in the time of the Emperor Tiberius, Spanish rams were sold for a talent,—about a thousand dollars of our money. The ram letting of two animals by Bakewell, the producer of the new Leicester sheep, produced in one season twelve hundred guineas. Our Mr Hammond sold his bucks for five thousand dollars each; and even in Australia, where perfection in sheep-breeding might be supposed to be everywhere prevalent, a ram at a sheep auction in Melbourne, during the present year, “after the keenest competition was knocked down at three hundred and fifty-five guineas.”

In the history of agriculture no names stand so prominent as great benefactors as those of Robert Bakewell, the creator of the new Leicester; John Ellman and Jonas Mills, the improvers of the South Downs; Von Thaer and the Duke of Lecknowsky, in Germany the improvers of the merinoes; Daubenton, the associate of Buffon, the founder of the French merino; Mr. McArthur, the creator of the Australian sheep husbandry; Edwin Hammond, of Vermont, mainly the originator of the American merino. The nobility of sheep-breeding is recognized in all the advanced nations. The Empress Eugene took the flock of Rambouillet under her special protection. The Queen of England takes pride in the choice flocks which adorn her parks. The English nobleman values the prizes for his perfected South Downs or Lincolns above all the honors of the turf. And, at a dinner of the landed gentry, the topic of sheep and turnips takes precedence of all other table-talk. Such recognitions lift the creative work of the sheep-breeder to the rank of the highest of the arts of agriculture, and make its acquisition not only a source of national emolument, but an object of national pride.

A MEANS OF SETTLING NEW TERRITORIES. Pastoral sheep husbandry is of the first importance to the nation as the most effective means of settling and improving the vast unoccupied lands of the new or vacant States of the West and South. Of all the products of agriculture, wool is most capable of transportation ; or, in other words, the greatest value can be placed in the smallest bulk, in a form liable to receive the least injury in the friction of transportation. When the freight of wheat from Chicago to the seaboard costs eighty per cent. of its value, of pork thirty per cent. and of beef twenty-one per cent., that of wool is but four per cent.; wool, therefore, may be grown with profit in the districts of the remotest interior favorable to its production.

SHEEP IN RUSSIA. No industrial movement of the present century is more marked than the development of the pastoral sheep husbandry, upon a vast scale, in new countries, distant from the markets where the products are sold. The manufacturing centres of Europe derive their chief supply from distant and newly occupied regions. The wool production of England remains stationary; that of Germany, Austria and France is declining. Russia alone, among the European nations, with her vast unoccupied lands, is extending her sheep husbandry as the readiest means of occupying her distant possessions. The numbers of her sheep in the Russian empire reach the enormous figure of 65,387,000. Single proprietors have not less than 400,000 animals. While Great Britain has 133 sheep to each hundred inhabitants, France 97 and Prussia 93, the whole Russian empire has 81, and certain provinces, as those of Central Asia, have 565 sheep for each hundred inhabitants. The culture of sheep receives the most watchful care from this eminently paternal government. This was well illustrated at the International Exposition. The choicest exhibit was made by an Archduchess. The imperial commissioner, himself a privy councillor, would not trust the explanation of the wool exhibits for awards to a subordinate, declaring, as he pointed out the characteristics of each exhibit with striking minuteness of information, that "this industry was peculiarly under the care of his government."

ARGENTINE REPUBLIC. Although the Argentine Republic did not seriously undertake the culture of merinos until 1826, she numbers now 51,500,260 sheep, producing 216,000,000 pounds of wool.

Estancia after *estancia*, district after district, has passed into the hands of the sheep farmer. The value of sheep has increased ten fold within twenty years, and of land in the same ratio. The shepherds, from the poorest classes of English and Irish immigrants, have become wealthy proprietors, and the republic, through her sheep mainly, has become the most prosperous of the states of South America.

AUSTRALIA. But Australia presents the most striking example of the influences of sheep husbandry upon civilization. In 1803, Captain McArthur brought a few merinos, from the choice flock of George III, to New South Wales. In 1810, the export of wool was 167 pounds. In 1875, the export of wool from New South Wales was 216,000 bales, of the value in the London market of between five and a half and six million pounds sterling. The number of sheep in the seven colonies of Australia, in 1874, was 61,684,127. The exhibits of wool from Australia, at the Exposition at Philadelphia, were the finest ever before made. Hardly less conspicuous than the wool exhibits were the evidences of wealth and progress in all the arts, the variety of products of the mine and the soil, and the illustrations of social and educational improvement, which made the exhibit from these distant colonies among the most attractive in the exhibition. The chief instrument of this civilization was the sheep. In the words of one of her commissioners, "Although Australia may freely boast of the unequalled richness and variety of her mineral productions, of the large returns and great fortunes amassed from her gold fields, yet nothing approaches the wool industry in importance." The close of this century will doubtless see these separate and dependent colonies incorporated into an independent republic, and the extraordinary fact will be shown of an empire founded by the humble sheep !

RELATIONS TO SETTLEMENT IN THE UNITED STATES. It is only within the last ten years that the system of pastoral wool husbandry, as an independent industry,—after the methods of Australia, the Argentine Republic, and Russia,—has been undertaken in this country. The attempts in Texas were arrested by the war of the rebellion. The tariff of 1867, by excluding the over-production of the Southern Hemisphere, firmly established the pastoral sheep husbandry upon the Pacific coast. This year, from the returns which we have, California will produce fifty-one million pounds of wool; while, in 1860, the whole country produced, according to the

census returns, but sixty thousand pounds. The pioneer wool-grower in California, Colonel Hollister, having led a company of emigrants to that State in 1852, saw, at the head of San Francisco Bay, a band of some two thousand Mexican sheep herded by two dogs, with no man in view. "If dogs can do this," said the colonel to himself, "what may not men do with sheep in a country like this, where grazing is perpetual, where no shelter is required, and where the natural increase is one hundred per cent. annually?" Starting, in 1853, with eight hundred sheep, secured for himself from three thousand brought into California from Ohio in 1852, he formed a partnership with the Messrs. Diblee Brothers, who had been successful wool-growers in Los Angeles county. In 1863, the partners bought the great Lompoc rancho for sixty thousand dollars, and stocked it with ten thousand sheep. In 1874, the landed property was worth a million and a half of dollars,—all the result of sixty thousand dollars originally invested, and ten thousand sheep well handled. The product of four hundred pure merino ewes purchased in 1862 was, in 1875, fourteen thousand one hundred and nine-three pure merino ewes, descended from the parent band, in addition to the males reared. In 1874, the sales of wool and sheep amounted to one hundred and twenty-four thousand two hundred and forty-nine dollars. With all these splendid results, in the words of his biographer, Colonel Otis, "Colonel Hollister himself looks upon sheep husbandry, not as an *exclusive* interest, to be prosecuted indefinitely on the extensive scale which now characterizes the pursuit, but rather as a pioneer industry for a new country, useful to bridge over the gap between a sparse and a dense population, and which ought to be gradually retired before the advance of settlement and the advent of the plough."

These words indicate precisely the part which the pastoral sheep husbandry plays in the settlement of a country. The sheep grower moves to new lands after opening those first occupied, to permanent agriculture. Sheep husbandry will advance from the foot-hills of California to the parks of the Rocky Mountains; and regions as wide as Australia or the Pampas of South America, supplied with aromatic grasses, preserving their nutritiousness during winter, lie open for pasturage between the Missouri and the Pacific. To give but one illustration: The Valley of the Republican is two hundred and fifty miles long and one hundred miles wide; containing two thousand five hundred square miles,

or sixteen millions of acres. "There is not a rod of these sixteen million square acres," says Dr. Latham, "that is not the finest of grazing, and which is not covered with a luxuriant growth of blue buffalo and gramma grasses." He continues: "New York, Pennsylvania, Ohio, Michigan, and California are the five largest stock and wool growing States, aggregating sixteen million sheep. The sixteen million acres in one valley would graze all the sheep of these States, and still leave millions of acres of grasses untouched." Texas and other Southern States have millions of acres nearer at hand, with advantages of winter grazing equal to those of Australia. We have before us the careful estimates of the most experienced flock-masters in this country, proving that sheep husbandry can be profitably conducted in Texas on the same gigantic scale as in Australia and Southern Russia. Who will deny, in view of these facts, that the wool industry performs the high part which we claim for it in our national economy?

RELATIONS OF DOMESTIC WOOL TO DOMESTIC MANUFACTURE. The domestic production of wool is highly promotive of the perfection and abundance of the wool manufactures of a nation. As a rule, the characteristic wool manufactures of the leading nations have been determined by the abundance and peculiarities of their own raw material. Turkey, having no clothing wool, makes but few and exports no cloths; but she sends her beautiful Smyrna carpets and rugs to all the wealthy markets of the world, for the simple reason that she has in abundance the admirable carpet wool produced by the barbarous or fat-tailed sheep inherited from the remotest ages. It may be said that the United States excels in the manufacture of carpets, although producing no carpet wools. This exception to the general rule is due to the fact that American ingenuity, developed in other branches of the textile industry, first successfully achieves the manufacture of carpets by the power loom.

England, the creator of the long combing-wool sheep, and by far the first country in the world in their production, was the inventor of the countless dress fabrics for common consumption made from this fibre. It is first through these fabrics, the products of the peculiar fibre of her own sheep, that England ranks as the first wool manufacturing nation in the world, and, secondly, that she has practically the command and the first choice of the products of her colonies, the fine wools of Australia

and the Cape of Good Hope, although continental manufacturers apparently have free admission to the London markets of the Cape and Australian wools. The substantial advantages which the English have in the command and first choice of these wools in their own market, is well recognized by other European manufacturers.

Germany, through the genius of her breeders and the advantages of a dry climate and not too fertile soil, having produced the electoral fine-wooled sheep, immediately availed herself of this domestic possession to give a new character to woollen cloths. The light and fine German broadcloths became the rivals of the more substantial and less pliable West of England cloths, which formerly had undisturbed sway, and still dispute supremacy with them at the International Expositions.

France furnishes a still more remarkable illustration of the influence of a domestic wool production. It is well known that the most luxurious woollen dress goods for fashionable consumption, such as all-merinos, cashmeres, serges, matlasses, baskets, challis, besides countless novelties appearing each recurring season, are of French fabrication. France established her prestige in this fabrication through her possession of the merino combing wools, which she in fact created. The directors of the national sheepfolds of France, after obtaining merinos from Spain, instead of pursuing the German methods of breeding, aimed to increase the size of the frame and the weight of the fleece of the animal. With this increased size and weight, there was developed a corresponding length of fibre, and a merino combing wool was for the first time created. The French manufacturers were the first to avail themselves of this new property of wool, which their own territory supplied. National pride stimulated them to create original fabrics from the new material furnished from domestic sources. They invented all the fabrics above described, and more recently worsted coatings; in a word, all the woollen stuffs of the nineteenth century, which distinguish themselves in their physiognomy from the tissues of the preceding centuries. To France must be accorded the honor of impressing the most characteristic features, both of sheep husbandry and wool manufacture of the present age. This was the result of the combined possession of sheep husbandry and wool manufacture by a nation having a genius for the arts, and at the same time always fully appreciating the relations of the wool industry to a national economy.

In further illustration of this branch of our subject, we may compare two other European nations : one possessing great disadvantages in a deficiency of experience, but with abundant flocks ; the other having the highest advantages of experience and traditionary skill in manufacture, but without sheep,—Russia and the Netherlands.

The first cloth factory in Russia was founded by Peter the Great, solely to provide cloth for his troops, in 1698, when Netherlands was at the height of its manufacturing prosperity. In spite of the encouragement of the government, the cloth manufacture made scarcely any progress during the last century ; not improbably because Russia had then no merino wools. In 1820, prohibitory duties were placed on black and green cloths, and very high duties on other cloths. We infer also, though we have no exact data on this point, that the merino sheep husbandry began at this period to receive expansion. From this period the wool manufacture made rapid strides. In 1871, the factories in the empire numbered 1,339 ; the workmen, 121,070 ; and the value of the production reached the sum of 77,017,600 roubles. To this is to be added a much more extended woollen industry,—the home fabrication of cloth by the peasants. “The industry of wool,” say the Russian statisticians, “suffices largely for the necessities of our vast consumption, and allows us even to export a part of our products to Asia.” The excellence and variety of the Russian wool products were fully demonstrated at our International Exposition. We need not add that the raw material of these products is furnished to Russia by her sixty-five million sheep, twelve million of which are merinos. These facts show that it is by developing all her internal resources and making her industries independent of all foreign supplies that this vast self-contained empire dares to place herself, as she is at this moment doing, in defiance of all the great powers of Europe.

Netherlands in the sixteenth century was the chief seat of the wool manufacture of the world. Then she absorbed the wool product of Spain and England. Without flocks, her wool industry has lost its importance, and in the poor displays at the exhibitions of Paris and Philadelphia there were but few traces of its former splendors. Switzerland, distinguished as she is in the silk manufacture, has no sheep and no woollen industry. Belgium, which has no sheep, but a very considerable wool industry, might seem to contradict our position. But with some few notable exceptions

the Belgian cloth industry is characterized by its cheapness, and the use of the weakest and cheapest of foreign wools, which are sure to betray themselves in the fabrics.

The wool manufacture of the United States is conspicuously dependent upon our domestic wool production. It was hardly established until the introduction and rapidly increased culture of the Spanish merino in the decade of 1810 and 1820. It was modified by the introduction of the Saxon sheep in 1814-26, and still again by subsequent changes in the general character of American wools. The two branches of the wool industry have always stepped together, though unconsciously, quickened or retarded by the same general influences. As the flocks spread in the new States, the mills were planted in their midst,—not clustered in a few centres as in Europe, but broadly scattered, like sheep feeding in a wide pasture. In the State of Ohio, the first of the wool producing States, there are in present operation 261 sets of woollen machinery distributed among 187 mills, and these mills distributed among 157 counties of the State. Some of the other Western States, all of which are eminently wool-growing States, have establishments and sets of machinery as follows:

STATES.	Establishments.	No of sets of cards reported.	Establishments, capacity not given.
California	10	59	2
Illinois.....	99	192	13
Indiana.....	157	215	33
Iowa....	98	118	20
Michigan.....	55	55	20
Missouri.....	57	69	19
Oregon.....	9	22	1
Wisconsin.....	67	72	21

All these mills use, exclusively, American wool, and almost universally the wool produced in their immediate neighborhood. It would be safe to say, that not one of these mills would have been established but for the contiguous flocks, and that, if forced to seek imported wool, each one would stop.

The gain to the manufacturer and wool-grower from the contiguity of the flocks to the mill, and the mills to the consumer, is

immense. There are savings of transportation, facilities for selection and purchasing, and conveniences, both to the manufacturer and wool-grower, in the direct exchange of cloth for wool. We have before us the individual returns of each one of the mills above enumerated. The mills are most of them small, from one to two sets in capacity. The remarks attached to so many of the returns, such as "sell our own goods at the mill," "goods made for home consumption," etc., show how they directly supply the necessities of their immediate neighborhoods, and what a saving is effected in transportation and dispensing with the middlemen. While the judges in the group of woollens at the Centennial were making their examination of exhibits for awards, their attention was directed to cloths, principally fancy cassimeres, exhibited by a mill of Oregon, of twelve sets, and therefore of very considerable magnitude. The styles, designs and fabrication were excellent, as well as the quality of the wool. The significant fact about these goods was the inconceivably low prices at which they were marked, making them the cheapest, for their quality, of any in the Exposition. The explanation of this phenomenon was that the cost of wool to the Oregon manufacturer produced from flocks grown immediately around his mill was about half that paid by the Eastern manufacturer. There was a saving of middlemen's profits and the transportation across the continent. The official award made by the judges expressly recognizes these facts.

The consumption of domestic wool is not confined to the Western manufacturer. All our manufacturers prefer American wools, at the same price, to foreign wools even nearly resembling them in quality. In view of the widely and erroneously asserted statement of the importance of extending our importation of foreign wools, we cannot too often repeat the results of the census statistics of 1870, relative to wool consumption in our woollen mills proper,—those producing cloths, blankets, flannels, &c.

Domestic wool used.....	154,767,095
Foreign	17,311,824
Cotton.....	17,571,929
Shoddy.....	19,392,062
 Total material.....	 209,022,910 lbs.

Thus the foreign wool consumed in our cloth mills is only ten per cent. of the whole wool used, and is of less importance than the cotton and shoddy which enter into their production. These figures are sufficient to show that the very foundation of our cloth manufacture is the domestic production of wool.

There is still one other consideration which must not be overlooked. A nation can import only what it has means to pay for. Any check of domestic production diminishes the power of importation. The wisest of all our political economists, Stephen Colwell, has shown that a nation consumes abundantly, only when it produces abundantly. When Pennsylvania is able to produce in a year five hundred thousand tons of iron, through the activities and quickening influences of this industry, and the rapidity of the societary circulation of which the whole State partakes, she is able to consume all these five hundred thousand tons. She pays for them through her own domestic production and exchanges stimulated by this great vivifying industry. Let the production of iron fall off, Pennsylvania will not import the deficiency. She will cease to consume. Railroads will cease extension, old tracks will not be repaired, the machine-shops will be stopped; with the arrest of production, the power of consumption comes to an end. This is as true in wool industry as in iron production.

Unfortunately our wool-growers did not do justice to themselves by the exhibits of raw fleeces at the International Exposition; but the foreign experts in the wool industry at Philadelphia saw with unconcealed surprise the evidences of our domestic wealth as displayed in our fabrics. They saw, with astonishment, blankets made from American wool in the new States of California and Minnesota, as well as old Massachusetts, which seemed fit only for royal couches; flannels, on the one hand, of snowy whiteness and of the softness of cashmeres, and others dyed with every hue of the rainbow, and in all varieties, so cheap and abundant as absolutely to shut out all foreign competition; shawls, pleasing in design and substantial in texture, and yet so reasonable in price that the humblest work-woman could afford the comely covering; yarns of every shade which the infinite applications of the knitter's art could demand, recalling Morris's lines,—

"The many colored bundles newly dyed
Blood red, and heavenly blue, and grassy green;
Yea, and more colors than man yet has seen
In flowery meadows midmost of the May;"

fancy cassimeres rivalling the best products of Elbeuf looms; and worsted coatings which had their only rivals in the master-pieces of Sedan. They heard manufacturers declare that for all these fabrics they preferred American wool, because it is "stronger, softer, and works more kindly." We believe, in fine, that the

conviction forced reluctantly upon our foreign visitors as to the power of America to supply its own markets, was due no less to the evidences of our command of raw material than to the proofs of our ingenuity and skill in fabrication.

Before dismissing this branch of our subject, we ought to answer the question which will naturally occur to many,—What reason is there for the alleged superiority of American wools? The answer is not difficult. All experts in wool fibre recognize that there are well-marked characteristic qualities in the wools of different nations, even when produced from the same races. The American wools, to which we have referred, are those of the merino race, which are our principal product. Their superiority is due in the first place to a physical cause,—our characteristically dry climate. Prof. Sanson, an eminent French authority, has shown that a dry climate is indispensable for the health or successful culture of merino sheep, and that even the will of Napoleon failed to make the merino sheep successful in the moist or oceanic climates. The second and most important cause is a moral one. In all other parts of the world, the flocks of merino sheep are tended by hiring shepherds. In this country, as a rule, the farmer is his own shepherd, and the flocks are usually so small that they can receive the closest supervision. Not without an eye to thrift, but in part influenced by a morality which is of Puritan heritage, the American farmer would sooner starve himself than his animals. Regular and abundant feeding makes healthy sheep, and strong and uniform fibre; that is, without the weak spots caused by an occasional deficiency of food. Thus the high quality of American wools is due mainly to the moral habits of our farming population.

PART OF THE WOOL MANUFACTURE. We have thus far considered only the relations of the agricultural branch of the wool industry to our national economy. We have yet to consider the wool industry as a branch of the mechanical, chemical, and industrial arts, or, in other words, the relations of the *manufacture* of wool to the State. The common sentiment of the civilized nations of the present day that, next to the preservation of liberty and justice, the highest duty and crowning glory of a nation is the acquisition of the industrial arts, is pronounced by the international expositions of the last half century. It will be affirmed with enthusiasm by the eight million visitors to the Centennial, who have returned delighted, instructed, and inspired, as it were,

with a new sense, an ambition for the precedence of our nation in the industrial arts. Among these arts, those of the textile industry take the first rank. They contribute most to the comfort of the people, and to one of the strongest passions of man,—the love of personal adornment; for, if there is one thought which predominates in a city population, it is that of the selection and preparation of clothing. In the great cities, it is the trade in textiles which throngs the thoroughfares, makes the streets gay with colored tissues, builds palatial warehouses, creates the highest rents, and secures the largest fortunes to the great distributors. The textile industry, above all others, displays the command of man over the forces of nature. Mr. Garsed, of Philadelphia, who manufactures in every day of ten hours thirty-three thousand miles of cotton thread, with the expenditure of force derived from seven tons of coal, has shown by careful calculation that, if it were possible for such quality of thread to be made by hand, it would require the labor of *seventy thousand* women to accomplish this work in the same time. The command of the improved textile manufacture increases the power of the factory operative over the hand-workman more than a thousand-fold. And this is the chief source of the supremacy of the manufacturing nations. The profit on the manufacture of cotton in Great Britain during the last fifty years has exceeded five thousand million dollars. Says Mr. Porter: "It is to the spinning-jenny and the steam-engine that we must look as having been the true moving powers of our fleets and armies, and the chief support also of a long-continued agricultural prosperity."

To come nearer home, the textile industry is the chief means of diversifying the occupations in the older States, of removing surplus population from worn-out lands, and of equalizing, by the aid of machinery, the weak muscles of more than half of our working population—the women—with those of men. It is shown by the first volume of the census returns of the State of Massachusetts, just published, that this State, having the most dense population of any State in the Union, and ranking seventh in actual numbers, in 1875 employed in the textile manufactures 85,287 persons, and, if we add those engaged in the allied clothing manufacture, 28,935,—a total of 114,222; while the numbers employed in agriculture, the care of animals, and the fisheries is but 81,156. The whole number employed in all manufactures and other mechanical industries was 316,450. The products of manu-

factures and fisheries in 1875 was \$596,415,866; while those of agriculture and mining were but \$13,461,599. The prosperity of the city of Boston is due to the fact that it is the centre of distribution of the raw material and finished products of those manufactures. One of her own satirists first ironically called this city the *Hub*,—a phrase sometimes amusingly applied by strangers as an expression of her own conceit. But Boston, almost without metaphor, might be called the hub—of a vast factory wheel.

But our theme is the relations of but one branch of the textile industry; and the general facts first referred to have been introduced only to give force to the first proposition which we make in respect to wool manufacture.

PIONEER OF OTHER INDUSTRIES. The manufacture of wool is the precursor of a general manufacture. The household fabrication of wool having been in former times, in temperate climates, the most extensively pursued of the household arts, the first advances from the rudest instruments to the more complicated machines were made in this industry,—such as the change from the distaff to the spinning-wheel; from the card to the heated iron comb of Bishop Blaise; from the fulling tub to the fulling machine moved by water,—the first substitution of the mechanical forces of nature for human muscles in the textile industry. In England, a protection of four centuries to the woollen industry had made her a nation of spinners and weavers, of artisans subsidiary to them. Commerce and capital had become familiar with the profits of a manufacturing industry; and the cotton industries were the natural offshoots of the wool manufacture, and needed hardly more than a hundred years to reach its present vast proportions. The Edict of Nantes, at the close of the sixteenth century, which restored to France the Protestants, who had acquired in the Low Countries the arts of spinning, weaving, and dyeing woollens, first planted the wool manufacture in France, out of which her varied textile industry has grown.

In this country, the woollen mill is shown to be everywhere the pioneer of a diversified manufacture. As we have said elsewhere: “Settlements are made in the beginning upon our watercourses. Water power is first applied to the saw-mill; then comes the grist-mill; then follows the woollen mill. In old times, it was the fulling-mill with its carding-machine. The fulling-mill was, and the woollen mill now is, to a matured industry, what the emigrant’s

wagon is to the great interior,—the pioneer of manufacturing enterprise, as that is of permanent settlement. The cotton, the machinery, the iron, the silk, the paper manufactures follow, and build up our Lowells, Patersons, and Manchesters. This is no fancy sketch. We remember the time when the Salmon Falls River, between Maine and New Hampshire, watering a district which was occupied by one of the earliest and important settlements in New England, dating back to 1632, had no other manufacturing establishment than a saw-mill, a grist-mill, and a fulling-mill. The latter disappeared, and was succeeded, in 1828, by a well-appointed woollen factory. Afterwards came other woollen factories and cotton mills; and the Salmon Falls River moves now one hundred and thirty-two thousand cotton spindles and fourteen sets of woollen machinery.” This is but a type of the march of manufactures everywhere in the country. They propagate themselves by contagion; or, like the banyan tree, their branches descend and become trees. The communities where they are planted become imbued with industrial instinct and knowledge. Hence, practical men say that the best place to plant a new mill is by the very side of those which have been long established. Manufactures not only propagate themselves, but engender other industries, as cultivation, with new plants and flowers, attracts and multiplies the birds and insects. The erection of a woollen mill of two or three sets, in a new State, which seems to us a trifling affair, is an epoch, the dawn of manufactures, which all experience tells us will expand into a widely diversified industry, and its attendant results of wealth and culture.

DEMANDS HIGH INTELLIGENCE. One reason for the influence of the woollen manufactures is the high character of intelligence and skill required for its successful pursuit. In this respect it undoubtedly stands at the very head of the textile industries. Great, undoubtedly, as was the genius displayed by those who introduced the cotton manufacture in its present form into this country, there is much less required in continuing its fabrication. The whole product of a mill often consists of but a single fabric. As Mr. Bachelder, the most eminent cotton manufacturer living in this or any other country, says: “Thousands of looms are employed making drillings, of precisely the same description, with the same number of threads both in the warp and filling, of the same average weight, with yarn of the same fineness, and without the least

variation in any particular, as were first invented and made by me in 1827."

In the wool manufacture, especially since the general disuse of broadcloth, the requirements of fashion demand new fabrics or new designs every season. A large fancy cassimere mill will produce not less than two hundred distinct designs each season, making four hundred in the year. In some mills there are made not less than fifty distinct classes of fabrics, to say nothing of styles. New fabrics perpetually call for new machines. The producer in this industry can have no rest: he must be constantly learning. No degree of skill in the selection of other fabrics is comparable with that which must be exercised in buying and applying wool. Its preparation is more difficult, and the finish of its products is more complicated. Add to this that the dyeing of the wool fabrics requires what is a distinct art by itself in Europe, and in some branches, such as the indigo fermented vat, is the most difficult work in practical chemistry, and we see a sufficient reason why the wool manufacture takes the first place in the textile arts. Some branches of the wool manufacture, like that of carpets, require the most profound knowledge of the principles of decorative art; others, like that of printing stuffs, are based upon a knowledge of the chemical arts. Indeed, it may be said that no industrial work brings so fully into play the results of scientific research and the practical applications of art as the vast establishments in this country which make and print the mixed dress goods of cotton and wool. Thus it will be seen that the acquisition of a perfect wool industry is in itself the possession of the most important arts.

THE MANUFACTURE ESSENTIAL TO A SUCCESSFUL SHEEP HUSBANDBY.
We have shown that without domestic wool we should not have mills. On the other hand, without mills we should not have sheep. We have exported so little wool that it has been said that the value of imported playing-cards exceeds the value of all the wool sent abroad from this country. Under the prevailing system of growing sheep in small flocks, it would be clearly impossible for the American farmer to compete in the markets of the world with the possessor of a hundred thousand sheep. We shall never export wool until a system of pastoral sheep husbandry, without artificial feeding in winter, is developed on a scale as broad as in Australia or Buenos Ayres. And the only means to that end is a

market for our wools at home. For many years to come, the sole dependence of the American wool-grower must be the consumption of our home mills. Even with an equality of natural facilities, the prices of labor, the high interest on capital, local taxation, and the general expenses growing out of the higher demands of American civilization, will not permit our wool-growers to compete with the producers of wool in the southern hemisphere. No one can doubt for a moment that our mills sustain sheep-growing in this country for *wool* alone. But it may be said that mutton sheep would be grown for their flesh and lambs; while the wool might be exported, as in Canada, which has no home market for its combing wools. In reply to this, we note the fact that, because she must export her combing wools, Canada is rapidly diminishing the production of her mutton sheep, filling their place with merino sheep, to supply her newly-established cloth-mills; while contiguous American States—Michigan, Ohio, and New York—are even more rapidly increasing their combing wools and mutton sheep, for which they have a home market in the worsted mills and the populations which the mills gather around them. Thus, recurring to the earlier propositions advanced in this paper, our woollen manufacture directly benefits the nation in supplying annual food, improving general husbandry, and settling new territory.

CLOTHES OUR PEOPLE. Our own woollen manufacture cheaply and abundantly clothes our people. Our last proposition has established that our wool manufacture contributes materially to the first necessities of a people, by supplying animal food and increasing the productiveness of lands, thus cheapening bread. The benefits it confers in supplying the second necessity, clothing, are beyond calculation. Much as cotton and linen contribute to cleanliness and comfort, and silk to adornment, wool, in our rigorous climate, is the only absolute necessity. It formed the sole clothing of our million soldiers in the great war. Falstaff said: "There's but a shirt and a half in all my company." With respect to linen and cotton, the same might have been said of all our armies. So easily did our mills supply one of the first necessities of armies in the field, that, at the close of the war, there was an overplus of three million overcoats.

SANITARY INFLUENCE. Before proceeding to demonstrate the proposition in hand, we will pause a moment to consider the sani-

tary influence of abundant woollen clothing. Recent life statistics have shown that the average period of life in civilized nations has been lengthened several years during this century. The more extended use of woollen clothing has materially contributed to this result. The soldiers of our Revolutionary war were largely clothed in linen. For general female use there was nothing better than the linsey-woolsey, with linen warp and woollen woof. This was not abundant on account of the scarcity of the wool. As wool became more abundant, the cloth was made in families, the best homespun was scarcely thicker or warmer than a common flannel of our times. Half a century ago, even the cloths worn by the wealthy were light and thin compared with those now in use. The use of woollen underclothing, such as flannel or knit shirts and drawers, was almost exclusively confined to men of the easy classes. Women in moderate circumstances wore only cotton dresses; for the invaluable mixtures of wool and cotton, the mousselines-de-laine and alpacas, were unknown. Women and children of wealth were clad more thinly than the poorest of our day; and consumption stalked with its deadly scythe over all our northern land. To-day, in our New England districts at least, the wool-knit undergarments are worn by all classes of every age and sex. Every working woman has her mixed woollen dress and her warm woollen shawl; every workman, his knit cardigan. No laboring man is so poor as not to have an overcoat. We remember the time when not one man in ten in the country districts had such a garment. The cloths for common wear are of double the thickness and warmth that they were even thirty years ago. Some of them, such as the Esquimos and beavers, are impenetrable to the cold. For out-door winter wear, the material for clothing of men and women is almost identical. Women discard "ladies' cloth," and don cloaks of beaver or kersey and dresses of fancy cassimeres; while the universal waterproof makes rain and snow innocuous. Physicians concur in declaring that, as a result of this improved clothing, colds and pneumonia are less prevalent, and the ravages of consumption have been largely checked. The *sanitary* influence of the woollen industry is, therefore no mean part among those which it plays in the national economy.

CAPACITY AND PRODUCT OF AMERICAN MILLS. The question next arises, Can our own industry perform the great work of clothing

our people *cheaply, abundantly, and well* without help from abroad? In answering this question, we must repeat facts elsewhere stated in other connections, and familiar to many of our readers.

First as to our machine capacity. It will serve the purpose of our argument equally to take the census statistics of 1870, while they have official authority.

The number of sets in the manufacture of woollens proper, consisting of cloths, flannels, and blankets, and yarns, is placed at 8,336. In the worsted manufacture, the number of combers is set down at 193, and the number of sets at 98.

One comber being the equivalent of three sets, the total in sets is 677.

In the carpet manufacture, the number of sets is 241, with 100 combers, making a total in sets of 541.

In the hosiery manufacture, including cotton, but principally wool, 519 sets.

RECAPITULATION.

Woollens.....	8,336
Worsted.....	677
Carpets	541
Hosiery	519
Total.....	10,073 sets.

The value of the products of this machinery, as given by the census, was as follows:—

Woollens	\$155,405,356
Worsted.....	22,000,331
Carpets	21,761,573
Hosiery	18,411,564
Total.....	\$217,578,824

Our imports in that year were:—

Woollens	\$14,660,403
Worsted Dress Goods.....	15,447,960
Carpets	3,940,707
Total.....	\$34,049,070

Add to this, which is the foreign valuation, the custom duties, premium on gold, and profit of importer, making the home valuation double that of the foreign, the home value of these imports equalled \$68,098,110. This, added to domestic production, made our whole consumption in 1870, \$285,676,964. So that our domestic production constituted three-fourth of our whole consumption. As to the character of the machinery and processes used

in the above named 10,073 sets, which, in fact, represents the degree of skill attained, we repeat the statement made to us personally by one having the highest authority ; viz., Prof. Herm Grothe of Germany, the author of the latest and most esteemed European treatise on the manufacture of wool, who, the last summer, visited our principal representative establishments. He declared that our mills had all the recent machinery and processes found in the best mills abroad, and that he saw nothing to be improved either in the mechanical appliances or administration of our establishments.

CHARACTER OF OUR PRODUCTS. Having had the opportunity of an official study at the International Exhibition, for many weeks, in company with able foreign and American experts, of our own wool products in comparison with those of other countries, we feel authorized to express an opinion as to the character of our products with confidence. In woollens proper, we make, with no exception now occurring to us, all the classes of fabrics made in the best European mills. The same may be said of hosiery. In worsteds, we make all mixed cotton and wool dress goods,—the classes of dress fabrics entering into most general consumption, and therefore of the first utility,—and many all-wool worsteds. We do not make the all-wool merinos and cashmeres, which are not made successfully even in England, nor some other fine wool novelties in dress goods, which are obtained wholly in France. Their use is confined to the wealthy and fashionable classes. Some we have very recently attempted with signal success,—such as the all-wool merino plaids and matelasses,—and shall doubtless make them all, except possibly the merinos and cashmeres. In carpets, we produce every variety except the Persian and Turkish and the Aubusson hand-made carpets, used only by the opulent classes.

In woollens, we are inferior only in broadcloths, and that not in quality, but in quantity of production, the general disuse of broadcloth, except for dress suits and by the wealthy, making it more profitable for our mills to run on goods in general demand. That we have no want of capacity is shown by the product of the few mills who still pursue this branch of manufacture, and by the fact that the finest sample of broadcloth shown at the Exposition, though not for competition, was made in this country twenty-three years ago. In blankets and flannels, our products are absolutely unequalled by any made abroad. In fancy cassimeres and

worsted coatings,—the great articles of consumption all over the world,—we equal any, surpass most, made abroad, in texture, finish, and beauty of design; foreign manufacturers eagerly seeking samples for imitation in their mills. Our thicker cloths for overcoatings suffer nothing in comparison with those made abroad.

In dress goods, there was little opportunity to make comparison, as Bradford, the principal competitor in classes of goods made by us, did not think it wise to enter the field. But the command of our own market against foreign competition settles the question as to the quality of our goods. In carpets of the cheaper and medium qualities, up to two and three ply ingrain, we are without competition, making the cheaper kinds so abundantly and cheap, that no home, however humble, need be without this most characteristic of household comforts. The extent of their use in our homes was a subject of surprise to our foreign visitors. The higher classes of tapestries and Brussels, and still higher, of Wilton and Axminster, in taste of design and perfection of texture, were absolutely equal to the best foreign samples; and, judging from the length and closeness of the pile, surpass them in wearing qualities. In this department, we have nothing to learn abroad.

The question of comparative cheapness of goods is more difficult to fix exactly. Foreigners declared that our fancy cassimeres were equal to those of Elbeuf, and cheaper than similar goods could be obtained in the French market. On the other hand, the cloths of Belgium and Yorkshire were unquestionably apparently cheaper than our own; but this apparent cheapness is illusory in a great degree, when we consider the low character of the materials which enter into their fabrication,—in one case, weak Mestiza wools; in the other, shoddy,—when compared with the substantial material of the American cloths. We do not hesitate to assert that there are no medium woollen goods, such as constitute the great bulk of consumption, which, in wearing qualities, will compare with American fabrics. The English admit that they consume not less than *thirty-eight thousand tons* of shoddy annually in making their woollen goods. The Belgians boast that they use the cheap Mestiza wool, and laugh at the Americans because they “stick to the old-fashioned, strong-bodied, long-stapled wools,” which are so valuable that they ought to be used for combing purposes, and because we do not “turn to advantage all wastes and refuses, which now, skilfully mixed, play such an important part in lowering the cost of fabrics.”

The point which we make is, not that the English and Belgians do not obtain their cloths more cheaply than we do, but that it is more *economical* for us to consume our own products than to depend upon the English and Belgians. The question of economy involves the wearing qualities of our cloths, the facilities for paying for them by domestic exchange,—as with wool by the farmer, with labor by the mill operative, with market produce by the gardener, or other facilities which attend home consumption. One of these facilities deserves attention, as it is the very climax of our wool industry. We refer to our ready-made clothing manufacture. Nowhere has this manufacture attained such perfection and economies as in this country. It is founded upon our wool manufacture; for seven-eighths of its raw material is furnished by our mills. So important is this industry, that it employs directly in Massachusetts alone 28,935 persons. Upon so vast a scale is it conducted that one establishment in Philadelphia, John Wanamaker's, covers two and a half acres, and one floor contains two million dollars's worth of goods. This manufacture clothes all the boys and the great bulk of our male population. It is declared by experts in this industry that "the wholesale manufacture has reduced the cost of clothing to the masses *one-half* certainly, and, making allowance for the difference in the value of money, even more." That system of production and consumption proves itself to be most economical to the people which makes consumption the most *abundant*. That our people are the most abundantly and substantially clothed of any in the world needs no demonstration. It is shown in our army and the vast superiority of its cloths over those furnished to any foreign troops. It is shown in what foreigners at Philadelphia so much admired,—the beauty of the uniforms of our volunteer troops. It was shown in the costumes of the millions at the Exposition; and, especially, in the absence of all distinction of garb in the people of the seaboard cities and the remotest interior. The personal appearance of a population indicates its social condition. And thus the woollen industry performs its last part in the national economy by abolishing the outward distinctions of class, and cultivating the personal self-respect of the individual citizen.

A question of public economy like that which we have discussed addresses itself directly and imperatively to those who control and influence national legislation. We have failed in our purpose, if they do not apply the lesson which these facts teach.

HISTORICAL SKETCH OF THE STATE COLLEGE.

Its Aims and Methods.

It needs no argument, in this day, to prove that knowledge is power, that the educated man is the successful one—not only in the professions which are usually regarded as “learned,” but in all the industrial avocations of man. In the arts, in factories, in manufacturing establishments—educated men are being employed in preference to those not educated, and the proprietors of these works, in every instance possible, apply the principles of science and education to the prosecution of their business, and to the saving of material and manual labor. In some large establishments, educated men are employed whose sole duty it is to keep the concern informed upon every discovery and improvement which is made by science affecting the prosecution of their business, that it may take advantage of the same, and produce goods as cheaply as other establishments, and be enabled to successfully compete with them in the markets of the world. And what is true in the arts is true also of agriculture. In all its varied and intricate processes it demands the assistance of science and education, and where these are judiciously applied, the work of the farm is more intelligently pursued and the results far more satisfactory. In breeding domestic animals, in the various processes of the field and garden, in the training and care of fruit trees, in compassing the hosts of insect foes, and in numerous other directions the aid rendered by science and by educated brains is of vast importance. In our own country, agricultural and industrial education has been a thing of recent origin and slow growth; while in England and on the continent of Europe, agricultural education has long been recognized and promoted by government, and the number of schools, colleges, experiment stations, seed-control stations, and similar institutions for instruction in scientific agri-

culture, chemistry, veterinary science, forestry, &c., is very large. In this country all our former efforts at education were in the direction of the professions, the colleges were for the few, not the masses—and farmers and artisans were kept in the background. Education was tending away from the farm and shop rather than towards them. The need for education was recognized in the establishment of agricultural journals, societies and clubs, and these led the way for the higher institutions which have since been organized. The early efforts—if we make one exception—towards agricultural schools in this country, were not successful, because the promoters of them did not understand exactly what was wanted. The efforts were patterned after the existing foreign schools, which were not adapted to us, on account of the different conditions of society and the people in our own country and the old world. The exception is that of the Michigan Agricultural College, founded by that State in 1855, more than twenty years ago, which is now in a most flourishing condition and well endowed. By the National grant of Congress in 1862, agricultural and industrial education was rendered possible to the masses through the establishment by the different States of colleges under its provisions. By this act of Congress, 210,000 acres of land were given to Maine on condition of establishing a college in this State in conformity to its provisions. This act was accepted by the Legislature, and in 1863 the subject of the new college was very generally discussed by the Legislature, the Board of Agriculture, and the press and people. A proposition to connect it with Waterville College was not accepted by the Legislature, and the Board of Agriculture passed resolutions deeming it advisable and expedient to establish an independent institution, on a different basis from that of any existing college. In this year—1863—a resolve was passed by the Legislature to choose thirteen Regents of an agricultural college to be established, but the resolve was never carried into effect. In 1864 a commission was appointed by the Governor, consisting of Hons. W. G. Crosby, Joseph Eaton and S. F. Perley, to receive donations and proposals for the location of the college, and the Governor was authorized to sell the Land Scrip in its aid. Proposals were made by Hon. B. F. Nourse, of his farm in Orrington; by Hon. F. O. J. Smith, of his land and buildings in Gorham, and by President Woods of Bowdoin College, of buildings, teachers, library and experimental farm to be furnished in connection with Bowdoin

College. The Commissioners, in their report, advised the acceptance of this proposition; but after a thorough discussion in the public journals, the Board of Agriculture and the Legislature, this recommendation was not adopted.

In February, 1865, the "Maine State College of Agriculture and the Mechanic Arts," was incorporated, and sixteen Trustees were recognized, representing the different counties of the State. On the 25th of April, the Trustees organized by the choice of Hon. Hannibal Hamlin as President, and they also issued an address calling upon the citizens of the State to come up to the work of the endowment of the Institution. At a subsequent meeting, held in 1865, Mr. B. F. Nourse of Orrington, renewed his offer of his farm and buildings, provided \$50,000 could be secured for the erection of the necessary buildings by subscriptions or donations. This farm was visited by the Trustees, and during the year they also visited sites for the proposed location of the College in Topsham, Gorham, Augusta, Fairfield, Newport and Orono, but no decision was made during the year. At a meeting held in January, 1866, the offer made by the towns of Orono and Oldtown, accompanied by an offer of \$10,000 from the citizens of Bangor, was accepted—it being considered by a large majority the most advantageous offer that had been made. In April of the same year, Dr. J. C. Weston of Bangor, was elected Clerk of the Board of Trustees, and in September, Mr. Hamlin having previously resigned, Hon. W. A. P. Dillingham of Sidney, was elected President of the Board. This Board, at a meeting held January 22d, 1867, elected as President of the College, Hon. Phinehas Barnes of Portland, a gentleman who had previously been elected Treasurer, and who had from the first inception of this movement taken a deep interest in its success—having written a series of articles on the establishment and management of the College which had attracted wide attention. The election of Mr. Barnes was the last act of this Board. It had found from its large number, and the difficulty of calling meetings at which a quorum would be present, that a re-organization would be desirable. Accordingly a new Board was constituted, consisting of seven members, of which Hon. Abner Coburn of Skowhegan was elected President, and Hon. Lyndon Oak of Garland, Clerk.

In 1867, a college building, now known as White Hall, and used for recitation purposes, was built, and the general farm buildings thoroughly repaired. At the meeting of the Trustees held

July 2, 1868, M. C. Fernald, A. M., was elected to the position of Professor of Mathematics, and Samuel Johnson of Jackson, was elected Farm Superintendent. The necessary arrangements having been made, and with these two instructors, Prof. Fernald acting as President, the Institution was opened in September with a class of thirteen students. The erection of a laboratory building was commenced this year, the same being built upon the plan, somewhat improved, of the laboratory at Brown University, Providence, R. I.

The towns of Orono and Oldtown had given a warranty deed of the farms, in which was inserted the condition that the property should revert to the town of Orono, should the location of the College ever be changed; the Trustees desired to change the conditions of this deed so that they might have the alternative of paying the present worth of the land, or abandoning the property if the location of the College was changed. Pending the settlement of this matter between the Trustees and the town of Orono, a year went by, during which the Legislature refused to make further appropriations to the Institution till the change was made in the terms of the deed, conveying the land to the State without qualifications. Of course this action suspended all building operations for the year; but with the giving of a satisfactory deed to the State, the Legislature, in 1870, made an appropriation of \$50,000.

In 1869, the statute concerning the Board of Agriculture was so amended that its Secretary was created a Trustee *ex-officio* of the Institution; and one of the two sessions of the Board to be held annually was fixed at the College, or near enough for the students to attend. Through the courtesy of the Presidents and Superintendents of the several railroads in the State, free passes have been obtained for the students to attend meetings in the different counties—this being regarded as coming within the requirements of the statute—and the meetings so held have been very interesting and profitable to the students. Besides, by visiting the different parts of the State, the students have been enabled to make decided friends for the Institution, and to give a good idea of its course of study and discipline to those who could not well visit it.

The College, since its establishment, has received the following appropriations from the State: In 1867, \$20,000; in 1868, \$10,000; in 1870, \$50,000; in 1871, \$6,000; in 1872, \$18,000; in 1873,

\$24,000; in 1874, \$12,500; in 1875, \$10,500; and in 1876, \$8,000; a total of \$159,000. If the above amounts seem large, it must be borne in mind that they are small compared with the appropriations which other States have made for institutions of a similar character. Thus, Michigan has given its College \$419,000 in eighteen years; Iowa, \$329,000 in seven years; Massachusetts, \$313,000 in seven years; Illinois, \$235,000 in five years, and Pennsylvania, \$270,000 in four years.

The laboratory building was completed in 1870, and the dormitory and boarding-house built in 1871. The dormitory is three stories high, and has forty-eight rooms. The President's house was built in 1872, a Professor's house in 1873, and the large barn in 1874. The students erected a building for their own purposes in 1876. The total number of buildings belonging to the College is as follows: Three for College purposes, one boarding-house, four dwellings for the use of the instructors, and four barns and stables.

Changes have been made from time to time in the Faculty of the College which it is not necessary here to specifically mention; but as constituted during the present year, 1876, the Board of Instruction has been as follows:

Rev. Charles F. Allen, D. D., President, English Literature, Mental and Moral Science.

Merritt C. Fernald, A. M., Mathematics and Physics.

William A. Pike, C. E., Mechanical and Civil Engineering.

Charles H. Fernald, A. M., Natural History.

Alfred B. Aubert, B. S., Chemistry.

Winfield S. Chaplin, C. E., Modern Languages, and Military Instructor.

George H. Hamlin, C. E., Librarian and Assistant in Engineering.

Joseph R. Farrington, Instructor in Agriculture.

Courses of Lectures have been given by non-resident professors, at different times, among which are the following: Dairy Husbandry, by X. A. Willard, A. M.; Market Gardening, J. J. H. Gregory; Anatomy and Physiology, Calvin Cutter, M. D.; Entomology, Prof. A. S. Packard, Jr.; Veterinary Science, Prof. James Law.

The following table represents the number of students in each year since the opening of the College :

Years.	Seniors.	Juniors.	Sophomores	Freshmen.	Special.	Total.
1868	—	—	—	13	—	13
1869	—	—	13	10	—	23
1870	—	9	9	14	—	32
1871	6	6	6	24	—	42
1872	7	7	25	32	—	71
1873	7	20	41	34	1	103
1874	19	42	30	28	2	121
1875	33	20	22	35	5	115
1876	18	16	37	20	3	94

The appropriations made by the State have been expended for the erection of buildings, the purchase of scientific apparatus, implements and farm stock, and for supplementing the income from the National grant in defraying the expenses of salaries. While the income from the grant is but \$8,400 per annum, the salaries of professors and teachers amount to \$12,500 per annum ; the balance of which has to be made up from the sums appropriated by the State from time to time. It has been found necessary, in order to keep up the character of the Institution, to furnish the instruction demanded by the increased number of pupils, and to sustain teachers of positive ability—to pay as good salaries as are paid by other institutions of a similar nature ; consequently the annual expenses in this direction have exceeded the income for the purpose provided by the endowment of the National Government, and the assistance of the State has been necessary. The College farm is worth \$15,000 ; while the value of the scientific apparatus is \$9,000 ; of the library, \$1,000 ; of the farm stock, \$3,800, and of farm implements, \$1,500.

Such, in brief, is the history of the Maine State College of Agriculture and the Mechanic Arts. It has been in operation but a very few years, has had to contend with much opposition, has been operating upon new ground, has been cramped for means—and yet there are some persons in our State who seem by their criticisms to be quite dissatisfied because it does not show greater results, because its graduates are not all becoming farmers, because it does not begin to pay back to the State something in return for what it has received. As if startling results could be obtained in a dozen years ; as if a graduate, in half as many years, could

purchase and stock a farm, become a successful farmer, and show to the State the value of a course of training at the State College! These results come slowly. All results of this kind are only reached after the most patient and the most persistent efforts. It is not to be expected of a young man a few years from graduation, that he shall be successfully established in business, unless he have large financial resources. Most of our graduates have to work their way through College, depend upon themselves, and do that first which offers the best immediate returns. Subsequently, they enter upon the business of life, or engage in that profession or occupation towards which they have long been looking. Moreover, it is not expected that all who take the course at Orono will become farmers: many will become teachers, some lawyers, some engineers, some manufacturers. But graduation determines nothing in regard to the profession a man will follow. Dr. Abbott, President of the Michigan Agricultural College, states on the authority of a member of the State Legislature, that out of a class of twenty-four, who graduated with him in law, only four were practicing lawyers. He also says that not over half the graduates of the professional schools practice the professions, although to do so requires no large outlay as a farmer's business does. But it is the aim of our State College to create a bias towards, and not away from the farm, to make the atmosphere of the place one of respect for all kinds of work and of a feeling of fellowship with farmers. In carrying out this idea, the labor system and the instruction are planned to match each other, to illustrate each other; so that to the labor is given some of the dignity of scientific work, and to the scientific instruction labor serves as a kind of laboratory practice for instruction. For the purpose of making better known to our people the aims and methods of this Institution, I copy from the last report of the Trustees, their general statement concerning the same, which, in the form in which it is printed for the College, has but a limited circulation among our young farmers and mechanics, those who are looking towards the College for giving them that scientific and practical training which they need to become better citizens and more skilled and intelligent workmen:

"DESIGN OF THE INSTITUTION. It is the design of the Maine State College of Agriculture and the Mechanic Arts, to give the young men of the State who may desire it, at a moderate cost, the advantages of a thorough, liberal and practical education. It

proposes to do this by means of the most approved methods of instruction, by giving to every young man who pursues the course of study an opportunity practically to apply the lesson he learns in the class-room, and by furnishing him facilities of defraying a part of his expenses by his own labor. By the act of Congress granting public lands for the endowment and maintenance of such colleges, it is provided that the leading object of such an institution shall be, 'without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to Agriculture and the Mechanic Arts.' While the courses of study fully meet this requisition, and are especially adapted to prepare the student for agriculture and mechanical pursuits, it is designed that they shall be also sufficiently comprehensive, and of such a character, as to secure to the student the discipline of mind and practical experience necessary for entering upon other callings or professions.

CONDITIONS OF ADMISSION. Candidates for admission to the Freshman class must be not less than fifteen years of age, and must pass a satisfactory examination in Arithmetic, Geography, English Grammar, (especial attention should be given to Orthography, Punctuation and Capitals,) History of the United States, Algebra as far as Quadratic Equations, and five books in Geometry. Although the knowledge of Latin is not required as a condition of admission, yet the study of that language is earnestly recommended to all who intend to enter this Institution. Candidates for advanced standing must sustain a satisfactory examination in the preparatory branches, and in all the studies previously pursued by the class they propose to enter. Satisfactory testimonials of good moral character and industrious habits will be rigidly exacted. The day after commencement, which is the last Wednesday of June, and the day before the beginning of the first term, are the appointed times for the examination of candidates.

COURSE OF INSTRUCTION. Five full courses are provided, viz.: A course in Agriculture; in Civil Engineering; in Mechanical Engineering; in Chemistry; and in Science and Literature. The studies of the several courses are essentially common for the first two years. There will be regular exercises during the four years in English Composition, Declamation and Military Tactics. Lectures will be given to the Freshman class, on Physics, Meterology, Physical Geography and Botany; to the Sophomore class, on

Chemistry, Horticulture and Practical Agriculture; to the Junior class, on Anatomy, Physiology, Astronomy and English Literature; and to the Senior class, on Rural Law, Mineralogy, Geology, Stock Breeding, Cultivation of Grasses and Cereals.

Special Course. Students may be received for a less time than a full course, and may select from the studies of any class such branches as they are qualified to pursue successfully. Students in the Special Course are not entitled to a degree, but certificates of proficiency may be given them.

Degrees. The full course in Civil Engineering entitles to the Degree of Bachelor of Civil Engineering; the full course in Mechanical Engineering, to the Decree of Bachelor of Mechanical Engineering; the full course in Agriculture, Chemistry, or Science and Literature, to the Degree of Bachelor of Science. Three years after graduation, on presentation of a thesis with the necessary drawings, and proof of professional work or study, the Bachelors of Civil Engineering may receive the Degree of Civil Engineer; the Bachelors of Mechanical Engineering, the Degree of Mechanical Engineer; the Bachelors of Science, the Degree of Master of Science.

COURSES OF STUDY.

First Term.

Physical Geography,
Meterology,
Algebra,
Rhetoric.
P. M. Labor on Farm.

FIRST YEAR.

Second Term.

French,
Algebra and Geometry,
Farm Drainage and Botany.
P. M. Book-Keeping and Labor.

SECOND YEAR.

French and Farm Implements,
General Chemistry,
Trigonometry,
P. M. Free Hand Drawing and
Chemistry.

Mechanical Cultivation of the Soil, and
Surveying, or History of England,
English Literature and Physics,
Analytical Geometry and Calculus or
Qualitative Chemistry.
P. M. Mechanical Drawing and Field Work.

THIRD YEAR.

COURSE IN AGRICULTURE.

Physics,
Physiology, Human Anatomy and Hygiene,
German,
Agricultural Chemistry or
English Literature,
P. M. Chemistry or
Analysis of English Authors.

Zoology and Entomology,
German,
Astronomy and Mechanics.
P. M. Chemistry and Experimental
Farming, or
Analysis of American Authors.

COURSE IN CIVIL ENGINEERING.

First Term.

Second Term.

Calculus,	Astronomy,
Hincks' Field Book,	Descriptive Geometry,
Physics,	First Part of Rankine's Civil Engineering
German.	and Mechanics,
P. M. Field Work and Shading.	German.
	P. M. Isometric and Cabinet Projections
	and Perspective.

COURSE IN MECHANICAL ENGINEERING.

Calculus,	Astronomy,
Machinery and Mill Work,	Descriptive Geometry,
Physics,	Machinery and Mill Work,
German.	German.
P. M. Machine Drawing and Shading.	P. M. Machine Drawing and Designing.

COURSE IN CHEMISTRY.

Physics,	Zoology and Entomology,
Physiology,	German,
German,	Chemistry,
Chemistry.	P. M. Laboratory Work.
P. M. Laboratory Work.	

FOURTH YEAR.

COURSE IN AGRICULTURE.

Comparative Anatomy,	U. S. Constitution and Political Economy,
History of Civilization,	Mineralogy and Geology,
Dairy Farming and Stock Breeding,	Cultivation of Cereals, Landscape Gar-
Logic.	dening,
P. M. Experimental Farming and	Rural Architecture and Sheep Husbandry,
Agricultural Botany,	Mental and Moral Science.
Historical Readings and Analysis.	

COURSE IN CIVIL ENGINEERING.

Second Part of Rankine's Civil Engineering,	U. S. Constitution and Political Economy,
Logic,	Mineralogy and Geology,
Physiology,	Third Part of Rankine's Civil Engineering,
P. M. Stereotomy, Topography and	P. M. Machine Drawing and Designing.
R. R. Work.	

COURSE IN MECHANICAL ENGINEERING.

Steam Engine,	Steam Engine Designs and Specifications,
Logic,	U. S. Constitution and Political Economy,
Physiology.	Mineralogy and Geology.
P. M. Applied Descriptive Geometry	P. M. Machine Drawing and Designing.
and Machine Drawing.	

COURSE IN CHEMISTRY.

Comparative Anatomy,	U. S. Constitution and Political Economy,
History of Civilization,	Mineralogy and Geology.
Logic.	Chemistry.
P. M. Chemistry.	P. M. Laboratory Work.

SPECIAL FEATURES OF THE COURSE. The prominence given to the Natural Sciences, and the practical element associated with the studies, render the first two years exceedingly valuable, as the groundwork of whatever more specific department may be pursued. Those who complete the course in Agriculture will have attained a good knowledge of Mathematics, French, German and English Literature, besides the studies in Natural Science that have a direct bearing upon agriculture. The study of Botany extends through nearly a year, commencing early in the Spring and extending late in the Autumn. General Chemistry and Physics continue through a whole year. Under Agricultural Chemistry will be considered composition of soils, relations of air and moisture to vegetable growth, chemistry of farm processes, methods of improving soils, fertilizers, and other topics which properly come under this department. This course, slightly modified so as better to adapt it to those wishing a thorough, practical education for other employments, is called the course in Science and Literature. This includes mental and moral science, logic and more of general literature. The student in Civil Engineering having laid a good foundation of general culture in literary studies, modern languages, mathematics and natural science, in his Junior year enters upon his engineering studies, embracing the theory and practice of constructing roads, railroads, bridges, canals, dams and other structures, and has thorough instruction and practice in mechanical and topographical drawing. The afternoons are devoted to field work and drawing. With the same instruction in general studies, those who take the course in Mechanical Engineering study the elements of mechanism, machinery and mill work, steam engines, water wheels, estimates and specifications for machinery. They are instructed to draw working plans from descriptions, models and inspection of machinery, as well as to design machines. The course in Chemistry includes general, analytical and agricultural chemistry. Under analytical chemistry is comprised the qualitative and quantitative analysis of minerals, alloys, earths, fertilizers and farm products. The students devote three hours a day to laboratory practice.

LABOR. It is a peculiarity of the college, that it makes provision for labor, thus combining practice with theory, manual labor with scientific culture. Students in this institution are required to labor a certain portion of each day, not exceeding three hours,

for five days in the week. The labor is designed to be as much as possible educational, so that every student may become familiar with all the forms of labor upon the farm and in the garden. In the lower class the students are required to work on the farm, and they receive compensation for their labor according to their industry, faithfulness and efficiency, the educational character of the labor being also taken into account. The maximum amount paid will be thirty cents for three hours labor.

MILITARY. Thorough instruction is given in Military Science by a competent officer. The instruction extends through the whole college course, and embraces personal, squad, company and battalion drill. The students are enrolled in companies under their own officers. Arms are furnished by the State. The uniform is navy blue yacht cloth, sack coat and pants, without brass buttons or trimmings that attract attention.

FARM AND BUILDINGS. The college farm contains three hundred and seventy acres of land of high natural productiveness, and of great diversity of soil, and is therefore well adapted to the experimental purposes of the institution. White Hall, the first building erected, affords excellent accommodations for a limited number of students. The lower rooms of this building are appropriated to general and class purposes. Brick Hall contains forty-eight rooms. The boarding house connected with the College buildings is open to students. With these buildings, the institution furnishes desirable accommodations for one hundred and twenty-five students. The chemical laboratory contains two apparatus rooms, a lecture room, a cabinet, a library and weighing room, a recitation room, and rooms for analytical and other purposes, and is in all respects admirably adapted to the wants of the chemical and mineralogical departments.

APPARATUS. The College is furnished with new and valuable apparatus for the departments of Physical Geography, Natural Philosophy and Chemistry, and for Surveying and Civil Engineering, to which additions will be made as the exigencies of the several departments require. Models have been obtained from the United States Patent Office, and others have been purchased, that serve for purposes of instruction.

LIBRARY. The library already contains 2,640 volumes, some of which have been obtained by purchase, while others have been

kindly given to the College. The volumes secured through the liberality of Governor Coburn, and the gifts of other friends, are a valuable addition to this department. It is earnestly hoped that so important an auxiliary in the education of students in the College will not be disregarded by the people of the State, but that liberal contributions will be made to the Library, not only of agricultural and scientific works, but also those of interest to the general reader.

CABINET. Rooms have been fitted up with cases of Minerals, and specimens of Natural History, and several hundred specimens have been presented to the College. The valuable private cabinet of Prof. C. H. Fernald is placed in these rooms, and is accessible to the students. All specimens presented will be properly credited and placed on exhibition. Rocks illustrating the different geological formations, and minerals found within the State, are particularly solicited. Additions have been made during the past year.

LITERARY SOCIETIES. Flourishing societies have been organized by the students of the College, which hold weekly meetings for declamations, discussions, and other literary exercises.

PUBLIC WORSHIP. All students are required to attend daily prayers at the College, and public worship on the Sabbath at some one of the neighboring churches, unless excused by the President.

EXPENSES. Tuition is free to students residing within the State. Those from other States will be charged twelve dollars per term. Rooms are free; all bedding and furniture must be supplied by the students, who will also furnish their own lights. Board, washing, and fuel will be furnished at cost. The price of board will be two dollars and sixty cents per week, the fuel and washing fifty cents per week. These bills, with those for incidental expenses, are payable at or before the close of each term. The terms are so arranged that the long vacation occurs in the winter, that students may have an opportunity to teach during that time. By means of the amount thus earned, together with the allowance for labor, the industrious and economical student can cancel the greater part of his College expenses."

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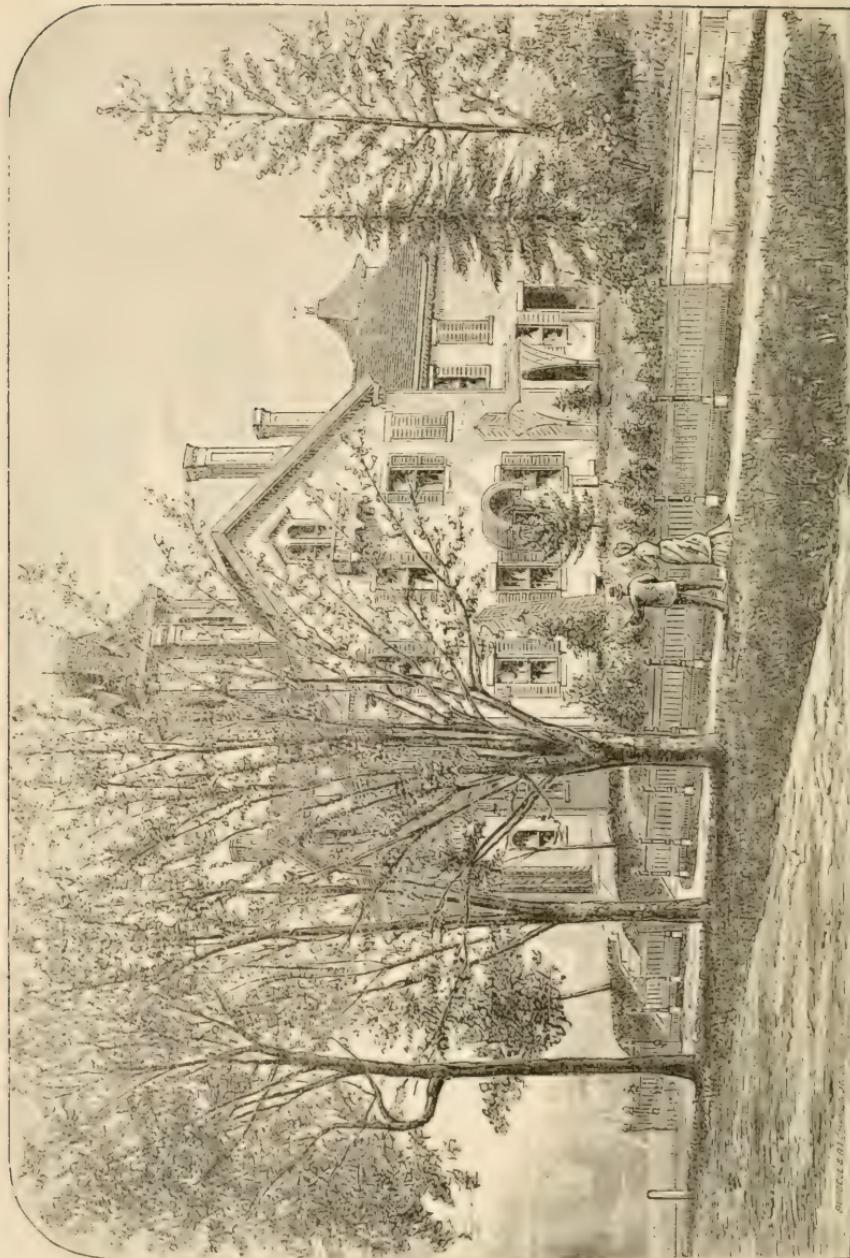
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RESIDENCE AND GROUNDS OF THE LATE DR. J. C. WESTON, BANGOR.



ANNUAL REPORTS
OF THE
AGRICULTURAL SOCIETIES

OF

MAINE, FOR 1876-7;

WITH ACCOMPANYING PAPERS.

EDITED BY
SAMUEL L. BOARDMAN.
SECRETARY OF BOARD OF AGRICULTURE.

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1877.

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Maine State Pomological Society.

TRANSACTIONS FOR 1876.

The report herewith presented embraces the Transactions of the Maine State Pomological Society,—so far as their publication is deemed to be of interest to the members of the Society or the public at large, or to be required by law or usage,—during the year 1876; closing with the Winter Meeting held (by adjournment) January 23d and 24th, 1877.

The primary object of our organization is “the promotion of fruit culture,” as an interest important to individuals and to the State; and among the various subjects connected with and tending to this object, which have received more or less attention during the past year, the experience and investigations of the Society have shown that no other is of such paramount and present importance as *high and thorough cultivation*. Accordingly the attention of the Society has been largely directed to this point.

It has also been found that many inferior or unprofitable varieties of fruit are grown in the State; and constant efforts have been made to diminish them,—by the frequent and full discussion of varieties, by discouraging their presentation at our exhibitions and by marking them with disapprobation in our fruit lists,—and to encourage the substitution of better varieties in their stead.

The Society has as yet been able to give but little attention to the production of new varieties, nor has it made any systematic efforts to introduce and test new varieties from abroad. These subjects will, undoubtedly, as they should, receive a due share of attention in the future.

It is a well established fact that we have, in the larger portion of the State, the requisite conditions of soil and climate for the production of apples of high quality and of the finest texture; of

such size, attractive coloring and unrivalled keeping qualities as to command attention in any market; and in endless varieties;—of pears, plums and grapes sufficient in variety and quality for all our wants, and of the small fruits in the greatest profusion and excellence.

We have varieties of fruits more than sufficient in number and intrinsically good enough in quality, for our present purposes. Our most urgent need is not the production of native seedling fruits or the introduction of new varieties from abroad, but the *thorough, high cultivation* of what we have; with a judicious selection of the best varieties for that purpose.

With an increased knowledge of the actual condition of the business of fruit-growing in the State, the importance of these two points has become each year more fully apparent than before, and hence they have occupied a large share of the time at all of our meetings. The exhibitions have also exerted a powerful influence in the same direction because attention to these fundamental conditions is essential to successful competition.

MEMBERSHIP.

By reference to the list of members hereto appended, it will be seen that the membership of the Society has changed somewhat since the last report, chiefly by the falling off of a considerable number of the earlier "annual members," who have not seen fit to continue their contributions, and the accession of others in their stead. This change is always to be expected, as there are among those who become members (more especially at the annual exhibitions) some who have no permanent interest in the work of the Society. The by-laws provide that the names of such persons shall be retained on the lists as members for two years after their annual payments have ceased. This provision was thought to be wise on the ground that it would prevent the summary dismissal of many who through forgetfulness, temporary absence or inability might neglect the payment of dues for a single year, and yet might wish to retain a continuous membership. But it is found in practice that it does not tend to encourage prompt payment, that it increases the incidental expenses of the Society, produces to that extent an essentially fictitious membership and brings but little money into the treasury. It might be well for the Society to consider the propriety of so amending the by-laws as to drop the names of non-paying members at the end of one year.

The Society must depend chiefly for its continued support and efficiency upon the life members. This class of memberships is better both for the Society and the individual, by reason of the comparatively small payment required (\$10.00), the additional benefits mutually secured and the permanent investment of the proceeds.

There was no increase in the number of life members, and consequently none in the amount of the permanent fund, during the year ending December 31st. The list being made up at a later date embraces the names of several who became such at the Winter Meeting and whose payments will appear in the Treasurer's accounts for 1877.

I am happy to report that so far as I am informed no member of the Society has deceased during the year.

The Society most urgently needs a large accession to its membership, and that it should embrace every section of the State. This will be apparent when it is remembered that its plans embrace, among other things, the collection of statistics, the gathering and diffusion of general information, the making of careful and extended experiments and observations, and the active work of the meetings and exhibitions.

There are enough persons in the State directly interested in the objects which the Society aims to promote, to place it, by their assistance and coöperation, on a level, financially and in its developing and educational power, with the flourishing horticultural societies of the other States of the Union. And there is a still larger class interested generally in the welfare of the State, in the development of its resources and the increase of its productions and in making its citizens prosperous and contented at home, to whom we may with propriety appeal for material aid. We seek to build up and encourage the arts of horticulture and rural adornment,—promoting prosperity, health, education and happiness, as the conditions of good citizenship and high civilization. We do not expect that any person by joining our Society will become suddenly rich or successful, but that all will be benefitted and the State enriched.

It is gratifying to report that the Society is making constant but very gradual additions to its working force from among the more intelligent horticulturists of the State, and receiving much encouragement and assistance from prominent individuals of the same class abroad.

The operations of the Society during the past year, aside from the Annual Exhibition and Winter Meeting which will be more fully detailed in subsequent pages of this report, may be stated in a few words. The officers have, as heretofore, rendered their services without compensation, and have transacted the most of the business devolving on them by means of correspondence, necessarily frequent and voluminous, in preference to entailing upon the Society the expense of frequent meetings. In fact but one meeting of the Executive Committee was held during the year otherwise than in connection with the general meetings of the Society.

The library has not been increased except by the addition of public and official documents and the reports of other societies received in exchange for our own, a list of which will be found in the report of the Corresponding Secretary.

There has been during the year frequent and extensive correspondence between the members, and they have contributed to the newspapers a large number of valuable articles on horticultural subjects. The public Press of the State is entitled to much credit for the large amount of horticultural matter of a high order, both original and selected, which it has of late given to the public in answer to an increased demand. On every hand there are unmistakable indications that the people of the State are thinking upon the subject, and it is the laudable ambition of this Society to lead in and give the proper direction to the interest which it has been instrumental in awakening.

The results of some of the specific researches and observations of the members and committees of the Society will appear in the detached papers at the end of this report.

THE SEASON OF 1876

was in its climatic conditions generally favorable for fruit-culture in this State. Throughout a considerable portion of the State, embracing parts of Androscoggin, Franklin, Kennebec and Oxford counties, the crop of apples was greatly reduced and in some localities entirely cut off by the ravages of caterpillars. But in sections where this was not the case and where the vitality of the trees had not been impaired by the operation of the same cause in the preceding year it is believed the crop was fully an average one; and the fruit was uniformly well ripened and fair. Those persons who have not witnessed the devastation alluded to can

have no adequate idea of its effects. The insects appeared so suddenly and in such numbers as in most cases to baffle the skill of the cultivators. Many persons however saved their trees by extreme vigilance and neglecting for the time all other employment, but at an expense exceeding the value of a single crop. It is gratifying to note that the most careful observations indicate that this pest will not re-appear in the coming season. It was fortunate that while our own crop of apples was so much reduced by this cause, large quantities were brought in from other States and sold at moderate prices ; but it was a novel sight to see some of our extensive orchardists buying fruit for their own use.

Pears were grown in about the usual quantity and of good quality, but in the immediate vicinity of Portland the crop was reduced by a violent hail storm at the time of blossoming. Grapes of the varieties adapted to the climate were produced in abundance and well ripened. Neither blight or mildew appear to have affected the one or the other of these crops to any considerable extent. The crop of plums was smaller than usual. The small fruits and berries were abundant and received much attention in cultivation.

For more specific information in respect to the season and its fruitage, reference may be had to the local reports embraced in this volume, presented at the Winter Meeting in answer to a circular issued by the President.

THE FOURTH ANNUAL EXHIBITION

of the Society was held at Waterville, on the third, fourth, fifth and sixth days of October, 1876, concurrently with the annual fair of the North Kennebec Agricultural Society. The two exhibitions were entirely distinct and independent of each other, though arranged by mutual agreement. The North Kennebec Society generously waived its prior claim to the occupancy of the new Town Hall, and its use was afforded by the town to the Pomological Society gratuitously. The citizens of Waterville interested themselves liberally in behalf of the Society and by their exertions contributed largely to the degree of success which attended the exhibition.

In making the arrangements for this exhibition the Executive Committee were aware of the manifold difficulties attendant upon the undertaking,—that it was a year of great political excitement

and general financial depression, that the pendency of the Centennial Exposition would to a large extent engage the attention of the people, and that many of our orchardists were discouraged by the repeated destruction of their crops by caterpillars. But it was deemed important that an exhibition should be held in order that the work of the Society should suffer no relapse ; and it was felt that if it should prove to be a failure it would be less detrimental than an entire suspension of operations. In order to guard against possible failure, it was provided in the regulations "that all premiums awarded should be liable to a *pro rata* reduction sufficient to meet any deficiency that might occur in the receipts, to meet said premiums and other expenses." Unfortunately, the continued prevalence of stormy weather during the exhibition reduced the receipts to such a degree that the Executive Committee were compelled, reluctantly, to resort to such reduction in preference to involving the Society in a permanent debt ; and accordingly a discount of 25 per cent. on the premiums was ordered, in which the members and other persons entitled to premiums very generally and cheerfully acquiesced.

The amount offered in premiums, subject to the above condition, was \$1,040.00, exclusive of \$40.00 offered and paid in full by James Vick, the celebrated florist and seedsman of Rochester, N. Y., as special premiums for cut flowers. The total amount of premiums awarded was \$697.00. Further financial details of the exhibition may be found in the report of the Executive Committee hereto appended.

The following schedule exhibits the premiums offered, the conditions affixed, the entries, and the premiums awarded.

[*Note* —The names of persons to whom premiums were awarded are given first, under each specification, with the amount awarded, and afterwards the names of other competitors for the same. When the name of a person is *repeated* the place of residence is omitted.]

CLASS 1.—*Apples.*

FIRST DIVISION.

Conditions.—“Entries for all premiums in this division must consist of five specimens of each variety exhibited, and (except Nos. 19 and 20) of at least twenty named varieties. Entries for premium No. 1 must be separate and distinct collections, not embracing any other collection or specimens.”

“Collections entered for premiums Nos. 2 to 17, may also be entered for No. 18, but in any such case only one premium will be awarded for one collection.”

Premium No. 1. For the best general collection of apples grown exclusively within the limits of either county in this State, but not necessarily grown by the exhibitor.

S. H. Cole, Lewiston, (Androscoggin County,) first premium, \$20; Joseph Taylor, Belgrade, (Kennebec County,) second premium, \$15; George B. Sawyer, Wiscasset, (Lincoln County,) third premium, \$10.00.

2. For the best general collection of apples, grown by the exhibitor, in Androscoggin County. (No entry.)

3. For the same in Aroostook County. (No entry.)

4. For the same in Cumberland County. Milton Dyer, Cape Elizabeth, \$10.

5. For the same in Franklin County. (No entry.)

6. For the same in Hancock County. (No entry.)

7. For the same in Kennebec County. Joseph Taylor, \$10. Adrian Bowman, Waterville; Alfred Smith, Monmouth; Charles S. Pope, Manchester.

8 to 13 inclusive. For the same in Knox, Lincoln, Oxford, Penobscot, Piscataquis and Sagadahoc Counties. (No entries.)

14. For the same in Somerset County. Frank E. Nowell, Fairfield, \$10.

15. For the same in Waldo County. Mrs. A. B. Strattard, Monroe, \$10.

16. For the same in Washington County. (No entry.)

17. For the same in York County. John Hanscom, Saco, \$10.

18. For the best general exhibition of apples. Pulsifer Bro's, Poland, \$20; S. C. Harlow, Bangor, \$15; Alfred Smith, \$10; Adrian Bowman, \$5. Henry Taber, Vassalboro'; Joseph Taylor, Charles S. Pope.

19. For the best five named varieties of fall apples. Charles S. Pope, \$5; Alfred Smith, \$3; Pulsifer Bro's, \$2. Joseph Taylor, Mrs. A. B. Strattard, S. C. Harlow.

20. For the best five named varieties of winter apples. Pulsifer Bro's, \$5; Alfred Smith, \$3; S. C. Harlow, \$2. Joseph Taylor, Mrs. A. B. Strattard, Adrian Bowman, Milton Dyer, Asa F. Severance, Nobleboro'.

SECOND DIVISION.

Entries for premiums in this division were required to consist of ten specimens of each variety exhibited.

21. For the best single variety of autumn apples. Charles S. Pope, \$3; Pulsifer Bro's, \$2. Joseph Taylor, Alfred Smith, S. C. Harlow.

22. For the best single variety of winter apples. Joseph Taylor, \$3; S. C. Harlow, \$2. Alfred Smith, Pulsifer Bro's.

23. For the best dish of American Golden Russets. George B. Sawyer, \$2. Mrs. A. B. Strattard, S. H. Cole, Alfred Smith, Daniel Ayer, Vassalboro'.

24. Baldwins Charles S. Pope, \$2; Alfred Smith, \$1. Joseph Taylor, Mrs. A. B. Strattard, Geo. B. Sawyer, S. H. Cole, Aretas Haskell, Pittsfield; F. W. Runnells, Clinton; Henry Taber, Geo. H. Andrews, Monmouth; Daniel Ayer, Pulsifer Bro's, Milton Dyer.

25. Black Oxford. S. H. Cole, \$2; George H. Andrews, \$1. Mrs. A. B. Strattard, Henry Taber, Pulsifer Bro's; I. S. Weeks, Vassalboro'.

26. Dean. Joseph Taylor, \$2.

27. Duchess of Oldenburgh. Pulsifer Bro's, \$2; Henry Tilley, Castle Hill, \$1. S. C. Harlow.

28. Fall Harvey. Aretas Haskell, \$2; Russell Eaton, Augusta, \$1. Henry Taber, Alfred Smith.

29. Gravenstein. Pulsifer Bro's, \$2; S. H. Cole, \$1. Joseph Taylor, S. C. Harlow.

30. Hubbardston Nonsuch. Pulsifer Bro's, \$2; Russell Eaton, \$1. Joseph Taylor, Henry Taber, Alfred Smith.

31. Hurlbut. Henry Taber, \$2; Daniel Ayer, \$1.

32. Jewett's Fine Red, (Nodhead.) Joseph Taylor, \$2; Alfred Smith, \$1. A. F. Severance, Aretas Haskell, Henry Taber, Pulsifer Bro's; Stephen Knox, Fairfield Centre.

33. King of Tompkins County. Pulsifer Bro's, \$2; Aretas Haskell, \$1. Joseph Taylor, Mrs. A. B. Strattard, Geo. B. Sawyer, Daniel Ayer.

34. King Sweeting. Alfred Smith, \$2.

35. Minister. (No entry.)

36. Mother. George H. Andrews, \$2; S. H. Cole, \$1.

37. Northern Spy. Joseph Taylor, \$2; Charles S. Pope, \$1. Mrs. A. B. Strattard, S. H. Cole, Russell Eaton, Aretas Haskell, F. W. Runnells, Henry Taber, Alfred Smith, Pulsifer Bro's.

38. Porter. Milton Dyer, \$2; Pulsifer Bro's, \$1. Joseph Taylor, Mrs. A. B. Strattard, Aretas Haskell, Alfred Smith.

39. Pumpkin Sweet. (No entry.)

40. Red Astrachan. S. C. Harlow, \$2. Daniel Ayer.

41. R. I. Greenings. Pulsifer Bro's, \$2; S. H. Cole, \$1. Joseph Taylor, Aretas Haskell, Henry Taber, Alfred Smith.

42. Roxbury Russets. Alfred Smith, \$2; George H. Andrews, \$1. Joseph Taylor, Adrian Bowman, Pulsifer Bro's.

43. Sops of Wine, (Bell's Early.) S. C. Harlow, \$2. Henry Tilley.

44. Somerset. Joseph Taylor, \$2.
45. Starkey. Charles S. Pope, \$2; Daniel Ayer, \$1. Henry Taber.
46. Tallman's Sweet. Pulsifer Bro's, \$2; Daniel Ayer, \$1.
Aretas Haskell, Henry Taber, Frank E. Nowell, Alfred Smith.
47. Williams' Favorite. S. C. Harlow, \$2; Joseph Taylor, \$1.
S. H. Cole, F. W. Runnels.
48. Winthrop Greenings. S. H. Cole, \$2; Alfred Smith, \$1.
Joseph Taylor, Russell Eaton, Henry Taber.
49. Yellow Bellflower. F. W. Runnells, \$2; S. H. Cole, \$1.
Joseph Taylor, Mrs. A. B. Strattard, Henry Taber, Frank E. Nowell, Geo. H. Andrews, Alfred Smith, John Hanscom, Pulsifer Bro's.
50. Seedling apples. (Not awarded.) S. H. Cole, F. W. Runnells and I. S. Weeks, each exhibited two varieties. Joseph Taylor, Mrs. A. B. Strattard, Columbus Hayford of Maysville, Adrian Bowman, Alfred Smith, J. C. Richardson of Garland, one each.
51. Crab apples. Geo. B. Sawyer, Transcendant, \$1. Joseph Taylor, Henry Tilley, Transcendant, Montreal Beauty and Hyslop; Frank E. Nowell, Alfred Smith, Pulsifer Bro's.
52. Collection of crab apples—not less than five varieties. Geo. B. Sawyer, \$3. Joseph Taylor, Mrs. A. B. Strattard, Alfred Smith, S. C. Harlow.
Sundries. Nathaniel Oak, Exeter, collection 17 varieties winter apples, gratuity, \$3; F. W. Runnells, Fall Pippin, Autumn Strawberry, Fall Jeneting, Fameuse and a sweet variety, gratuity, \$2; Daniel Ayer, Fall Seek-no-further, Wagener, 20-ounce and Queen Vic, gratuity, \$2; Joseph Taylor, Judy and Flanders apples, gratuity, \$1; S. H. Cole, Spitzenburgh; G. B. Sawyer, Fameuse; Henry Tilley, Beauty of Kent and Fameuse; Geo. H. Andrews, Fairbanks; John Hanscom, Bottle Greenings; S. H. Farnsworth, China, basket of apples.

Dr. H. A. Robinson of Foxcroft, presented very fine specimens of the Rolfe apple, so called, some of which were forwarded by the Secretary to Mr. Charles Downing, and elicited the following reply: "The large red apple, marked Rolfe, is the same as 'Macomber' on page 262 of *Downing's Fruits and Fruit Trees of America*, second revised edition. I have received it under both names. * * * * It has fruited here two seasons and promises to be valuable. I find on referring to my notes that Calvin Chamberlain of Foxcroft, Me., says that it was a seedling planted by Mrs. Betsey Houston of Abbot, Me., on her farm, which was soon after sold to Mr. Rolfe, who presented the apples to Benjamin Macomber, and the latter named it Rolfe. Of course the name is *Rolfe*."

The description above referred to (Downing, p. 262) is as follows:

"MACOMBER—Origin, Guilford, Maine. Tree a good annual bearer. Fruit, full medium, oblate, angular, yellowish, shaded and striped with red. Stalk, short. Cavity, large. Calyx, closed. Basin large and regular. Flesh white, fine grained, tender, sub-acid. Good. Core, small. December and January."

The same fruit was exhibited at the Winter Meeting of the Board of Agriculture in 1872, under the name of *Rolfe*.

Concerning the seedling apples exhibited, it must be confessed that they did not receive that degree of attention and careful examination which they ought to have had. This was not the fault of the awarding committee, but of the arrangement by which the seedlings were placed in the same division with single dishes of named varieties. Of the latter there were about 200 plates, representing more than sixty varieties. The labor of thoroughly examining and correctly judging so many specimens, is quite as much as should be imposed upon a single committee. As to the seedlings, it only appears that the premiums were "not awarded" and the varieties not named, consequently they are eligible for exhibition as seedlings another year if on further trial the growers shall deem them worthy of it.

CLASS 2.—Pears.

Entries for premiums Nos. 53, 54 and 55 were required to consist of five specimens of each variety exhibited, and for Nos. 56 to 81 inclusive, of ten specimens each.

53. For the best general exhibition of pears. Samuel Rolfe, Portland, \$15; Joseph Taylor, \$12; Alfred Smith, \$8.

54. For the best five named varieties of autumn pears. Joseph Taylor, \$5; Alfred Smith, \$3. G. B. Sawyer.

55. For the best five named varieties of winter pears. (No entry.)

56. For the best single variety of autumn pears. Joseph Taylor, \$3; Alfred Smith, \$2.

57. For the best single variety of winter pears. Samuel Rolfe, \$3; Alfred Smith, \$2.

58. For the best dish of Bartlett pears. (Not awarded.)

59. Belle Lucrative. Geo. B. Sawyer, \$2.

60. Beurre d' Anjou. Alfred Smith, \$2; Joseph Taylor, \$1.

61. Beurre Bosc. (No entry.)

62. Beurre Hardy. Samuel Rolfe, \$2.

63. Beurre Superfin. Joseph Taylor, \$2.

64. Beurre Clairgeau. Geo. B. Sawyer, \$2.

65. Beurre Diel. (No entry.)

66. Buffum. Alfred Smith, \$2; Joseph Taylor, \$1.

67 and 68. Clapp's Favorite and Doyenne Boussock. (No entries.)

69. Duchess d'Angouleme. Jos. Taylor, \$2 ; Alfred Smith, \$1.
 70. Flemish Beauty. Joseph Taylor, \$2 ; Hiram Conforth, West Waterville, \$1. Alfred Smith ; Lemuel Dunbar, Waterville ; S. C. Harlow.
 71. Fulton. Samuel Rolfe, \$2. Joseph Taylor.
 72. Glout Morceau. Alfred Smith, \$2.
 73. Goodale. Joseph Taylor, \$2.
 74. Howell. Geo. B. Sawyer, \$2.
 75. Lawrence. Joseph Taylor, \$2. Geo. B. Sawyer.
 76. Louise Bonne de Jersey. (No entry.)
 77. Seckel. Samuel Rolfe, \$2.
 78. Sheldon. Joseph Taylor, \$2.
 79. Urbaniste. Samuel Rolfe, \$2.
 80. Vicar of Winkfield. Alfred Smith, \$2.
 81. Seedling pears. S. C. Harlow, for a seedling from the Bartlett, originated at Bangor and named the Harlow pear, \$2. Joseph Taylor.

Gratuity—to Alfred Smith, for a very fine dish of Marie Louise, \$1.

CLASS 3.—*Grapes.*

82. For the best exhibition of foreign grapes, grown with fire heat. (No. entry.)
 83. For the best exhibition of foreign grapes, grown in cold grapery. H. P. Storer, Portland, (P. Wade, gardener,) \$10 ; Andrew S. Sawyer, Cape Elizabeth, \$8 ; Geo. B. Sawyer, \$5.
 84. For the best cluster of Black Hamburg. Geo. B. Sawyer, \$2. Andrew S. Sawyer, H. P. Storer.
 85. Wilmot's Hamburg. H. P. Storer, \$2. A. S. Sawyer.
 86. Victoria Hamburg. A. S. Sawyer, \$2. H. P. Storer.
 87. White Frontignan. (No entry.)
 88. Grizzly Frontignan. (No entry.)
 89. White Muscat. H. P. Storer, \$2. Geo. B. Sawyer.
 90. White Chasselas. Geo. B. Sawyer, \$2. Andrew S. Sawyer, H. P. Storer.
 91. Lady Downes. (No entry.)
 92. Buchland Sweetwater. H. P. Storer, \$2.
 93. Trentham Black. H. P. Storer, \$2. Geo. B. Sawyer.
 94. West's St. Peters. H. P. Storer, \$2.
 95. White Nice. (No entry.)
 96. Red Chasselas. H. P. Storer, \$2.
 97. Chasselas Musque. (No entry.)
 98. For the best collection of native grapes, (open air.) Galen Hoxie, Fairfield, \$10 ; Geo. B. Sawyer, \$8 ; J. A. Varney & Son, North Vassalboro', \$5 ; Lemuel Dunbar, \$3. Joseph Taylor.
 99. For the best single variety, open air, three bunches. Joseph Taylor, \$2. Geo. B. Sawyer, Lemuel Dunbar.
 100. For the best three bunches Delaware. Geo. B. Sawyer, \$1. Joseph Taylor, Lemuel Dunbar.
 101. Concord. J. A. Varney & Son, \$1. Joseph Taylor, Geo. B. Sawyer, Galen Hoxie, Lemuel Dunbar.

102. Hartford Prolific. Galen Hoxie, \$1. Geo. B. Sawyer,
Geo. II. Andrews, C. S. Pope, Lemuel Dunbar, J. A. Varney & Son.
 103. Rebecca. (No entry.)
 104. Allen's Hybrid. Geo. B. Sawyer, \$1.
 105. Adirondack. J. A. Varney & Son, \$1.
 106. Black Hawk. J. A. Varney & Son, \$1.
 107. Creveling. (No entry.)
 108. Massasoit. (Rogers' Hybrid No. 3.) (No. entry.)
 109. Wilder. (Rogers' Hybrid No. 4.) Geo. B. Sawyer, \$1.
 Lemuel Dunbar.
 110. Lindley. (Rogers' Hybrid No. 9.) Geo. B. Sawyer, \$1.
 111. Agawam. (Rogers' Hybrid No. 15.) Geo. B. Sawyer, \$1.
 112. Merrimac. (Rogers' Hybrid No. 19.) Geo. B. Sawyer, \$1.
 113. Salem. (Rogers' Hybrid No. 22.) Geo. B. Sawyer, \$1.
 Geo. H. Andrews, Lemuel Dunbar, J. A. Varney & Son.

Gratuities—to Geo. B. Sawyer, for native grapes grown under glass. (Allen's Hybrid, Diana, Delaware, Iona,) \$2; Andrew S. Sawyer, for fine cluster Trebiano, \$3; H. P. Storer, for fine dish Golden Hamburgh, \$2, for Black Prince, \$2, for Chasselas Fontainbleau, \$2, for Muscat of Alexandria, \$2; H. C. Frost, Monmouth, for fine display of Isabella grapes, \$1; also exhibited Northern Muscadine.

CLASS 4.—*Miscellaneous.*

114. For the best general exhibition of plums, not less than six varieties. (No entry.)
 115—135 inclusive. For single varieties of plums, peaches, apricots and nectarines. (No entries.)
 136. For the best dish of quinces. Hiram Conforth, \$2.
 137. For the best ornamental dish of fruit. Pulsifer Bro's, \$3; Mrs. Geo. B. Sawyer, \$2. Mrs. A. B. Strattard.
 138. For the best peck of cultivated cranberries. Alfred Smith, \$3; Mrs. A. B. Strattard, \$2. F. P. Haviland, Waterville.
 139. For the best orange tree, in fruit. (No entry.)
 140. " " lemon " " "
 141. " " fig " " "
 142. For the best exhibition of canned fruits, not less than five varieties, of domestic manufacture. Joseph Taylor, \$3; Miss E. S. Pearson, Vassalboro', \$2. Mrs. A. B. Strattard, Mrs. Geo. B. Sawyer.
 143. For the best exhibition of fruit jellies, not less than five varieties, of domestic manufacture. Mrs. Geo. B. Sawyer, \$3. Mrs. A. B. Strattard.
 144. For the best exhibition of pickles, domestic manufacture. Mrs. A. B. Strattard, \$2.
 145. For the best exhibition of terra cotta ware, made in this State. Portland Stone Ware Co., \$10.
 146. For the best exhibition of ornamental earthen ware, (vases, flower pots, &c.,) made in this State. Portland Stone Ware Co., \$5.

147. For the best oil painting of fruits or flowers. Mrs. F. L. Alden, Waterville, \$3; Same, \$2, (four paintings,—pansies, gladiolus, morning glories, fruits.) Miss I. M. Newhall, Waterville, (apple blossoms.) Mrs. W. W. Edwards, Waterville, (two paintings.) Gratuity, \$2.

148. For the best drawing or other picture of fruits or flowers. (No entry.)

Gratuity.—Mrs. G. B. Sawyer, for specimens sauces, ketchup, &c., \$1.

Honorable mention.—J. E. Woodhead, Chicago, fruit tree labels; Nathaniel Oak, Exeter, barrel carriers; Mrs. S. M. Newhall, Waterville, crab apple marmalade. Mr. Wendelin Busch of Waterville exhibited several full size portraits of citizens of Waterville, painted in oil by himself, which, though not within the range of objects for which the Society can award premiums, received general approbation for fidelity and artistic execution, and added much to the decoration of the hall.

CLASS 5.—*Flowers.*

FIRST DIVISION.

149. For the best display of cut flowers, filling not less than 100 vials, Mrs. Charles Stanley, Winthrop, \$10; J. A. Varney & Son, \$8; Mrs. F. A. Fuller, East Winthrop, \$5; Mrs. A. B. Strattard, Mrs. Russell Eaton, Augusta; Mrs. G. B. Sawyer, James Vickery, Portland.

150. Roses, not less than five varieties. James Vickery, \$2.

151. Dahlias, not less than ten varieties. Mrs. F. A. Fuller, \$2. J. A. Varney & Son.

152. Pinks. J. A. Varney & Son, \$2; James Vickery, \$1.

153. Japan Lilies. Mrs. G. B. Sawyer, \$2.

154. Asters, not less than ten varieties. Mrs. Charles Stanley, \$2; J. A. Varney & Son, \$1. Mrs. A. B. Strattard, Mrs. F. A. Fuller.

155. Pansies. Mrs. Charles Stanley, \$2; Mrs. Peter DeRocher, Waterville, \$1.

156. Zinnias. Mrs. A. B. Strattard, \$2; Mrs. F. A. Fuller, \$1. Mrs. Charles Stanley.

157. Phlox Drummondii. Mrs. A. B. Strattard, \$2; James Vickery, \$1. J. A. Varney & Son, Mrs. Charles Stanley.

158–160, inclusive. Stocks, Balsams, Crysanthemums. (No entries.)

161. Petunias. J. A. Varney & Son, \$2; Mrs. A. B. Strattard, \$1. Mrs. F. A. Fuller, James Vickery.

162. Gladiolus. (Not awarded.) Mrs. A. B. Strattard.

163. Tuberose. James Vickery, \$1. Mrs. A. B. Strattard, Charles S. Pope.

164. Verbenas. J. A. Varney & Son, \$1; Mrs. Peter DeRocher, \$2. Mrs. A. B. Strattard, Mrs. Charles Stanley, James Vickery.

165. Geraniums. J. A. Varney & Son, \$2 .James Vickery.
 166. Ferns. James Vickery, \$2.
 Mrs. Moses Getchell, Winslow, exhibited a fine collection of Gladiolus and other flowers, which were not entered for premiums.

SECOND DIVISION.

167. For the best exhibition of green-house plants. James Vickery, \$10 ; J. A. Varney & Son, \$8.
 168. For the best pair of parlor bouquets. James Vickery, \$3. Mrs. A. B. Strattard.
 169. For the best pair of wall bouquets. Mrs Peter De Rocher, \$2 ; Miss Martha Taylor, Wiscasset, gratuity, \$1.
 170. For the best pair of hand bouquets, James Vickery, \$3.
 171. For the best single bouquet. (No entry.)
 172. For the best bouquet of Asters. Mrs. Charles Stanley, \$2 ; Mrs. A. B. Strattard, \$1. Mrs. F. A. Fuller, J. A. Varney & Son.
 173. For the best bouquet of Dahlias. Mrs. F. A. Fuller, \$2 ; J. A. Varney & Son, \$1.
 174. For the best floral design. Mrs. Charles Stanley, \$5 ; Mrs. A. B. Strattard, \$3.
 175. For the best floral wreath. James Vickery, \$3. Mrs. Charles Stanley.
 176. For the best floral dinner table decoration. Mrs. A. B. Strattard, \$1.
 177. For the best basket of wild flowers. Mrs. Charles Stanley, \$1 ; Mrs. A. B. Strattard, Joseph Taylor.
 178. For the best collection of flower seeds. Mrs. A. B. Strattard, \$2. Miss Edith A. Sawyer, Wiscasset, gratuity, 50 cts.
 179. For the best exhibition of pot plants. (Not awarded.) James Vickery, J. A. Varney & Son.
 180. For the best single pot plant. James Vickery, \$2 ; J. A. Varney & Son, \$1. Mrs. Peter De Rocher.
 181. For the best hanging basket. James Vickery, \$3. Portland Stone Ware Co.
 182. For the best exhibition of shrubs, in pots, in flower. James Vickery, \$3 ; J. A. Varney & Son, \$2.
 183. For the best exhibition of dried grasses. Mrs. Charles Stanley, \$1. Miss E. S. Pearson, Vassalboro'.
 184. For the best exhibition of everlasting flowers. Mrs. Charles Stanley, \$2 ; Miss E S. Pearson, \$1 ; Mrs. A. B. Strattard, gratuity, 50 cents.
 185. For the best Wardian case. (No entry.)
 186. For the best aquarium, with plants. (No entry.)
 187. For the best rustic stand, not less than three feet in height, filled with choice plants, James Vickery, \$3.
 188. For the best rustic chair, home made. (Not awarded.) Joseph Taylor.
 Special Premiums offered by James Vick, Seedsman and Florist, Rochester, N. Y., to amateurs only.

[Awarding Committee — James Vickery and J. A. Varney, Florists.]

For the best collection of cut flowers. Mrs. Charles Stanley, \$20; Mrs. G. B. Sawyer, \$10; Mrs. F. A. Fuller, \$5; Mrs. Russell Eaton, Augusta, Floral Chromo.

For the best floral work. Mrs. Charles Stanley, \$5; Miss Martha Taylor.

CLASS 6.

GARDEN CROPS AND VEGETABLES.

189. For the best exhibition and greatest variety of vegetables. Peter De Rocher, Waterville, \$8.

190. For the best exhibition and greatest variety of potatoes, not less than five varieties, one peck of each. W. H. Pearson, Vassalboro', \$5.

191. For the best single variety of potatoes, one peck. (No entry.)

192. For the best seed corn, not less than 20 ears, in trace. W. H. Pearson, \$2; F. E. Nowell, \$1.

193. For the best sweet corn, 12 ears. Joseph Percival, Waterville, \$2; Milton Dyer, \$1. W. H. Pearson.

194. For the best 10 blood beets. F. E. Nowell, \$2. W. H. Pearson.

195. For the best 10 turnip beets. (Not awarded.) W. H. Pearson, Peter De Rocher.

196. For the best cabbages, 6 heads. Peter De Rocher, \$2. W. H. Pearson.

197. For the best cauliflowers, 6 heads. (No entry.)

198. For the best carrots, 10 specimens. Peter De Rocher, \$2.

199. For the best parsnips, 10 specimens. Peter De Rocher, \$2.

200. For the best ruta bagas, 10 specimens. W. H. Pearson, \$2

201. For the best English or strap-leaf turnips, 10 specimens. (No entry.)

202. For the best celery, 6 roots. Peter De Rocher, \$1.

203. For the best peppers. (No entry.)

204. For the best onions, half bushel. (No entry.)

205. For the best tomatoes, 25 specimens. Charles S. Pope, \$1.

206. For the best marrow squash, 3 specimens. (No entry.)

207. For the best Hubbard squash, 3 specimens. F. E. Nowell, \$2; W. H. Pearson, \$1.

208. For the best Butman squash. (No entry.)

209. For the best turban squash. W. H. Pearson, \$2.

210. For the best Marblehead squash. W. H. Pearson, \$2.

211. For the largest squash. (No entry.)

212. For the best pumpkins. Joseph Percival, \$1. W. H. Pearson.

213. For the largest pumpkin. W. H. Pearson, \$1.

214. For the best musk melons, 3 specimens. (No entry.)

215. For the best water melons, 3 specimens, Galen Hoxie, \$1. Elmer Bowman, Waterville.

216. For the best citron melons, 3 specimens. Austin Bowman, Waterville, \$1.

Gratuity—to F. E. Nowell, for pop corn, \$1.

Respecting the leading features and general character of the exhibition, the Secretary gladly avails himself of the following full and carefully prepared editorial report which appeared in the *Maine Farmer* of October 14, 1876. This is done the more willingly as the article embraces the observations of a careful and disinterested observer, and also because it includes a succinct statement of the history and work of the Society and its relations to other societies and the public. For the sake of brevity some parts which are substantially a repetition of what has been elsewhere said, are omitted :

"The State Pomological Society—which has during its brief existence made a good record for itself by its fairs and publications—held its fourth annual exhibition at Waterville last week. It occurred at the same time, but was independent of the fair of the North Kennebec Society, a part of whose exhibition was held in the same building. The first exhibition of this State Society was held at Bangor, the second and third at Portland, and the fourth as above. Its first and third fairs were held in connection with those of the State Agricultural Society, its second and fourth having been held independently. At no exhibition it has ever held has there been a finer display than at the last, although some previous ones may have been larger; and but once before has its hall been arranged with more taste and skill—that at Portland in 1874. While on some accounts it is to be lamented that by the formation of the State Pomological Society, the fairs of our State Agricultural Society have in some departments, been lessened in interest in consequence—yet on the other hand the former Society has by its publications, labors and fairs accomplished a grand work for Maine pomology, one which the old State Society could never have accomplished, because as it was conducted, it could not give that time to the patient detail necessary to achieve what has been done by the earnest labors and intelligent efforts of the workers in the new Society. The tendency of late years has been towards special organizations for special purposes; as a result we have our fruit, dairy, poultry and horse associations, most of which hold their independent exhibitions; and while they detract from the interest and success of an old State organization which

has for its object the promotion of all these branches, and which has done good work in the past; and while such influence is to be regretted, yet no one can honestly say these special organizations are not needed, and are not doing a most useful and creditable work. By every means let them all be encouraged and aided; there is work enough to be done, and in all laudable efforts for the good of our various State industries and interests, the laborers are always too few.

A GENERAL LOOK AT THE HALL. The fair was held in the new Town Hall at Waterville, a hall, which in its proportions, artistic decorations and appointments, is as neat and appropriate as it is elegant, and which is as positive a source of pride to the town as its predecessor was a disgrace—and we venture it has never in its brief history looked more attractively, or been decked with a more royal display, than this from the hands of Flora and Pomona, twin goddesses of beauty and fruitage. Entering the hall we find six long tables running lengthwise, and occupying rather more than one-half the area of the floor. Through the centre is a wide alley, and at the upper end of the hall the visitor passes from this alley under an arched way, to the stage. On each side of this arch are tables filled with pot plants, the stage being devoted to cut flowers. On the table at the right as one enters, under the gallery, is a special collection of picked varieties of apples; the upper end of the table being devoted to grapes. The second table is occupied by Androscoggin county, and the third by Kennebec—this comprises all the tables on the right of the main aisle. On the left, the first half of the first table is given up to pears, the remainder being occupied by Kennebec county; the second table is taken by Lincoln county, and the third devoted to collections from Penobscot, Somerset, Waldo and Aroostook counties, and a few miscellaneous lots. Under the gallery at the right and left of the entrance, are two tables devoted to garden vegetables, canned fruits, &c., and also one at the left of the stage, a part of which is assigned to vegetables. Around the gallery rail is an attractive display of paintings and chromos, and in some showcases at the extreme right, Carleton places on exhibition some of his unrivalled work in the photographic art. This comprises a general outline of the hall, the beauty of which cannot be described, and can only be appreciated after a close inspection of its various points of attraction. The gorgeous beauty of the many-

colored fruits and flowers, the delightful aroma from pears and grapes, the exquisite fragrance from lily and tuberose, and carnation—filled the hall with delight for the senses, and involuntarily led the mind upward in adoration of that Supreme Intelligence, who has caused the earth to yield these beautiful things for the service and good of his children. And the earth holds in store for whoever will have them by industry and intelligence, an abundance of just such gorgeous flowers, and just such luscious fruits as these which are before us in their indescribable beauty. Who will not make some effort to secure them?

LOOKING AT THE EXHIBITION more in detail, let us begin with the grapes ; not because they are of first importance, but because just now, we happen to be standing here by the table on which they are displayed ; in all nearly eighty plates from, perhaps, eight or ten exhibitors, and forming a most luscious and tempting sight. The out-door grapes on exhibition were specially fine, the season having been favorable for their growth and ripening ; while of the foreign varieties, both those grown by heat and in cold houses, the display was exceptionally fine. * * * Forty-six of the seventy-nine plates on exhibition were native grapes, and of these, the prominent growers were Lemuel Dunbar, Waterville ; A. S. Sawyer, Cape Elizabeth ; J. A. Varney & Son, North Vassalboro' ; G. H. Andrews, Monmouth ; Joseph Taylor, Belgrade ; G. B. Sawyer, Wiscasset, and Galen Hoxie, Fairfield. The Messrs. Varney had eleven varieties, including the Martha, Hartford, Black Hawk, and several of Rogers' hybrids. Mr. Sawyer of Wiscasset, shew thirteen varieties of natives, among which were the Martha, Eumelean, Perkins, Delaware, Hartford, Concord, and some of Rogers' hybrids. He also had a good display of natives grown in a cold grapéry, which shows what protection in our climate will add to the size and condition of grapes, which, ripened out of doors, are often not eatable. His collection of out door grapes was the best on exhibition. Mr. Hoxie had some very nice Delawares, Concords, and Hartfords. Of the foreign grapes the show was very good, the exhibitors being G. B. Sawyer ; Patrick Wade, gardener to H. P. Storer, Portland, and A. S. Sawyer, Cape Elizabeth. Mr. Wade shew thirteen plates, Mr. A. S. Sawyer eleven, and Mr. G. B. Sawyer five. Mr. Wade had the largest collection, but the best bunches were shown by his neighbor over on the Cape, Mr. Sawyer, who had two specimens of the Trebbiano,

a grape not much known among us, but of great excellence, being by a long ways ahead of anything ever seen at our pomological fairs. Almost equally noteworthy were his Victoria and Wilmot's Hamburghs. Mr. Wade's best specimens were elegant clusters of Victoria Hamburgh, White Muscat and Wilmot's Hamburgh. He also had five bunches of Muscat of Alexandria, White Muscat, Trentham Black, Golden Hamburgh and Chasselas de Fontainebleau. Now that we are here, let us follow down this table loaded with

THE BEST APPLES IN THE HALL, selected by their exhibitors from among the grand lots in the hall, with a view of competing for the prizes offered for the best ten specimens of each variety shown. And a grand sight it is; one hundred and nineteen plates—every apple on which is superb and perfect, and all of which will this week be on exhibition at Philadelphia, where we are positive they will take no "back seats." The leading contributors here are Pulsifer Brothers, East Poland ; Friend Joseph Taylor, Belgrade ; A. Smith, Monmouth ; S. H. Cole, Lewiston, and S. C. Harlow, Bangor. The apples on this table are choice representative specimens, and we deem it fair to say no such apples were ever before brought together for a competitive exhibition in this State. The sorts that appear most noteworthy are the Nodhead, of which Friend Taylor has the best—Mr. Pulsifer's coming close to his ; Baldwin, one of which, showed by Mr. Smith, who leads off, weighs $10\frac{1}{2}$ ozs ; Roxbury Russet, the variety from which a larger profit is realized than from any other grown in Maine on account of its late keeping habit ; Yellow Bellflower, the best being shown by G. H. Andrews of Monmouth ; Fairbanks, a highly esteemed and handsome sort which originated in Winthrop ; Hubbardston Nonsuch, of which Pulsifer Brothers have the best ; Northern Spy, C. S. Pope, Manchester, taking the lead ; Rhode Island Greening, Spitzenburg, King of Tompkins County, Gravenstein, Williams' Favorite, and Porter—Pulsifer Brothers showing some very elegant specimens of the latter, the best we think, ever grown in the State, and among the handsomest in the hall. A good arrangement of this table was shown in having each plate of a certain variety grown by different exhibitors placed side by side for easy examination and comparison by the judges ; this being only one of a number of sensible little plans instituted by the managers for

the convenience and satisfaction of committees and spectators. Perhaps no where in the hall is the benefit of the

LIBERAL FEEDING OF APPLE TREES, more noticeable than at this table. Here are specimens of well known varieties excelling others in size, color and flavor ; so that often one is at a loss to determine if he is not mistaken. Then comes the inquiry, " What is the difference ? " Feed, feed, is the one answer ; manure your trees and get good fruit—starve them and get poor, knotty, hide-bound, scurvy, worthless apples. Why not be liberal in applying dressing to your orchards as well as to your cornfields ? You will surely get your pay for it. The next table embraces a collection from

ANDROSCOGGIN COUNTY, the exhibitors being Pulsifer Brothers, East Poland ; S. H. Cole, Lewiston, and Mr. Richardson, Greene ; the table containing seventy-two varieties—not a duplicate among them—of which the Messrs. Pulsifer contributed fifty-four sorts. This table embraces all the best known and most popular varieties grown in the State with some nice apples of local reputation only, and not described in the books ; among these latter are the Noyes, which originated in Minot, a very handsome apple, in season with the Nodhead, very salable, equal to Nodhead in size, juicy and crisp ; and the Early Orange, originated in Poland, better than the Porter for cooking, because it is more distinct in flavor, and does not lose its taste in cooking ; hardy and a good bearer. The Messrs. Pulsifer have a young orchard, and have not been prominent exhibitors until within the past few years. Their annual crop is 300 barrels, which will be reduced to 100 barrels on account of caterpillar ravages ; notwithstanding they kept one man employed for a whole month before the trees leaved out in spring, picking off the clusters of caterpillar's eggs—a job which Mr. Pulsifer says paid well. They make a specialty of growing the Roxbury Russet, Baldwin, Rhode Island Greening, Talman's Sweet and Black Oxford. Mr. Pulsifer recommends the following as a good variety for Maine growers :—early fall : Sweet Bough, Porter, Early Harvest and Yarmouth Cat Head ; late fall and early winter : Nodhead, Hubbardston Nonsuch ; late keeping sorts : Baldwin, Roxbury Russet, Talman's Sweet. A large number of varieties he regards as very perplexing and unprofitable, and would recommend orchardists to grow for profit, not more than four or five, each, of the fall and winter varieties. At the head of the

KENNEBEC TABLE, we find Friend Joseph Taylor, with fifty-two varieties, comprising the well known fall and winter sorts. In making up his collection Friend Taylor has included several locally famous apples, among them the Zachary Pippin, an early winter apple of positive merit which originated in Belgrade; Judy, a handsome red sweet apple of fine quality, a native of Rome; Flanders, a pleasant sour fall apple from Dexter; Columbus, a large red apple, which originated in Belgrade; Stuart, a very nice fall apple from Belgrade, and Sweet Greening, an excellent fall apple, the scions of which were brought from Martha's Vineyard as many as seventy-five years ago. Besides these, Friend Taylor has remarkably fine samples of the Nodhead, Baldwin, Somerset, Porter, Williams' Favorite, Dean, (a very handsome apple,) and King of Tompkins County. On this table are smaller but very creditable exhibits from J. A. Varney & Son, and Charles S. Pope. The Kennebec collection crowds itself on to the fourth table, at the head of which is a fine exhibit from

A. SMITH & SON, MONMOUTH, which comprises fifty varieties, all of uniform excellence. In this lot are the Porter, Northern Spy, Baldwin, Fall Harvey, Talman's Sweet, Vandevere, Nodhead and many others. Mr. Smith makes a specialty of Roxbury Russets, and last year kept his crop till July, and then marketed them in Bangor for \$7 per barrel. At this price who questions the statement that it is the most profitable variety grown in the State? Adrian Bowman of Waterville, had a collection of very noticeable specimens, although no attempt was made by him to show a large number. His Early Harvests, Baldwins and Nodheads, were certainly elegant; while he had very fine samples of the King of Tompkins County, Black Oxford and Northern Spy, and good Roxbury Russets and Talman's Sweets. Russell Eaton of Augusta contributed specimens of Hubbardston Nonsuch, Fall Harvey, Northern Spy and Winthrop Greening, all of which were very large, uniform and well grown. From the fourth table, the Kennebec collection again crowds itself over upon the

FIFTH TABLE, where it makes a display, which of itself would be notable even as a county exhibit, at a State Fair. Messrs. J. Pope & Son here show between twenty and thirty varieties of fall and winter fruit from their celebrated orchard at Manchester, from which they are this year getting a fair yield, despite the unfavorable conditions. Henry Taber of Vassalboro' has about twenty

varieties, all choice specimens. Daniel Ayer of the same town shows eleven plates, among them elegant specimens of the Starkey, a Vassalboro' apple of high character; fine Talman's Sweets and King of Tompkins County, with good specimens of the Twenty Ounce, Wagener, and Queen Vic—about which we know little. J. S. Weeks also of the same town, has a few lots, and F. W. Runnels, Clinton, shows eighteen varieties, some of which are fine looking apples, but his collection is wanting in value though not in interest, because so few of the sorts have names attached. And when apples get "skiting off," how hard it is, even for experts to identify them and bring them back to their proper places. Many of his esteemed varieties could not be identified, and will probably pass on down the mouths of future hungry children, with their true names unknown. The remainder of this table, comprising in fact nearly all of it, is taken up with the

LINCOLN COUNTY COLLECTION, which carries away the palm for the largest collection, having one hundred and sixteen plates and over one hundred distinct varieties. This collection was made up by Mr. Sawyer, the Secretary of the Society, and was contributed to by John Currier and H. J. A. Simmons of Waldoboro', L. H. Winslow, Nobleboro'; D. C. Pottle, Alna; G. B. Sawyer, Henry Ingalls, J. M. Knight, Dr. S. B. Cushman and Arnold Greenleaf of Wiscasset, and others. The latter gentleman sent a specimen of a sweet apple about which we should like more information. It is a red showy apple, one of the handsomest in the hall, and although in fair eating now, will keep to the last of November. Mr. Currier made a specialty of sweet apples, of which he shew seven or eight sorts. Mr. Pottle contributed twelve varieties. Mr. Simmons nineteen, and Mr. Knight ten. We cannot help thinking, looking at these one hundred distinct varieties, and remembering that our most experienced cultivators tell orchardists to grow but few sorts, and make a specialty of them, whether the Society could do better than to discontinue all efforts towards encouraging the showing of the greatest number of varieties, and give larger premiums to a smaller number of select sorts. Turning to the left we come to the last, or sixth table, where Mr. S. C. Harlow of Bangor, leads off the

PENOBCOT COLLECTION, with fifty varieties—a fine exhibit. Among them are the Beauty of Kent—a very showy apple; Alexander, another large and showy sort; Northern Spy, very fine

samples; Maiden's Blush, Ben Davis, Stone Sweet, Job (?) Kilham Hill, Lane, (?) and other well known sorts. Nathaniel Oak, Exeter, was the only other contributor to the Penobscot table. He had a good exhibit of some twenty varieties, among which were the President, Milding—a somewhat well known New Hampshire apple worthy of dissemination—Wood's Sweet, Doctor, and others. * * * * *

Upon this table were also shown several smaller county collections, one of the largest of which was that from Waldo county, entered by Mrs. A. B. Stratford of Monroe, which comprises some sixty plates, showing besides the leading hardy sorts, good specimens of the Porter, Hubbardston Nonsuch, Maiden's Blush, Keswick Codlin, American Golden Russet, Orange Sweet, Yellow Bellflower and Naked Limbed Greening. The latter is supposed to be a native of Waldo county, bears every year, and is one of the best sorts in Maine. Frank E. Nowell, Fairfield, puts in thirty sorts from his orchard for the Somerset collection, noticeable among which are the Baldwin and Northern Spy. Had other growers in southern Somerset done as well, their county collection would have taken high rank. John Hanseom, Saco, put thirty-two varieties into the York county collection, his specimens of the Granite Beauty, Greening, Baldwin, Yellow Bellflower and Bottle Greening, being especially fine. Upon this table are a few plates from

AROOSTOOK COUNTY, worthy of notice—Henry Tilley, Castle Hill, (latitude $46^{\circ} 40'$) contributing half a dozen plates, on which are small specimens of Fameuse, Sops of Wine, Hyslop Crab, and an apple which he calls Beauty of Kent, but which is incorrectly named. Columbus Hayford, Maysville, sends specimens of a seedling, which is good till April, but will keep till June, and which, we should think, would be esteemed in that section. We are pleased to notice these apples from our high latitude, but believe Aroostook can do much better than she has this time, with a little effort. Milton Dyer, Cape Elizabeth, one of the successful market gardeners of Cumberland county, who lives on the light "table-land" about one mile from Portland Light, and in a somewhat exposed and bleak situation, brought down some twenty-five sorts, just to show what could be done at growing apples on the sea-coast. His specimens were generally small, and not so fair as those grown in some other localities, but of

Perters, Baldwins, and Northern Spies, he had, however, very nice specimens. This closes our somewhat hasty examination of the apples, and we now give attention to the

COLLECTION OF PEARS, which occupies a position on the centre left-hand table near the main entrance, and of which there are in all sixty-four plates. At the head of the table—the post of honor, and in this instance justly deserved—is the exhibit of one of our veteran and most enthusiastic contributors, Mr. Samuel Rolfe, Portland, who has twenty-eight varieties, nearly double the number of any other contributor. Mr. Rolfe recommends for culture in Maine for those who can grow but a few sorts and who wish a succession, the following: Bartlett, Louise Bonne of Jersey, and Beurre Langelier. The Sheldon is a very nice fall sort, and the Fulton—a native of Maine—is an excellent fall pear. The Flemish Beauty he cannot grow, on account of its cracking. Beurre d' Anjou is one of the best grown, and was recommended by the American Pomological Society, as the best single pear in America. A. Smith & Son, Monmouth, shew fourteen varieties, including the Marie Louise—if well gown, rich in flavor and equal to the Bartlett when in season—Louise Bonne of Jersey, Flemish Beauty, of which they had good specimens, Vicar of Winkfield, Glout Morceau, and Duchess d' Angouleme. Friend Taylor had thirteen sorts, noticeable among which were his Flemish Beauties, which fairly beat the State. He had specimens of the Goodale, which is not yet bearing well, but which he hopes may come on in a year or two. It is a pear of much promise, but he cannot speak of it with much positiveness. He also has the Lawrence, a choice winter sort, Buffum, Duchess, Sheldon and other kinds. Mr. Harlow of Bangor, has two or three plates, Mr. Sawyer of Wiscasset, four, and other exhibitors one each.

In the department of vegetables there were but few contributors. W. H. Pearson, Vassalboro'; Peter De Rocher, Waterville, and Frank E. Nowell, Fairfield, each shew general collections which were creditable and interesting. The former had eight varieties of potatoes. Joseph Taylor, Mrs. G. B. Sawyer and Mrs. A. B. Strattard, made exhibits of canned fruits, jellies, pickles, &c. Passing to the upper end of the hall, we find the centre space occupied with a large collection from the Portland Stone Ware Co., consisting of lawn vases, hanging baskets, ornamental flower pots, vases, terra cotta ware, &c. It was a fine display.

CRANBERRIES. Mr. A. Smith of Monmouth, shew some very handsome cranberries which he raised on a swale planted to vines four years since, and covering twelve square rods, from which he gathered a bushel this year. He plowed the ground four inches deep and set the plants four feet apart. Nearly every farmer has land which might be utilized in this way, and thus provide himself with a most valuable fruit. Mrs. A. B. Strattard of Monroe, has some large cranberries, raised upon a piece of wet land thirty feet square, set four years ago, from which one and one-half bushels were gathered this year. F. P. Haviland of Waterville, also contributes a dish of cranberries.

STOVE AND GREEN-HOUSE PLANTS. There were but two exhibits in this department; one from J. A. Varney & Son, North Vassalboro', the other from James Vickery, Portland. Mr. Varney's collection embraced one hundred and fifty pots, most of them well grown and looking fresh and healthy. Besides the ordinary plants of such a collection—geraniums, fuchsias, ferns, coleus, lantanas, he had a nice little collection of cactuses, several fine sedums, begonias, ivy geraniums, marantas, abutilons (including the unique climbing variety), dracænas, &c. Since the Messrs. Varney st. ed their Excelsior Conservatory at North Vassalboro', they have met with good success, and it is a pleasure to see so good specimens of choice plants, grown in a locality where they were formerly but little known, as were those exhibited by them. Mr. Vickery had a smaller general collection, than his competitor, many of the same kinds, and some which far surpassed anything exhibited by Mr. Varney. This was true of his cissus discolor, of which he shew an elegant specimen, of several fine caladiums, a number of choice heaths, and three or four treceinas. He also exhibited several elegant coleus; two or three dozen ferns (some of which were quite rare and handsome, especially the Hares-foot), some fine begonias and varigated ivies. His collection as a whole was very choice. Now let us ascend the stage and examine the

DISPLAY OF CUT FLOWERS, exhibited by Mrs. A. B. Strattard; Mrs. Geo. B. Sawyer; Mrs. Russell Eaton, Augusta; Mrs. Charles Stanley, Winthrop; Mrs. F. A. Fuller, East Winthrop; James Vickery, Portland, and J. A. Varney & Son, North Vassalboro'. From the considerable distance at which some of the flowers had been brought, they were not looking as fresh as could have been wished, but on the whole made a highly interesting show. These

several exhibits were made for the Society's premiums, as well as for the special Vick prizes to amateur growers, from which competition commercial florists were excluded. The Messrs. Varney exhibited nearly 150 phials, among which were 30 distinct varieties of verbenas, 35 of petunias, 25 of carnations and dianthus pinks, 23 of asters, 15 of phlox, and 12 of dahlias. Mr. Vickery made little attempt to make a large exhibit, but had a choice lot of rose buds and tuberoses, with about 25 varieties of verbenas and a dozen dahlias. The collection of Mrs. Stanley was very fine, comprising good phlox and asters, 25 varieties of verbenas, half a dozen choice gladiolii, 27 select pansies, and 50 dahlias. Her neighbor Mrs. Fuller, had a very choice display, in which were 74 distinct dahlias, most of them well grown, and 23 varieties of asters. Mrs. Sawyer's collection, without being large, was choice; and Mrs. Eaton's fair. To our mind, and without knowing the action of the awarding committee, we should say that Mr. Varney had the best commercial, and Mrs. Charles Stanley the best amateur collection. Mr. Varney had the best verbenas; Mrs. Fuller the best dahlias; Mrs. Stanley the best asters, and Mrs. Sawyer the best arranged exhibit. It was not so strong in varieties as some others, but embraced more sorts and was arranged most attractively. Of wreaths, table decorations, bouquets, crosses and floral designs, the fruit tables displayed a goodly number. Mrs. Stratford shew a very pretty design for a dinner table decoration, a large floral cross, and two crosses of everlastings. Mrs. Charles Stanley shew a floral design—a monument covered with green overlaid with flowers, on the top of which was a vase of gladiolii—also an elaborately constructed wreath of crystalized grasses and everlastings, a really artistic piece of work. Mrs. Fuller shew an elegant bouquet of dahlias, and Mr. Vickery made an exhibit of hand and parlor bouquets. Among the other similar objects with which the tables were decorated, was a vase loosely but artistically filled with delicate gladiolii and native ferns, which won much admiration. It was contributed by Mrs. Moses Getchell of Winslow.

On account of the very small number in attendance, all the intellectual exercises arranged for the meeting were postponed, with the exception of the Annual Meeting of the Society, which occurred on Thursday evening.

[CONCLUSION. We have given a somewhat minute report of this exhibition in the several departments, because its importance

seemed to warrant it. Never, perhaps, in our State has so well arranged and perfect an exhibition of our Maine fruits been brought together, as on this occasion; and it was a matter of constant regret that so few persons were present to enjoy and study it. During a portion of the time it was accompanied by unfavorable weather,—but, judging from the attendance with which it opened, it would hardly have been better had good weather continued throughout the week. And yet the extent, character, and systematic arrangement of the exhibition was such that it would have been a paying investment for every fruit-grower of any pretensions, to have spent two days in a careful study of the varieties on exhibition. They would, in that time, have obtained a better practical and correct knowledge of fruit than they could by a twenty years' experience on their own farms; and taking advantage of the knowledge they would have gained, could have carried on their business with higher intelligence and larger profit. What they have lost by not attending this exhibition will always be a source of regret, but it can in part be made up to some, by visiting future fairs of the Society.

The arrangements for systematizing the exhibition, not only for the convenience of the exhibitors and judges, but for the benefit of the public, were most complete—involving a deal of labor on the part of the Secretary, which were in most instances admirably carried out. Fruit lists, separate labels for varieties, and exhibitors' names, accompanied each exhibit; and by the use of various blanks and printed forms the essential and imperishable facts of the exhibition, regarding each individual sort and variety, were recorded for the future use of the Society and the future good of the Pomology of Maine. These results will appear in the transactions of the Society, and there its good will become immortal, even though the beauty of its loaded tables last but a few days, and is seen by but few persons.

It is discouraging, we must admit, to hold these fairs year after year, to go through with the labor they involve, have nobody attend them, and in the end find it impossible to meet the small bills incurred, by the still smaller receipts which come into the treasury of the Society. This ought not so to be. The Society should have a thousand annual members in this State, and it soon would have, did fruit-growers but appreciate the importance of the work it is doing for the good of Maine Pomology, one of the great interests of our people. They must awake to this matter, and lend

a helping hand, or this Society, which has been kept alive by a few zealous men whose efforts and labors have been unremittingly performed, and which have been productive of marked results for good—will surely go down. Has it not proved itself deserving of a worthier fate?"

THE ANNUAL MEETING OF THE SOCIETY

was held on Thursday, the third day of the exhibition, at which officers were elected for the ensuing year, (as elsewhere named), votes of thanks were adopted—to the town authorities of Waterville for the liberal facilities afforded for holding the exhibition, to the citizens for their assistance and coöperation in the same, and to the Maine Central and Knox & Lincoln Railroad Companies for granting free return tickets to persons in attendance; and the remaining business was postponed to the Winter Meeting, invitations for holding which were received from the Farmers' Club of Monmouth through Mr. Geo. H. Andrews, and from the citizens of Waterville through Joseph Percival, Esq., President of the North Kennebec Agricultural Society.

On the fourth day a collection of specimens of Maine Fruits was made up and forwarded for exhibition at the Centennial Exposition, numbering 150 varieties of apples and a few of pears, and Messrs. Z. A. Gilbert and J. A. Varney were appointed as a committee to attend the same. (Their report will be found in full in the proceedings of the Winter Meeting.) Then came the general packing and clearing up, and with the social festivities of the evening and the leave taking—with its indifferent pecuniary results, but with its higher and better and more enduring success in its educational, æsthetical and social results—our fourth exhibition ended.

PROCEEDINGS OF THE WINTER MEETING.

The fourth Annual Winter Meeting of the Society, (being an adjournment of the annual meeting held at Waterville as before stated), was held at Monmouth, in the Congregational Church, on the 23d and 24th days of January, 1877, in accordance with the following

PROGRAMME.

"TUESDAY, January 23d, at 3 o'clock P. M., Preliminary Business Meeting.

At 6½ P. M., Public Meeting. Address of Welcome by M. J. METCALF of Monmouth. Reply to same, and Annual Address by Z. A. GILBERT, President of the Society. The remaining time to be filled by discussion of subjects presented.

WEDNESDAY, 9 A. M., Business Meeting: Annual Reports of Officers, Election of Officers to fill existing vacancies, and other business.

10 A. M., 1½ P. M., and 6½ P. M., Public Sessions,—during which the usual Exhibition of Winter Fruits will be held, to which all are invited to contribute, especially of new and rare varieties; and the following subjects will be presented for consideration and discussion :

Fruit growing in connection with general farming.

Natural adaptation of soils to fruit culture.

Report on fruit and flowers at the Centennial, by the delegates of this Society.

Report of the Committee on list of fruits for amateur cultivation.

Report of the Corresponding Secretary, Dr. J. C. WESTON of Bangor.

County and Local Reports on fruit growing, by the several Trustees and others.

Revision of the Society's Fruit Lists.

Voluntary Essays and Reports, by Members and others.

An Address by Dr. N. T. TRUE of Bethel; Subject, 'The soil and its preparation for an orchard.'

The exercises to close with a Social Reunion of the Members and guests, with ladies, to be held in the Vestry, at 8 o'clock P. M."

The place of meeting had been selected as one of the strongholds of the Society, being a central point in a locality long celebrated for the production of fine fruit; and embracing among its population many valued members of the Society. A general invitation had been extended to the fruit growers and horticulturists of the State, by printed circulars, posters and publication in the newspapers; free return tickets were issued by the Maine Central and other railroad companies, and all persons attending were freely and hospitably entertained by the people of Monmouth, who were unremitting in their efforts to make the meeting a pleasant and profitable one. The weather proved propitious. The attendance was much larger than at any previous Winter Meeting, filling the spacious auditorium of the church at each public session and affording gratifying proof of the progress of the Society.

The exhibition of winter fruits was quite satisfactory, embracing a great variety of specimens, all in fine condition, neatly arranged and correctly named, and generally of superior quality. For full details of the exhibition reference is made to the report of the special committee on the subject in subsequent pages. The tables were decorated with an elegant basket of cut flowers from the conservatory of the Misses Pope of Manchester, and some fine plants in pots contributed by the ladies of Monmouth.

It is much to be regretted that the shortness of the time assigned for the meeting prevented the full consideration of all the subjects embraced in the programme. In every other respect the meeting was a most gratifying success.

FIRST DAY.

The Society assembled pursuant to adjournment, at the time and place designated, and was called to order by the President. Then proceeded to arrange the order of exercises for the public sessions. Messrs. Alfred Smith of Monmouth, F. M. Woodward of Winthrop and Charles H. Jones of Warren, were appointed a committee to examine and report upon the exhibition of fruit.

Adjourned.

Re-assembled at 6½ P. M., the President in the chair.

M. J. METCALF, Esq., of Monmouth, then presented the following

ADDRESS OF WELCOME.

*Mr. President, and Gentlemen of the
Maine State Pomological Society:*

I have the privilege and pleasure in behalf of the members and friends of your Society in the town of Monmouth, to extend to you a hearty welcome to this gathering and to the hospitalities of our homes. We thank you for so promptly accepting our invitation to hold this meeting of the Society with us, and we trust it will appear that in so doing you have acted wisely.

To the most of mankind the precise location of the garden of Eden is an unsettled question ; but, (pardon our vanity), to us the town of Monmouth occupies that ground ; and we have learned in this restored and improved Paradise, with its almost numberless pomological products, and our much enlarged wants and necessities, that there is no such thing as “*forbidden fruit*”; and though we dwell not in Italy or the “*Sunny South*” we literally sit under our own vines and trees, with our wants well supplied and none to molest or make us afraid.

In the days of our grandmothers their store-rooms and tables were always supplied with an indispensable stock of *dried apples and pumpkins*. In these, our golden days of progress and prosperity, with increased numbers and varieties of richer and finer fruits, we reckon the former coarse and less nutritious fruits as comparatively of no account. Long ago in this, *our garden of Eden*, there were fruits of so poor a quality that their use by man or beast might well have been prohibited. The apple trees of those days, although stalwart and vigorous as the primeval products of the forest, bore small, sour and un nutritious fruit,—just fit to make the sourest and hardest cider, with which to manufacture the sourest and worst of drunkards; and to a great extent they produced their legitimate results.

It is discreditable to any man to have a poor, miserable fruit tree when he might just as well have a good and profitable one. And the tree itself shares in the discredit of its owner. A “*sour apple tree*” is an object of contempt and has been assigned to ignominious uses.

But, Mr. President, by the faithful and untiring labors and influence of this and similar societies, our *Eden*—and many another one, too—has not only been made to “*bud and blossom as the rose*,” but has been made to bear an increase of better fruit,—“*some*

thirty, some sixty and some an hundred fold." Horticulturists and fruit-growers, at least as much as any other class, have learned that they may and ought to be co-workers with God in re-creating and improving His works; that it is their privilege and duty to keep their eye on the great Supreme Producer and be ready to take His work in its partial development and carry it on to maturity and perfection; to take the wild olive tree and ingraft in it the good olive; to make the crooked, sour, unpromising tree bear good, wholesome and abundant fruit,—corresponding with and compensating the labor, patience, ingenuity and skill of the more advanced, prosperous and happy inhabitants of the new Paradise,—of the better and more fruitful civilization.

In closing I again say, Welcome,—with the renewed expression of the hope that we may have a pleasant, interesting and profitable meeting.

PRESIDENT GILBERT responded:

In behalf of the Society allow me to thank you, sir, for this generous welcome so fittingly expressed. It gives us encouragement to know and feel that we are welcomed here in the town of Monmouth. It is also a pleasure to know, as we do from the audience here assembled as well as from your words, that we did well to come here. It encourages us to know that we have come to a place where the people are interested in what we are doing.

It is a fact that all blessings are not showered down on one spot. I believe it to be a fact also, that in any thrifty and prosperous town in the State of Maine, such as the town of Monmouth is, the people enjoy as many of the blessings of life as are given in any locality in our country. It is true we have rigorous winters, but they give us their compensation, and we are not subjected to the enervating influences of long-protracted and depressing heat, which are experienced in warmer latitudes. The very air we breathe gives us activity. The very atmosphere which sends us the snow storms gives us health. The extreme cold compels us to active exertion, and while we protect ourselves against it we keep our minds active and our affections warm. So we have compensations for our inconveniences, and when the balance is struck we have the heaviest column on our side.

In preparing a programme for this meeting, we have endeavored to bring out those points which seem most appropriate to the time and place and to correspond somewhat with the occupations and

tastes of those with whom we meet, and we hope that we have succeeded in arranging a programme that will be satisfactory, and that it may be so carried out as to be acceptable to those who may seek to receive benefits therefrom.

In this county were made the first efforts in our State for the progress of agriculture, including horticulture and pomology. In the town adjoining this, and in this town too, the leading men put forth the first efforts to lead the rural population up to a higher standard and a greater prosperity. The people of this section have never forgotten those teachings. You are to-day profiting by them. You are leading better lives ; you are a more prosperous, more intelligent, and happier people than you would have been but for these efforts and teachings.

I say you are reaping the advantages of these efforts. The growth may have been slow, but surely does the leaven work. And as surely as you are the better for the efforts of the farmers who preceded you, so surely will our efforts, if we work wisely and well, bear their fruits. So we have a responsibility. It is important that we work well, remembering that we are working not for to-day only but for all time to come ; and with this assurance, realizing the importance of our labors and the necessity for them, we have this compensation—that as a Society we have been fortunate ever since our organization in falling among friends ; and that the efforts of the Society in the cause for which we are laboring are appreciated by the best class of our people. We believe this from the fact that wherever we have gone we have met with a warm welcome, but never more so than at the present time. We feel doubly encouraged in view of this.

Allow me then, in closing these remarks, to again thank you for the welcome that we have received, and also, lest there may not be another opportunity, let me tender the thanks of the Society for the hospitable entertainment that has been proffered to us. These kindnesses of yours are appreciated ; the recollection of them will be carried home by us, and will remain in our memories as pleasant reminders of this occasion.

ANNUAL ADDRESS OF THE PRESIDENT.

PRESIDENT GILBERT then addressed the Society as follows :
*Ladies and Gentlemen,—Members and Friends of the
Maine State Pomological Society:*

In obedience to your call I again address you upon topics relating to the success of our youthful Society. Another year with its results has been folded into the past, and we, mindful of the lessons it has taught us, and looking around for the results which it has brought, again buckle on our armor, and with strength renewed from the efforts of the past and courage ever hopeful in view of the broad fields of active life ever open before us, enter again into our labors in the full assurance that as they are faithfully performed so will they in due time be rewarded. Such is life,—ever hopeful, ever laboring. Is that labor always faithful?

What, then, are we as a Society endeavoring to accomplish ? It cannot be charged that it is self-aggrandizement or personal emoluments, for the history of nearly all societies having similar and related purposes has proved that such results are not often attained and need not be expected. There is, however, in all communities, and especially in our own State, a call for efforts looking to the promotion of pomology, and of horticulture in general. Into these labors we as a Society have entered. However self-sacrificing these labors may be, the field stretches away before us and calls us to its work. It is a duty we owe to the community in which we live that we respond to this call. Public spirit is a quality which every one should feel himself in duty bound to cultivate. No one has a right to complacently fold his arms and leave the work of driving on the march of progress wholly to other hands. As another has truthfully said, "Every man should look out upon the community in which he is living and ask himself what he can do for its improvement." Were not such efforts put forth and continually kept up in the moral and social world we should soon relapse into barbarism. So too, in the world of the beautiful around us efforts are needed, and example is contagious. Look at the noble, self-sacrificing labors of those who have been instrumental in surrounding our houses with much that contributes to our happiness in life. Have not their labors received a compensation in the blessings we are now enjoying ? And shall not we continue those labors, that others may receive like benefits ?

Though horticulture is not necessarily connected with farming, yet farming is not complete without horticulture. It is the aesthetics of farming—the poetry of farming. Thus the whole community is within the reach of the efforts we are endeavoring to put forth. Is not the field broad enough—is not the work sufficiently inviting for our united efforts?

We want to extend the usefulness of our Society by drawing to our ranks more working material. We need large accessions to our list of members—not wholly for the fees, but also that we may have a larger number from which to draw for such services as may be from time to time needed. A few individuals, working over the same ground year after year, without having their labors seconded and encouraged by others, will become weary in well doing. They need to come in contact with outside enthusiasm that they may imbibe its spirit and thus be spurred on in their labors. Where, too, labor of the same kind is required of them many times repeated, they are apt to repeat themselves, and thus their productions are simply a repetition. Say what we will about education and progress, there is but little about any of us which is purely original, and if we are required to draw all that at one time then we must fall out of the ranks or repeat ourselves. So we need more members that we may have more workers. We need the help of those who are gathered here at this time, not only to sustain this meeting, but also to sustain the Society in future years. We have had your assistance in arranging for this meeting, and we need it as well and hope to have it, in other directions.

We also invite membership that those who thus enroll themselves may be benefited at the hands of the Society. If we succeed in making the Society useful, as we hope to, and trust that in the past in some measure we have done, then its members to that degree are and will be benefited. And any one who thus joins hands with us cannot fail of greater benefit than he will receive standing aloof merely an interested looker-on. So, while you will benefit the Society by membership, it in time compensates you for this confidence.

Our methods of work need no essential changes, yet we may and should expand them to some extent, as we have been from time to time endeavoring to do. We are endeavoring to reach the people through three well defined channels: By holding annual exhibitions; by holding meetings like this for the reading of

essays and the discussion of topics; and by publishing our proceedings for distribution over the State. Our aim is to reach the people, and we know of no better methods in our present condition than the above named. We realized in the start some of the obstacles we are finding in the way of success. The object of an exhibition is to draw together the people, and by the beauty and variety there displayed, educate them to a higher appreciation of the importance of horticulture and awaken in them an enthusiasm that will spur them on to greater and more successful efforts to secure for themselves surroundings of beauty and utility, that the standard of their lives may be elevated, and life itself made more pleasant and useful. But in order to reach these results, the people must attend the exhibitions. Human tastes and aspirations are such,—and we must take these things as they are,—that anything of a purely elevating tendency, and which does not appeal in any way to our lower natures, does not attract the great masses of the people. The nonsense of a corps of negro minstrels draws fuller houses than the purest rendering of the productions of the great masters. A circus with the foolishness of a noted clown will be crowded while art galleries are empty. A stump speaker who can tell a commonplace story in an off-hand, attractive manner, will chain an audience when the greatest scholarship and highest culture will simply empty the seats. So an exhibition of fruits and flowers, charming in its beauty and variety, will have few visitors, while a horse-trot will draw together its shouting thousands. Yet an exhibition cannot be run without receipts, and exerts but little influence without visitors.

We have held four exhibitions—two connected with the State Agricultural Society, and two independent and alone. In both of the cases where we have run alone we have been disappointed in the attendance. Holding independent exhibitions is strictly in accordance with the desires of its officers and with the character of our efforts. If they cannot however be made to pay running expenses, then a question of serious importance presents itself. In locating our exhibitions we find we can hardly go into any locality without getting in contact with a local Society. Every county in the State has its agricultural fair, and some several of them, so that turning our attention wheresoever we may, we in a measure interfere with these local exhibitions.

To avoid any actual or supposed injurious interference with the attendance upon the North Kennebec Fair at Waterville, last

autumn,—since our exhibition must be held near the usual time of autumn fairs,—we arranged to hold it independent but concurrently with the local fair. In this, as in all previous cases, no difficulties arose with the officers and managers in carrying out the agreements entered into; yet the people sometimes gain erroneous ideas as to the arrangements, which lead to disappointments. This was the case to some extent at Waterville. It may as well then, in view of past experience, become the settled policy of the Society to hold its exhibitions distinct in time as well as in arrangements from all local exhibitions. This is a subject which may well claim the attention of members at this meeting. It is believed that the life of the Society and its usefulness require an annual exhibition. How shall it be conducted, and how maintained, are questions of interest to all.

A thought here presents itself in connection with our fruit exhibitions, which has before been presented to your consideration, and the importance of which is such that it should be annually repeated till it commands more attention than it has yet received. I allude to the work of the standing committees on nomenclature and new fruits. Such committees, if faithful to their duties, may do a vast amount of much needed work, and their reports would be an important and valuable addition to our annual volume.

Meetings for a mutual interchange of ideas and experiences are most effectual educators. This Society early conceived the idea of employing this means of carrying on its work. There is no question but the many meetings held among farmers for the consideration of special subjects in which they are interested, are the means of diffusing a vast amount of information and in a great degree contribute to the progress now being made in the various branches of agriculture. To no class can such meetings be more directly influential than to the fruit grower. But in order to reach those whom we are trying to benefit we must go where the people are. If the Board of Agriculture would discuss general farming, it must go among the farmers. If the Dairymen's Association would discuss dairying, it must go among the dairymen. So if we would discuss fruit growing, we must go among the fruit growers. The fruit growers do not live in the city, so we must hold our meetings in the country, where the fruit growers are. There the meetings will prove most useful and most successful—for there we shall draw together those who are engaged in growing fruit. These meetings should, as far as possible, partake of the

character of institutes for imparting pomological knowledge to those who avail themselves of the opportunity to be present. By this we do not mean that those who conduct the meetings are professors of pomology and come here prepared to teach it in all its branches. We come here for the purpose of interchanging ideas; and while we act our part as best we are able, we expect to draw information from the experience of those who are present, and send it out to those who are searching for knowledge in the direction in which we are working. Thus you become the teachers, and we are only the medium through which the knowledge you possess is imparted to others. Much good may go out from such a meeting as this, and it is hoped the attendance at this time will be such as to give a high character to the deliberations.

We occasionally find an individual so void of everything but selfishness—so hedged up in his own narrow limits, that he can see no good results growing out of efforts made to encourage progress in any direction. Should such an individual ask what we have done, we can only cite him to our records. Our annual reports are a record of the work of the Society. We make no claims for brilliant achievements. We are planting the tree of knowledge in the faith that in due time it will bring forth fruit.

Our fruit list is a safe guide for those seeking information in regard to the most desirable varieties to plant. It contains in an available form the experience of practical fruit growers. No variety is there recommended which has not proved worthy of recommendation. There may be new varieties of great value which are not entered in the list. When they have been proved worthy of it, by the test of experience, they will be inserted.

Arrangements have been made to have a list of fruits for amateur growers prepared and presented to this meeting for the approval of the Society. Gross mistakes have been made by those who would grow a few select varieties for use in their own families. With but a small tract of land to devote to a fruit garden, they have no room to waste on inferior varieties. Without experience to guide them, it is not strange that after years of watchful care many of them find their ground encumbered with such as they do not want. With a list prepared by those who are familiar with the different varieties of fruit, and carefully revised by the Society, those seeking information have a safe guide to follow.

Gentlemen, fellow-members, there is still much work which may be done. The Society, if its members are earnest and faithful,

will find that its work never can be completed. As it goes on increasing in strength and drawing to its ranks new members and new workers, the field of labor will continually open before it, inviting to effort. As we labor earnestly and faithfully, so shall be our reward.

The President's address was by vote referred to a special committee consisting of Messrs. Henry McLaughlin, Joseph Taylor and J. A. Varney.

DISCUSSION.

Dr. N. T. TRUE of Bethel. There are some forty minutes before nine o'clock, and in the absence of any other business I would be happy to hear from the members of the Society or from any gentleman present on the points suggested by the interesting address to which we have listened. There are certainly points worthy of further consideration, and I think there will be no better opportunity for considering them than the present.

The SECRETARY. I know of no one present better qualified to open the discussion than Dr. True, and I would call upon him to address the meeting.

Dr. TRUE. I presume I shall inflict all the punishment that the pomologists present are deserving of in this world, to-morrow, and I would prefer to be excused to-night. However, there are one or two points on which I would like to speak. The President has alluded to the first efforts made in this county in behalf of the agricultural interest. They are exceedingly interesting. Some of you may call to mind the name of Benjamin Vaughan, of Hallowell, an English gentleman who came to this country a good many years ago. He introduced many varieties of fruit, and some of them have been propagated, and in that way he did a good deal to improve the character of the fruit grown in that section. I came to this town to reside more than forty years ago. I was struck with the efforts that had already been made here in introducing the cultivation of some kinds of fruit. Those efforts were not always successful. Many of them were experiments, but experiments are not always unprofitable even when they fail in securing the direct end desired. I made my first home in the house which had been owned and occupied by Hon. John Chandler, known to many of you as our first Senator in Congress. He had

introduced trees, which were growing about his residence, that I did not suppose could be grown in Maine. I remember seeing my first Seckel pear in his dooryard, bearing good crops of excellent fruit at least every other year. It is a small pear to be sure, and not to be recommended perhaps as the best, but worthy to be cultivated. Then I remember of seeing what I never saw elsewhere in the State of Maine. He had introduced a catalpa tree, which, it had been supposed, would only live in the neighborhood of Charleston; but there was the tree by that house, with its great leaves. The snow would kill it to the roots about every winter, but the roots would survive. It was not suitable for culture of course, but it was an experiment and one which I honor him for making. Then he had planted a row of sycamore trees, and they had grown up to be quite large trees. He also raised apples. He had one variety that was always a favorite with me. That was the old English Nonsuch. I don't know that there is any apple that I prefer to it. It is not an apple perhaps that could be successfully propagated in all parts of the State, but from that place many barrels of them used to be sent away. His first efforts in raising grapes were not successful, perhaps because then we had not varieties adapted to the climate. These facts show the character of the experiments he made; and they had to make experiments in those days. It was the only way they could ascertain what was adapted to their wants. Since that day wonderful improvements in pomology have been introduced, and these early efforts are of great interest as matters of history.

There is another point to which I wish to call attention, and it was suggested to me by what has been said with reference to this town. I know something about it from my residence of ten years here, and I think that there are few portions of the State where they can raise such apples as can be raised in Monmouth. There are few if any places in the State where you can raise so good Black Oxfords as you can see on the tables here. The Greening cannot be grown, so far as my observation goes, as well as the Roxbury Russet. The production of the latter fruit has always been a characteristic of this town. I have seen long rows of these trees here laden with the richest fruit. Now I have some trees of the same variety at Bethel, and I wish that somebody would come some night and cut them down. They bear a disagreeable fruit that cracks and is unfit for consumption. I have let them grow in the hope that they would do better.

GRAPE CULTURE.

Dr. TRUE proceeded :—Allusion has been made to the Blood's Seedling grape. Well, sir, I have eaten very good grapes of that variety grown in this town, and would be glad always to have as good grapes as these were, and none worse. In another place it might not be good. I think it is one of those grapes that is various in its quality. What I want to come at is, that every person who owns a little lot of land might have one, two or three grape vines growing up by the side of his house where the morning sun can come in and where they can be protected from the first frosts and high winds. My experience has been that if we can get them past the first frosts we can ripen grapes and have them good. I believe that every person can raise at least one grape vine. It is something that is useful, as well as beautiful, running up by the side of a house. The experiments have been tried. I can remember when we had not a grape that we could rely upon as adapted to out-door culture in Maine. Now we have some four of five, perhaps more, varieties. I will mention three or four while I think of it. The Hartford Prolific is a good grape and a rapid grower. The Delaware is a slower grower, but when under way it produces good fruit. Then there is another, the Northern Muscadine. I am always glad to get a good supply of these grapes well ripened. There is one other variety to which I wish to call the attention of the Society. I do not know whether it is known in this State, but it is a seedling which originated in Oswego, N. Y., known as the Worden grape. Gentlemen who have tried all the varieties they can raise there, are propagating this in preference to others. It ripens there earlier than others. I think it ripens earlier than the Hartford Prolific. I would like to bring this matter to the attention of the gentlemen present who are familiar with these things. Perhaps Dr. Weston, who watches all these matters, has fruited it and can tell us about it.

Dr. WESTON. I have had no experience with the Worden grape. I have read about it, but I am not aware that it has been introduced into the State.

Mr. SAWYER being called upon, responded :—I did not intend to say anything to-night. I have, it is true, grown some grapes,—in fact, most all the kinds that are commonly grown in this State,—and have ripened almost all of them under some circumstances—some more frequently than others. In regard to the Worden

grape, I think it is not grown in this State except to a very limited extent. I am quite sure that Mr. Goodale has introduced it and is growing it on his grounds in Saco, but I do not understand that he has the vines for sale. I have not seen it myself, but it is well spoken of.* I am obliged to say that one or two of the grapes that our friend Dr. True has spoken of do not please me. I believe that we have better grapes than the Hartford Prolific or the Northern Muscadine, and which we can grow as well as these. The Delaware of course cannot be objected to. The fact of its slow growing should not be a serious objection, for it will grow if you will give it a good chance, and the fruit will be satisfactory. It bears an abundance of clusters, and the size of the berries may be increased by judicious thinning, as with other grapes. We have many good grapes in the State for which the season is not quite long enough, and they will not ripen. We can sometimes ripen the Catawba and Sweetwater. We can ripen the Isabella about once in six years; I think not oftener. You remember that at our first annual exhibition, at Bangor, we had grapes from Piscataquis county. Mr. Calvin Chamberlain, a gentleman well known for his interest in fruit growing, sent us grapes grown in the open air on his grounds in Foxcroft. I do not remember of tasting them, but they had the appearance of being well ripened, and yet there were many sections where grapes did not fully ripen that year. There is a class of grapes grown quite extensively in our State—the Rogers' Hybrids,—produced by crossing some of our native varieties with European varieties. Mr. Rogers produced a large number of these hybrids, and the same thing has

* In answer to inquiries, Mr. GOODALE writes, under date of Feb. 19, 1877:—"I have grown the Worden grape for ten years and more. Its wood and leaf resemble the Concord, but the vine is less vigorous, and of rather slender growth. The fruit also resembles the Concord,—the berries rather larger, bunch hardly as compact. In some years it has (in common with Concord and some others,) suffered from a disease attacking the berries, which has lessened the crop. It inclines to over-bear, but when properly thinned it is not only much earlier than Concord but in quality is superior to that, even at its best—(and the Concord rarely ripens *fully* here.) Except for the two drawbacks above named I would rank it, for culture in Maine, a long way ahead of any other yet proved on my grounds; and with them I would part with any other quite as soon. I have no vines for sale."

Mr. JOHN CURRIER of Waldoboro', writes:—"I fruited it year before last, and did not notice that it differed much from other good grapes that I have, but last year it yielded a large crop and we called it decidedly the best grape that we had. The berries are of good size, also the bunches, though not large. I have vines for sale."

I also learn that it has been grown by some other members of the Society, and it is hoped we may have it at the next exhibition.—SEC.

been done by others. He at first designated them by numbers, but afterwards gave names to the best. His No. 3 is the Massasoit; No. 4 is the Wilder; No. 9 is the Lindley; No. 15 is the Agawam; No. 19 is the Merrimack. The Salem, (No. 22), is probably the most widely known of that class of grapes. All of these, except the first named, are described and recommended in our fruit list. I have found that these grapes, in my locality, ripen nearly every year. There is a large class of grapes that will grow and may be ripened almost every year, and this is a field in which the Society can do a good work. Our exhibitions have already done much in the improvement of the taste and knowledge of the people who have attended them. Very much depends in growing grapes upon the removal of a portion of the fruit, and this is a principle which, so far as I know, holds good in regard to all fruits. A very little protection will enable us to ripen the best grapes; as the Iona, which never ripens fully without it, requires but a slight protection to carry it past the early frosts; and when well ripened I know no better grape. So as to the Diana, which is the best keeping variety I know of. The Rebecca is a fine grape, but I have found the vines tender and unreliable in the open air. Allen's Hybrid is a very delicious grape, which I think will do better with some artificial protection, although it is grown at Bangor and elsewhere, in sheltered positions, quite successfully. I make a distinction between *shelter*, which all varieties require in our climate and which may be afforded by buildings, fences, trees, &c., and *artificial protection*, by which I mean a covering, either permanent or temporary, of glass, cloth or other material, to prevent the effects of late spring and early autumn frosts and of damp foggy weather in summer. This is a subject to which I hope to call the attention of the Society more particularly at some future time. We ought also to give attention to the peculiarities of soils and culture required by different varieties. I would caution every one against buying untested varieties. Attractive pictures and the representations of itinerant venders will generally mislead the novice who trusts in them.

APPLES FOR MARKET.—HIGH CULTURE FOR APPLES.

Mr. A. C. CARR of Winthrop, being called upon by the President, said:—I did not expect to be called upon to-night, especially after hearing the gentleman from Bethel and the gentleman from

Wiscasset. The apple alluded to by Dr. True as the English Nonsuch, I suppose is the Canada Red Nonsuch, (Red Canada.) I think it may be profitably grown in this county. It is rather small, but is of good flavor. Speaking of the Roxbury Russet, we do claim, and I think rightfully, that this section of the State is *the* section to grow the Roxbury Russet. I have bought a few apples and handled some, [Probably more than any other person in the State.—Sec.] and so near here as in the neighboring town of Greene I don't believe anybody ever saw put up a good barrel of Roxbury Russets, but for Baldwins they can't be beat. On the east of the Kennebec, too, it is hard work, generally speaking, to raise good Roxbury Russets, but here we raise what we call good ones. They are very good for shipping. Right here I may say that it seems to me that we ought to raise the apple that will fill and satisfy the market. Of course we want to raise various kinds for our own use, and perhaps we ought to raise a few more kinds than we want for the market. We want to raise but few kinds for market. A gentleman said to me that the market calls for five barrels of Baldwins to one of every other kind. I think it is so. So the Baldwin is really the apple to grow for money. I think the Baldwin and the Roxbury Russet are the most profitable apples for us to raise. I had good success with my trees last year. I didn't allow the caterpillars to eat them up, and I got fifty or sixty barrels where my neighbors had none; and I expect some next year.

MR. ALFRED SMITH of Monmouth. Allusion has been made to the Roxbury Russet. I have a few of them. I am considerable of an old man, and I have raised that fruit from my boyhood. It seems to be the prevalent opinion that it cannot be raised anywhere but in Monmouth. I have come to a different conclusion, but I may be mistaken. It needs high culture anywhere, and with that you get good fruit yearly. Without it you cannot expect it to succeed anywhere. As to the Baldwin, it will not bear high culture on low lands. On our high lands it does well, but it will winter-kill if driven hard. I have nothing against the fruit, but I have lost more money in undertaking to raise it than with any other kind. As for the Russets, in Winthrop I had an orchard of four acres. The outside rows were well manured naturally, from the fact that the sheep used to lie under them. These trees produced beautiful "golden" Russets,—as the neighbors called them,—while those in the centre of the orchard bore very inferior

apples, so much so that they were worthless. They were Russets, but the neighbors said a different fruit from the "golden" Russets that grew on the outside. In fact they were the same, but so small that anybody would be ashamed of them. On one row where the sheep were in the habit of lying, I raised forty bushels from nine trees,—as handsome apples as you ever saw, while the inferior ones were not fit for market—on the same soil. Now any one can see it was culture that made the difference. The Russets in my orchard in this town, when I came here, were so mean that I was ashamed of them. I sent them to Boston and they passed for No. 2's. I have since raised from those trees as good apples as ever I raised in Winthrop. *High culture has done it.* Last fall, at our exhibition, I saw some handsome Roxbury Russets from Waterville, and from Mr. Pulsifer's orchard in Androscoggin county,—as handsome specimens as we raise in Monmouth. Right here, on a soil different from mine, Mr. George H. Andrews raises them. You can see his fruit here, as handsome as you ever saw for Russets. *It is in the culture.* Many soils must be underdrained in order to produce good fruit, but we must always feed in order to produce fruit. Without it the fruit is mean. The Baldwin is a very slow grower. It will produce fruit for awhile, but it will run down to a small amount without high culture.

The PRESIDENT. This discussion has finally brought up a very important question, and one on which too much stress cannot be laid; that is, *thorough cultivation for the production of fruit.* There is no more important question in connection with the subject of fruit growing. There is no question on which fruit-growers need more prompting, unless a fruit-buyer, like Mr. Carr, might say it is the subject of *deaconing.* I am admonished, however, that we cannot pursue it to any great extent at this time. If there shall be an opportunity, it may be discussed further before the close of the meeting.

The President then announced that any questions arising in the minds of persons present, on subjects connected with fruit growing, and which might be presented in writing, would be answered or presented to the Society for consideration before the close of the meeting on Wednesday; after which,

Adjourned.

SECOND DAY.—MORNING SESSION.

The business meeting of the Society was adjourned till five o'clock P. M.

At the opening of the public session the President announced the order of exercises for the day, and introduced Dr. J. C. Weston of Bangor, Corresponding Secretary, who presented his annual report, embracing interesting and instructive papers on "Lawns and Landscape Gardening" and "Window Gardening."

REPORT OF THE CORRESPONDING SECRETARY, FOR 1876.

DR. J. C. WESTON OF BANGOR.

Your Corresponding Secretary would announce that copies of the Annual Report of the Maine State Pomological Society for 1875, were sent by the Recording Secretary to kindred associations so far as it was possible to ascertain the address of the officers of such societies, and there have been received by him in return and from other sources, the following works which have not been heretofore acknowledged,—all of which have been added to the Society's library, viz:

AMERICAN POMOLOGICAL SOCIETY. Proceedings of the fifteenth session held at Chicago, Ill., September, 1875. (Presented by G. B. Sawyer.)

DEPARTMENT OF AGRICULTURE OF THE UNITED STATES. Annual Report for 1875, and Monthly Reports for 1876. Also List of Agricultural Societies and Farmers' Clubs in the United States, (pamphlet.)

MAINE. Report of the Secretary of the Board of Agriculture for 1875; also General Index to Agricultural Reports of Maine from 1850 to 1875.

MASSACHUSETTS. Transactions Mass. Horticultural Society for 1875, Parts 1 and 2, and 1876, Part 1. Also Schedule of Prizes for 1877.

CONNECTICUT. Seventh and Eighth Annual Reports of the Secretary of the Board of Agriculture, being for the years 1873 and 1874, and each containing reports on orcharding and fruit culture contributed by Mr. P. M. Augur, Pomologist of the Board.

NEW YORK. Proceedings of the Western New York Horticultural Society, 1876.

PENNSYLVANIA. Programme of the Pennsylvania Horticultural Society for 1876. This is an old, wealthy and well organized society, and like the Western New York Society includes among its members many well known horticulturists and nurserymen. It is to be regretted that it does not publish its transactions in full.

GEORGIA. Proceedings of the Georgia State Horticultural Society, at its first session, held at Macon, August, 1876. This is a new Society, organized during the past year, under the most favorable auspices. We tender to it our fraternal greetings.

MICHIGAN. From Prof. Charles W. Garfield, of the State Agricultural College at Lansing, and recently elected Secretary of the State Pomological Society, we have the Transactions of the Michigan State Pomological Society for 1874 and 1875, (all the preceding volumes having been previously received and acknowledged); Transactions of the State Board of Agriculture, 1865 to 1875 inclusive, except 1867 and 1869, and the Report of the Superintendent of Public Instruction for 1874,—forming a most valuable accession to our library, and for which we return the thanks of this Society. The Pomological and Agricultural Reports of Michigan are magnificent volumes of upwards of 500 pages each, finely printed, profusely illustrated and well bound, and published by authority of the State. The liberality with which the Michigan State Pomological Society has been patronized by the State government, together with the zeal of its members, has resulted in a wonderful development of the fruit producing capacity of the State, and justly entitled her to the distinction accorded by Mr. Bateham, the able Secretary of the Ohio Horticultural Society, as "the banner apple State." These results ought to serve as a salutary lesson to other States.

WISCONSIN. Transactions of the Wisconsin State Horticultural Society for 1875 and 1876. From F. W. Case, Secretary, Madison.

MINNESOTA. Transactions of the Minnesota State Horticultural Society for 1875, and the same for 1875-6. From Prof. C. Y. Lacy, Secretary, Minneapolis.

The two societies last named are composed of efficient and enthusiastic members, and are doing good work. They also receive liberal aid from the State governments. The reports are issued in good style and contain much useful information,—fully up to the current standard of such publications.

ONTARIO. Report of the Commissioner of Agriculture of the

Province of Ontario, embracing the Reports of the Fruit Growers' Association and of the Entomological Society of the Province for 1873.

Reports of the Fruit Growers' Association and Entomological Society for 1874, and the same for 1875. From D. W. Beadle, Secretary, St. Catherines.

These societies are efficient and well sustained, and their proceedings will afford us many valuable suggestions. We notice that the Fruit Growers' Association distributes annually among its members, trees, vines or plants of some variety regarded as desirable, announcing the same for some years in advance.

QUEBEC. First Report of the Fruit Committee of the Montreal Agricultural and Horticultural Society, and Fruit List of the Province of Quebec. From Mr. Charles Gibb, Abbotsford. These publications indicate a good beginning and well considered efforts in the right direction among our northern neighbors, and we hail them with much pleasure.

We have in former years received and acknowledged reports from the State Societies of Ohio, Pennsylvania (Fruit Growers' Association) Florida and Nebraska, but none during the past year. We trust we shall be remembered by all of them in the future.

Our Secretary has recently obtained from the list published by the Department of Agriculture at Washington, and from other sources, reliable information in respect to societies of a similar character in several of the other States, and will communicate with them at an early day for the purpose of effecting an exchange of publications.

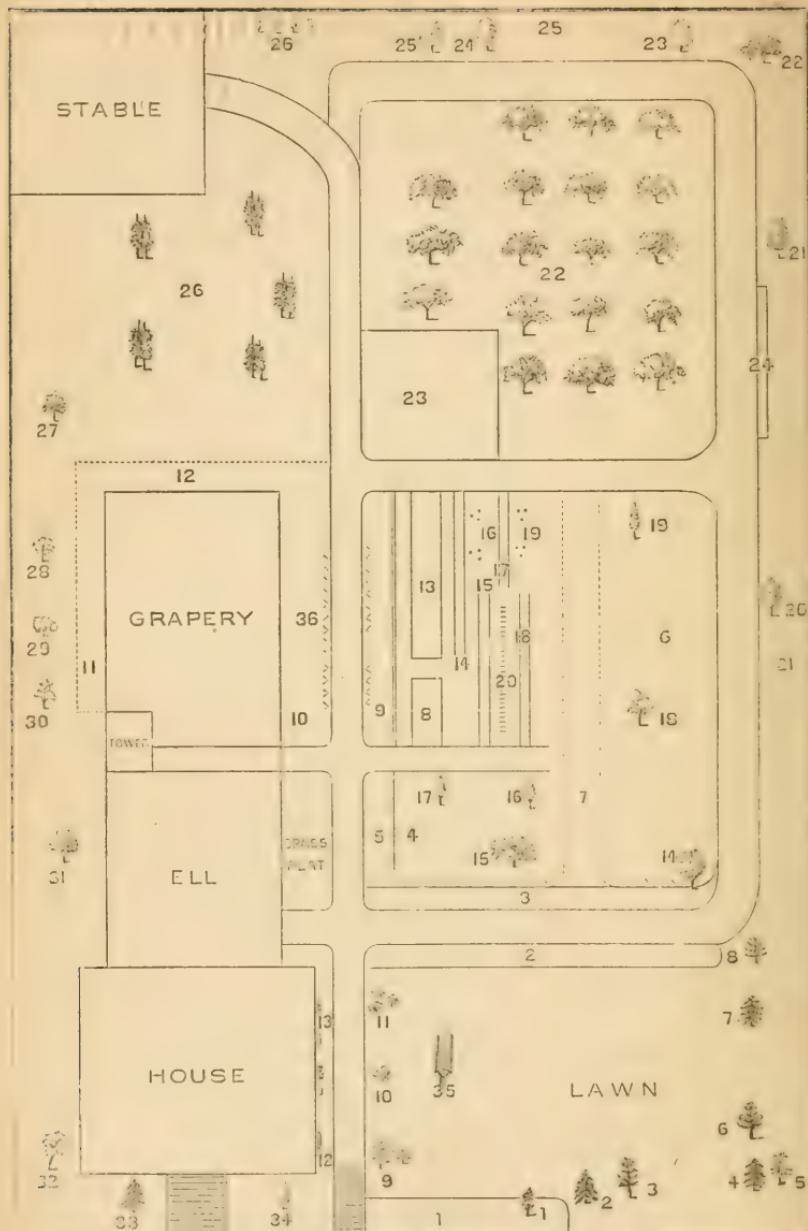
We have also received the following works from individuals, viz: From CHARLES DOWNING, Newburgh, N. Y., Second Appendix to Downing's Fruits and Fruit Trees of America.

Col. D. S. CURTISS, Editor, Baltimore, Md., The Maryland Farmer, monthly, vol. 13, 1876. Published by E. Whitman, Baltimore.

THOMAS MEEHAN, editor and publisher, Philadelphia,—occasional number of The Gardener's Monthly.

JAMES VICK, Rochester, N. Y. Vick's Floral Guide for 1876 and 1877.

Also numerous catalogues from nurserymen, seedsmen, &c.



PLAN OF GROUNDS OF THE LATE DR. J. C. WESTON, BANGOR.

REFERENCES.

TREES, SHRUBS AND VINES.

- No. 1. Tree Honeysuckle.
2. Spruce
3. Pine.
4. Spruce.
5. White Birch.
6. Scotch Pine.
7. Spruce.
8. Pine.
9. Group—Barbery, Peony, Weigelia
10. Weigelia.
11. Pyrus Japonica, Moss Rose.
12. Roxbury Wax Work.
13. Grapes—Salem, Deleware.
14. Plum.
15. Apple—Bell's Early.
16. Pear.
17. Pear.
18. Plum.
19. Pear.
20. Cherry.
21. Cherry.
22. Apple.
23. Plum.
24. Cherry.
25. Cherry.
26. Hops.
27. Cherry.
28. Lilac—purple.
29. 'Snow-Ball.
30. White Lilae.
31. Cherry.
32. Mountain Ash.
33. Norway Spruce.

34. Wild Pear.
35. Trellis, with Clematis.
36. Deleware Grapes, on poies.

BEDS.

- No. 1. Lily of the Valley.
2. Flower border for annuals and
bedding out plants.
3. Flower border for perennials, etc.
4. Vegetables with a row of dahlias
bordering flower beds.
5. Rose bed.
6. Vegetables.
7. A double row of bean poles set
close.
8. A flower bed.
9. Rose bed, tulips on edge near
path.
10. Grape border, tulips on the edge
near path.
11. Grape border.
12. Grape border.
13. Asparagus.
14. Pear nursery.
15, 17, 18. Pears.
16, 19. Cucumbers.
20. Celery.
21. Raspberries.
22. Strawberries, set with pear trees.
23. Vegetables.
24. Rhubarb.
25. Corn.
26. Corn set with pears.

LAWNS AND LANDSCAPE GARDENING.

[Continuation of Dr. Weston's report as Corresponding Secretary.]

England surpasses all other countries in the beauty of its lawns. The humidity of its climate, the frequent rains in the season of growing vegetation, cause the grass to flourish with great luxuriance, and the frequent cutting produces a velvet like turf of vivid green, which is a constant delight to the eye. There is nothing so attractive in all nature's domain as this soft carpet, with the most beautiful flowers in a setting of emerald. And no one can contemplate the lawns on the grounds of Oxford and Cambridge and hundreds of other localities, without admiration and a desire to imitate them.

Although our own country has a more fervid heat and a drier atmosphere, yet experience has shown that we also can cultivate lawns which may be very satisfactory. Every humble home may even have its patch of green grass of greater or less extent, according to the means of the owner, which may be enjoyed as keenly as the largest landscape garden belonging to the wealthiest landholder. "It is a mistaken idea, indulged in by many, that to make a home place beautiful, requires a large expenditure of money; and it is still more a mistaken idea that to accomplish this successfully, a person must be acquainted with the rules and principles of landscape gardening in all the minutiae of its details, or if they lack this knowledge themselves they must, perforce, employ some person learned and skilled in the intricacies of the art, to do it for them. These ideas have no doubt deterred many from undertaking what they have long desired, a home beautiful in its surroundings and adornments. Taste and purpose, combined with study and observation, will produce the desired result, often much more satisfactorily than a lavish expenditure of money."

As the lawn is one of the most important features in landscape gardening, it will first be considered; and as knowledge derived from experience and example is apt to be most practical and useful, I will communicate my own method.

The very first thing needed in preparing the ground is to provide effectual drainage by stone, tile or brick drains, unless the land is so situated that this is accomplished without extra artificial means. In premises consisting of three-fourths of an acre, the

garden is from six to ten feet above the streets that bound it on three sides, and the surface slopes from the centre towards the west and towards the east, and a terrace on the margin extends to the sidewalk, so that the surface and the surplus water of the soil readily flows off, and all the waste water from the house and that from the house of a neighbor seventy-five feet distant, is conveyed away through brick drains from the cellars, hence no additional drainage of the lot is required. If it had been level or wet it would have been necessary to lay an underground drain through the centre. Thus a dry soil is secured at all seasons of the year, and a healthy uniform growth of plants and trees. It is equally important to make the soil deep, rich and mellow, so that the roots of the grass may descend easily in pursuit of the necessary moisture and nutriment, and from their distance below the surface, may thus escape the bad effects of the drouths and heat of summer. In this way only can a fine, handsome, close turf be obtained, which shall flourish in perennial verdure, maintaining its vigor season after season, with little additional treatment.

It having been determined to convert a plat of ground fifty feet by sixty into a lawn, all the plants, shrubs and trees which were not required for ornament were removed the last of September. The surface was covered with a plentiful supply of old, well composted manure, and the ground was spaded two feet deep, taking care to distribute this manure evenly with the soil, so that green spots and patches may not disfigure the lawn. If this work is done in early autumn, the seeds of the weeds contained in the fertilizing material will be apt to germinate, and before reaching maturity these weeds will be destroyed by the frosts of winter, and consequently the next season the grass will be less infested by undesirable plants.

Early in the spring as soon as the soil is free from frost, and friable, the ground was graded, raked and thoroughly rolled so as to be smooth and compact. It was then raked again and English lawn grass with a small quantity of white clover was sown on a calm day, evenly and thickly so as to cover the entire surface, and then rolled again when the work was complete. If this sowing is done before the early vernal rains, the seed is sure to come up quickly and evenly, and become well rooted and vigorous before the soil is dry, and this germination is also promoted by the additional rolling. The seed ought to be used at the rate of at least four bushels to the acre so as to ensure a close, firm turf.

Some may prefer American grass seed. James Cruikshanks of Massachusetts, after long experience with various mixtures, finds the following to give the best satisfaction: "Eight quarts of red top, two quarts of fine top, three quarts of Rhode Island bent, and three quarts of Kentucky blue, adding half a pound of white clover. These grasses when kept short will soon make a fine lawn, which is one of the best components of a good landscape. Some soils require more seed than others, but the proportion will be the same whatever the quantity required."

When the grass is a few inches high and is strongly rooted, it should be mown just before an expected rain, and spread evenly over the surface for a mulch, which is to be removed in a few days, or as soon as the grass starts vigorously again, and this process is repeated during the season until autumn, as often as the growth seems to require it. In September wood ashes were scattered upon the ground in season to be conveyed into the soil by the autumnal rains and stimulate the growth of a thick aftermath, which affords protection to the roots from the frosts of winter. A fine compost of manure would be equally effectual. The second season the lawn ought to be mown every ten days, or often enough to keep it short, close and green.

The arrangement of the walks is an important matter. No more should be made than are necessary, as too many paths divide the lawn too much, especially if small, and mar its beauty. Their location and direction should conform to ideas of utility and beauty. If circumstances allow, a curved path or road is much more beautiful, particularly if a tree or a group, or the conformation of the ground seem to require the circular walk.

In the premises under consideration, the house is twenty feet east from the street, and convenience requires that it should be entered by ascending stone steps directly to the front door. If it were situated further in the rear and in the centre of the lot, and was less elevated, the approach would be much more effective and in accordance with the rules of landscape gardening, if a carriage road entered at one corner and gracefully sweeping round in front of the door departed at the other corner, with a group of trees in the centre of the lawn in front and single trees interspersed at suitable distances along the road, so disposed as not to intercept desirable views. Another series of steps ascend to a straight granite walk, which passes to the other doors in the southern end and ell of the house, facing the lawn. Lawns about twenty feet

wide extend in front and at the northern end of the house, ell and span-roof grapevines.

Such being the position of the house, and such the nature of the existing walks, the additional paths have to conform; and it was necessary also to plant the trees, shrubs, climbing vines and flowering plants so as not to be incongruous, but to harmonize with the existing order of things. Accordingly a straight path was made from the door in the ell, along the eastern margin of the lawn until it approached a large Scotch pine, when it was necessary to curve it so as to meet another path extending to the vegetable garden; and along this path were made borders for shrubs and flowers, rather than disfigure the beauty of the small lawn by introducing through it beds of flowering plants.

In the border next the lawn were planted low annuals, perennials and bulbous plants, such as pansies, pinks, mignonette, sweet alyssum, verbenas, nemophila, agrostemma, Drummond phlox, tulips, lilies, graceful dentzia, mountain mist, &c. In the other, next the vegetable garden, were planted taller shrubs and plants, such as Mahonia, flowering almond, rose acacia, peonies, dahlias, gladiolas, asters, &c. Beyond, rose bushes, climbing vines, morning glories, nasturtiums, scarlet and white runners and asparagus, afford a further screen to the vegetable garden in the rear of the lot. The trees also are so disposed as to conceal it and afford that privacy which is desirable. The necessary paths in the rest of the garden, whenever convenient and practicable, curve so as to avoid sharp corners.

In a corner of the lawn most remote from the house is a group of trees, consisting of a Norway spruce in the background, and in front a white birch and a scarlet maple, the lighter green of the deciduous trees contrasting well with the darker foliage of the evergreen. Elsewhere are two other spruces, an American white (*Pinus Strobus*), Scotch (*Pinus Sylvestris*), and Austrian pine (*Pinus Austrica*),—attractive when only three feet high, and set sufficiently far apart to grow and develop in all their symmetry and beauty until they attain their natural size. They, with the rock maples and elms planted in the border of the street, also afford shelter from the westerly winds. The buildings give additional shelter to the garden, and obviate the necessity for a Norway spruce hedge on the north.

On the western margin is a hemlock hedge (*Abies Canadensis*), kept close shaved and low, which, with its peculiar green is an

object of beauty, particularly when the new buds push forth, and the adjoining terrace is clothed with lilies of the valley, which first greet the opening spring with their broad green leaves, and fragrant flowers. These are separated from the turf by a plank inserted in the ground edgewise just below the surface. On the southern border is a long hedge of arbor vitæ, disclosing its evergreen verdure all winter above the line of snow.

In the lawn are interspersed at suitable distances, so as not to interfere with the children's play-ground, flowering shrubs, such as rosea and variegated Weigelia, Pyrus Japonica, crested moss rose, &c., and in the centre opposite the garden hood is a latticed arbor upon which flowering vines climb and cling with their entwining tendrils, so that when covered it is veritably a thing of great beauty.

In the old lawn, in front and on the northern exposure, were planted the sugar pear, or shad-bush, (*Amelanchier Canadensis*), Scotch larch, European ash, cherry trees, snow ball, white and purple lilacs. The trees have attained large size and are perfectly hardy. The sugar pear is the first tree to blossom in the spring, and its abundant white flowers, like an immense bouquet, inspires the mind with sensations of delight, giving promise of the coming efflorescence and fruit of other trees; and the scarlet blossoms of the *Pyrus Japonica* next succeed and retain their vivid color for weeks.

The walls of the house are relieved by the clematis, woodbine, Roxbury waxwork and grape vines, growing with perennial verdure and luxuriance from spring to autumn, and cheering the cultivator at the ripening harvest with crimson foliage, scarlet berry, yellow, red and purple cluster.

Other trees and shrubs besides those mentioned had been tried and either had been discarded or had died. The locust, which in its long sprays of foliage resembles the acacia, is attractive, but its very luxuriance and the rapidity of its growth so affect its wood, that it readily splits under the influence of the wind, and loses its symmetry. The mountain ash or round wood, (*Pyrus Americana*) is very handsome with its smooth bark and clean limbs, but easily falls a victim to the borer. Only the frequent application of strong soap suds to the bark during summer, will save it. The European ash is more vigorous and hardy, and is an ornament, particularly in the fall, when covered with clusters of red berries. Many trees which flourish in a more southern clime, will not sur-

vive the rigorous winters of Maine, but we can secure a sufficient variety. The same is true of certain shrubs in northern Maine. The rhododendron, so exquisite in its foliage and flowers on the lawn, is tender. It has been more than once transplanted from its native bed near Sebago lake, but missed the protection of the trees and the peculiar soil from which it had been removed, and only survived one or two winters. Still some variety may succeed if well covered with evergreen boughs and the winter snows, or it may be planted in a tub, which may be removed to the house for shelter.

The roses which have proved hardy and satisfactory are the Gen. Jacqueminot, Giant of Battles, Baron Prevost, Edward de Fosse, La Reine, Lanne and Crested moss, and the Thurette, the common white, blush and Harrison roses which bloom but once, yet are valuable for their hardiness and profuse efflorescence. In our rigorous climate it is important to fasten them to the earth before the ground freezes, and cover them with evergreen boughs which should not be removed until the buds are ready to push in the spring, and the extra bloom will well repay the trouble. These hardy trees and shrubs are sufficiently numerous for the grounds of most estates.

As shown in this paper, the rules of landscape gardening which were practicable, have been applied to a garden limited in extent. Different grounds might require somewhat different treatment, according to circumstances. A suburban or country home would furnish a larger arena for the display of taste and skill.

It may be well to add a few simple directions in respect to the construction of garden walks: Dig out the soil the width of the proposed path, at least two and a half feet deep. At the bottom lay a foundation of large stones closely fitted together. A second layer of smaller stones should follow the first, and so on, each succeeding layer smaller than the preceding, until the space is nearly filled level with the surrounding surface, then cover with coarse cinders, and finish with gravel and sand, or coal ashes or finely broken stone. In this way walks and roads are made in parks both in Europe and this country, and thus a permanent and perfectly well drained and dry walk, free from weeds, is secured at all seasons.

For the instruction of those who desire to adorn and render attractive suburban estates, the following essay on Landscape Gardening, by James Cruikshanks, is copied:

* "The principles upon which Landscape Gardening is founded are intended to produce unity of design with harmony in execution and also picturesque beauty, and where these are not combined the grand object in view is not attained.

It is necessary to consider the location of the house, with all its surroundings, the size of the place, also the views to be obtained from it, whether they are distant or circumscribed, of wood or water, tame or romantic, of mountain or meadow, of sea or land.

An estate commanding such views requires very different treatment in the arrangement, from one where the house is embedded in a forest with only space enough to get a small lawn, and consequently without distant views. In forming the component parts of a good landscape, much also depends upon the character of the scenery in view, for if the sea can be seen on the one side, and a mountain on the other, the planting would require to be bolder and more decided than if the only views to be obtained were a meadow with its flocks and herds. * * *

The first thing that requires attention is to have the ground properly drained and subsoiled, and afterwards graded and enriched; also to have the places marked off for groups of trees which it is intended to plant. You will then be ready to sow the grass seed, and must be sure to procure the best mixture to produce a good lawn. * * * *

It is difficult to give a design for any supposed place, as almost every one differs somewhat from its next neighbor; but assuming the ground to be nearly level, or slightly undulating, with a public road in front, and rather a sloping to the road than otherwise, placing the house about two-thirds of the depth of the property towards the back, will give a good opportunity to have the necessary buildings, such as the stables, carriage house, ice house, etc., behind the mansion where they can be shut out of view, if desired, by irregular groups of planting, which could lap over each other and thus secure privacy. This arrangement would afford space for a fine lawn in front, with small, irregular clumps of trees and flowering shrubs near the road, making the lawn look as large as possible and giving views of pleasant objects beyond.

The house being located as before stated, and say, about one-fourth of the width of the lot from either side, with an easy, curved avenue from the road, such an arrangement would give a good opportunity to get a small kitchen garden and orchard at the

back of the house, with a greenhouse and grapery running about parallel with the house, and a flower garden in front of them, flowering shrubs and low evergreens forming a boundary between the flower garden and the lawn. Anything that was unsightly would thus be kept out of view, and at the same time everything required could be conveniently located.

The flower garden being a distinct department, the best effect will be produced by cultivating in it principally florists' flowers. The beauty of a lawn is lost in a great measure by introducing clumps of bedding plants through it, however artistically they may be arranged; nothing pleases the eye so well as the pure, green grass with here and there a handsome ornamental tree judiciously located.

The buildings and drive being thus disposed of, the next thing requiring attention is the planting of the boundaries in such a manner as to afford sufficient shelter on the north and west sides, these being the quarters from which our heaviest gales come, but without giving it a too formal appearance, and at the same time taking advantage of all the most desirable views that can be obtained, and this can only be accomplished by judicious grouping.

The same may be said of the south and east sides, although they may not require to be so densely planted, unless it be to hide some unsightly object; but where the view of the sea, or the bold outline of a mountain can be obtained, the landscape gardener should be sure to take advantage of them. In planting, avoid straight rows, and let the outlines of groups be sinuously diversified, taking care to arrange the trees and shrubs according to their size and color, keeping the tallest at the back and the lightest shades of foliage on the most salient points. Small groups of ornamental trees and shrubs may be judiciously planted through the most distant parts of the lawn, but generally, single trees are all that will be required on a small place."

Downing says, * "By Landscape Gardening we understand not only an imitation in the grounds of a country residence, of the agreeable forms of nature, but an *expressive, harmonious and refined imitation*. In Landscape Gardening, we should aim to separate the accidental and extraneous in nature and to preserve only the spirit or essence. As an art, it does not consist as some may suppose, in producing a counterfeit of nature, but in *idealizing natural beauty in a lawn, park or garden.*"

* Treatise on Landscape Gardening.

* "Of the general principles applicable to small suburban estates, we shall first speak of *Adaptation*.

It not unfrequently happens that an estate comes into one's possession upon which certain undesirable features may be presented either by the dwelling, or by the grounds, or by both, with which it is impracticable, or at least not desirable to interfere. The only course to be pursued in such a case, is to make the best of existing circumstances; and it is in this adaptation of means to ends that the executive abilities of the man of taste and good judgment are best exhibited, tending often to the production of the very best results.

Congruity is one of the most important principles to be kept in view in the arrangement of the smallest estate, and is one that is more frequently violated among us than almost any other. For example, it is not uncommon in looking from the house, to see upon one side of the estate, plantations of trees and shrubs arranged in natural order, and on the opposite side, a straight avenue flanked in a formal manner. Here is an evident incongruity. Again, the introduction of fruit trees among those which are strictly ornamental, especially upon a lawn, strikes the eye of taste unpleasantly; so also does the presence of vegetables among the garden flowers.

The disposal of architectural ornaments in a style different from the main house, immediately about and attached to it, as for example, those of a rustic character, are instances of the want of congruity. On the same principle, the attaching of a common greenhouse to a dwelling of any pretence to architectural style cannot be admissible.

In the arrangement of an estate, there should be one expression or leading feature to which the others should be subordinate. This principle termed *unity*, should be recognized even more in small estates than in large ones, for the reason that its violation in the former is more striking and more quickly detected.

Unity, however, should not interfere with the proper introduction of *variety*, which should be shown in the plantations, in the walks, flower-beds, and in the various garden ornaments, as well as in the vistas, recesses, pieces of water, etc."

† "Variety must be considered as belonging more to the details than to the production of a whole. By producing intricacy, it

* Extract from Essay by Daniel Dennison Slade. Trans. Mass. Hort. Society, 1875; Part 2d, p. 38. † Downing's Landscape Gardening.

creates in scenery a thousand points of interest, and elicits new beauties through different arrangements and combinations of forms and colors, lights and shades."

"Simplicity is an essential element in the laying out and embellishment of the small suburban estate. It is not inconsistent with the other principles of which we have spoken, nor is it incompatible with true elegance and refinement.

Convenience never should be sacrificed to ostentation and extravagance, as is too often the case. Perhaps this mistake is more frequently made in the disposition of walks and roads than in any other way. Mr. Mitchell tells us in very pleasing words what guides we should follow in this matter.

* "A walk," he says, "is first of all a convenience; whether leading from door to highway, or to the stable court, or through gardens, or to the wood, it is essentially, and most of all a convenience; and to despoil it of this quality by interposing circles or curves, which have no meaning or sufficient cause, is mere affectation. Not to say, however, that all paths should be straight; the farmer, whose home is at a considerable remove from the highway, and who drives his team thither, avoiding rock and tree and hillock, will give to his line of approach a grace that it would be hard to excel by counterfeit." * * *

The gardens, both flower and vegetable, should be of easy access, the stables and out-houses should be in sufficient proximity, and nothing which can contribute to comfort and convenience should be overlooked.

For the full enjoyment of even the smallest suburban estate there must be a degree of *seclusion*. Not to be able to work in one's garden, to meditate or walk therein, without being subjected to the gaze of neighbors or the passers-by, is a condition which is not agreeable to the refined mind. This seclusion need not be such as to entirely deprive one of vistas into the distant or adjacent country, which are important addenda to every place, and for which every provision should be made, but it should be sufficient to afford that sense of quietude and freedom from interruption so dear to every man, especially a professional one, after the cares and labors of the day.

This seclusion is to be obtained by a judicious disposition of plantations and hedges, and not by high walls and fences, unless in exceptional cases.

* My Farm of Edgewood.

Having thus marked out the general principles which should govern in the laying out and embellishment of the small suburban estate, it remains for us to add that there are a vast number of places, which from the nature of circumstances do not admit the application of any principles beyond those which neatness and order afford. The cultivation of trees and shrubs, a well kept lawn, and a distribution of flowers constitute all that can be expected therein."

WINDOW GARDENING.

In the rigorous climate of Maine, the beautiful flowers lie dormant more than half the year, enclosed in their shroud-like buds, awaiting the annual resurrection when the moist warm breeze of spring shall breath upon them and bid them burst their cerements and awake to renewed life; and so it happens, that during all that long period we are deprived of the sight of the exquisite flowers, unless we provide for them an artificial climate, where they may grow and bloom perpetually in spite of winter's cold and frost. This can be done by one who has a bay or any other window with a southern or eastern exposure. There can be cultivated the ivy training about the room, roses full of bloom, perfuming the air with sweet fragrance, geraniums, heliotropes, fuchias and calla, etc.

* "They will thrive alike in the conservatories of the rich, the cottage of the poor, or the workshop of the mechanic. But how few understand their culture; how few treat them as living beings that breathe, and are sensitive to the changes of their surroundings; the temperature too cold or too hot will affect their very life, the soil also may run to the two extremes, may be either overfed or starved; too much kindness is as fatal as too much neglect; constant care tells the whole story of successful plant culture, yet bestowed in such a manner as to be hardly realized, a little now and then with a constant eye to their wants, and you will find your window of plants a source of constant satisfaction.

Flowers are not to rejoice the vision of the rich alone, neither is a greenhouse necessary; not that you can grow all kinds of plants to perfection in the dry atmosphere of a room heated by a coal or wood stove, but there are enough plants which will thrive to answer every want, and the others can be added as your means permit.

But to grow plants to perfection, such as you would wish to

* Trans. Wisconsin State Hort. Society, 1872; p. 184.

show for specimen plants, is not the easiest thing in the world. It is necessary to secure *both bloom and healthy growth*. The one is sometimes obtained at the expense of the other.

Do not crowd your plants by trying to keep more than your room will accommodate. If you do, the effect will be similar to the growth of a timber thicket, each plant striving to surmount its fellow, and in a short time, long, lank plants with a tuft of foliage at the tip, will be your recompense. Remember, that a few well grown model plants will give you far more pleasure than a score of ill-shaped things. A similar effect will be produced if plants cannot have sufficient light. *Plenty of light* is indispensable, and to secure this, no situation is so good as a south window, but if this cannot be had, then choose one facing the east, it will do almost as well, receiving the full rays of the early morning sun. A few plants will succeed without much sunlight, but they are the exception.

Use due caution in the heat of the room, neither too great by day nor too near the frost mark at night. Thirty-eight or forty degrees at night, is as low as it is safe to venture. A good base burning coal stove is unobjectionable, though some have argued to the contrary, keeping a steadier, more even temperature than any other stove. There will not be gas enough escape to do the least injury, and a better temperature is maintained through the night than by any other means.

Clean culture is absolutely necessary. Dust, which is always filling the air, will rest upon the foliage, stopping up the pores of the plant, encouraging insects, and soon your plant becomes yellow and seared. The remedy is apparent. The mouths or breathing tubes must be kept open. This can only be accomplished by frequent washings. At least once a fortnight, oftener would be better, the plants should be set in a tub of warm water and thoroughly washed. This will check the depredations of insects and contribute to the growth and health of the plants. Watering is one of the most difficult parts to consider. No specific rule will apply to all. One like the rose, wants a moist soil, but not so wet as to be sodden, but what might be called a soil in good working order, while a fuchsia, or a calla can hardly get too much water, especially while in bloom. A good rule to follow is, water regularly; a little study will soon teach you as to the wants of those you have, then follow the teachings of experience, and your plants will become neither too dry nor too wet.

The soil should usually be good black loam from the garden, top soil from the woods or about decayed logs, or well decomposed turf, and a mixture of sand. To these add one part from an old hot-bed of thoroughly decomposed manure or from a manure compost.

The worst obstacles to success are the insects. A very dry atmosphere is favorable to the red spider; frequent syringing or washing is sure death. The mealy bug and scale can only be kept down by watching closely for them, and washing with warm soap suds, which is not agreeable to their tastes. The louse or aphis is readily killed by tobacco smoke. This is done in various ways, the most convenient of which is to place the plants under a barrel or box, and insert a dish of ignited coals on which tobacco has been sprinkled and letting it remain ten or fifteen minutes. A second application in a few days will effectually rid your plants of this pest.

The entire system of plant culture may be summed up briefly. Secure plenty of light, even temperature, cleanliness, regularity in watering and good drainage.

In the window of an enthusiastic lady amateur in Milwaukie in February, the ivy is growing vigorously in a single pot under or in the rear of the flower stand. The fuchsia has nearly one hundred blossoms and buds on it. The tea roses, heliotrope, geraniums and calla have given blossoms almost constantly, rendering the window an object of great attraction and pleasure during the long, cold winter months. My only injunction to all is, go and do likewise.

Every flower is your friend; it will require but little effort on your part to be the friend of every flower."

The PRESIDENT. I hardly need to say that I have been deeply interested in the paper presented by Dr. Weston, and especially so in his description of his own lawn and grounds; and as it is a well known fact that we can copy better than we can originate, it struck me that it might be well for the Society to invite him to furnish a plan of his premises for publication in our transactions, as a guide or hint to others. We are aware that this subject of lawns and ornamental planting has received considerable attention, even in our rural towns; and I therefore mention it in this connection.

Mr. JOSEPH TAYLOR of Belgrade. I have listened with great interest to the reading of Dr. Weston's paper, and I approve of the President's suggestion. Perhaps we are not all in a situation to copy it, but we might take hints from it that would be interesting and advantageous.

Dr. TRUE followed in the same strain, illustrating his remarks by reference to failures in ornamental planting which had come under his own observation.

The SECRETARY spoke of his personal observation of Dr. Weston's premises, and alluded to the necessity of diagrams and practical directions for the benefit of those persons who have not the time or means to make themselves skillful in the art of landscape gardening.

On motion of FRIEND TAYLOR,

Voted, That Dr. Weston be requested to furnish a plan and perspective view of his grounds and buildings for publication in the Transactions in connection with his report.

LIST OF APPLES FOR AMATEUR CULTIVATORS.

Mr. CHARLES S. POPE of Manchester, chairman of the committee appointed at the last Winter Meeting to prepare a list of fruits to be recommended for cultivation by amateurs, submitted a report embracing a list of apples for the purpose named, which report was accepted and partially considered, and is here presented as revised by the Committee under the instructions of the Society.

REPORT.

"In selecting this list we have proceeded on the supposition, that those who expect to raise fruit of good quality and fine flavor will be willing to give the trees a good situation and high cultivation. For while some varieties, like the Starkey and Hubbardston Nonsuch will do well with ordinary orchard culture, many of our best apples, as the Early Harvest, Pomme Royal, and Jewett's Fine Red, will prove almost worthless under such treatment.

In our selection we have discarded those apples of which large size and fine appearance were the only desirable qualities, and aimed to present those only whose good texture and fine flavor will well repay for the extra labor bestowed. It is impossible for us to recommend a list of apples that will succeed equally well in all localities, and while it is our aim to give those that will prove fine in most sections, it will still remain for the cultivator to ex-

periment to some extent, and discard such as he finds are not suited to his particular location.

Some of our best market apples are accepted as desirable for home use, but many of the varieties that should be in every amateur collection have some defect, either in size or bearing qualities, that make them unprofitable market fruits.

Early Harvest.—This apple, although rather acid, should have a place in every collection on account of its earliness,—ripening the first of August. Requires high cultivation, without which the fruit is liable to crack.

King Sweeting.—Rather small, but exceedingly sweet, tender and juicy. We do not know of any apple that will take its place. Season, last of August and first of September.

Primate.—Tree a strong, thrifty grower, and an abundant bearer. Flesh tender and flavor sprightly. Season, September.

American Summer Pearmain.—Tree a slow grower. Fruit of first quality. Very tender and exceedingly juicy. Liable to crack in some locations. Last of September.

Porter.—Too well known to need description here.

Gravenstein.—Tree a vigorous grower and an abundant bearer in alternate years. Rather tart, but with a rich, aromatic flavor. Flesh tender, a little coarse. A great favorite. Season, October and November.

Winthrop Greening —Fruit a little coarse, but with a fine flavor. Not an early bearer, but bears well in most localities where the tree is grown. Falls badly from the tree before fully ripe.

Pomme Royal —(Syn. *Dyer*.) This apple when well grown has few equals. Very tender, crisp, and juicy, with a remarkably rich aromatic flavor. Requires high cultivation and thrives best in a warm, sheltered situation. Should be well ripened on the tree. Quality poor unless well grown. Season, October.

Dean.—Many have condemned the Dean apple, from a trial before fully ripe, it being then rather tart, but when fully ripe is exceedingly tender and melting. Medium size, and a good bearer. Season, November.

Starkey.—A native of Vassalboro', where it is very popular. Medium size, with a mild sub-acid flavor. Is received with favor wherever introduced.

Jewett's Fine Red. (*Nodhead*).—No collection is complete without this apple. Requires high cultivation, and even with the best

of treatment the crop of perfect apples will be light, on account of the thinness of the skin.

Mother.—A native of Massachusetts. Skin yellow,—mostly covered with a bright red, changing to a deep red in the sun. Not so tender as some, but with an exceedingly aromatic flavor. Requires good soil or many of the apples will be small and tasteless. Should be in every collection. Season, November to January.

Hoyt Sweet.—A medium sized, very sweet apple, ripening in December, but will keep until March. Quality, best; tender and crisp.

Canada Red.—An old variety, but one of the best when well treated. Medium size, fine texture and lively sub-acid flavor. Season January to March.

Hubbardston Nonsuch.—A popular apple on account of its large size and fine quality.

Peck's Pleasant.—Supposed to be a seedling of the Newtown Pippin, which it resembles both in shape and flavor. With a firm, crisp texture and fine flavor. Is worthless when it becomes mellow.

Talman's Sweet.—Although not of the best as regards texture and flavor, the Talman's Sweet as a late keeper and a fine cooking apple is indispensable; when well ripened it is a favorite dessert fruit with many.

Northern Spy.—One of the best late keeping varieties, retaining its sprightly flavor to the last. Although late in coming to bearing in some localities, it is a good bearer. Should remain on the tree until danger of injury by frost."

DISCUSSION ON THE AMATEUR LIST.

The PRESIDENT. By this report it will be seen that only a list of apples has been presented,—the preparation of the list of pears having been assigned to another member of the committee, who is not present; and the list has not been sent in. You will bear in mind the notice here taken of the fact that the list of apples for amateurs should be somewhat different from the list of varieties to be grown for the market. The former does not and should not fully correspond with the latter. The amateur cultivator, in his garden, grows fruit for use at home. The commercial orchardist grows fruit for the money; he wishes to raise those apples which

will sell best in the market,—although they may not be the best for home use. Good quality, however, is always acceptable in the commercial list; and here the remark might come in that good quality—even extra quality—does not disqualify an apple for cooking. I have little sympathy with the encouragement of the growth of *cooking apples*, that is, supposing they are *only* good for cooking.

It strikes me that this list should be discussed somewhat fully, and it is hoped that those persons present who have had practical experience with these varieties will examine the list and see if it ought to be amended and modified so as to become more fully acceptable to those who raise apples for home use, than it now is. By so doing you will benefit not only persons who are present, but those who are looking for information on this subject. We will listen to such remarks as may be suggested by the report, and hope that the time will be promptly and fully occupied.

On motion of Dr. WESTON,

Voted, That the varieties named in the report be considered separately.

Early Harvest.—The PRESIDENT. This apple, although rather acid, is a very good one, but requires considerable cultivation. The question arises whether allowing it to become fully ripe does not obviate the objection as to its acidity?—it is to a considerable extent the first early apple ripened, and the children are always eager for the first apples. Is there any other good apple so early?

Mr. SAWYER. I should say that it is one of the best early apples.

Mr. G. H. ANDREWS. It needs high cultivation; otherwise it will crack. It is, however, a superior apple. They were very nice last year, but in some cases did not succeed as well as usual. I raised 12 to 15 bushels of them, which I sold for \$1.50 per bushel.

The PRESIDENT. What is its quality as a cooking apple, or for family use?

Mr. ANDREWS. Very good.

QUESTION. Does it cook well before fully ripened?

Mr. ANDREWS. Yes, sir, it cooks well. I consider it one of the most desirable apples I am acquainted with.

Voted, To retain the Early Harvest on the list.

King Sweeting.—The PRESIDENT. Perhaps a little explanation may be necessary upon this variety. It originated in Belgrade, and has been carried over a considerable portion of the State. It is known as the King Sweeting throughout the State where it is cultivated; it is rather small but very sweet, tender and juicy. Season, last of August and first of September.

JOSEPH TAYLOR of Belgrade. In regard to that apple it will maintain every thing that has been said of it. I know its origin. My father took the first scion some 60 or 70 years ago, and the first apple we ever got of this kind, grew from that graft. It was eaten by the family of my father, each only had a taste of it, and it was pronounced by us, children as we were, the best apple we ever tasted, and I am certain that it will maintain its reputation to-day. It is the best sweet apple that I ever tasted, I think.

The PRESIDENT. Its texture is coarse, is it not?

FRIEND TAYLOR. Not very.

QUESTION. How does it keep? does it decay quickly?

FRIEND TAYLOR. No; I have known some of these apples to keep into the winter. I have found them as stray apples among my winter apples. It is an apple that will ripen well; some of them will get ripe earlier than others. It is a desirable apple on that account, and it is a great bearer, and therefore it is the very perfection of good fruit.

Voted, To retain the King Sweeting on the list.

Primate.—The PRESIDENT. This apple is not extensively grown in the State, although a fine fruit. There has a question arisen here whether this fruit should be introduced at this point of time as a succession. Will the chairman of the committee inform us upon that point, and whether the Early Harvest does not in a measure take the place of it? I would ask friend Taylor if he raises the Early Harvest?

MR. TAYLOR. I have never raised that apple, but I have raised the other variety you were speaking of; it is a variety the scions of which were sent me from New York, and for about five or six years I have raised them. I know but little about the Early Harvest.

QUESTION. What time does the Primate ripen?

ANSWER. About the latter part of August or the first of September, I believe.

MR. POPE. The idea we had in putting it on the list was that

it made a good cooking and eating apple at about the time the Early Harvest was gone.

Mr. ANDREWS. It is an apple that sometimes becomes a little watery. It is a watery apple throughout the whole season; the whole apple seems to be so, but I think that is no particular objection.

The PRESIDENT. The matter here alluded to is one that can be resolved only in this manner. It struck the chair that it might be well to consider that point here; both of the kinds being early apples, and if they ripen at about the same time, whether the quality of the one is equally as good as the other.

American Summer Pearmain.—The PRESIDENT. It is a very good apple and is not very extensively grown in the State, and consequently its recommendation is a surprise to some.

Mr. SAWYER. It is an old variety and we have decided that there was very little known of it in this State, as appears by our fruit list as revised last year.

The PRESIDENT. We know the quality is good enough. The question that presents itself is, whether we had not better inquire into it considerably, from the fact it has not been propagated to any considerable extent, though being an old variety and of high quality.

Mr. POPE. I have known this apple for many years, and have always considered it one of the best. I think it should by all means remain on the list.

The PRESIDENT. I think that as it is an old variety and reliable to a certain extent, we should encourage its culture. We have seen that many times even early apples may be kept out of season.

Voted, To retain the American Summer Pearmain on the list.

Porter.—The PRESIDENT. Too well known to require any discussion. [Passed without discussion.]

Gravenstein.—The PRESIDENT. A tree of vigorous growth and an abundant bearer; it is a great favorite. Season, October and November.

Mr. ALFRED SMITH of Monmouth. They are good, but I wish to ask one question in relation to this tree. I have lost five within a few years. Does it pay to grow them?

Dr. TRUE. It has had a limited cultivation in our State. We find in almost every town a few trees of that variety. I have

seen very few in Oxford county, and I think it is a very rare tree, and it is considered hardly worthy of propagation.

The PRESIDENT. There is one quality of this fruit which redeems it, and that is, it is a good cooking apple. If you have never tried it for that purpose, give it a trial.

Mr. SAWYER. I cannot see why it should not be common in our State. As a matter of fact we know it is grown very largely in the British Provinces, north and east of us. I think there must be some special cause for the failures reported here, although I am not able to say what it is.

The PRESIDENT. There may be something connected with the locality. If they can grow it in Nova Scotia,—and they do grow it very extensively there, for large quantities of them are shipped thence to England, and some of the finest specimens of the fruit that I have ever seen were shown at the Centennial,—but it was largely confined to one locality, the Annapolis Valley in Nova Scotia, so that its success or failure may be owing to some peculiarities of location.

Mr. POPE. There are cases where the bark bursts on the body of the tree, from the limbs to the ground.

Mr. SMITH. Did you refer to me?

Mr. POPE. I have known several cases.

Mr. SMITH. These trees were grafted and they did well for four or five years, and then began to act in the manner described. It is a very excellent cooking apple and pretty good eating. It is very likely the Gravenstein may be raised in this town and in Winthrop. I know another variety, the Fairbanks apple, raised by Mr. George H. Andrews of this town, which is an excellent fall apple; very fair and of good quality. Mr. Andrews can tell you better about it than I can.

Mr. ANDREWS. I propose that we go over the list first.

The PRESIDENT. It may be very proper, and another variety may be suggested for consideration; it is in order, but the time admonishes us that we must act promptly.

Mr. CARR. I think we had better pass that matter. In relation to this apple, the Gravenstein, however, I will say that it is very nice; a short time ago I bought some of them and they were the handsomest apples I ever saw; in fact so handsome that I called my family to see them, and all thought them very handsome. I think it is a variety that should be cultivated.

The PRESIDENT. There is no question about the quality of the apple.

Mr. TAYLOR. I move the adoption of the apple, from the fact that the tree is healthy and the fruit good.

A MEMBER. I would like to inquire if we cannot amend that list and add some other apples? If so I propose that we adopt the Moses Wood.

QUESTION. What season?

ANSWER. From the first or middle of September until the last of November.

Mr. TAYLOR. I would ask if he wishes to reject the Gravenstein?

The PRESIDENT. The Moses Wood will come a little earlier than the Gravenstein, and it has been moved that it be inserted in its proper place in the list, not in place of any other variety, but added to it. Now it should be borne in mind that some of these apples have been tested to a larger extent in the locality where they originated than in any other section of the State. I am not aware of the Moses Wood being objectionable in regard to hardiness or productiveness when tested in other sections of the State. It is desirable in other sections as in Kennebec County. It has proved to be a very good fruit.

A MEMBER. I should like to ask where it has been tested?

ANSWER. In Kennebec county.

Mr. SMITH. It is an annual bearer, and I consider it good fruit.

A MEMBER. It will be well enough for us to know whether it will grow in any other county. From what I have heard of it I have no doubt that it is a very good apple, but we know there are places in Kennebec county where it will not succeed. I think it a much better apple for an orchard than some others.

Mr. POPE. Our experience with that apple is, that it decays quickly after ripening, and is rather acid.

On motion of Dr. TRUE, *Voted*, not to insert the Moses Wood in the list.

Winthrop Greening.—The PRESIDENT. Another local variety found in Kennebec county. It is also quite late.

Dr. TRUE. I have seen some very good specimens in this county, but I am not certain that I have ever seen it in Franklin county.

Mr. ANDREWS. It originated in Winthrop. It is a very heavy apple, fine flavored and of good size. I have but one tree of it.

It has come into bearing within three years—a very good tree, bark hard and smooth, but when the apples get partly grown they drop, although they remain pretty well on my tree. I don't know whether this dropping is peculiar to the variety or not. The apple is, I think, desirable.

The PRESIDENT. Does anybody ever have heavily laden trees growing Winthrop Greenings?

SEVERAL MEMBERS. Yes, sir.

Mr. TAYLOR. I have raised it, and upon the same trees that I have grafted the Winthrop Greening I could have taken four times the profit had they borne some other kinds of fruit. This apple is a shy bearer. I know this to be so, for I have done everything I could and I could not get a good crop from it.

Mr. SMITH. I have found that cutting back in June is of great benefit. I learned that from grafting. I noticed that when I cut a tree in the manner I have spoken of, the limbs which I left would fill and hang full of apples. It would make the fruit hang better.

A MEMBER. In our experience during a number of years with this apple, we find that it drops and that the wind will take it off very easily, and we have to gather them before they are fully ripe if we wish to save them; that is the fault with them, they drop too easily, and I do not consider it a very profitable kind to raise on that account.

Mr. CARR. I consider them excellent apples, as good perhaps as any raised in the State. They will bring a good price at all times, simply because people will have them. It is really a good bearer and bears every year, too. I have been called upon for scions, and have sent them quite a number of times to people in other sections, and I never knew a person who had them once but wanted them again.

Mr. STETSON of Greene. They drop off and are watery.

The PRESIDENT. The quality of the fruit?

Mr. STETSON. The quality is very good, if you can save them.

Mr. M. J. METCALF of Monmouth. I consider it a most excellent fruit, and I think that it should not be dropped from the list. It is a shy bearer, as we say, but tolerably reliable.

Mr. A. W. TINKHAM. I have had some experience in growing the Winthrop Greening. My father engrafted a tree with it many years ago and it has outlived every other tree in the vicinity, and the tree to-day is as vigorous as it was forty years ago. I have

never seen any trouble with the apples except that they drop off some; but so far as the bearing of the tree is concerned, I consider that it bears very well indeed, and I think it is a superior apple. It will do well on any soil. I have grafted trees on slaty soils, and in fact on all kinds of soils and with the very best success.

Mr. L. L. ALLEN of North Monmouth, submitted the following list as the result of his own experience :

Apples.—Early Harvest, Sweet Bough, Williams' Favorite, Porter, Rock Sweet, Winthrop Greening, Talman's Sweet, Minister, Rhode Island Greening, Roxbury Russet.

Pears.—Bartlett, Clapp's Favorite, Seckel, Beurre d' Anjou, Belle Lucrative, Lawrence, Vicar of Winkfield.

Grapes.—Delaware, Hartford Prolific, Concord, Old Colony, Northern Muscadine, Brighton, Champion, Salem.

The hour for adjournment having arrived, the report of the committee was laid on the table, with the understanding that its consideration should be resumed at the earliest opportunity.

[The report was subsequently re-committed with instructions to the committee to complete the list in accordance with the action of the Society and their own judgment, for publication in the Transactions.]

Adjourned.

WEDNESDAY AFTERNOON.

The Society re-assembled at $1\frac{1}{2}$ P. M., the President in the chair. The first exercise of the afternoon was an address on the

THE SOIL, AND ITS PREPARATION FOR AN ORCHARD.

By N. T. TRUE, M. D., of Bethel.

Mr. PRESIDENT:—In accordance with my own inclination, and strengthened by your suggestion, I have selected for a theme, *The Soil, and its Preparation for an Orchard*.

I need hardly state that the subject which I have selected, lies at the very foundation of all successful cultivation of the apple in the State of Maine. Certainly, my own more extended observation and experience, failures as well as success, thoroughly con-

vince me that the great army of farmers and gardeners in this State have not yet felt the importance of a better knowledge of the soil, and its most thorough preparation, before anything like success can crown their efforts in raising an orchard. The very few who have succeeded have quite frequently passed through a very bitter experience.

ORIGIN AND CLASSIFICATION OF SOILS.

I am not aware that any classification of the various soils such as would indicate their origin, composition and adaptation to orchard culture, has ever been made. There is now so much intelligence among Pomologists, that such a standard arrangement seems absolutely necessary for intelligent work. I will, therefore, venture to present before you such a classification, which is simple and easily remembered.

As all our soils are made up of rocks which have been worn down or decomposed, it will be very natural to classify them with reference to their origin and composition. Let us then arrange them in the following order :

- I.—Soils of Granitic Origin, or Gravelly Soils.
- II.—Soils of Schistose, or Slaty Origin, or Schistose Soils.
- III.—Soils of Limestone Origin, or Calcareous Soils.
- IV.—Soils of Clays and Sands, or Loamy Soils.

I.—*Gravelly Soils* are composed of essentially the same elements as the coarse granites which are so common in Maine west of the Kennebec river. We may then know at once the composition of such a soil, when we know that of granite. The granites of this State are composed of three essential substances,—sand, clay and potash, and less than five per cent. of iron, lime, and magnesia. The potash, so essential in all agricultural operations, is so locked up in granite by the sand and clay, that it is not in a soluble condition, and is of no value. If there were no other agencies at work, nothing valuable could grow in a granitic soil. How then is it *made available*?

There is one substance found everywhere in the air, water and soils, which needs to be more carefully studied. It is called *carbonic acid*. In very recent books it is called carbon di-oxide. You are all familiar with it as a gas, in the sparkling bubbles from soda water; in the bubbles formed in raising dough for bread; in the impure air which you expire 140 gallons from your lungs every

day; in the poisonous fumes from burning charcoal, in the fire extinguisher, and in the sprightly taste of spring water. In a solid state it forms 44 per cent. of all the limestone in the world.

Now there must be a use for this substance somewhere in the economy of nature; and with the hope of meeting the approval of the Society, I will endeavor to explain somewhat fully its action. I hold in my hand a coarse, granite rock. You notice on the side which has been exposed to the weather, that it has a white, chalky appearance. Now the carbonic acid in a state of solution in water has the power of attacking a granite rock and setting free the potash. This carbonic acid is the principal agent in decomposing every rock you see crumbling to pieces. The moment it sets at liberty a particle of potash it combines with it and makes it soluble in water. Whenever the carbonic acid in the soil is in large quantities, or as chemists say, *in excess*, it forms bicarbonate of potash, soda, magnesia and lime. All these new compounds are very soluble in water. The carbonic acid will not touch a particle of the sand or clay in the rock, and these two substances are simply set at liberty. Every intelligent farmer has been taught, that if one proportion of phosphoric acid is combined with one of lime, it forms a phosphate of lime, but it is not readily soluble in water and is almost useless as a manure; but when *two* parts of the phosphoric acid unite with one of the lime he then has a biphosphate of lime, or what is sometimes called superphosphate of lime, which, in this condition, is very soluble in water, and a ready food for plants.

Let us go back to our carbonic acid. When it is in excess in water, it combines in the proportion of *two* parts of the acid to one of the potash, soda, magnesia and lime, and forms bicarbonates of these substances which are all very soluble in water. These salts become entangled in the soil and are the mineral food of your plants and trees. If these salts find their way into the brooks, the salts of potash, soda and magnesia, are swept into the ocean to keep up the supply of salts there, while most of the lime will, on exposure to the air, lose one part of its carbonic acid, and be precipitated to the bottom of the stream in the form of a white powder, and if made solid it would become limestone or marble. Iron will precipitate to the bottom of running streams in the same way, and form beds of iron ore.

Now, gentlemen, this is just what is constantly going on right before your face whenever you cultivate the soil. This carbonic

acid is incessantly gnawing away at the rocks in your soils, and dissolving out the elements that have hitherto been locked up. It may be that some present may for the first time understand one of the simple, yet beautiful operations in nature which play so important a part both in nature and in agriculture. You will now all the better understand the reason why we have heat and cold, rain and sunshine; and how we assist nature by plowing and cultivating and harrowing and hoeing our soils. We do it to expose them to that all pervading substance—carbonic acid.

Much of our pleasure in agricultural pursuits, arises from our ability to trace out these hidden operations of nature. We cannot and never shall know all of nature's secrets, but it is only a fool that will obstinately shut his eyes to what is going on before them. As the intelligent mechanic secures higher wages by reason of his intelligence, so the intelligent pomologist will be much more likely to succeed in fruit culture who carefully watches every condition necessary for a good result. It enables him to select with vastly better judgment such elements as his soil most needs. He understands from what has been said, that every atom of carbonic acid which has been at work setting free these salts from the rocks and soils has, also, produced an equivalent of clay to form our clay beds.

The apple tree can never grow and be productive in a purely granitic soil. Several important elements, such as soda and phosphorus, so necessary for the fruit, are almost entirely absent in such a soil, and no plant or tree can *create* an element. A purely granitic soil is of rare occurrence in Maine. Occasionally it may be seen in the gravelly hills in the western part of Oxford county, and in the northerly portions of Cumberland and York counties. The pine tree, requiring but a small per cent of these mineral elements, will flourish in such a soil, but not the apple tree.

II. *Schistose Soils* are the ruins of schistose, or coarse slaty rocks. I have introduced this new word because it seems to me a very convenient one in the classification of our soils. Over a large portion of this State the rocks are stratified, that is, they split up into thin slabs and angular fragments. When these rocks are found *in place*, the soil above them is usually full of these fragments. We call these *schists* or *schistose* rocks, and the soils produced from them we choose to name *schistose* soils. I hold in

my hand one of these rocks which you can examine. If these rocks contain a very large per cent. of *clay*, and split up into thin layers, we then call it a *slate* rock.

These schistose rocks contain all the elements in different proportions which constitute a good soil. The experienced eye of the farmer recognizes them at once as *warm* soils. They are more easily decomposed than granite, and the results of this decomposition constitute the mineral food for plants and trees. Here again we find the ever-present carbonic acid busily at work, and its task is much easier than with granite, for it readily works its way *through* the rock and decomposes it more rapidly.

Schistose soils are very conspicuous in the towns of Monmouth, Winthrop, Readfield and Litchfield, and may be considered a fair type of this class of soils. The rocks in these soils are flat and angular, and quite fragile, and are constantly wearing away and forming fresh supplies of plant food.

This class of soils may be regarded the best for orchard culture, and may be found in most towns west of the Penobscot river. It is often the case that there is a blending of the gravelly soil of the first class with these schistose soils. This is so in the towns of Hebron, Hartford, Turner, Parsonsfield, Poland and New Gloucester. All these towns are noted for their large orchards.

III. *Calcareous Soils* are formed from the ruins of limestone, or carbonate of lime. Here the lime is locked up with carbonic acid, and in this condition it is not readily soluble; but when it is saturated with water having an excess of carbonic acid which forms a bi-carbonate of lime it is then readily taken up as plant food.

Calcareous soils are exceedingly rare in Maine. Indeed, at this moment, I cannot refer to a single spot in the whole State, yet lime, as you all know, is very essential for plant growth. Impure limestones abound in patches and larger beds in very many towns, and are of greater value than they receive credit for. In the towns of Hebron, Poland, and in the western part of Norway, the schistose soils are comparatively well supplied with lime from these beds, and I attribute the success of orchardists in these towns very largely to its presence.

In Monmouth there is considerable phosphate of lime in the rocks and soils. This is always a good indication. In the towns which I have mentioned, I do not exaggerate when I state, that a

tree will spring up in a pasture, be neglected by its owner, save perhaps to graft it, and yet make a better bearing tree than is produced in most other towns in the State where they are supposed to receive proper attention, but where lime is very deficient.

IV. *Loamy Soils*, when pure, are composed of sand and clay as a mixture, or as a compound called silicate of alumina. When absolutely pure they are entirely unsuited for the cultivation of crops, for clay rarely ever enters into the composition of plants, while no plant we raise can live on sand alone. Loamy soils in this State are rarely ever pure, but are more generally composed of the fine sediment from the schistose soils of the second class, and contain in variable proportions all the essential elements of a good soil. These finer sediments are found on the lower levels of land and constitute the most valuable soils for the cultivation of the potato and the grasses. As these soils contain a large per cent. of clay which is very retentive of moisture, they require careful drainage for an orchard, otherwise tender varieties, especially, are liable to be winter killed. I have seen many fine orchards in Cumberland county in this class of soils. The successful culture of the apple and other fruits in Bangor, and vicinity, has been effected in this class of soils.

Now, gentlemen, it seems to me that with a well defined idea of these four classes of soils as types, we can by inspection, and by our experience not only recognize them, but all the shades of mixture from any two or more of these. Indeed, you already do this in your practice, and I have only called your special attention to it, that your discussions on this subject in the future may have some uniform standard of reference.

COMPOSITION OF THE APPLE.

I think you will now easily comprehend the relations of an apple tree to the soil, if I should take one of the Roxbury Russets that grow so fair and large in this vicinity, and analyze it. Suppose I take 100 pounds of Russets, dry them and then burn them till nothing is left but ashes. These would weigh about four ounces,—a small, but a very precious substance that has been taken out of the soil where they grew. We shall better appreciate the illustration if I take 100 pounds of these ashes. There will be found in them 13 pounds of phosphoric acid, 7 pounds of sulphuric acid, 38 pounds of potash and 25 pounds of soda. There

will also be a little lime, iron and magnesia. The *mineral* food necessary for our Russet will then be a *little* lime, a little magnesia, a little iron and a little sulphuric acid ; and a *great deal* of phosphoric acid, soda and potash.

Now we cannot get rid of such facts in pomology. We cannot raise Russets or any other variety of apple where these elements are deficient in the soil ; we *can* raise them where they are abundant. Schistose soils and well mixed loamy soils, generally abound in them.

I was struck many years ago at the amount of phosphate of lime in the rocks and soils of this very town of Monmouth, and, it is abundant, but not too much so by any means, in every apple growing section of the State. Furthermore, the rocks which contain phosphate of lime, also contain associated with it large quantities of soda and potash. The sulphur rocks in this town are easily decomposed by the application of lime, by which the necessary sulphuric acid is obtained which combines with the lime and forms gypsum, or plaster of Paris.

Now there is no theorizing thus far. The relation between the tree and its soil is well understood by intelligent pomologists. In the towns which I have indicated, the fortunate possessor of such a schistose soil hardly realizes the difficulties under which men labor in other sections in raising an orchard. He hardly finds it necessary to supply his soil with artificial manures to any great extent. They are already in the soil. The intelligent practical man will supply plaster of Paris for his sulphuric acid and lime ; bones, guano and superphosphate of lime for his phosphorus ; wood ashes for potash, and refuse brine, seaweed or common salt for soda. The farmer who can procure these substances at the cheapest rate and in the right proportions, will succeed not only in furnishing the right materials for a thrifty orchard, but for almost any other crop.

COMPOSITION OF THE APPLE TREE.

In presenting before you the elements necessary to produce an *apple*, I indicated *all* the *essential* elements necessary to be provided in some way for the production of a handsome Russet ; but, if I should stop here, I should lead you into a grave mistake. The proportion of each element in the growth of an apple is quite different from that of the tree which produces it.

The wood of our Russet apple tree contains in its ashes about $19\frac{1}{2}$ per cent. of potash, while its fruit requires 34 per cent., or nearly twice as much. You will find only a trace of soda in the tree, while the fruit requires as much as 25 per cent. of soda, indicating that if you have a barrel of waste brine, or a bushel of dirty salt, you would apply it to your fruit bearing trees, and not to those still in a growing condition. On the other hand, while there is less than 5 per cent. of lime in the fruit, the wood contains as high as 63 per cent., and would indicate a supply of that substance in soils when it is deficient. The fruit demands as high as 15 per cent. of phosphorus, while the wood requires only one-third as much, or 5 per cent., indicating that you would apply bone manure and superphosphate of lime to your bearing, and not to your growing trees. These facts are instructive to us as *indications* of what we may do.

AGRICULTURE NOT AN EXACT SCIENCE.

You must have noticed that I have frequently used the mild word *indications*, in pointing out to the pomologist the character of his soil. That is as far as we are warranted in going at present. In our weather report we have only the word *Probabilities* written over the morning bulletin. No man yet dares foretell how many inches of snow or rain will fall on a certain spot to-morrow, nor whether this or that local spot will certainly have snow or rain at all. Notwithstanding these minor defects, the sea captain consults the weather chart and the cautionary signal, before he decides whether or not he shall set sail. If he fails to do this, he runs the risk of losing his insurance, so great is the dependence placed on these reports by the underwriters.

Just so with the intelligent pomologist. He will perfectly understand me when I tell him that he cannot measure out just so much of one substance and so much of another, and expect to receive an exact mathematical product in return. The highest human attainment is that of exact mathematical measurement, yet no civil engineer ever measured a distance of one hundred rods the second time and came out with his first result. The cultivated musician measures with his ear the precise length of his string, in order to procure the exact number of vibrations in a second, yet he is never absolutely perfect. Chemists have been hard at work for a century endeavoring to find the exact weight of an atom, yet

they have only approximated to such an important result. Astronomers have labored for centuries with the aid of the most costly instruments, to ascertain the distance of the earth from the sun, and are still conscious that they may be in error one or two millions of miles.

The same fact is true of agriculture. It is not an exact science, but every step we take in the right direction leads us nearer to a correct measurement. I have no patience with that class of men who will have nothing unless it is absolutely perfect. They are always disagreeable and useless men. We all travel through dark and mazy forests, and by different and often winding paths in our search after truth. Dark and crooked though our way may be, it is no excuse for us to shut our eyes to every glimmering ray, and go utterly blindfolded. We constantly put in exercise our better judgment, with the full assurance in the outset that no infallible rules can be given. We can only partially explain all the processes of nature. She works silently and secretly. We witness every day some *result* of her operations, and trace them back as well as we can to their cause. He who cultivates his powers of observation, and carefully watches the relations between causes and effects, is the man who is the most likely to succeed in the cultivation of an orchard. He cannot do it by theorizing, but by careful experiment. He must take facts and use them just as he finds them. No man who lived in the Eastern countries three thousand years ago, ever imagined that an apple could be kept over winter. At last the fact was established that it could be done, and everybody now acts in accordance with it.

We have thus far observed the action of carbonic acid only as an *instrument* for unlocking the *mineral* substances in the soils, which are taken up by the roots of plants. We must add to our soil for an orchard, manures of vegetable and animal origin. These contain the same elements as the rocks themselves, but they are set free by the aid of another element, *oxygen*, or if you choose to call it, common air. This element attacks your manures, and sets free the mineral substances, besides forming new compounds, ammonia, water and carbonic acid. Thus you have two very important agencies at work in the preparation of your soil, carbonic acid, and oxygen.

Carbonic acid does not enter the roots of plants, but is taken from the atmosphere. Look at a single green leaf. It is a wonderful thing. You can take some charcoal, or carbon, and by

burning it combine it with the oxygen of the atmosphere and form carbonic acid, but no chemist has ever yet invented a furnace hot enough to separate that charcoal from its oxygen. They cling together with a terrible grasp. That leaf which your mind's eye is looking at, can breathe this carbonic acid into itself as if it were lungs, and the gentle rays of the sun that shines upon it have power sufficient to separate these two elements. The carbon willingly obeys the command, and goes into the tree to build up its woody structure. Thus the charcoal of your tree is obtained first from the decomposition of vegetable and animal manure in the form of a gas, which we call *carbonic acid*; then it passes into the atmosphere where the leaves of plants prepare it in a condition to build up the tree.

There is then a perpetual round going on among these elements from dead to living matter, and from living to dead matter. When we cultivate our soils we only aid nature in her work. We can add no new property to these substances; we only hasten the work so as to give a rapid growth to whatever we cultivate.

PREPARATION OF THE SOIL.

If I have not wearied your patience by this discussion of the character of the soil, I will now select a site for an orchard, which may be supposed wanting in some or most of the important elements we have indicated. Let not any one be frightened if my ideal is a very high one. I will let you down to a lower level before I close.

If any one of you has a thousand dollars for which he has no earthly use, let him select for his orchard one acre of land from his field which has been cropped for many years. Let it be permanently fenced. I assume that it is a rocky schistose soil, and naturally drained. Let him plow it in autumn, and in the following spring manure it well and plant and cultivate potatoes. Keep the ground mellow and clear of weeds throughout the season. By this course he receives a present profit, which is an important consideration with most farmers, especially such as do not have a surplus thousand dollars. After the potatoes are harvested, plow a narrow strip on one side of the piece, and with a good supply of help, dig and throw to the surface all rocks large enough to obstruct the plow. Follow each furrow with the plow again, or with the subsoil plow, and loosen the soil as deep as you can. If I

dared to say so, I would have you trench every foot with pick and spade till you reached the hard pan, or a depth of eighteen inches. Pile the stones back into the trenches for a drain. The furrows should run in the direction of the natural drainage of the land. Treat in the foregoing manner just as large a strip as you have the time and means to accomplish that season, *and no more*. Haul on to the strip all the manure you can afford of whatever kind, and plow it in. The next spring manure in the hill and plant and cultivate thoroughly for a crop of corn. As soon as it is harvested, spread over the ground a generous coat of manure, plow it in as deep as you can, and harrow it smooth. Stake out the spots for your trees at a distance of twenty-five, or better still, thirty feet from each other. Plow six furrows in one direction so as to have the dead furrow directly over the spot where you plant the tree. Cross plow it with six furrows in the same manner. The furrows need not be more than eight feet in length. This will save much shoveling and prepare the soil for the roots of the tree. Shovel out a generous hole, say four feet or more square, and fill in with old compost manure and soil mixed together. Probably the cheapest and best manure for this purpose, is composed of vegetable mold, muck, leaves, ashes and lime, and exposed to the soap suds from the house, and carefully worked over several times during the season. Level off the spot and let it remain till spring.

The next step is to select good trees and set them out very carefully. Prepare the ground and plant with beans in drills just wide enough for your narrow cultivator to run between the rows, and at the same time place some coarse mulch around each tree. For several successive years any hoed or root crop may be cultivated, provided you are not stingy in the use of manure, and keep the ground mellow by clean cultivation. Some would prefer no crop at all after planting the trees. Of this I am not quite sure in our hot summers, but no grasses or grains should be sown till the trees have acquired sufficient growth to bear. Everything should have this end in view. Keep the rest of your acre under good cultivation, and take up another strip each year till you have in this manner gone over your acre. By this time your one thousand dollars will be expended, but at the end your trees will be worth, at least, ten dollars apiece, and you could not be induced to sell one of them for fifty dollars, you would love them so well.

It is right here, gentlemen, that I want to impress on your minds the difference between the habits and wants of an apple tree and those of our ordinary field crops. In the latter the roots extend but a few inches in depth, and require the cultivation and manures to be just beneath the surface of the soil. With trees it is different. The roots of a thrifty young tree will run down several feet in a rightly prepared soil, in search of food. This deep culture will prevent young trees from being checked by summer drouth, which destroys not a few trees, or prevents their rapid growth, and leaves them to die a lingering death after a feeble existence of two or three years.

Is my ideal too high for the practical farmer, or gardener? Is it necessary? I am now going to fight those little uprisings in your throats, by some bits of personal experience and observation. Thirty-seven years ago, I fenced a little yard of thirty feet by seventeen, about twenty rods from where we now are. I trenched it all over with a spade, and labored hard in doing it, manured it and planted it with potatoes and corn. The next spring I again spaded it very thoroughly, manured it heavily and sowed it with beets and carrots. At the same time I planted a row of young maples around the border of the plat which I brought from the woods on my back. I headed them all in. That same year, one tree produced a shoot fourteen inches in length. Did any one present ever see such a growth the first year of transplanting a maple? It is the only instance in my experience. Persons now living can testify to the tremendous growth of the whole row of trees. As I look at them to-day, they are the only things which remind me that I am older now than when I planted them.

In a corner of the same house-lot I planted the same spring, a large apple tree which I had removed from the old nursery planted some twenty-five or thirty years before by Gen. John Chandler, on his farm near the Academy. I dug over the ground some eight feet square, but which was fifteen or eighteen inches lower than the land adjacent. I set out the tree as high as I could, and with a wheelbarrow, with which I had become quite familiar in those days, I wheeled in a large quantity of turf, chip manure, and soil, to bring it up to a level with the rest of the lot. I clipped the tips of nearly every twig on the tree, *but cut off no branches.* The next spring I had it grafted with the Fall Harvey apple. The

scions took, grew rapidly and made the handsomest tree I ever owned. A few years since I visited that tree, and enjoyed it as I would an old friend. I measured the diameter of the top and found it to be thirty-three feet. I have been informed that it has always been a prolific bearer, and is still a handsome tree.

Twenty-five years ago I was taught from the books to prepare an asparagus bed by trenching a spot eight feet by ten to a depth of three or four feet, and filling it up, mixed with a cord of stable manure. This I afterwards learned was unnecessary for asparagus, as its roots descend but a few inches, but the roots of a neighboring apple tree found their way to the coveted spot, and for twenty-two out of twenty-five years, I have received my annual supply of fall fruit for family use from that one tree. It was the best practical lesson I ever learned in pomology, and my only regret now is, that I had not put it fully in practice ever since.

So far my experience. Now for my observation. I have a neighbor who selected a plat of ten square rods eighteen years ago, employed a laborer to trench it all over to the depth of eighteen inches, and throw the rocks to the surface. This he did in two days and a half, but which but few men could have done in that time. He then manured it, planted his garden and covered it with apple trees. For several years past he has had his family supply of apples from that little spot. He has planted trees elsewhere on his farm in the ordinary way from time to time, but I am not aware that he has ever gathered a peck of fruit. If I have not proved my point to your satisfaction, I have to my own. The rule I would lay down is this: Plant one tree a year if you have the ground well prepared for it. Plant two, or as many more as you can afford, each year. A better general rule would be: *Plant just as many trees, and no more, as you have land previously prepared for them in the best possible manner.*

The amount of manure required to keep an apple tree in vigorous action is quite large. I have never yet been able to satisfy myself how much manure a large old apple tree would make use of where the soil had become exhausted. I think a cord would not be too much if well trenched into the soil. How far am I out of the way in my judgment?

I have no doubt that in many locations, a lower standard of cultivating an orchard might be practiced, but I doubt if anything short of what would make a good garden would be the successful

way. Certainly no lower standard should ever be attempted than that of preparing the land for a large crop of corn.

If I mistake not, a large majority of the attempts at raising orchards in this State have been in the following manner: A piece of land was plowed up in the field without being separately fenced, then planted with potatoes and corn for two years, and then sowed with grain and grass seed. Just at this point the apple tree agent contrives to be present, and the owner buys twenty-five dollars worth of thrifty trees from a Western nursery and sets them out in as small holes as possible. The limbs grow half an inch that year. The next year they leave out and the branches grow a quarter of an inch. Two or three in a favored spot do something more. The third year he finds several of them dead,—browsed down by his cattle on the previous autumn, broken down by the snow, burned to death by the sun, or what is more likely, every leaf has been gasping for breath ever since it was set out, and it dies by being literally starved to death. The trees have been paid for, but woe to that apple tree agent if he makes his appearance at the end of the third year! Five or six of them are left to struggle on with the vain hope that some time or other in the Providence of God, they will produce apples as large and as handsome as the pictures in the apple tree agent's specimen book. I think I do not exaggerate when I tell you that a million dollars' worth of fruit trees have been starved to death in this State within the last thirty years,—starved in just the way I have endeavored to describe the process. As the farmer looks at a black hearted apple tree, or feels its spongy bark, and sees it dying in this way, he is throwing out of his life his best years of labor and hope, and the blood flows through his system more sluggishly, than if he was filled with joy at his thriving orchard well laden with fruit. He who has a young and thriving orchard never grows old. The loss of a young orchard is a calamity.

MULCHING.

It may be within the province of my address to call your attention to the subject of mulching. I think that the experience of nurserymen is in favor of vegetable substances for this purpose, and that in no case either for mulching or as a manure, should undecomposed animal manures ever come near the roots of an apple tree; a compost such as may be made on most farms from

surface soil, leaves, muck, ashes and lime, thoroughly worked over, will always be of value.

I do not remember of seeing the point discussed, but it has occurred during the experience of a few years, that there should be a distinction made between our practice of mulching merely for the sake of keeping the ground loose and free from weeds by the use of straw or weeds, and the use of strong though coarse manures. If trees are mulched year after year with manures, a multitude of fibrous roots spring out from the tree above the surface of the ground, and the mulch is filled with them. Is this as well as to trench in the manure or spread it broadcast over the surface, and mulch with coarse vegetable substances, as leaves and straw?

It is a problem, I think not quite solved in the minds of pomologists, whether we shall make the best application of manure by spreading it over or near the surface of the ground, while trees are in a bearing condition, or whether we shall not secure better results by trenching in the manure at a greater depth. It may be that both methods are equally necessary. It is certainly worthy the consideration of the Society at some future meeting.

Allow me to caution you never to replant an old orchard, unless you can follow to the letter the high idea I have set before you. To accomplish anything, a new soil must be made. I have already portrayed the character of an orchard starving to death. Unless the greatest pains is taken, the same results will follow your efforts in this direction. If you lose a sheep it can at once be replaced, and you will soon receive a profit, but not so with an apple tree. If you have a sickly sheep, you may nurse it month after month, and then it dies. You have lost your time, your profits and your *sheep*. It is worse than this when you have a sickly looking apple tree. You dislike to cut it down as probably you should do, and so you let it remain year after year a sickly looking tree, and then—let it *die*.

HIGH CULTIVATION ALWAYS NECESSARY.

It is very difficult raising our ideas to the point that high cultivation is as necessary for an orchard as it is for a garden. A wrong habit has unconsciously been handed down from our fathers who could plant trees in a virgin soil and they would grow and bear bountifully without any additional manuring. We know well

enough from experience what is necessary for a garden. We visit our city cousin, and are surprised and sometimes mortified, that his little garden spot produces more fruit than our own orchard at home. With the most of us the cultivation of an orchard means *work*—persevering, *hard work*. The man who spends half a day in digging and preparing a hole for one tree, is quite as likely to receive as much profit in ten years, as the man who digs twenty holes and sets out twenty trees in the same time. When your wife brings along her empty flower pot, she knows what she is about when she tells you to get such and such soil for such a plant, and she closes her demand by emphatically declaring that *you must get the richest earth you can find*. Cheat her in this thing if you can.

The more nearly we approach our high ideal in the cultivation of an orchard, the shorter the time before trees will be in a bearing condition. A difference of several years can, in this way, be easily accounted for; and as we have but one short life to live, it is of much personal consequence that we see the fruit of our labors as soon as possible. I think I may lay it down as a general rule, *that the higher the degree of cultivation, the shorter the time necessary for the production of fruit*. Not only is *time* an important consideration, but I think I may safely give another general rule, that *the higher the degree of cultivation, the larger and better the quality of the fruit*. As the *quantity* of fruit is an important consideration, still another general rule may be given, that *the higher the degree of cultivation the more abundant will be the crop*.

CULTIVATION OF THE HABIT OF OBSERVATION.

One of the first things necessary in the education of a child is the cultivation of the habit of observation. With this habit once formed he never becomes stupid, because he is busy seeing things and reflecting over what he has observed. The same is true of men. I have noticed this as the most prominent trait in every gardener, pomologist or naturalist that I ever saw. This faculty is especially necessary while preparing the soil for an orchard, as well as in watching the growth of the tree. The conditions of things are so various, and the processes often so hidden, that we shall constantly find something new to add to our knowledge and increase our skill.

During the last autumn I saw a snail in the midst of a wooded swamp on my farm, where the muck is some eight feet in depth. Its thin shell was composed of lime. I do not believe there is a chemist living who could detect a particle of lime in that soil, yet that snail had succeeded in extracting enough lime from that muck to cover his body. We are placed on the soil like so many snails, to learn as far as possible all the secret processes by which its mineral treasures can be unlocked and made useful.

THE PRESENT AN AGE OF PROGRESS.

The age in which we live is an age of progress. Science has made wonderful strides since we were born. Science and art have revolutionized every occupation in our land, and he who does not adapt his business to this new order of things will starve. It will not do to shut our eyes to the changes that are going on in the science and art of agriculture. Since I was a resident of this town, the mowing and reaping machine have been invented. The sewing machine has found its way into almost every household, while the rail cars go and carry us everywhere, and the lightning acts as our mail carrier. A flying machine seems all that is necessary to make the list complete, which it is hoped some enterprising genius may yet invent. No man is so stupid as wholly to shut his eyes to the wonderful achievements of science and art. Shall *we, too*, not make equally wonderful discoveries in our appeal to mother earth, that she may yield up her hidden treasures for our profit and pleasure?

CONCLUSION.

Now, gentlemen, while I have set before you a very high standard, I have endeavored not to be unreasonable, or suggest what is beyond the ability of any one to carry out. What I have said, I wish you to regard as hints and suggestions, rather than as positive commands. A long series of years in trying to raise an orchard, has made me very modest in my expectations, but I trust the combined experience of those who *have* been successful, will be so developed by this convention, that good orchards rather than poor ones shall be the rule, and not the exception in the State of Maine.

There are some men who take great pleasure in looking at the patient ox, or a beautiful horse. I quarrel not with such. But there is something pleasing at the sight of the man whose delight

is in looking at a thriving tree laden with fruit. It reminds one of the story of Pomona, the goddess of the apple orchard. She cared not for forests and rivers, but loved the cultivated country, and trees that bore delicious apples. Her right hand bore not a javelin, but a pruning knife. Armed with this, she busied herself at one time to repress the too luxuriant growth, and curtail the branches that struggled out of place; at another, to split the twig and insert therein a graft, making it adopt a nursling not its own. She took care, too, that her favorites should not suffer from drought, and led streams of water by them that the thirsty roots might drink. This occupation was her pursuit, her passion. The divinities of the field desired to win her, but Vertumnus loved her best of all. Often in the disguise of a reaper, did he bring to her corn in a basket, and looked the very image of a reaper. With a hay band tied around him, one would think he had just come from turning over the grass. Now he bore a pruning hook and personated a vine-dresser; and again with a ladder on his shoulder, he seemed as if he was going to gather apples. In this way he gained admission to her presence. One day he came in the guise of an old woman. The old lady entered the garden and admired the fruit. She advised Pomona to leave all her other admirers and accept Vertumnus, for he is *young* and *handsome*, and can make himself just what you command him. He loves the same things that you do, delights in gardening, and handles your apples with admiration. But *now* he cares nothing for fruit, nor flowers, nor anything else, but only yourself.

When Vertumnus had spoken thus, he dropped the disguise of an old woman and stood before Pomona in his proper person, as a comely youth. It appeared to her like the bursting of sunlight through a cloud. The sight of his true form prevailed, and she accepted him as her own.

Happy is the man who loves a beautiful apple tree, which his own hand has cherished! His name is Vertumnus, and his tree is Pomona.

The PRESIDENT. Doubtless it would have been agreeable to all present if the speaker who has so closely held your attention this afternoon could have continued until the hour of adjournment, yet perhaps he has done as much this afternoon as we could well ask of him at one time, and we may have an opportunity to hear from him still further before the close of the exercises.

The time will be further occupied with a discussion of the subject of fruit growing in connection with general farming; and since farming is the chief business followed in this community and nearly all its people are engaged in fruit growing, the discussion will be commenced with reference to

FRUIT GROWING IN THE TOWN OF MONMOUTH,

by one who is familiar with it, Mr. George H. Andrews of Monmouth.

Mr. ANDREWS. If it would not be deemed irrelevant I would say, prior to entering upon the subject, that I have been much interested in the address of Dr. True, and I hope it may get into the hands of every man in Monmouth and of every other town in the State. I am particularly desirous that it should go into the hands of every man in Monmouth; and now for one dollar every man may be entitled to and will receive the Society's Transactions containing this paper. Is not that cheap enough? What do you think it cost Dr. True to give us that production which we have all listened to with so much interest? How many years of labor has he spent in preparing it? "He wrote it out in a day," some one will say. No, he did not write it in that time; he spent years and years to give us the principles of that paper. Now I simply refer to this for the purpose of submitting a motion, which is, that Dr. True be requested to furnish a copy of his address to the Secretary for publication in the annual report.

The motion of Mr. Andrews was adopted.

Mr. ANDREWS proceeded: We are doing something in the town of Monmouth in the way of fruit growing, and we have begun to do it in earnest. A good many trees were set out thirty years ago, but very few of them are alive to-day; but we have been learning and thinking all the while on this subject. I will name a few persons who have within the last ten years planted orchard trees to the number of 100 or more each, and I know that a large majority of these trees have been well set out and well cared for, and are now doing well: Joel Witherell 250, S. C. Andrews 250, A. Wyman 150, O. W. Andrews 150, J. W. Jackson 100, Levi Butler 150, H. W. Tilton 100, A. C. Crossman 500, Dr. D. E. Marston 1400, A. J. Fogg 400, David Marston 400, G. W. Fogg 300, G. H. Andrews 300, N. F. Prescott 300, H. H. Sawyer 150, J. D. Donnell 500, A. W. Tinkham 500, J. R. King 400, Alfred Smith 400, B. Walker 500, Samuel Robinson 200, Charles H.

Berry 200, F. L. Stanton 300, Edwin Simpson 100, Jacob Robinson 100, George Robinson 100, Seth Fogg 100, H. G. Titus 300, J. A. Strout 100,—making, with other persons whom I might name who have set less than 100 each, a total of more than 10,000 trees planted in this town within the last ten years; and there are still others whose names I do not recall at this moment. This, I think, shows investigation and interest in the business.

In setting my own trees, the holes were dug in the fall, large and deep; in the spring the top soil was thrown in at the bottom, and a compost above it. They are now beautiful trees,—that is all I have to say in regard to them.

We have some fine fruit here, (pointing to the tables,) and the most of it was raised here and at North Monmouth. The best fruits that we see on exhibition are generally grown in villages. Such apples as these are developed by good culture. The trees that bore them were not hungry last year. Here are Black Oxford apples. They are good for nothing if not well grown. It is of no use to raise them unless you take good care of the trees,—mulch and manure them—or in other words feed them, and then you will get good fruit.

Mr. President, we are happy for this occasion. We are glad to meet you and the Society here, and we hope to receive a benefit from your presence with us. We shall be a thousand fold better for this meeting to-day, and we shall hold in grateful remembrance what you have done for us.

Mr. ALFRED SMITH, in response to the call of the President for further remarks upon the subject of fruit growing in Monmouth, presented the following statement:

Twelve years ago, being in want of some young apple trees, I bought of an agent of Chase Brothers, twenty-five such trees, and planted them (well cut back) on three-quarters of an acre of good land, in good condition and having a western aspect. Twelve of them did not prove true to the order, and of these twelve seven proved not to be well adapted to the soil, or climate, and after doing well for a few years, have died. Five of the seven were Gravenstein and proved tender and winter killed. The other five of the twelve (not true to order) are doing well and in bearing, but the fruit is worthless and I shall have to re-top them to better varieties. The remaining thirteen were Roxbury Russets, Northern Spy and Talman's Sweet, and are in bearing and doing well.

About the time I ordered the above trees, I planted a nursery.

When two years old, budded it to about all the standard varieties then in the State, that are adapted to central Maine, viz: Northern Spy, Roxbury Russet, R. I. Greening, Talman's Sweet, Yellow Bellflower, Nodhead (Jewett's Fine Red), Hubbardston Nonsuch, &c., and have planted them in orchard form on about three acres of land in good condition,—making in all about four acres of young orcharding—besides two acres of old orchard, in good condition, which has generally been kept free from the ravages of the caterpillars, at an expense of from twenty-five to thirty dollars per year, for the last two years.

And we think our trees have well repaid us in fruit, the profits of which, year before last were \$225, and last year, \$60; besides having the pleasure of seeing our trees clothed in green foliage and giving promise of fruit another year.

We plant our trees two by one and one-half rods apart,—believing that light and air are essential to their health and vigor, as well as rendering the fruit less exposed to mildew, the spores of which attach themselves to the fruit in wet and warm weather in August. We also need room to cultivate the trees till in fruit, and then it requires room to move ladders while gathering fruit and destroying insects. Again, we regard a western or northern slope or aspect as preferable to a southern or eastern one. On the former, the trees are checked in summer by the cooling wind, and grow more firm and less porous, and ripen their wood and bark earlier in autumn and the fruit is less exposed to mildew and the depredations of many insects, and in winter much less exposed to the direct rays of the sun and the alternate freezing and thawing in the spring months; while on the latter it is *vice versa*.

We have from eight to ten thousand apple trees from two to three years old, partly budded; also one thousand or more good, stocky pear trees, (30 or more of the best varieties, well adapted to this climate,) from two to five years old.

So far as our experience goes, we regard the Doyenne d' Ete, Beurre d' Assomption, Clapp's Favorite and Bartlett as good for summer and early autumn; for late autumn, the Beurre d' Anjou, Sheldon, Louise Bonne de Jersey, Flemish Beauty, Duchess d' Angouleme and Buffum; for winter, the Beurre Langelier, Glout Morceau, Lawrence and Vicar of Winkfield. I see no reason why Maine may not as well raise her own pears as to hire Massachusetts to do it for us, and we can if we feed as high and as persistently.

We have now one-fourth of an acre of standard pears in orchard form, planted one by one rod apart, with a dwarf in the centre of each square, and one-half of an acre more to be planted in the spring. The land is well plowed, dressed and under-drained. We have also one acre of strawberries, in good condition, well mulched and now covered with boughs; also an abundance of black cap raspberries, besides currants, gooseberries, plums and cherries.

FRUIT GROWING IN CONNECTION WITH GENERAL FARMING.

ESSAY BY JOSEPH TAYLOR OF BELGRADE.

Of all the industrial pursuits among men, for the life-giving sustenance of the human family, agriculture is the parent. From our mother earth is derived the supply needful for our physical wants; and fruit growing is but one of the many branches of agriculture; yet I deem it one of its most important branches,—especially in the cultivation of such fruits as are native or best adapted to the soil and climate in which they are to be cultivated; and much of our northern temperate zone seems to be especially congenial to the cultivation of apples, pears, and many of the smaller fruits. But especially do I place the apple culture, and its yield, for general use, and for profit to the grower, at the head of all the varieties of fruits that are grown in our own State, and as a part of the business of farming I think there is no one branch so remunerative to the cultivator as that of apple raising, considering the outlay for cultivation. I am aware that man cannot live by apples alone, but inasmuch as "money answereth all things" he can sell his apples for money, with which he can buy more bread and other necessaries for his family than could be obtained for the same outlay of time and labor in any other branch of farming. I am aware also that choice fruit-bearing trees do not spring up spontaneously in our own country, but need to be planted by the hand of man and nurtured by the skill and with the care of the cultivator; and a lack of these important requisites is the principal cause why there is such a failure in successful fruit growing. It is true there are many destructive insects that prey upon our fruit trees and fruit. Some of them may be considered as almost chronic afflictions, but many are itinerants, and rage only at intervals, and in particular localities at the same time. Such was the case with the caterpillar last year. That species known as the Forest tree caterpillar, is, of all the insect tribe, the most insidi-

ous foe to the cultivation of the apple that we have to contend with. The failure of the crop of this fruit in very many sections of Maine the past season was owing to his persistent ravages. Old apple trees especially, and the branches of such as were inaccessible to man, were almost entirely denuded of both leaves and fruit, and yet after all the destruction of the apples on the old trees by this enemy, such fruit growers as had had in previous years a provident forecast of the necessity year by year, of replenishing their orchards with young and thrifty trees, had the pleasure, after the contest with the enemy was over, of harvesting a pretty fair yield of apples.

Now, in speaking of the comparative value of the different kinds of farm products, by placing the apple crop at the head of the list, I do not intend to exclude, by any means, the cultivation, in degree, of most other kinds of farm products, and so much of all the different kinds as are needed for family use, such as potatoes, garden vegetables, all the different varieties of small fruits, and even corn, and if the farmer has the courage to cultivate wheat enough for flour for his own use, he is to be commended for his frugality and enterprise; and the cultivation of all these different products of the farm and the garden need not interfere with that attention to the orchard which is needed for its successful development of growth, and the product of fruit.

In making these remarks, I assume that the orchard has already been planted out, and if not, I advise every farmer that has neglected it hitherto, to lose no time, should he live and be in health at the opening of spring-time, in preparing at least one acre of ground for an orchard, and setting it out with apple trees of healthy and seedling growth.

I will now give my views in reference to the cultivation of the pear, as it regards the profit or otherwise of its general or extensive cultivation. I do not deny, nor do I suppose any lover of good fruit will, that the pear in its own intrinsic perfection, is a luxury unsurpassed by most kinds of fruit, but to enter into an extensive cultivation of it, for other purposes than for home use and for a limited home market, would seem to me of doubtful propriety. I have cultivated the pear, on rather a limited scale it is true, for the last twenty years, but as far as my experience has gone, I have not found the culture of the pear so remunerative as that of the apple. True it is, that the pear tree is not liable to be infested with so many obnoxious insects as the apple tree; but

there is a malignant blight, which seems innate to the pear, and which I have some fears will prove in time a serious obstacle to its cultivation. This blight has appeared on my pear trees the past season. It has mostly been confined to the limbs of the trees, and seems to be produced by some virus matter in the sap, yet I am not certain that this is a correct conclusion in the case. I think the blight has not yet become very extensive in our State, but in some of the Western and Middle States it has already infected the young pear trees to a fearful extent. As soon as there is any appearance of disease in a limb, let it be immediately removed, and thereby it may be that the body of the tree and main portion of the limbs will be preserved.

Fruits of most kinds, and especially the apple, have been very abundant in our markets this season, but this abundance has not been furnished from the product of our own State, but from neighboring States, and at a very low price. Yet owing to the exceeding scarcity of money, the non-bondholding portion of the community has been deprived of that luxury which in former years they have been freely supplied with. As far as I have been informed, the belt of country including the counties of Oxford, Androscoggin, Franklin, the greater part of Kennebec and Somerset, embraces that section of the State in which the caterpillar has been the most destructive to the apple crop. In other sections of the State I am informed that the yield of apples has been quite abundant.

The prospect of a good crop of apples another season, I think is fair from the indications of the fruit buds upon trees whose leaves were not entirely eaten off by the caterpillars last year, but we must not expect fruit from trees that were stripped of their leaves at a time in the season when the fruit buds were being developed preparatory to a growth of fruit the next year. For it will require one season of growth for the tree to recuperate its lost vigor, and mature the germ in the bud indispensable to the production of fruit the succeeding season. From my own observation in regard to the appearance of the caterpillar cones on the limbs of the trees, I do not look for the ravages of that enemy to a very great extent another year. It is true I have discovered a few of the cones of the Forest tree caterpillar, which may be distinguished from those of the tent caterpillar by their peculiar glossiness and a darker color, and their encircling the limbs, forming a ring around it, while the tent caterpillar forms its cone only

on the side of the twig, and of a lighter color and covered with a sort of fustian coating. By a careful search for these cones upon the limbs of the trees during their nudity, we may destroy the most of them. For it is a remarkable fact that but a very few, probably not more than one in a thousand, of the myriads of caterpillars that destroyed our apple crop last year, survived the period of their chrysalis state. The larger portion of them died immediately after becoming full grown; and I think their destruction was mainly caused by an active little gnat or maggot furnished with a sharp-pointed proboscis, with which he penetrated the body of the caterpillar.

Another enemy to fruit growers is the codling moth, which punctures the fruit in its immature state, leaving an egg in the tender skin, and during the growth of the fruit the worm eats its way into the very core, producing such a deformity and imperfection in the fruit as to make it quite unsaleable and oftentimes unfit for use. Much of the injury of this worm may, I think, be prevented by the pasturing of our orchards with sheep, which would eat up all the dead fruit as it fell, thereby destroying the worm and preventing a succeeding generation. Sheep husbandry also of itself I deem a profitable branch of agriculture, as well as a profitable aid to fruit growing.

In treating upon the different subjects which I have but merely hinted at in this short essay, I have not had in view an idea of presenting anything new to any of the members of the Pomological Society, but if by any laudable means I may aid and encourage others in the adoption of that system of agriculture which is the most promotive of peace, pleasure and profit, I shall be a joint sharer with you in those many blessings which are constantly being shed upon His dependent children by our Heavenly Father.

The PRESIDENT. There are several important questions which may profitably be considered in connection with the subject presented, one of the principal of which is: Can fruit growing be *profitably* conducted in connection with general farming? Another very suggestive question is: Which is the most profitable, raising fruit for market, or growing common farm crops and keeping domestic animals? These are subjects which may be discussed this afternoon, and which admit of a wide range of views, and they are questions that may come home to some farmers following the higher methods of cultivation. We know

there are many fruit growers present who are also engaged in farming, and we wish to fill the remainder of the afternoon with a discussion of these topics. We are very happy to see that there are present a goodly number of members of the Winthrop Farmers' Club, and we hope that they will participate freely in this discussion.

Mr. J. R. NELSON of Winthrop. I think the best address that I have ever heard upon the subject of fruit growing, is the one we have listened to this afternoon from Dr. True. As we look over our State, we see the fruit interests are coming up very fast, and our friend Andrews has told us that there are 10,000 trees set out in this town and doing well. Now I would ask if those who have set those trees are not pursuing the course that Dr. True laid down? As far as I am concerned, I am and always have been decidedly interested in fruit growing. These apples exhibited here are grown very nicely for this year, and are very different from apples grown on trees that are starved to death. The paper presented by Mr. Smith contains some excellent suggestions. He has a large number of trees, and he can tell better by far than the average farmer about the profits of the business. A large number of his trees have been treated in the manner indicated by Dr. True in his lecture this afternoon. That point should be strongly impressed on the mind of every man. How many orchards are there from five to twenty years old that do not receive the necessary care, and are not half manured to grow fruit successfully? A man must feed his trees. Our fruits in this village and in every other village, are better than the fruits on average farms,—and why? Because they receive more care and culture, thus giving us a notable illustration of the difference between fruit which receives care, and that which does not. If a man has the means and time at command and wishes to set an orchard, and will cultivate it properly after it is set, he may reasonably expect good results as rewards of his efforts. I am afraid, Mr. President, that a large number of the trees which are being set out in the town of Winthrop are being lost for the want of sufficient cultivation. Dr. True has told us one cord of manure should be applied to each tree, but I do not understand that a cord is enough for a tree for life. If you eat dinner to-day it is no reason why you will not require dinner to-morrow; and I am fearful that a great many persons who set out their 500 trees, have not the 500 cords of manure for them. I think there are some trees that cannot be induced to produce better by cultivation. I have some that never

have produced much fruit, and I have never fully understood why they should not do so. I would really like to hear the opinions of the fruit growers here, some of whom have had experience with trees for the last twenty years, as to what the results have been. I do not think it right for us to go away without making an effort to consider the question, and consider it well.

Dr. TRUE. I wish some farmer here who has had large experience with apple trees, would give us his opinion in regard to the quantity of manure necessary to a tree, and the production from the tree thus treated.

The PRESIDENT. I will call upon Mr. Smith of Monmouth, to give us this information.

Mr. SMITH. I have an old orchard of about two acres in this town, the trees of which are grafted with standard varieties of apples. When I bought the farm on which this orchard stands, about fifteen years ago, it was in a very low condition, owing to the treatment it had received. I think I have added to that orchard, within the last twelve years, thirty or forty cords of manure, and perhaps twice that amount, and also more than one hundred bushels of ashes and more than twenty tons of mulching. I brought out a broad green leaf, and I presume if you had cut into one of those trees fifteen years ago you could not have counted the fibres, they were so close together, but that they might be distinctly seen now. It has borne very well and I have sold a great deal of fruit from it. The trees are now in good condition, and I will say that for the last two years I have considered that orchard, or the produce of it, equal to the profits of my hay, and I cut twenty tons of good hay. Now others can do as well as I can. If I were to be taken from that farm and placed on a farm where there was no orchard, I should feel very much as Adam did when turned out of Eden. I should expect to get my living by the sweat of my face.

Mr. VARNEY. I did not quite understand the idea of Dr. True in relation to the one cord of manure to a tree.

Dr. TRUE. I was a little afraid I might be misunderstood. I will put the question to you, Mr. Varney; will one cord of manure once in three years do? Perhaps it would be well to put it in the form of a practical question, as it is a practical question, and one that will apply all over our State, where there are old orchards: Is it best to use such large quantities of manure or not?

The PRESIDENT. Such questions are very much to the point, and another one which is suggested right here, is, Whether there is any profit in growing fruit for the market? I think a man should manure his orchards to the extent of his means, or as far as circumstances will allow him to do so. I was talking with a prominent fruit grower in my own town a few days since in relation to an orchard which he formerly owned and which bore abundantly, and which had since fallen into other hands and been neglected. I inquired of him whether it had run down under the slack treatment, and in reply he said that it had, very much. Speaking of the value of manure, he said that he had known one-half cord of manure to produce more than \$20 in apples raised from the tree to which the manure was applied. Now that in part answers your question, and is proof of the necessity of high cultivation; and I think that this is a subject on which there cannot be too much said. I will call on Mr. Atherton of Hallowell.

Mr. ATHERTON. I am only a young man, and I think there are persons here who have probably had more experience in orcharding than I have, but this subject is one that interests me very much. Not long since I was in Vassalboro' on business, and was stopping with a prominent and well-informed citizen. While at dinner, the subject of fruit-growing was introduced and discussed at some length. Speaking of apples in Massachusetts, he said they did not pay for their culture and care. Now this is a serious question,—Whether we shall put our money into orchards or not, and could we not invest it otherwise to better advantage? I was very happy to listen to the address by Dr. True, this afternoon, although there were some things mentioned by him which are rather discouraging to us, who cannot get the \$1000 which he spoke of as necessary to start an orchard. If a man has the thousand dollars to invest in the enterprise, of course it is well enough, but if he does not have it, it seems to me that he may start an orchard on a cheaper scale with \$500 or perhaps even with \$100. I know of two young men who started some time ago; their father told them if they would take a piece of ground and take good care of it, that he would buy for them one hundred trees apiece. They took a piece of ground that did not produce five hundred pounds of hay, and turned it over; this was in the fall; early in the spring the father bought the trees, and they were set out, I think about twenty by thirty feet apart; they were well

manured, and grew finely, and a fine little orchard was started at comparatively small expense. So you see that what the Doctor told us about the \$1000 is not absolutely necessary. I think if your trees are healthy and you have plenty of manure, that is all you need. I don't doubt that there are many orchards that are starved to death, and a good many that are served nearly as badly by being half-starved. In regard to what the Doctor said about the soil being changed, and making new soil, I do not know, but in our experience we have had a good many old trees die. I have set out a considerable number of trees and have had good success with them—found no trouble at all only give them mulching enough and take care of them. I have heard of such a thing as giving too much care to trees, but I do not know in regard to this.

MR. ANDREWS. I wish to say a few words in regard to the cultivation of the trees in Monmouth. Our trees are well set, so far as I know. In reference to my own, they grow vigorously and as fast as I desire them to grow, or as it would be healthy for them. A man must put his time and care to such things and take pains. If he is a farmer he expects to spend his time on his farm; it is not expected that he will spend it at a store but on his farm, and if he takes an interest in all things connected with farming he will probably succeed. Now I know that the trees set out in this town will succeed, from the attention that is being paid to them. It is of no use to set out your trees and then leave them to their fate; you must apply something and continue it; if you cannot put on as much dressing as you would like to, put on what you can, if it is but a bushel; it is the easiest thing in the world if you only say you will.

MR. HOWARD of Winthrop. I don't know as I have anything to say. Our trees were attacked by caterpillars year before last, and last year. I have labored to prevent the ravages of the caterpillar, and think I have succeeded quite well. Now the question before this convention as I understand it, is raising of fruit in connection with farming. Some of our friends have given us a description of the fruit raised in their gardens where they had the best possible chance to take care of it; we do not doubt them in the least. They have asserted considerable in relation to the richness of the ground, which we believe to be all very true, but we do not wish to discourage any man. If he cannot have an orchard to his taste at first, the only way is to continue trying. We believe it is a worthy object to raise fruit, but the idea has

been advanced by many that they can raise it without culture. I think there are ways of raising fruit in connection with farming, that may be made profitable. I think it has been proved that trees can be raised without going to a very great expense. There are men who have raised fruit in this State at less expense than Dr. True's process requires, and it can be done again. I would urge every man to set out trees, carefully grown, in a good, thrifty, growing condition, and I have no doubt that they will do well. If you raise fruit not suitable to be consumed upon your table, give it to your stock. I know it is not popular now, but I do not believe in the principle of the old lady, who said she was glad caterpillars were on the trees, as she thought it would prevent the making of cider; and she said she would pray for them to come upon us another year. I believe that you can use apples to advantage in feeding them to your stock. If I had a thousand barrels of apples in my cellar, I would use them profitably with the stock I have. Now, people may not believe a great deal in feeding out apples to stock, but there is more in it than is generally supposed. They are certainly worth ten cents a bushel to feed to cows, and if they are worth that, every man can raise fruit enough to make it profitable to feed, if he cannot compete with the West in the markets; and I think every man can do so without resorting to the expensive mode which Dr. True and Mr. Smith have described. Just select a good locality for your orchards, set your trees out in a right manner, and they will be all right if properly cared for. I should prefer Maine trees. Dig good sized holes and fill partly up with firm soil, set your trees and carefully tend them, and you may raise an orchard and raise fruit. I think in nine cases out of ten, that system properly carried out will succeed, and at a less cost than one-tenth of the expense mentioned by Dr. True. And when he has succeeded, the question comes up, what shall he do with the fruit? how shall he dispose of it? Why, give it to the stock, every spare apple that he has—and sir, I look upon this as a very profitable question to every man who intends to live by farming. Attend to it carefully, and in the end it will surely pay.

Mr. METCALF of Monmouth. I did not improve the privilege of being present this afternoon and hearing what Dr. True presented; but from what I have heard I think he has entertained you very well. I believe these gentlemen have been looking at the subject of fruit raising in Maine. I believe it to be a subject worthy of

much consideration, and very fitting on the present occasion. We have here before us an exhibition of fruit that has survived thus far—well into the middle of the winter, and every specimen is in good condition, while car loads of fruit coming from the West, have rotted long before this time. I am not going to say much now—just a thought or two. I think we have encouragement in the State of Maine, to plant orchards, and take care of them after they are planted. I think that if you would have choice fruit, you must of necessity put on from a cord to a cord and a half of dressing. I think that the State of Maine is one of the finest portions of the Union for fruit culture, and apples especially. In relation to making cider, I believe in it. I think we should have plenty of cider, so that we can have good, pure vinegar, instead of the poor, filthy stuff we sometimes get.

Dr. TRUE. I do not fully understand the situation of things. It seems to me that a wrong impression has been given. I remarked, I think, after giving my ideal, that we could not expect to raise an orchard without cultivation, and I consider that a good practical standard for a farmer. I took my ideal from what I actually saw in the State of New York, where I visited some time since. A gentleman whom I visited there, has an orchard which is now eight years old, and I never saw better trees in my life. Last year many of them had from a bushel to a barrel of apples upon them, and almost all of them were bearing, and now you could not buy one of those trees for \$50.

In setting out an orchard, a man wants first, a good plat of land and well selected trees, and he also wants them set in a proper manner, and if well cared for, mulched and manured, they will do well. You, Mr. President, know the character of the soil in Oxford county; you know how we have to work to raise an orchard. I have seen trees in some parts of the State growing finely almost without any exertion on the part of the owner, and if I could have the same kind of soil at home to plant an orchard on, I would like it very much; but we have to work every way or our trees will starve to death, because the soil does not contain the elements so necessary to the growth of apples. In the towns around here you have soil containing every necessary attribute that is needed, and trees will grow almost spontaneously, and you can raise apples without any great degree of culture; but of course culture is better. I intend to plant two acres to trees in

the spring. I spent two weeks with my boys taking out the rocks; another spring I am going to plant the trees, and if I live long enough to see them grow, I shall graft them. But let us remember above all other things in connection with fruit growing, that we must not let our trees starve to death.

Mr. METCALF. You see that Dr. True is prepared to defend himself and what he has presented, and I have found him during my acquaintance with him to be pretty correct and generally able to prove his assertions.

Mr. HOWARD. I would advise every man to try to raise some fruit, if nothing more than enough for his family, but the raising of fruit in connection with farming must be upon the consideration that it will pay well. When we look into the subject fully we shall see that we must raise it upon a system less expensive than that mentioned by Dr. True.

Dr. TRUE. What did you get for apples last year?

Mr. HOWARD. I did not have many apples.

The PRESIDENT. Gentlemen, do not let us be frightened at the production of apples in the West; do not let that intimidate you or keep you from planting trees. To-day such apples as you see before you will bring in the market \$3.00 a barrel, if sold rightly, and car load after car load of apples from the West have been sold for \$1.50 a barrel, while some of them sold as low as \$1.00 and some as high as \$2.50. A gentleman whom I recollect, sold six hundred bushels of apples as fast as he could label the barrels for \$3.00 a barrel. Don't be frightened by the Western fruits; it is a blessing that we have them in such a fall and winter as this. We should be almost destitute of fruit to-day had it not been for the supply that we received from abroad at low prices; while such fruit as you see before you is bringing a liberal price.

Mr. CARR. It seems to me that this subject has not been fairly treated this afternoon. There has been considerable discussion as to whether a cord of manure is too much for a tree. I do not think it is,—and where is the man who does think so? Mr. Smith has told us that he moved from Winthrop, from a farm on which there is an orchard which I consider to be a very fine one indeed, and I do not know what induced him to leave it. My friend from Winthrop, the President of the West Winthrop Farmers' Club, has told us plainly that he was no orchardist, which may be true, but he can raise good stock and is a good farmer. The gentleman from Hallowell has told us what he and his brother have done

there. Now if they had adopted Dr. True's method and carried it out, they would have been better off,—they would have got heavy crops of apples.

Speaking about Western fruit, the fact is we can raise our fruit in Maine for what it costs us for freight from the West. The freight amounts to from 80 cents to \$1.00 per barrel, and I think we can raise apples at a less cost than that.

One gentleman has spoken about feeding apples to stock. It is well enough if apples are unfit for any other use, but I think that a farmer who takes care of his trees, and raises good fruit, can find a better use for it than that. If a man shakes his trees he must expect his apples to be bruised and hurt. I will say that there are no apples on these tables that were shaken from the trees; they were picked, and picked carefully. I am a believer in good apples, well grown and gathered in a careful manner. I believe fruit raising is the most profitable of anything you can do on the farm,—and in my opinion the more dressing you use the better.

A MEMBER. Mr. Carr is perfectly right, I think; I agree with him entirely. In relation to carrying on orcharding and general farming together, I do not think we can do both successfully. I think we must give our undivided attention to orcharding and let other matters go, or if we wish to follow general farming it is better not to try to do much at raising fruits.

Mr. SAWYER. I regard the suggestion made by Mr. Carr in relation to the careful gathering and handling of fruit as of great importance, and as pertinent to this as it is to every other discussion upon the subject of fruit growing. With good fruit, careful handling turns the scale between profit and loss. The larger portion of the fruit brought into this State last fall from Massachusetts and New Hampshire was gathered in the most careless manner, and transported in bulk without being assorted, and was received in a bruised and soiled condition; and although it was sold at a very low price it brought all it was worth. These apples were mostly Baldwins, and but few of them have been kept to the present time, while apples of the same variety grown by our own orchardists and properly handled are now in prime condition. I have in mind at this moment two men in my own county whose practice well illustrates the importance of the careful handling of fruit. One of them (who is also largely engaged in fish-breeding) raised some 500 bushels of apples last season, the larger portion

of which were Baldwins and are now in his cellars in good condition, and will be marketed in the spring at paying prices. The other man to whom I refer, living in my own town, raises large quantities of early apples, which he sells readily at good prices in competition with the early fruit brought in from other States; and he considers it more profitable than winter fruit, by reason of more prompt returns and the saving of subsequent labor. The reason of his ready sales is that his fruit is gathered properly and at the right time, honestly assorted and put upon the market without being bruised or soiled. Purchasers do not hesitate to take such fruit in preference to that brought from abroad at the same season. Both of these men, as well as many others who might be mentioned, are engaged in "general farming," and make everything pay.

In view of numerous examples of this kind as well as upon general principles, I believe that any person who pursues his business with intelligence, industry and skill, may profitably combine fruit growing with general farming,—and I have written a resolution embodying that belief, which I will present, as follows:

Resolved, That fruit-growing may be successfully followed in this State in connection with general farming.

The resolution was adopted.

Adjourned.

WEDNESDAY EVENING.—CLOSING SESSION.

The Society having re-assembled at 7 o'clock P. M.:

The first business of the evening was the report of the Committee on

MAINE FRUITS AT THE CENTENNIAL.

Rev. J. A. VARNEY of North Vassalboro'. It is proper for me to preface this report by saying that when it became known that no successful effort had been made to represent the agricultural interests of Maine at the Centennial Exhibition, the officers of this Society decided to make an exhibition of Maine Fruits there immediately after our annual exhibition at Waterville; and accordingly the President and myself were appointed to make a selection of fruits for that purpose and to proceed to exhibit the same at Philadelphia.

Mr. Varney, in behalf of the Committee, then presented the following

REPORT.

In making a report of the exhibition of Maine Fruits at the International Exhibition at Philadelphia, I am not a little puzzled to know how to proceed. Indeed, it were easier to write a paper concerning what we did not exhibit, than otherwise. It was, in my opinion, a misguided step on the part of the people of this grand old State of Maine, upon whose banner "Dirigo" is emblazoned, that all her products and industries were not fully represented in the great World's Exhibition. And, when it is too late to repair the loss we have sustained, those of the people of our Commonwealth who visited the exhibition, at least, now see that it would have been true economy to have placed abundant means in the hands of our able and judicious Commissioners to enable them to make a fair and full exhibit of all our products and industries. Of what Maine represented there, we can speak only in praise. Of what she did not exhibit, as compared with other States of the Union and the assembled nations of the earth, with humbled pride we leave unsaid, until the next centennial year comes round, when, I trust the younger children of our national household, as Kansas and Colorado, nestled in and around the Rocky Mountains, shall not be permitted to steal away the Motto and the glory of the old Pine Tree State.

Our journey to Philadelphia was commenced on the morning of the 9th of October,—the fruit having been sent forward by express two days before. On the 10th we arrived in the city, and after securing a boarding house, and a good dinner, we proceeded at once to business. It was an easy matter to find our packages of fruit at the Pennsylvania Railroad Depot, and give orders for their speedy transmission to the Centennial Grounds. Quite easy, too, for a stranger to find his own way thither, provided he was prepared to submit to such an unmerciful squeezing and crowding on the street and steam cars as you can never again experience during this mortal life. Long, lank and lean men had the best chance there—and so far, we herewith extend our sincere congratulations to this Society on the wisdom of their selection of delegates to the Centennial. Had you chosen men of aldermanic proportions, I am half persuaded you might have looked in vain for their report at this meeting, and for aught I know, our estimable Secretary

would have been obliged to strike two names from the Pomological Records of Maine. It is surprising to see what numbers of living beings a Philadelphia car conductor is capable of packing into an ordinary car. They leave the station with the car seats comfortably filled, and then take on from one to a dozen at every crossing for the whole four miles. I am fully aware that this was the Centennial year, and facts as well as history tell us that the world has made rapid strides during the last century. I am prepared to believe that steam navigation, railroads, the telegraph, the art of photography, etc., have come into public notice during the last half of the past century, but nothing short of a hundred years is required to teach the art of *car-packing* as they have it.

We proceeded to the head-quarters of our Commissioners, Messrs. C. H. Haskell and Joshua Nye, and throughout our stay in Philadelphia, found them at their post, ever ready to render all needed assistance.

If you appear at the gates as a private citizen you have only to present your ticket and pass on, and so for the first time we paid our entrance fee, and soon "found ourselves lost" amid the wonders of the world. But we must go in and out often, and being entitled to an Exhibitor's Pass we made application for the same at once. Now work begins, and we found that for us,—even here at the Centennial,—it was quite as well to adopt that good old saying, "Let patience have her perfect work." I hope you will not think I am about to find fault with the management of their business affairs. By no means. I will state it once, now, but can well remember that I said it over and over again as we cruised from one department to another. In due time the passes were presented to us, and how our hearts leaped for joy as the suggestion flashed across our anxious minds,—we are triumphant, the last knot has been tied. But alas, how soon the placid waters of our happy spirits become restless and ruffled again with "red tape." On opening the envelope to the long-coveted pass, we find ourselves in another dilemma—as we read: "This ticket not good unless it contains the photograph of the owner."

A short journey now to the photograph gallery within the grounds, there to learn, after waiting some two hours, that in the course of a week or so our turn would come, when for one dollar each they would be prepared to place a correct likeness of our homely faces in the little aperture fitted for its reception within the paper. Two ugly faces (pardon me, Mr. President) in two

small apertures, in the two passes, for two dollars, in about two weeks. Again somebody muttered—"red tape."

What a blessing, when among strangers in a strange city, to have the companionship of one that knows more than you do. My friend suggests, that as we may go out at the gates *ad libitum*, we may procure the needed photographs in the city for one-half the money, and so save one dollar to help out in *doing* Philadelphia. We followed his suggestion—but "oh my!" such a face as was to be seen in one of those passes!

Our worthy Secretary requested me to "report all that I saw and learned at the Centennial, only withholding such things as would not be proper for me to relate,"—a very important desideratum, I can assure you. How very fortunate this Society may consider itself to have such accurate discernment combined with the unusual readiness of the pen, to jot down its doings. Well, this together with certain orders from one high in authority among us, whose pomological mandates, like the laws of the Medes and Persians, are not to be disregarded, leaves me to make the humble effort to tell you of some things I saw and learned.

It would be a task too burdensome to go into detail, and as tedious as the nightly waiting at the Belmont Avenue Depot for a car-ride to Market Street. "Quicker home to go on foot," and more endurable doubtless for you to procure snow-shoes and strike out for your homes. We were inclined to complain of friends visiting the Centennial, because they gave us no more definite accounts and descriptions of what they saw there, but once there you may comprehend the situation. One week, a month even would be little time enough to record the names only of the subjects and interests represented there. From the Old World and from the Isles of the Sea came samples of wood, almost numberless, with men to tell us all about their uses and value. California and Michigan were there, too, to show us the tall pines they grow, and the sleds, all loaded, on which they draw them from the forests—as though a man from Maine had never seen a pine tree, or a bob-sled! Well, the fault was not theirs, if fault was anywhere. This was as it should be. In the Pomological Building were large displays of potatoes, some of which we thought were grown on exceedingly poor soil, and in a dry season at that. We could have selected samples larger and fairer on exhibition at our State Fair at Waterville; but we did not do it. So it was with many other things I must not enumer-

ate, we were sorry, yes ashamed, to find missing from among the multitude of men and things on exhibition there. I did not say there were no women and children there. On the contrary, like the potatoes and apples, there were all sorts, all colors and sizes,—on foot and on wheels, with canes and umbrellas, and without,—protected and unprotected; and if we may judge from a two-weeks' jamming experience in Philadelphia, he was a lucky man who had neither of these under his immediate protection.

Through the kindness of the gentlemanly janitor, Mr. Brackett of Iowa, we secured the table we desired, in a central location. The fruit came out of the packages in fine order, very few specimens having suffered from the previous handling and the journey from Waterville. The space allotted us was ample, and we wished we had forwarded a larger quantity.

Our first work was to put the fruit in order and arrange it to show to the best advantage. This done, and the large placards on which we caused to be printed the words "Maine Fruits," placed over the table so that they might be seen from any portion of the building, we were now ready for the inspection of the Fruit Judges.

Whatever complaints may have been made as to the inefficiency of the judges in other departments, the fruit department was favored with experts, who performed their arduous duties faithfully. Our fruit received high commendations at the time of their examination, and we have since been notified that it was awarded a diploma and a medal.

Well, as we stood and looked across the table, we said, as did the Commissioners also, "We are glad this fruit is shown here." I need not say to you who have seen such a table of fruit on exhibition, that it was indeed beautiful. Notwithstanding the impromptu manner in which the enterprise was set on foot and carried out, it was a success. We received the congratulations of the Commissioners, as well as of many prominent fruit judges and fruit growers from different portions of the country. All acknowledged that ours was a creditable show of fruit. We found, too, that the impression prevailed quite generally, in other States, that we could not grow good fruit, because of our close proximity to the Arctic regions. A few plates of pears and about one hundred and fifty varieties of apples comprised our list. Here I wish to remark, that the tables in Pomological Hall were poorly arranged, being constructed with three stories or shelves

rising one above another toward the centre, thus showing three tiers of plates from each side. So that in order to get a full view of all the specimens of fruit on each table, you must walk entirely around it. Then, in taking a general survey of the hall, only the upper tiers were to be seen. This objection was obviated, however, when the fruit was removed to Agricultural Hall, (as it was after a few days, to make room for the World's Poultry Show,) in the use of level tables constructed in the same form as those adopted by this Society in its annual exhibitions. Amid the confusion, so general, I found it very difficult to keep my mind or eyes upon any one thing long enough to take such notes as might be useful to myself or of interest to others. I am thinking others sometimes got mixed somewhat, as I recall the result of certain note-taking one day. Some one suggested, (I don't propose to call any names here,) that we devote the morning to taking notes on the fruit exhibited in the Pomological building. With notebook and pencil we set about the work. I think it safe to say, that scarcely fifteen minutes had passed before some one called my attention to a "magnificent pumpkin" on a table near at hand. The pumpkin (fruit) and a big squash gone over,—"and these potatoes,"—"Why, sir, a Lewiston grocer (Lewiston is in Androscoggin county) would not look at such a second time." Then "Here is some Oregon wheat," from four to six feet in height, the kernel plump, white and nearly as large as Rio coffee. Then another table loaded with vegetables and fruit. Now, all I remember distinctly about this table is the fact that on it were some very fine Italian chestnuts in the burr. Chestnut burrs are ugly to the fingers. If this variety of chestnuts are generally as large and fair and good as those we saw, I sincerely hope the seed may come true to name. I have had only a limited experience in raising chestnuts, and these only *horse chestnuts*,—but I am always in doubt about apple seeds, and *New York apple trees* as well, because you can't tell what the fruit may be till you see it, or taste it. Now in referring to my note-book, the only nameable things I find recorded on that morning, are the number and varieties of apples, pears, plums, peaches, grapes, &c., said to be contained in the Michigan contribution, and something about some magnificent Italian chestnuts seen on another table. Before dismissing this part of my subject, I desire again to express the hope that Italian chestnuts, when planted, are sure to vegetate, prove hardy, and are certain to reproduce Italian chestnuts. If my companion

did more, I trust we shall be favored with a full report of that morning's labor.

Let us spend a few minutes among the fruit. Near by was the North Carolina contribution, principally apples, to which was added samples of leaf tobacco, Dent corn, &c.—shown by as perfect a specimen of North Carolina humanity as that State could produce. A "right smart" talker, however, and he was in nowise backward in his denunciations of the "powerful weak" accommodations devoted to Pomology at the Centennial. He was quite liberal however, and it was with one of those improved Centennial bows that we acknowledged our obligations as he presented us with two of those huge ears of Dent corn. (We placed them very carefully in a packing box under our table, and they remain there yet for aught I know.) North Carolina apples are much larger than ours, but not as large as those grown in some other States. They were soft and spongy, and many of them nearly covered with a dingy scurf or mold. "This," said our friend, "is unusual, being caused, I reckon, by a leap of rain immediately followed by right smart heat." Here, as in many specimens of Western and Southern fruit, we found it quite difficult to identify species. A Baldwin, for instance, grown no farther away than the State of Michigan, is so unlike the Baldwin of Massachusetts or Maine that close inspection is necessary to name it. At this time, their Baldwins and Northern Spys were easily indented with thumb and finger, while ours, as you all know, were hard and firm.

California, Oregon, Kansas and Colorado take the lead in great crops of the largest fruit. They tell us of apples and pears weighing $2\frac{1}{2}$ pounds, but I saw none on exhibition that would outweigh our largest samples by more than one-third, say $1\frac{1}{2}$ pounds. All of these lack the high coloring of Maine apples, are less firm, and though in their season may be equal in flavor, yet are coarser grained and of less value in respect to keeping qualities.

Kansas and Colorado expended thousands of dollars in the exhibition of fruit here, to say nothing of their magnificent show of cereals, minerals, &c. In the centre of their State building stood a monument of apples, tastefully arranged, containing many barrels of fruit. A fresh supply was kept constantly on hand or on the way thither, to take the place of any that showed signs of decay.

Michigan claims to be the banner apple State. Mr. Ilgenfritz, representative of the State Agricultural and Pomological Societies of Michigan, informed me that they had placed on exhibition 250 varieties of apples, 60 of pears, 22 of grapes, 30 of peaches, and 19 of plums. They made a splendid show, occupying several tables loaded down with fruit. A correspondent of the *Country Gentleman* is of the opinion that the apple crop of Michigan is of more commercial importance, as compared with other farm products, than is the case in any other State. He also asserts that the Michigan Pomological Society is composed mainly of the very best class of farmers,—men of more than ordinary ability and education,—and that as a Society, they are earnestly and intelligently working to develop the fruit growing interests of their State. Another significant fact is, that they have the coöperation of the Legislature and State government to a larger degree than is received by any other State Society of the kind. Their annual Pomological reports are volumes of 500 to 600 pages, published at the expense of the State,—and besides, an appropriation is made to defray the expenses of the officers of the Society. Mr. Ilgenfritz informed us that the State appropriated \$5000.00 to defray the expenses of their exhibition of fruits at Philadelphia, and that they should nearly or quite double this expenditure. Two full car loads of fruit were taken to the Centennial from that State after the time of the general pomological exhibits in September. As it is, we are inclined to accord to Michigan the honor of being the Banner Apple State. Why should we not do so? Let no Maine man say it is all because they have a milder climate, or a more congenial soil for fruit culture, for we are not inclined to yield this point at present. They have in Michigan as cold weather as we ever have—the mercury running down to 35° and 40° below zero. They have their winter killing seasons, the pear blight, the borer, the canker worm, the caterpillar and the curculio as well as we. Their apples will average a little larger than our own, and their crops may be heavier, but considering our locality, it being easy of access to market, both home and foreign, the high coloring, sprightly flavor and good keeping qualities of Maine fruit, we believe that better returns are realized for the labor bestowed and the money judiciously invested, than is realized in any Western or Southern State.

The collection of apples from Nova Scotia was a very creditable one,—shown by Mr. Robert W. Starr and his wife, of Cornwallis,—

and was, to my mind, the only one that in all respects equalled the Maine apples. These were good, sound, smooth, nicely colored apples, susceptible of high polish, and in every sense first-class fruit. In this collection alone were found well grown specimens of the Blue Pearmain equal in size to ours. The Gravenstein and Yellow Bellflower (persistently called by them Bishop Pippin) excelled ours.

From Quebec was a large collection of apples, many of which were seedlings, such as we consign to the cider-mill.

The exhibition of fruit from Ontario had been long on the tables, and hence was stale, so that we could not judge of its merits.

I was disappointed in the show of fruit from Minnesota. It was but little more than half the size of our samples. Pennsylvania too, was scarcely up to our standard in size, and made but little effort to display fruit. Iowa had a fine collection of artificial fruits. These were all of wax, in natural colors, and if they were fair representatives, I judge that Iowa produces good fruit. Perfection of outline, enormous size and high colors are more easily attained in wax than grown upon trees. We were not favored with any New York fruit at this time,—neither from any New England State save our own. There were most excellent samples of evaporated fruits on exhibition, of which, in the absence of a proper knowledge of the methods of preparing, and the profits of the business, I can say nothing—except that the idea would appear to force itself upon us, that here is an opportunity for the profitable consumption of our surplus fruits in the over-bearing years. Some of us have been faint-hearted, when we have looked out upon the bountiful harvest, and ready to cry out, "the business is overdone—it will not pay." Perhaps, with these new processes of preparing fruit so that it will keep in perfection an indefinite length of time, richer harvests await us. There need be no fear of overdoing the fruit raising of Maine. In some portions of this State the crop of apples was entirely cut off the past year, but prices ruled low on account of the enormous crops raised in Massachusetts and farther West.

It is a singular occurrence, when in the markets of Maine a barrel of apples may be bought for the price of two bushels of potatoes, or less. Notwithstanding the extremely low prices of apples in the month of October, good winter fruit has brought \$1.00 per bushel since the middle of December. Let us, then, seek to grow such varieties as shall meet the demand in our

several localities. Where early fruit finds ready sale at remunerative prices, there plant or graft with such. In localities where early fruit is unsaleable, grow for winter and spring sales.

Too often and too long have our orchardists and gardeners been guided in their selection of varieties by the pretty fruit lithographs shown by the smooth-tongued tree jockey, rather than by good sound judgment and common sense. I shall not soon forget a remark made at a meeting of the Board of Agriculture at Winthrop, by a gentleman of that town. Though spoken, I believe, in reference to another subject, it is equally applicable here, and to the point. This is it: "The people of Maine are the most *gullible* people in the world." Especially is this remark true, if I interpret the word *gullible* correctly, in our selection of fruit trees, and varieties of the same. Occasionally we may have obtained that which was desirable,—as often by mistake, perhaps, as otherwise. In our fruit catalogue we are outspoken and explicit in our opinions with regard to the varieties of fruit best adapted to our climate. Let us be as plain and explicit with regard to the kind of trees we can recommend to grow such fruit upon. I wish to place myself upon record here. Buy only Maine grown trees, if they can be obtained; if not, order directly from some reliable nurseryman as near home as possible. Let no travelling tree pedler receive your order, for however honest he may be, he seldom or never knows what he sells you, or where his trees are grown even. If I were to start a new orchard, I would use, principally, seedling trees that had been once or twice transplanted in the nursery where they were grown, and graft in the stock or top when well established. I say *principally*, because there are a few varieties that will succeed quite as well grafted at the root, in this climate, and *only* a few.

I ought to say before closing, that the grape exhibit from several States occupied a prominent place. It was too late for plums and peaches except as canned or preserved.

The Horticultural department, though confessedly meagre at the time of our visit, affords too wide a field for me to enter upon in this report. Horticultural Hall is a magnificent building, and is to remain a permanent fixture in Fairmount Park. In the out-door exhibit were to be seen the representative trees of this and many foreign countries. Here too, were the remains of different methods of ornamental and flower gardening, which were still objects of beauty and interest, though disfigured somewhat by early

frosts. I wish to remark here, that in the parterre, or sunken garden leading out from the west end of Horticultural Hall, some of the most beautiful and attractive gardens or beds were composed of common varieties of foliage and bedding plants, such as are to be found at any good florist's around home.

To all our farmers and amateur gardeners,—to *all* who possess a small bit of land, or yard, I wish to say that a slight investment even, will well repay you in the effort thus to adorn your homes.

Possibly I may be charged with egotism, in regard to my estimation of the importance and advantages of the fruit growing interests of Maine as compared with other States. With us this enterprise is yet in its infancy, and it only remains for the *few*, yet *earnest*, unselfish workers in our youthful Society, to go forward in their beneficent endeavors until a generous public shall appreciate their efforts. That time will surely come.

In these semi-annual meetings,—as yet but thinly attended,—seed is being strewn on soil that cannot fail to yield a good harvest in due time.

After the reading of the report, THE PRESIDENT, who was associated with Mr. Varney on the Committee, made the following remarks :

As a few minutes yet remain, I wish to add a few words to the report to which you have listened, upon one or two points to which the speaker did not allude. One object we had in view, and one of the lessons we set out to learn, was the art of exhibiting. We intended to study the methods of exhibiting fruit, that we might thereby be enabled to improve upon what we had learned at home in our exhibitions. This was kept prominently in view while there. I think I may say without egotism that we did not learn anything in that respect while there, by which we could profit, unless it was what we learned negatively, for we did learn "how not to do it" in several respects. We did not find so attractively arranged an exhibit of fruit as we are in the habit of making at our exhibitions. I do not say this to claim credit to ourselves, but we expected to find something that we might learn from, and in that respect we were disappointed. The arrangement was bad, and the hall was exceedingly bad, and received the condemnation of all fruit growers. The tables were bad. We all know that a display of pictures in an exhibition has no effect in an uncouth hall, and in this exhibition, held in a rough building erected on the grounds at slight cost, all artistic effect was lost.

All the merit of the art was hidden by the uncouth surroundings. The arrangement in an exhibition of fruits and flowers is one of the fine arts, so to speak, and its effect on the mind depends much on the surroundings. These surroundings were out of place. In the paper presented this forenoon upon landscape gardening, the point was made that certain things should not be in proximity to certain other things. The vegetable garden should not be upon the lawn, but in some out-of-the-way place. So cabbages and potatoes should not be exhibited in immediate connection with fruit. Good taste can be manifested, as we see upon the tables before us, in the exhibition of flowers with fruit, but never of coarse articles.

One remark also in regard to the efforts of Michigan to show her fruits in the East. Now we ought to copy from Michigan in one direction—we ought to possess some of her enthusiasm. Much of the enthusiasm of Michigan was transported from Maine. Many men did we find who took pride in exhibiting her fruits. They are aware that the success of fruit growing in their State depends on an Eastern market, and therefore they are anxious to make a favorable impression on Eastern people, that the markets may be open to their fruits. Hence they run their exhibition, so to speak, regardless of cost. They cared not that the State appropriated only \$5,000 to sustain it, they went on with the sanction of the State officers, until they had then exceeded a cost of \$10,000. Will they not be rewarded? Will not those men who went to Michigan from Maine, now that an Eastern market is made for their fruits, reap a reward for such efforts? In common Yankee parlance, "won't it pay?" Of course it will. And if we exercise the activity that they do in growing their fruits and the perseverance that they do in seeking a market, would it not pay us? I think the answer, "yes," is the one that applies to us in our favorable position. Their Pomological Society holds its exhibition in connection with the State Agricultural Society, and the State Society gives them a certain amount of money annually for their part of the exhibition. They give them \$1,500 a year generally. That is the encouragement which they give to Pomology there. They recognize its pre-eminent importance. One of your prominent fruit growers said here to-day that Kennebec county, so long famous for its fruits, is not producing so many barrels of marketable fruit as she was twenty years ago—not because of the accidents of the two years past, but because your trees are not sufficient to produce as many apples as were produced twenty years

ago. The questions arise: Are you planting sufficiently? Are you making such improvements as are demanded by the circumstances and the possibilities within your reach? I say you are not.

REPORT OF THE COMMITTEE ON THE EXHIBITION OF FRUITS AT THE WINTER MEETING.

[Owing to the temporary indisposition of Mr. Smith, the Chairman of the Committee, this report was read by M. J. Metcalf, Esq., of Monmouth, who, in presenting it, called attention to the high character and fine condition of the fruit exhibited, with reference to size, color, texture, soundness and freshness of appearance,—challenging comparison as a *winter* exhibition with the fruits of any other region; and invited the members to test its qualities at a social re-union which was to be held at the close of the session.—SEC.]

The Committee appointed at the Winter Meeting of the Maine State Pomological Society, held at Monmouth, January 23d and 24th, 1877, to examine and report on the fruit on exhibition at that meeting, submit the following report:

Your Committee were very much pleased to find on exhibition sixty-seven plates of fruit, viz: two of cranberries, three of grapes, two of pears, and sixty of apples. Each of the latter contained ten or more specimens of very fine apples, highly commendable in quality, size and color, and the most of them eminently adapted to the soil and climate of central Maine.

George H. Andrews of Monmouth presented some very excellent specimens, showing intelligent cultivation, viz: Roxbury Russet, (the fairest and best we have ever seen on exhibition,) Black Oxford, Yellow Bellflower, Baldwin, Pound Sweet, Red Canada, and seedlings for name—all perfect specimens; also some specimens of Isabella grapes, very good for the season.

J. O. Preble of Monmouth presented Rhode Island Greenings, Red Canada, and seedlings not named; all very good.

J. L. Perry of Litchfield, two plates of apples, (unnamed varieties, of very good quality.)

Some fine specimens of Baldwins and Yellow Bellflowers were presented by David Woodbury of Monmouth.

H. W. Tilton of Monmouth exhibited one plate of large, well-ripened Baldwins, showing good culture—symmetrical in form and very highly colored.

L. F. Starrett of Warren exhibited a variety of the Greening class, for a name, of good form, rather above medium size, of fair quality, somewhat resembling the Rhode Island Greening.

Wm. H. Boynton of Monmouth, one plate of very good Baldwins, also a variety for name.

Charles S. Pope of Manchester, four varieties, viz : Waldlower, Red Canada, Starkey and Mother apple, all very fine specimens.

Joseph Taylor of Belgrave exhibited very fine specimens of Northern Spy, (the largest and best of that variety on the table,) also some very good specimens of Childs apple, Esopus Spitzenburg, Hubbardston Nonsuch, and two plates not named.

J. W. Foss of Monmouth presented one plate of very good Hubbardston Nonsuch.

N. F. Prescott of Monmouth, Roxbury Russets and Baldwins, all fine looking specimens.

Hiram G. Judkins of Monmouth, very excellent specimens of Hubbardston Nonsuch and Nodhead.

Francis A. Fuller of East Winthrop exhibited good specimens of Black Oxford and Esopus Spitzenburg, also some very good specimens of Isabella grapes, well ripened—as your Committee had the privilege of testing them.

M. J. Metcalf of Monmouth presented very good cranberries and grapes.

Mr. Joseph King of North Monmouth presented some very fine specimens of King of Tompkins County, beautiful in color, large and fair; also some very good Spitzenburgs, Black Oxfords, Maiden's Blush, Seek-no-further, Baldwins and Yellow Bellflower.

J. L. Orcutt of North Monmouth presented specimens of two varieties of apples, but your Committee did not get the names. They were very good standard varieties

Thirteen varieties of apples, two of pears (Vicar of Winkfield and Glout Morceau), and one dish of cranberries, were exhibited by Alfred Smith of Monmouth. The varieties of apples were Northern Spy, Baldwin, Winthrop Greening, Hubbardston Nonsuch, Rhode Island Greening, Roxbury Russet, Red Canada (Old Nonsuch of Massachusetts), Fall Harvey, Talman's Sweet, Nodhead, Red Russet (large, somewhat resembling the Baldwin, but keeps as well as the Roxbury Russet—the tree vigorous, hardy and productive), Yellow Bellflower (an annual bearer, productive, hangs to the tree till gathered, like the crab varieties—tree perfectly hardy and vigorous); also a red winter sweet apple, name unknown, of good quality, probably of English origin, from Vaughan's Nursery, Hallowell. Conspicuous for size, beauty of form and color among Mr. Smith's varieties, was a plate of Nod-

heads, Winthrop Greenings and Baldwins, one of the latter weighing ten and one-half ounces, diameter four inches, circumference one foot.

Your Committee were surprised to see on exhibition so large a display of beautiful winter fruits, it being the largest exhibition ever presented at any winter meeting of the Society, and highly creditable to the exhibitors,—to whom many thanks are due. In consideration of the recent devastating ravages of the caterpillars in this county and vicinity, such an exhibition was a pleasure and surprise, and seemed to animate and revive the drooping courage of fruit growers and orchardists to renewed faith and works, which combined with intelligence, will remove all the obstacles in the way of fruit growing in Maine.

Respectfully submitted.

ALFRED SMITH,
F. M. WOODWARD,
CHARLES H. JONES, } Committee.

Mr. SMITH spoke briefly of the fruit on exhibition, also of the beneficial influences of the Society, and the efforts by which its membership in Monmouth had been largely increased during the past year, and urged others present to engage in the work,—concluding as follows: "You all love fruit. There is no man but loves fruit. Let us raise such fruit as we see here. No one can afford to raise poor fruit. Let us take a lesson from this fruit. It was raised by men of intelligence. Such fruit cannot be raised except by working intelligently in harmony with the laws of the universe, which are the laws of God."

The PRESIDENT. This closes the public exercises of the meeting. It is now one of the things of the past, and only the pleasant recollections of it are left behind. I crave your indulgence for all the short-comings I have manifested in the performance of the duties which I have been called upon to perform. I thank you also for the interest and attention manifested.

On motion of Mr. Starrett of Warren, *Voted*, that the thanks of the Society be and hereby are tendered to the Maine Central and Knox and Lincoln Railroad Companies for their liberality in granting free return tickets to persons attending this meeting.

On motion of Mr. Sawyer, *Voted*, that the warmest thanks of the Society are due and are hereby tendered to the citizens of Monmouth for the complete arrangements made for holding this

meeting and for the hospitality with which they have entertained the members during its continuance.

MR. METCALF. I am not satisfied that the thanks in relation to this session shall be all on one side, and in behalf of this community, and this town, I thank this Society for meeting with us, and for the good which I am sure your meeting will do.

Mr. Metcalf, in behalf of the ladies of Monmouth, then extended an invitation to the members of the Society and others present, to partake of a supper in the vestry of the church immediately after the adjournment of the meeting.

Adjourned.

MISCELLANEOUS PAPERS

PRESENTED AT THE WINTER MEETING AND ORDERED TO BE PRINTED.

APPLES FOR THE MARKET—WHAT VARIETIES SHALL WE RAISE?

BY LYMAN F. ABBOTT OF WILTON.

I do not propose to discuss this subject at much length, but merely to state the result of an experiment adopted by myself last winter to ascertain the views of some of our best orchardists in regard to what are the best ten varieties of apples for general cultivation. The experiment, though not as satisfactory in its results as was hoped, gave an indication of the course which those having experience in fruit-raising are following, and also elicited the opinions, founded upon long experience and wide observation, of those whose intelligent practice in this important branch of rural economy is particularly valuable at this time, when the culture of the apple is prominently before the farmers of Maine.

The plan adopted, though perhaps not so well matured as it might have been had the matter been longer considered, (and it undoubtedly would have received more attention had we thought of bringing the matter before the Society), was the sending of the following card to a number of persons in the State who were regarded as well qualified by experience to give an opinion that would be a guide to the novice in the business.

"DEAR SIR:—As an interesting experiment, but more especially to elicit information upon a point of much practical importance to the farmer and amateur horticulturist, I desire your coöperation in determining, as near as may be the best ten varieties of apples for general cultivation for market purposes; also, as to the two or more varieties of pears best adapted for cultivation in the northern and central parts of the State. Nomenclature, that adopted by the Pomological Society, as near as may be.

For this purpose I send you this card, which if you will fill out as indicated by the numbers and return to me at your earliest convenience, I shall be greatly obliged.

Respectfully yours,

L. F. ABBOTT."

These cards were each numbered from one to ten for apples and two varieties of pears indicated, with space for brief remarks. Fifty of these cards were inclosed and addressed to as many prominent orchardists in the State. Only about seven-tenths of the cards were returned; probably some failed from being addressed wrongly, and others evidently were mislaid and forgotten. The result of the voting "as far as heard from" was a trifle more satisfactory and a good deal less complicated than our late Presidential election, but some of the "returns" were about as tardy, but they gave no uncertain sound when they did come.

The following tabular statement gives the result. The figures at the head of the columns indicate the order of excellence, and those beneath, opposite the varieties named, show the number of times that variety was named by different individuals. For instance, the Baldwin was named as No. 1, twelve times; as second on the list three times, and only once as the lowest in the order, as indicated under 10. The right hand column gives the whole number each variety received. The result, as indicated by this experiment, would give as the best varieties Baldwin, 25; Rhode Island Greening, 25; Northern Spy, 15; Talman's Sweet, 15; Roxbury Russet, 13; Porter, 12; Hubbardston Nonsuch, 12; Red Astrachan, 12; Gravenstein, 10; Nodhead and King Sweeting, each 8. Of pears the Flemish Beauty stands 12; Louise Bonne de Jersey and Bartlett, 6 each, while the Beurre d' Anjou has 5.

APPLES.	NUMBER OF TIMES NAMED AS—										Whole No.
	1st.	2d.	3d.	4th.	5th.	6th.	7th.	8th.	9th.	10th.	
Baldwin.....	12	3	1	3	—	1	3	1	—	1	25
Rhode Island Greening.....	2	9	4	2	2	3	—	2	1	—	25
Northern Spy.....	2	—	2	1	3	1	—	2	3	1	15
Talman's Sweet.....	—	2	1	2	—	—	5	1	2	2	15
Roxbury Russet.....	—	2	3	1	1	1	1	2	—	2	13
Porter.....	—	1	2	2	1	—	3	1	1	1	12
Hubbardston Nonsuch.....	—	1	2	—	3	3	1	2	—	—	12
Red Astrachan.....	3	1	1	1	—	1	—	3	—	2	12
Gravenstein.....	—	1	1	1	1	2	—	2	—	2	10
Nodhead.....	—	—	1	3	—	2	—	—	1	1	8
King Sweeting.....	1	1	1	1	1	1	—	—	1	1	8
Williams' Favorite.....	1	1	—	—	1	1	—	—	2	1	7
Yellow Bellflower.....	—	1	—	—	2	3	—	1	—	—	7
Harvey.....	2	—	1	2	—	—	—	—	1	—	6
King of Tompkins County.....	—	—	—	2	2	—	1	—	1	—	6
Dean.....	1	—	—	1	1	—	—	—	1	1	5
Sweet Bough.....	—	—	—	—	1	1	—	2	1	—	5
Blue Pearmain.....	—	—	—	1	2	—	2	—	—	—	5
Duchess of Oldenburgh.....	1	—	—	1	—	—	—	—	1	—	3
Early Harvest.....	1	1	—	—	—	—	—	—	1	—	3
Pumpkin Sweet.....	—	—	—	—	—	1	—	—	1	1	3
Fameuse.....	—	—	—	—	1	—	—	1	1	—	3
Garden Royal.....	—	—	1	—	—	—	1	—	—	—	2
High Top Sweet.....	—	—	—	—	—	1	—	—	1	—	2
Ribston Pippin.....	—	—	—	—	—	1	—	—	1	—	2
Black Oxford.....	—	—	—	—	2	—	—	—	—	—	2
Starkey.....	—	—	—	1	—	1	—	—	—	—	2
Mother.....	—	—	—	1	—	—	—	1	—	—	2
Wagener.....	1	—	—	—	—	—	—	1	—	—	2
Cat Head.....	—	—	—	—	—	1	—	—	—	—	1
Danvers Winter Sweet.....	—	—	—	—	—	1	—	—	—	—	1
Hurlbut.....	—	—	—	—	—	1	—	—	—	—	1
Bartlett Seedling.....	—	—	—	—	—	—	1	—	—	—	1
Minister.....	—	—	—	—	—	—	1	—	—	—	1
Foundling.....	—	—	—	—	—	—	1	—	—	—	1
Winthrop Greening.....	—	—	—	—	—	1	—	—	—	—	1
Cole's Quince.....	—	—	—	—	—	1	—	—	—	—	1
Primate.....	—	—	—	—	—	1	—	—	—	—	1
Bumpkin.....	—	—	—	—	—	1	—	—	—	—	1
Vandevere.....	—	—	—	—	—	—	1	—	—	—	1
Sherwood's Favorite.....	—	—	—	—	—	—	1	—	—	—	1
Somerset.....	—	—	—	—	—	—	—	1	—	—	1
Milding.....	—	—	—	—	—	—	—	—	1	—	1
Noyes Apple.....	—	—	—	—	—	—	—	—	1	—	1
Bailey Sweet.....	—	—	—	—	—	—	—	—	1	—	1
Winter White.....	—	—	—	—	—	—	—	—	1	—	1
Sops of Wine.....	—	—	—	—	—	—	—	—	1	—	1
French.....	—	—	—	—	—	—	—	—	1	—	1
English Russet.....	—	—	—	—	—	—	—	—	1	—	1
Red Russet.....	—	—	—	—	1	—	—	—	—	—	1
Seek-no-further.....	—	—	1	—	—	—	—	—	—	—	1
Gloria Mundi.....	—	—	1	—	—	—	—	—	—	—	1
Sweet Baldwin.....	—	—	1	—	—	—	—	—	—	—	1
Early Pennock.....	—	1	—	—	—	—	—	—	—	—	1

PEARS.	1st.	2d.	Whole No.	PEARS.	1st.	2d.	Whole No.
Flemish Beauty.....	9	3	12	Glout Morceau.....	1	—	1
Louise Bonne de Jersey..	2	4	6	Goodale	—	1	1
Bartlett.....	5	1	6	Fulton	—	1	1
Beurre d'Anjou.....	—	5	5	Lawrence	—	1	1
Clapp's Favorite.....	3	—	3	Seckel.....	—	1	1
Nickerson.....	—	1	1				

APPENDED REMARKS.

In regard to the Baldwin, Mr. Alfred Smith of Monmouth, writes: "I have left the Baldwins out in the cold. It is too tender for Maine; will not bear high, persistent culture, save on our highest ridges. We deem it a failure in northern Maine, also near lakes and streams or on flatish land." The Roxbury Russet, Mr. Smith says, "is an annual bearer, will bear high culture in southern and central Maine, but is liable to fail in the northern parts of the State. It is a late keeper in summer, and has no competitor in the market at that season, hence will always command the highest price. The Northern Spy, Rhode Island Greening, Yellow Bellflower, and Talman's Sweet, are hardy yearly bearers."

Hon. Washington Gilbert of Bath, says: "The Rhode Island Greening and Talman's Sweet in my opinion are the standards, although it is very desirable to find a larger sweet apple of equal quality. The Roxbury Russet under *no* culture is a poor thing, but does well in certain districts under good culture, and is to be regarded in any case only as tolerated for want of something better in its season. If the Northern Spy proves satisfactory on full trial, the Russet ought to be wholly discarded with us. The Hubbardston Nonsuch I commend for extensive culture, and see no reason why it is not an excellent apple in this State for shipment to foreign markets. In some parts of Lincoln county, the Hurlbut proves an acquisition; strong and hardy in wood, an early and enormous bearer every year; fruit fair second rate. As this apple bears migration to Maine without difficulty, I see no reason why it may not do well throughout the apple growing regions of the State. My view is that the requisites for a good market variety are, vigor and hardiness of wood, early, constant and abundant bearing under good culture and *selling* qualities of fruit. It is not so much a matter of importance to the farmer whether the quality is absolutely good, as whether the apple sells well. He cannot afford to educate the taste of the people. He must adapt his wares to the demands of the market. Very few buyers know what is a first-rate apple; and if the farmer offers them an apple of the finest quality, very likely they would pay somebody else a higher price for a poorer apple, costing the producer but half as much as the apple of finer quality. If, therefore, the Hurlbut is not equal in quality to the Rhode Island Greening,

or even the Baldwin, yet if it produces twice the quantity of the Greening, as I think it does, and sells for even a quarter less by the barrel, there is still a great advantage in its culture. But there would not be that difference in price. To sum up, my advice would be 1, 2, 3 of my list. (R. I. Greening, Talman's Sweet and Hubbardston Nonesuch.) To plant Baldwins where the planter feels that he can take the risk of early death or decay, or failure in quality, and Roxbury Russets only where high culture is intended, and where its local success has been demonstrated in similar situations in the planter's neighborhood, and to experiment vigorously, but persistently with 6, 7 and 8,—(Hurlbut, King of Tompkins County and Northern Spy.”)

CULTURE OF THE GOOSEBERRY FOR MARKET.

BY L. F. ABBOTT, (*Frye, Jr.*) WILTON.

Of most people it may be said that they have their hobbies. While in many instances the idiocritical in the make up of the individual may be wholly unknown to himself, the peculiarity is perfectly apparent to his friends. This may be my case. That I have my hobby is probable; possibly it may be in the direction indicated at the head of this essay. But were I to be allowed to express an opinion it would be in the negative. It might be bees, bugs or botany, but not the gooseberry. But I believe in the gooseberry, however, as a market fruit to be raised in Maine. And notwithstanding our good brother McLaughlin of Bangor, believes that fifty bushels a year of this fruit would supply the Maine market, I still vote for the gooseberry as profitable to raise to a reasonable limit. The markets of Lewiston and Auburn are not half supplied in the season of this fruit. And what is true of those two places is true of all the larger places in the State. But we need not be confined to a home market. This fruit always has found a ready sale in Boston for the limited supply which has been sent there. I think we need not be troubled for a market for all we can raise. But are they profitable? That's the question that is to be answered; and to discuss this part of the subject and point out a method of culture that has proved successful, is the purpose of this essay.

As compared with Strawberries. I believe that taking a half acre of land and planting equal portions with gooseberries and strawberries, and keeping it thus occupied for a term of ten years,

giving each the cultivation that the plants require to realize good crops, that at the end of the ten years the balance sheet would show largely in favor of the former. In the first place much higher cultivation and consequent increased cost of production, would be required for strawberries; the market is more fluctuating, consequent upon greater competition, besides greater liability to damage from bad weather, transportation, and, at times, an overstocked market of so perishable a fruit. Besides this, the work of replanting every two or three years is an expense not incurred in the culture of the gooseberry.

The Gooseberry Worm. There is one serious drawback in the culture of the gooseberry that looks formidable to those that have taken no pains to rid their bushes of the scourge. I refer to the gooseberry worm. This is a hard customer, truly. But by having a knowledge of its habits, and attending to the plants at the right time, this obstacle is not so formidable as it at first seems.

Soil and Situation. In starting a gooseberry plantation it is quite essential that at the beginning the work be rightly done. A good, retentive, strong soil is essential, and if free from stones all the better; and I should endeavor to give the land such a depth of working before setting the plants that all after culture would be very near the surface, and that mainly to keep the ground clear from weeds. A situation where the snow is liable to blow off entirely in the winter, is worse than where it might drift somewhat. A southerly or easterly exposure should be avoided when practicable. A dry soil, a sunny exposure and a dry atmosphere, are unfavorable to the culture of this fruit.

What plants to set. In purchasing plants, or from whatever source they are obtained, it is best to procure those that were started from cuttings or young plants from layers, having good roots. Plants are quickly multiplied by layering, and with a little pains one can easily produce his own plants by procuring a few from the nursery and then bending down the ends and covering them with earth. They quickly take root, and by care one can soon raise a hundred plants with fine roots; but if half a thousand are wanted to set at once, the better—because quicker—way would be to either plant cuttings or order from some reliable nurseryman, who would furnish them, not to exceed six cents apiece, and possibly considerably less by the quantity.

Varieties. Of those I have grown I should give the preference to Houghton's Seedling, but from what I hear of Smith's Im-

proved, should give that variety a trial. If my memory serves me, Mr. Varney, at the last Winter Meeting of the Pomological Society, spoke highly in favor of that variety, as did also Mr. Fernald, although we do not find their remarks in the last report.

Setting the Plants. In setting the plants, we should take into consideration the fact that we shall need to apply dressing and mulching material in the course of time, and consequently set the plants with this object in view. My experience the last fall has convinced me that I committed an error in planting four feet apart instead of five. The trouble is not so much in the plants being crowded as from the inconvenience in passing among the vines with horse and wagon for various purposes. If the plants are set in squares of five feet, by driving the horse quite near the row an ordinary farm wagon will run clear of the rows by about a foot. Nearer than that the liability is to injure the plants by passing over them.

To facilitate the work of setting, we stretch a line about a foot from the ground for the rows; with a five foot measure and hoe, pass along and dig the holes. The plants will be tied up in bundles of fifty each; place them in a pail half filled with water, cut the band, and pass along throwing down a plant at each hole. With a garden trowel return over the row and set the plants, taking care to have the upper roots at least three inches beneath the surface. If your ground is liable to be bare of snow during the winter the action of the frost and frequent hoeings will bring the roots too near the surface if not pretty deeply set at first. Press the earth down firmly about the roots, and from their being wet, it will readily adhere to them.

Cultivation. Hoe as you do corn, at least three times during the summer—keeping the ground perfectly clear of weeds, and as often as the worms appear wet the bushes over with water in which poke root has been steeped. This is more effectual and much cheaper than to buy the powdered helebore.

Remedy for the Gooseberry Worm. Take a half-hogshead, which your groceryman will be glad to get rid of at fifty cents for a whole one—one with iron hoops is best. Place this near your bushes; then dig a bushel or two of poke root, (helebore). If you have none of your own, your neighbors will not charge you high for the privilege of digging. Wash clean and put in your tub and add a dozen pails of water. This should be done quite early, as soon as the leaves on the plants begin to put out, so as to be

ready for the worms the last of May. The flies that produce the worms make their appearance, usually, the last week in May. Their presence is readily shown by turning up the leaves, when numerous clusters of eggs will be seen upon the under sides, adhering in rows upon the ribs of the leaves. The worms hatch from these in about four days and commence eating slight holes through the leaf. As they become older the tissue of the leaf is wholly devoured before they leave it. At this stage of their growth their presence is easily detected, and a weak solution of the poke will destroy them. Much vigilance is required to keep the plants clear of these insects, as successive broods appear every month, or oftener, through the season. A garden syringe with a fine nose, costing one dollar, is wanted to apply the solution.

After Cultivation. The third year the plant will bear quite a crop of fruit, and continue increasing in productiveness indefinitely, according as the plantation is enriched and otherwise cared for. A half bushel may be picked from a single plant. To avoid any ill effects upon the fruit that might be feared from the use of the worm remedy, it is well to withhold the solution for ten days before picking, unless rain should occur before. When the plants have borne one or two crops, top-dress the ground thoroughly in the fall. As the bushes will be getting large, occasioning more inconvenience in passing among them, let the work be thorough. Use a compost of manure, leaf mold, ashes, turf, &c. Mulch at the same time with chip manure, sawdust, or anything that will keep the manure from drying up, as well as the ground cool and moist. It will also serve to keep down the weeds.

Picking the Fruit. Picking should be done while the fruit is yet green, after it has attained to full size and before it begins to turn. While in a green state the berries are hard and remain so for a long time after the fruit is gathered. But after it begins to change color it soon grows soft, and on that account is objectionable for market. So, too, premature turning of the fruit is the result of picking in hot weather and allowing the berries to lie in a mass or barreling them up without allowing them to become cooled. Hence, they should be spread out thinly as picked, or put in the cellar.

Preparing for Market. Remove the leaves and dirt by running through a fanning mill, adjusting the sieves so as to separate the smaller berries, also the coarser particles of dirt. Pick out all partially decayed and wormy fruit by hand. When ready for

market, line nice, clean flour barrels with paper, fill the barrels so there will be no empty space, head up and forward to the grocery-man with whom you have had a previous understanding to receive them. Ten to twelve cents a quart, after paying commission, may safely be reckoned on. Ten dollars a barrel, net, is less than the average price for several years past. That this fruit may bring that for some time to come I see no good reason to doubt. But could two dollars a bushel be realized, the result would be more satisfactory than investing money in wild-cat stocks, not to say anything about some so called "savings" institutions.

REPORT FROM CUMBERLAND COUNTY.

HARRISON, January 20, 1877.

Z. A. GILBERT, Esq.:

Dear Sir :—Your communication of January 1st was duly received. I am sorry I am no better prepared to furnish you full and accurate information on all the points named in your letter, as my opportunities for observation during the past season have been quite limited, especially in this county.

The apple crop in this immediate vicinity was very small in 1876. This great decrease of product from former years was caused by the depredations of the caterpillars, which for the second time ravaged indiscriminately, defoliating the trees and destroying every germ of fruit; and it is feared by some that the trees have sustained permanent injury, and will, in future, be less healthy and productive than formerly.

It is a noticeable fact that the caterpillars confine their operations mainly to the elevated localities; our hills and high ridges being badly infested by them, while orchards located in valleys and low-lying places near ponds and streams, have usually escaped serious damage. I know of some farmers, who, by persistent watching and fighting the enemy have preserved their trees from injury and secured a fair crop of fruit. There is no other cause of want of productiveness in our apple orchards for the past year, except the general lack of care and cultivation in order to promote a regular and constant growth. The instances of handsome, thrifty orchards, which in their appearance tell a good story of the energy and skill of the owner, are exceptional, though it seems that there is a waking up on this subject, and there is evident a spirit of interested inquiry into the best methods of treatment for

orchards. I learn that in some parts of this county, particularly the lower part, good crops of apples were realized the past season. The towns of Windham, Gorham, Gray, New Gloucester, and most of the towns in this county, have a soil naturally well adapted to fruit growing, and we have many earnest, progressive farmers who are endeavoring, by intelligent and sacrificing labor and investment, to solve the question of the profitableness and economy of fruit-raising.

Our supply of trees for planting comes mainly from the Western nurseries, though some of our Maine nurseries are being drawn upon for a part of the trees required for new orchards; and I believe our home-grown stock is generally found good.

I am not aware of very serious damage to apple or pear trees on account of blight. I have noticed indications of leaf blight on my pear trees, but I think it was not so bad last year as in previous years. I am testing the effects of a thorough top-dressing with coal ashes on pear, plum and cherry trees, for the purpose of promoting a healthy condition, and for protection against insect enemies, particularly the curculio.

The Baldwin apple is the principal kind raised for the general market, and is, in this section, very productive, and in elevated localities quite hardy. But in low places, where an extreme degree of cold prevails in the winter months, I think it is less hardy and apt to die out in a few years.

The Northern Spy, Hubbardston Nonsuch, Rhode Island Greening and Roxbury Russet, are being propagated more than formerly.

The improved varieties of crab apples are being planted here quite extensively, on account of their fine quality for cooking and preserving, and superior hardiness. The Transcendent Crab is very popular,—more so than any other.

The principal market for any apples raised hereabouts in 1876 was Bridgton, where they have been worth from \$1.50 to \$2.50, according to quality.

I have noticed in the towns of Waterford, Sweden and Lovell, in Oxford county, during the past autumn, some well kept orchards, and in some parts of those towns good crops of fruit were raised.

I congratulate the lovers of fruit culture on the success of the State Pomological Society in awakening a fresh interest in this favorite pursuit, and remain, with sincere regard,

Your ob't serv't,

GRANVILLE FERNALD.

REPORTS FROM LINCOLN COUNTY.

WALDOBORO', January 15, 1877.

There has been no general change in the interest manifested in fruit culture in this county for the past season. Old orchards are yearly dying out and giving place to young and thrifty trees. The crop of fruit in this county, the past season, was not an average production for the bearing years, it being about one-third less than the crop of 1874. The past winter (1875-6) was more severe and damaging to fruit trees in this vicinity than any preceding winter for the past twenty years. The sudden changes of weather, alternating between hot and cold, nearly ruined all the plum trees in this section; plum orchards producing several bushels in 1874, did not produce the same number of quarts the past season. A large number of pear and apple trees of all sizes and ages were also winter-killed. Mr. John Currier, proprietor of the Waldo-boro' Nursery, informs me that he lost hundreds of trees in his nurseries last winter. I noticed that many of the fruit trees in this vicinity looked unthrifty and sickly through the past season, and saw but few orchards that appeared healthy and vigorous; the fruit raised was smaller in size than that of previous years, caused by the unthriftiness of the trees and by the long continued drouth. Several varieties of pears were a failure in this town; the Flemish Beauty badly cracked, while the Beurre de Amalis was woody and worthless. Grapes matured much better than on previous years, and a number of native varieties ripened well in open air. Our grape vines were badly injured in early summer, when they were putting forth their leaves, by a small worm, about the size of a cambric needle, of the color of the vine, and from one-fourth to one-half inch in length. These insects devoured the leaves with alarming rapidity. We could not devise any means of destroying them, neither could we obtain any information about them. The apple-tree or tent-caterpillar and the forest-tree caterpillar appeared in immense quantities, and several orchards were nearly stripped of their foliage. The depredations of the forest-tree caterpillar continued about two weeks, in the month of June. They fed at night or in early morning, and in the middle of the day were collected together in large bunches upon the trunks of the trees, when a pail of strong soap suds would put them *hors du combat*. The apple-tree or tent-caterpillar continued to ravage the trees until harvest time.

For the encouragement of nursery and orchard culture, the Lincoln Agricultural Society have the past two years offered liberal premiums. A large number of young trees are set out yearly in this county, and until last spring a large portion of these trees were from New York, but the trees set in 1876 were mostly grown in Maine. Experience is teaching fruit growers that acclimated fruit trees are the best for Maine. We have no doubt in regard to this, as we have repeatedly tried the New York trees upon the same soil, and with equal culture with our Maine trees, and our trees are hardier, more thrifty and better bearers, and in every way superior to imported trees.

The fruit raised in this county is mostly marketed in Lincoln and Knox counties, and it does not supply the demand, as large quantities of fruit are brought here from Massachusetts and the West yearly. Apples were very cheap through the past summer and autumn, being worth from fifty cents to one dollar per bushel. The leading varieties of apples grown for market in this vicinity are as follows: Summer varieties,—Red Astrachan, Williams' Favorite, Sops of Wine, Early Harvest, Sweet Bough. Autumn varieties,—Gravenstein, High Top Sweet, Jewett's Red, Porter, Lady Hale, Fall Pippin, Winthrop Greening, Foundling. Winter varieties,—Baldwin, Hurlbut, Late Baldwin, English Russet, Rhode Island Greening, Minister, Northern Spy, French Russet, Sweet Porter, Sweet Russet, Golden Russet, Yellow Bellflower, Hubbardston Nonsuch, Canada Red.

Respectfully yours,

H. J. A. SIMMONS.

NOBLEBORO', January 25, 1877.

MR. SAWYER:

Dear Sir :—I received your letter in due time, but owing to sickness and urgent business have neglected to answer it until now.

I am a beginner in the fruit-growing business, having set my first lot of eighty trees six years ago last spring. Some of these I raised from the seeds; the remainder I bought of Mr. John Currier of Waldoboro'. With the exception of a very few which winter-killed the third winter after setting, (these being R. I. Greening and Gravenstein), they have all done well. Some of them are now more than five inches in diameter, and from which I

gathered more than two bushels of apples each. Last fall they had more or less fruit, it being the second year of their general fruiting. I have set trees at different times since, so that now I have an orchard of four hundred apple trees, all of my own raising, and grafted when one year old, excepting a part of the first lot as stated above. The most of my trees are set in grass ground. I dig around them both fall and spring, and once a year I work in manure and wash them with Babbitt's potash to kill lice and keep the trunks free from moss. I search for borers three or four times in the course of the season, and have commenced to try the use of sheathing paper, allowing the lower end to run down into the soil and the other end to extend up on the trunk about one foot and tied with rope-yarn. I tried this method last year and think very favorably of it.

I am not propagating trees very extensively, but have a nursery of about 6000 apple trees. I have had experience with over eighty different kinds, many of which I have discarded as I find them to be unreliable as orchard trees. I have travelled over a large portion of the State and taken much pains to ascertain the varieties best adapted to this section. From experience and observation I am satisfied that success in raising an orchard depends much upon the varieties selected. I have endeavored in my own practice to plant such kinds as make the best growth and the most hardy trees, regardless of the quality of the fruit. My object is to raise an orchard of hardy, thrifty trees in as short a time as possible.

I have learned by experience that there are many very choice varieties which it is almost impossible to raise from nursery trees, or at least would take double the time that it would to raise some others. These can be grafted into those which will grow more rapidly, after the latter have become large enough to bear a bushel or two of fruit. In this way one can get more fruit in less time than by undertaking to raise such varieties from nursery trees.

The question may be asked, "why not take seedling trees without being grafted and grow them to the proper size, then graft into the branches, instead of grafting them in the nursery and again in the orchard?" My answer is, that a large portion of the seedlings prove to be slow growers and not hardy, and one can raise an orchard from kinds that are known to be hardy and rapid growers in half the time and run no risk in regard to these points. There are many very valuable varieties of apples that

are hardy and rapid growers and well adapted to Maine; such as Hurlbut, N. Y. Pippin, Fameuse, Ben Davis, Talman's Sweet, Garden Sweet, Red Astrachan, &c., while there are many others, too numerous to mention, that are not adapted to our cold climate.

I have an orchard of 160 pear trees, some of which were planted eight years ago, but the most of them within two years. I have raised nearly all of them from the seeds. So far I am very much pleased with the prospect of raising pears. My trees are standards. Six years ago I set thirty dwarfs, which have proved a failure—nearly all having died, while my standards set at the same time and with the same care have fruited the last two years. I have about 1500 nursery pear trees.

My grapes did very well the past season.

In great haste, yours,

ASA F. SEVERANCE.

REPORT FROM PISCATAQUIS COUNTY.

EAST SANGERVILLE, January 16, 1877.

Z. A. GILBERT, *President of Maine State Pomological Society:*

Dear Sir:—Yours of January 1st, desiring information in regard to the conditions and progress of fruit culture in this section, (central Piscataquis), is received.

The apple crop is above an average. I estimate it 25 per cent. above.

Of pears very few are raised, more attention is being given to their production than formerly.

Of plums and cherries the field is surrendered pretty much to their enemies, the curculio and black knot.

Currants and gooseberries are nearly all ruined by the currant worm.

Of grapes nearly every family has a vine or two. The Delaware and Early Hudson are the earliest, consequently the most approved varieties.

Our orchards have not been devastated by any unusual insect depredation. The ravages of caterpillars have been less than usual.

Of young trees a small percentage were injured or killed during the winter or spring by the cleaving of the bark from the trunk near the ground. Cause, supposed to be too early starting of the sap, followed by freezing. (Please give the matter attention.)

For the increase of orcharding we have depended too largely upon Western grown trees hawked about the county by the irrepressible tree agent. The result in planting out these trees has been a general failure.

Beginners in orcharding are desirous of obtaining too many varieties. A wise course is to select a few of the most approved sorts adapted to the climate and market. The following well proved varieties are perhaps as good a selection as can be made; the trees generally proving hardy and productive, viz :

High Top Sweet, Sops of Wine, Red Astrachan, Duchess of Oldenburg, Porter, Orange Sweet, Fameuse, Nodhead, Jersey Greening, Dean, Talman's Sweet, Yellow Bellflower, Black Oxford and Rolfe; the last being a seedling originated in the county. It is being introduced into Penobscot county under the name of the *Coreless*. It is believed to be a valuable variety. [See page 9.]

In brief, my conviction is that the increase and improvement of orcharding in this section demands,—

1st. That we raise our own trees. It is generally conceded by our best informed fruit-growers that seedlings properly grown, then transplanted to the orchard, and after becoming well established and thrifty, engrafted in the branches, make the best trees.

2d. More attention must be given in selecting hardy varieties only. Those succeeding perfectly in more southerly sections of the State are quite liable to fail in Piscataquis.

3d. Better cultivation must be given. More care must be exercised in preventing breaking by cattle and drifting snows. Trees must be watched and kept free from insect depredations.

Finally, we need more light and knowledge to guide and help us overcome the obstacles in the path that leads to success in fruit culture. To the Society of which you have the honor to be the worthy President, we look for this assistance.

Yours truly,

H. L. LELAND.

REPORT FROM WALDO COUNTY.

By J. W. LANG, BROOKS.

The following imperfect notes are submitted in lieu of something better, which, had I known I was to be called upon, would have been prepared.

The season with us in Waldo county has been one of small returns from the orchard. Several causes have brought this about.

The comparatively good crop of the previous season rendered this an "off-year," and the short, sharp drouth experienced in June tended to blight the setting fruit. The crop harvested was, however, fully sufficient for home use.

Insect depredations were rather in excess of the average. The caterpillars made an onset in the opening days of spring and summer and required "eternal vigilance" to prevent their injuring orchards to a serious extent. Those who gave strict attention to their trees were rewarded by a partial crop of fruit, and in having their trees kept in a state of vigor and health which neglected ones did not retain. The codling moth and the borer are great pests in some localities, and this year have done more than average damage. Enough attention is not given to taking care of the wormy fruit and the larvæ is left to develop in almost undisturbed freedom. There is increased attention given to exterminating the borer as better knowledge of its habits is diffused.

Young trees continue to be planted out, but not so largely as formerly. They are mostly from New York nurseries. Those sold for the two past years have been largely Russian and crab varieties. If this continues, nearly every farmer will have a crab orchard soon. We cannot but disapprove of this almost wholesale planting out of crabs. They may make good trees to re-graft, but we have enough hardy stocks of larger growth and habit that are preferable.

We have a few small nurseries in this county, but the persistent New York tree agents contrive to make the largest sales. The Robertson Bros. of Monroe, have a very good nursery. There are others in the town, also at Belfast, Winterport, and other points.

I have a very good opinion of the Hurlbut apple. I procured some grafts of H. J. A. Simmons of Waldoboro'. They have been set two years. They have made a splendid growth and look thrifty and hardy, but have not yet fruited. As far as growth is concerned, I can endorse Mr. Simmons' high opinion.

The Naked Limbed Greening maintains its high character and is gaining new friends. This apple is extensively grown in Monroe and Prospect. The Rhode Island Greening does not do very well with us and appears not to be entirely hardy. The Yellow Bellflower does well—even best—upon heavy soils,—on land where the Baldwin would throw up at once.

We recommend the putting out of more Duchess of Oldenburg, and Red Astrachan, for fall use and marketing. They are ready

to use early and bring good prices. The Kilham Hill is found here in almost every orchard. It is considered a very good fruit, and profitable.

Small fruit culture is on the increase, especially strawberries and cranberries. Pears do not do well here except in a few localities. Grapes are claiming more attention than formerly.

REPORT FROM WASHINGTON COUNTY.

Mr. Z. A. GILBERT:

Dear Sir :—Your card of the first instant is at hand.

As you are aware, but few apples are grown in this county as yet, and owing to the "hard times" but few trees have been set within the past two years. Most of those few were bought of agents from New Brunswick,—not because they were preferred to home-grown trees, but because that was the easiest way to get rid of the agent.

The year 1876 would have been our apple year but for the dry weather which caused many of the young apples to fall. If the drouth shall be found to have reversed the bearing year it will have been a blessing in disguise.

The price of fruit here is, of course, ruled by the Western markets, but our apples always bring a little more than Western ones.

The tent caterpillar was more plenty here last season than in former years, but where promptly exterminated did little or no damage.

Yours truly,

H. A. SPRAGUE.

CHARLOTTE, Washington Co., January 15, 1877.

In Memoriam.

ALBERT NOYES.

DR. JAMES C. WESTON.

"Par nobile fratrum."

ALBERT NOYES of Bangor, died suddenly of disease of the heart, March 16, 1877.

He was mentioned in the act of incorporation of the Maine State Pomological Society in 1873, was a member of the Executive Committee during that year, and afterwards till the time of his death Trustee for Penobscot county. He ever manifested a deep interest in this and kindred associations, hence it is appropriate here to pass briefly in review the leading incidents of his active life.

He was born in Newburyport, Mass., Aug. 9, 1816, and was the son of John and Nancy (Garron) Noyes. When he was two years old the family removed to Salem, Mass., where he obtained his education. In 1836 they removed to Bangor, and Albert Noyes, in company with his elder brother Henry, commenced the iron and tin ware business, in which he continued until the day of his death. He was a successful and honorable manufacturer and merchant and gained the confidence and esteem of the whole community.

In 1840 he was married to Caroline Dole of Bangor, who with four sons and three daughters, survive him. In his private life, he was genial and kind, an affectionate relative and warm friend. In his public life, he was charitable, benevolent, cheerfully accepting offices in his city, in his parish and in his favorite associations which would tax his time and energies, and heartily coöoperating in every project which would tend to benefit the community.

He always had a taste for the cultivation of flowers and fruits. He early erected a rural cottage in the suburbs of the city, built a conservatory and established a nursery in his spacious grounds. Every new and rare plant, bulb, shrub, vine and tree he promptly procured and introduced to the knowledge of his fellow-citizens, and so contributed his full share to encourage a love for rural pursuits.

He was very fond of his home. To him it was the most attractive spot upon earth; and one of his most cherished recreations was to devote his leisure moments to labor in the garden, and to reading works pertaining to horticulture and agriculture.

In 1850 he was one of the pioneers in the formation of the Bangor Horticultural Society, in whose welfare he was ever interested, always contributing to make its annual exhibitions attractive and successful; and he represented this Society in the Board of Agriculture three years, from 1858 to 1861. He enlarged his premises, buying more land, and successfully engaged in agriculture, owned valuable stock and the choicest poultry; and became an active member of the State Agricultural Society and Penobscot Agricultural Society.

He was President of the Penobscot Poultry Association incorporated in 1870, and of the Maine Poultry Association incorporated in 1871. He was also a Director of the New England Poultry Society, a branch of the National Society. He served each with rare zeal and ability, and was always present at their exhibitions carrying his most valuable specimens.

Only the day before his death, he spoke with great satisfaction of the Maine Poultry Association, of what it had accomplished, of the cheering prospects of the next annual exhibition, and of the remarkable generosity of the citizens of Portland in providing liberal premiums.

This bare recapitulation of the various associations to which he belonged, sufficiently indicates what valuable services he rendered his fellow men, often without emolument or hope of reward. He was so generous and useful that he won their love and gratitude, and all feel a sense of loss in his sudden decease.

J. C. W.

DR. JAMES C. WESTON died at his home in Bangor, after a brief illness, on the 17th of May, 1877, in the 60th year of his age. He was one of the charter members of this Society, and among the first to contribute to its permanent establishment by enrolling himself as a life member. At the first election of officers he was chosen as the Corresponding Secretary, which position he filled most acceptably to the time of his death.

Dr. Weston was born in Bath, in this State, September 18th, 1817. He graduated at Dartmouth College in 1842, and from the Medical Department of the same institution in 1845. During the latter part of that year and the year 1846, he was Assistant Surgeon at the Baltimore City Hospital, and subsequently he was City Physician at Portland until 1849. From the latter date until 1853 he was Surgeon at the U. S. Marine Hospital in Portland, and during 1853 he removed to Bangor, where he ever afterwards resided.

For a number of years Dr. Weston has been retired from the more active practice of his profession, but his services were in frequent requisition as a consulting physician, and his abilities were very highly esteemed by the medical fraternity. He was a prominent member of the Maine Medical Association, and had this year been elected its Historian to prepare a history of the Society for the last quarter of a century. He had also been an Examining Surgeon for the Pension Bureau since 1863.

Dr. Weston was a man of scholarly tastes and of varied and extensive learning, and took an active part in all movements for the promotion of mental, moral and social culture. In 1870 and 1871 he travelled extensively in Europe, visiting all the celebrated art galleries and making careful notes of his observations, which formed the basis of a course of lectures which he recently delivered before the Bangor Art Association, of which he was Vice President. He was no less fond of music than of art, and was one of the founders, and at the time of his death, President of the Bangor Handel Association. His style in writing and speaking was easy, fluent and graceful,—though varied as the themes to which he devoted his attention. In the ornate word-painting of the art critic, the concise terms of scientific demonstration, the faithful narrative of the historian, and the straightforward language of common sense as applied to practical farming and the affairs of every day life, he was equally at home, and his words were always well chosen and his ideas clearly expressed. He was

refined, affable and beloved in all the social relations ; quiet and modest in his intercourse ; industrious, persevering and thorough in every undertaking ; decided in his convictions, and faithful to his trusts in all the public duties of citizenship. He was twice married, and leaves a wife and two young children, daughters, by his second marriage.

The life of Dr. Weston was in the highest and best sense a success. His work was *well done*. By the traits of character and the works of beneficence above imperfectly delineated, he endeared himself to every community where he was known, and made a friend of every person with whom he was associated. But, marked as was his success in these things, happy as were his surroundings and brilliant as were his accomplishments, his most enduring fame, and his highest claim to the gratitude of the public and of posterity, rests upon his efforts in behalf of the agricultural, horticultural and industrial interests and institutions of the State. During his residence in Portland he was an active member of the Portland Horticultural Society, and at a supper given by that Society to the State Pomological Society, on the occasion of our exhibition in that city in 1874, he remarked that whatever success he had attained as a fruit culturist, was due to the interest awakened by the Portland Society during his residence there.

Upon his removal to Bangor he became connected with the Bangor Horticultural Society, of which he continued to be an efficient and useful member to the time of his death. He was also a member of the State and County Agricultural Societies.

During the years 1862, '63 and '64, he was a member of the State Board of Agriculture, and took an active part in its proceedings. The nature of the subjects presented for the consideration of the Board during those years—resulting partly from the condition of public affairs and partly from extrinsic causes,—as well as the current of thought upon agricultural and industrial topics within the State, gave great importance to its proceedings; and as a member, and during most of the time chairman of the business committee, Dr. Weston had great influence in directing their course.

Prominent among the subjects claiming the attention of the Board, as well as of the Legislature and the public, at that period, were the establishment of the State Agricultural College, involving the more general question of agricultural and industrial education among the people; the relations of capital and labor, and of man-

ufactures to agriculture; and the unusual demands upon the farmers of Maine growing out of the then present condition and prospects of the country. On each of these, as well as upon some of the more usual subjects of agricultural discussion, Dr. Weston presented able and exhaustive reports, and it is worthy of note that in a Board composed of men of marked ability and great practical wisdom and holding its meetings (at that time) concurrently with the sessions of the Legislature, the specific recommendations in his reports were in every instance unanimously adopted. A more particular reference to some of these papers would best illustrate the breadth of his views, his accurate knowledge of the resources of the State, his clear comprehension of its wants and his faith in its future development; but the unavoidable length of this notice will admit of but a single extract for that purpose:

* * * "The errors of the past are irremediable. The present and future can only be moulded by our influence. * * * * As we look through the long perspective aisles of the future, we catch a glimpse of a coming golden age; when every branch of natural science, every art, every weapon of obsolete warfare, shall contribute to bring the art of agriculture to perfection; when our vast area shall become one great, fertile garden, teeming with busy manufacturing villages and cities, and our keels shall plough every sea, transporting our surplus materials, enhanced in value by the cunning fingers of our artisans, and exchanging them for the products of the more favored climes. It is now in our power to hasten a consummation so devoutly to be wished, by promoting scientific education and diffusing intelligence, so that Maine, in accordance with her proud motto, shall take the lead in the onward career of progress and improvement."

Dr. Weston was also an occasional contributor of interesting articles to the agricultural and horticultural journals.

In 1872, when the "foot and mouth disease" among cattle, created serious alarm throughout the country, Dr. Weston was appointed by the Governor, under the special statute of that year, as one of the "Commissioners on Contagious Diseases among Cattle." His associates on this commission were the Hon. S. L. Goodale and the Hon. Joseph Percival. The action of the Commissioners was prompt and decisive, and happily the necessity which called for their appointment was of short duration.

Dr. Weston's memory will be especially cherished by the members of the Maine State Pomological Society. He took an active part in its establishment and the development of its work. He was ever ready to undertake the most difficult labors, and brought to their performance the same zeal and fidelity which distinguished all his undertakings. At the annual exhibitions he was almost invariably selected as chairman of some of the most important committees, and his awards were always judicious, discriminating and satisfactory. At each Winter Meeting he presented interesting papers, always attending in person when it was possible for him to do so. By the amendment of the By-Laws in 1874, it became his duty as Corresponding Secretary, to present "an annual report embracing a review of the proceedings of other and similar societies, with such extracts from their proceedings as he should deem to be of special interest," and he performed this duty with rare ability, making judicious selections and appropriate comments.

His interest in the Society, and his faith in its efficiency, were ever increasing, as his efforts in its behalf were self-sacrificing and continuous.

But a few days before his last illness, Dr. Weston prepared and forwarded to the writer of this, the tribute to the memory of his friend Mr. Noyes, which precedes this notice. That and the revision of the proofs of the valuable paper on "Lawns and Landscape Gardening," published in connection with his annual report in this volume, were among the last labors of his life. No words could more fitly describe his own rural tastes, his interest in horticultural pursuits and general agriculture, his attachment to his own beautiful home and his fidelity to every public trust, than those in which he speaks of his lamented friend.

The decease, almost simultaneously, of two of our original and prominent members, resident of the same city and so much alike in the characteristics above alluded to, is an event of sad and peculiar interest to this Society.

Shortly before his last sickness, Dr. Weston had made arrangements for the preparation of a view and plan of his residence and grounds, designed for publication in this volume, in accordance with the vote of the Society at the last Winter Meeting, and was only waiting that the artist might catch in his perspective view the opening foliage of early spring upon the trees, and for warmer and pleasanter weather to enable him to make the necessary meas-

urements for the ground plan, when his labors were arrested by the attack of the insiduous disease which proved fatal.* To him the brighter and pleasanter days of the opening summer came not. It was his to bid farewell to the opening buds of springtime, to take a last fond look at the structures and grounds which his skill had designed and beautified—the flowers and vines and trees which his hands had planted and trained with loving care. He rests from his labors, in the fruition of a well spent life and a sustaining hope.

The members of this Society, and especially those who were more intimately associated with him in the labors to which he was so enthusiastically devoted, desire to place on record their high appreciation of his character and services, and their heartfelt sympathy with his afflicted family.

* The plan was afterwards finished by Mrs. Weston, with artistic skill, and with strict fidelity to her husband's original intention.

DESCRIPTIVE CATALOGUE
OF THE
LEADING FRUITS OF THE STATE OF MAINE,
ADOPTED BY THE MAINE STATE POMOLOGICAL SOCIETY AS A GUIDE TO PLANTERS.

Plan of the Catalogue.

The names of varieties are given according to the nomenclature adopted by the Society, which is substantially that of "Downing's Fruits and Fruit Trees of America." A few leading synonyms are given, and these are placed in italics immediately under the name adopted by the Society.

In respect to apples the State is divided into three divisions, designated as the Northern, Central and Southern Divisions.

The northern division embraces northern Oxford, Franklin, Somerset, Piscataquis, Penobscot and Aroostook counties.

The central division embraces the remainder of Oxford, and Androscoggin, Kennebec, Waldo, Hancock and Washington counties.

The southern division embraces Cumberland, Sagadahoc, Lincoln, Knox and York counties.

The explanation of the abbreviations and signs used in the several tabular columns is prefixed to the list of varieties in each of the respective classes of fruits.

The list of apples embraces many varieties not recommended, but by no means all that are grown in the State. The lists of other fruits embrace only such as are recommended to some extent.

Cultivators are requested to note carefully any errors which may be found in the catalogue, or any well founded opinions derived from their observation and experience differing from the conclusions therein indicated, in order to report the same at future meetings of the Society, with the view to make the catalogue as nearly perfect as possible.

II — APPLES.

EXPLANATION OF ABBREVIATIONS AND SIGNS.

In the column of "Size" l. stands for large; m. for medium; s. for small; l. m. for large medium, and s. m. for small medium. In the column of "Quality" b. signifies best; v. g. very good; g. good, and p. poor. In the column of "Use" C. stands for cooking; F. family use—cooking, baking, &c.; D. desert, and M. market. In the column of "Season" S. signifies summer; E. A. early autumn; A. autumn; L. A. late autumn; E. W. early winter; W. winter, and Sp. spring; In the column devoted to the several

Number.	NAMES.	Size.	Quality.	Use.	Season.	Northern Division.
1	Alexander.....	l.	p.	C.	A.	h. r.
2	American Summer Pearmain.....	m.	b.	D.	E. A.	-
3	American Golden Russet..... <i>Golden Russet.</i>	s.	b.	D.	E. A.	-
4	American Golden Pippin.....	m.	v. g.	-	W.	-
5	Baldwin.....	m.	g.	M.	W.	†
6	Beauty of Kent.....	l.	p.	M.	W.	-
7	Benoni.....	m.	v. g.	D.	E. A.	r.
8	Black Oxford.....	s.	g.	-	L. W.	r.
9	Blue Pearmain.....	l.	v. g.	M.	E. W.	-
10	Brigg's Auburn.....	l.	v. g.	D.	A.	-
11	Canada Reinette	l.	v. g.	M.	W.	h. r.
12	Cole's Quince.....	l.	b.	D.	S.	h. r.
13	Congress.....	l.	g.	M.	A.	-
14	Danvers Winter Sweet.....	m.	g.	F.	L. W.	-
15	Dean	m.	b.	D.	A.	h. r.
	<i>Nine Ounce.</i>					
16	Duchess of Oldenburg	l.	g.	C.	A.	h. r.
	<i>New Brunswicker.</i>	-	-	-	-	-
17	Early Harvest	m.	v. g.	D. C.	S.	-
18	Early Strawberry.....	s.	v. g.	D.	S.	-
19	Early Pennoch.....	m.	b.	D.	A.	-
20	English Sweet	m.	v. g.	M.	E. W.	r.
	<i>Ramsdell's Red Sweet.</i>					
21	Esopus Spitzenburg.....	m.	v. g.	M.	W.	†

I—APPLES, *Continued.*

divisions, h. r. signifies highly recommended; r. recommended; † not recommended; ? introduced but not fully and extensively tested; blank, nothing reliable known of the variety in the division under which such blank is found. The letters *Am.* in the column of Remarks indicate that the variety to which they are affixed is included in the Amateur List (pages 62-4.)

It should be borne in mind that any recommendation is for the special use designated in the column of "Use."

Number.	Central Division.	Southern Division.	REMARKS.
1	†	†	Hardy, productive, and showy. Succeeds well in high latitudes.
2	—	—	Not extensively grown. Limited trial proves well. In Kennebec reported a good bearer. <i>Am.</i>
3	r.	r.	Excellent dessert apple. Prolific. Several varieties are erroneously grown under this name.
4	—	?	An old variety. Never extensively tried in this State.
5	h. r.	h. r.	Tender—should be planted on high land.
6	?	?	
7	r.	r.	Highly recommended by many.
8	†	†	Hardy and productive—inclined to overbear. Not good for cooking, hence not popular in market.
9	r.	r.	Reported by some to succeed well in Northern Division.
10	r.	—	A native of Androscoggin county. Popular wherever tried.
11	—	—	Hardy. Succeeds well where tried in Aroostook county.
12	r.	r.	
13	r.	—	
14	†	†	A late keeping sweet apple—not very popular. Has been generally superseded by other varieties.
15	r.	?	A popular apple wherever known. Productive. <i>Am.</i>
16	r.	?	Hardy in Northern Division. For extreme north cannot be too highly commended.
—	—	—	Claimed by some to be a distinct variety—a seedling of Duchess of Oldenburg.
17	r.	r.	Under good cultivation one of the most desirable early apples. Quite tart unless fully ripe. <i>Am.</i>
18	r.	r.	
19	h. r.	—	One of the most popular in market where known, as a dessert apple. Good bearer.
27	?	—	Popular in some sections. Not extensively tested in Maine. Recommended by those who have tried it.
21	†	†	Excellent, but not productive enough to be recommended. Extensively tried, yet not popular when profit is the test.

CATALOGUE OF

Number.	NAMES.	Size.	Quality.	Use.	Season.	Northern Division.
22	English Russet.....	m.	g.	M.	W.	r.
23	English Russet..... <i>Poughkeepsie Russet.</i>	s.	v. g.	M.	Sp.	-
24	Fameuse .. .	s.	v. g.	D.	E. W.	h. r.
25	Fall Harvey..... <i>Harvey.</i>	l.	g.	M.	L. A.	r.
26	Fall Pippin .. .	l.	v. g.	M.	E. W.	r.
27	Fall Jenneting.....	l.	v. g.	M.	A.	-
28	Foundling .. .	m.	g.	D.	A.	-
29	Franklin Sweet.....	l.	b.	F.	A.	-
30	Garden Royal.....	s.	b.	D.	A.	-
31	Gloria Mundi.....	l.	v. g.	D. M.	A.	-
32	Golden Ball .. .	l.	g.	C. M.	E. W.	†
33	Gravenstein .. .	l. m.	v. g.	C. M.	A.	h. r.
34	Granite Beauty .. .	l.	v. g.	M.	W.	-
35	Hightop Sweet .. .	s.	v. g.	F.	A.	r.
36	Hoyt Sweet.....	m.	b.	F.	W.	-
37	Hubbardston Nonsuch .. .	l. m.	b.	F. M.	E. W.	h. r.
38	Hurlbut.....	m.	v. g.	M.	W.	-
39	Jewett's Fine Red..... <i>Northhead.</i>	s. m.	b.	D.	L. A.	r.
40	Jefferis .. .	m.	v. g.	D.	A.	-
41	Jonathan .. .	m.	v. g.	D.	W.	-
42	Kilham Hill.....	m.	g.	M.	W.	-
43	King of Tompkins County.....	l.	b.	M.	W.	?
44	King Sweeting .. .	m.	b.	F.	S.	h. r.
45	Large Yellow Bough..... <i>Sweet Bough.</i>	l.	g.	M.	S.	-
46	Loudon Pippin.....	l.	g.	M.	W.	?
47	Maiden's Blush .. .	m.	g.	M.	A.	-
48	Minister.....	m.	v. g.	D. M.	W.	-
49	Milding.....	l.	v. g.	M.	W.	-

APPLES—Continued.

Number.	Central Division.	Southern Division.	REMARKS.
22	r.	r.	This is not the English Russet of the books. Good grower—productive. Quality hardly “good.”
23	r.	r.	A valuable late keeper. Not so large as Roxbury Russet, but succeeds on soils where that fails.
24	r.	r.	Very hardy.
25	r.	r.	Supposed to be identical with Harvey. A fine fruit. Succeeds well in Northern Oxford and in Franklin.
26	—	?	
27	?	—	Quite extensively introduced with early importations of New York nursery stock.
28	?	?	
29	r.	r.	An excellent sweet apple for family use.
30	r.	r.	Can hardly be recommended for general cultivation. Too small for market.
31	h. r.	—	Not that of the books. Extensively grown in the central part of the State, and wherever grown is a popular apple.
32	†	r.	Two or more varieties are grown in the State under this name. The one here described is the true Golden Ball of Downing. An early and annual bearer; tree vigorous and hardy. The description in the first catalogue was erroneous.
33	h. r.	h. r.	Reported a shy bearer in Piscataquis. <i>Am.</i>
34	?	?	Not extensively introduced. Promises well.
35	h. r.	h. r.	
36	?	?	An excellent winter sweet apple. <i>Am.</i>
37	h. r.	h. r.	<i>Am.</i>
38	r.	r.	
39	r.	r.	Under high cultivation profitable—otherwise fruit imperfect. Best known in this State by the synonym. <i>Am.</i>
40	—	?	Not extensively grown in this State.
41	—	?	Excellent dessert apple. Not much grown in this State.
42	†	†	Not generally popular, but regarded favorably in Waldo.
43	?	?	Is not fully proved. With many does not prove desirable.
44	h. r.	h. r.	Origin, Sidney, Maine. Valuable for family use. <i>Am.</i>
45	r.	r.	Valuable chiefly because so early. When fully ripe quality “very good.”
46	—	—	
47	†	—	A very handsome apple.
48	r.	r.	An early, great and continuous bearer.
49	?	—	A new variety from New Hampshire. Promises we

CATALOGUE OF

Number.	NAMES.	Size.	Quality.	Use.	Season.	Northern Division.
50	Moses Wood.....	m.	v. g.	C. D.	S. & A.	-
51	Mother	m.	b.	D.	E. W.	-
52	Mountain Sweet.....	m.	g.	M.	W.	-
53	Naked-limbed Greening.....	m.	g.	M.	W.	h. r.
54	Northern Spy.....	l.	b.	M. D.	W.	r.
55	Orange Sweet.....	m.	v. g.	M.	A.	r.
56	Peck's Pleasant.....	m.	v. g.	D.	W.	-
57	Pomme Royale.....	m.	b.	D.	A.	-
58	Porter.....	m.	v. g.	M.	A.	r.
59	President.....	l.	g.	M.	A.	-
60	Primate.....	m.	b.	D.	S.	-
61	Pumpkin Sweet.....	l.	b.	F.	L. A.	r.
62	Rambo.....	m.	v. g.	M.	W.	-
63	Red Astrachan.....	m.	v. g.	F. M.	S.	h. r.
64	Red Canada	m.	v. g.	D.	W.	†
	<i>Old Nonsuch.</i>					
65	Ribston Pippin.....	m.	v. g.	D. M.	W.	-
66	Rhode Island Greening.....	l.	b.	M.	W.	†
67	Rolfe	l.	g.	M.	W.	r.
	<i>Macomber.</i>					
68	Roxbury Russet.....	m.	g.	M.	Sp.	†
69	Sarah	l.	g.	C.	A.	r.
70	Sops of Wine.....	m.	g.	M.	S.	r.
	<i>Bell's Early.</i>					
71	Somerset	l.	b.	D. M.	A.	h. r.
72	Starkey.....	m.	b.	D. M.	L. A.	-
73	Superb Sweet.....	m.	b.	D. M.	A.	-
74	Sweet Russet	l.	v. g.	F. M.	E. W.	-

APPLES—Continued.

Number.	Central Division.	Southern Division.	REMARKS.
50	r.	r.	
51	r.	r.	A choice dessert apple. Tree considered a little tender, though Cole calls it perfectly hardy. <i>Am.</i>
52	r.	—	A new variety. Origin, Greene, Me. Promising.
53	h. r.	—	Grown extensively in Waldo county.
54	h. r.	h. r.	Slow to come into bearing, but when it does, under high cultivation, proves desirable. <i>Am.</i>
55	r.	—	Highly recommended by many.
56	?	?	<i>Am.</i>
57	?	—	<i>Am.</i>
58	h. r.	h. r.	<i>Am.</i>
59	r.	r.	
60	r.	r.	Strong grower and abundant bearer. <i>Am.</i>
61	h. r.	h. r.	Good for baking,—very sweet. Also good market apple. Succeeds well in portions of Northern Division.
62	?	?	Popular in the West. Not fully proved here.
63	h. r.	h. r.	Popular everywhere. Quite tart unless fully ripe.
64	†	r.	Not as profitable as many other newer varieties. <i>Am.</i>
65	†	†	Not universally profitable. In some localities proves a good bearer.
66	h. r.	h. r.	
67	—	—	Native of Abbott, Piscataquis county. Desirable in that locality and promising elsewhere.
68	r.	r.	Cannot be generally recommended for all localities. On soils adapted to it, proves one of the most profitable. On other soils it is a very poor bearer. Needs high cultivation.
69	—	—	Native of Wilton. Great bearer.
70	r.	r.	Extensively grown and best known by the synonym. Hardy, productive and profitable.
71	h. r.	h. r.	Native of Mercer. Showy. Fruit every way valuable. Said by some to drop badly.
72	h. r.	?	Native of Vassalboro', where it is extensively grown, and called one of the most profitable. Quality among the best. <i>Am.</i>
73	r.	—	An excellent apple, though not extensively grown.
74	?	?	There are many kinds grown under this name, with nothing to recommend them but their late keeping and their exceeding sweetness. This variety is large and has much to recommend it as an early winter sweet apple. Good for baking.

CATALOGUE OF

Number.	NAMES.	Size.	Quality.	Use.	Season.	Northern Division.
75	Swaar	l.	v. g.	M.	W.	?
76	Summer Sweet Paradise.....	l.	v. g.	F. M.	E. A.	-
77	Talman's Sweet	m.	v. g.	F. M.	W.	h. r.
78	Tetofsky	s.	b.	D.	S.	h. r.
79	Thompson.....	m.	v. g.	M.	E. A.	†
80	Twenty Ounce	l.	p.	C.	L. A.	†
	<i>Cayuga Red Streak.</i>					
81	Wagener	l. m.	v. g.	M.	W.	-
82	Williams' Favorite	l.	g.	M.	S.	r.
83	Winthrop Greening.....	l.	b.	F. M.	A.	-
84	Yellow Bellflower.....	m.	b.	D. M.	W.	h. r.
85	Yellow Newtown Pippin.....	m.	b.	D.	W.	-
	<i>Albemarle Pippin.</i>					

APPLES—*Concluded.*

Number.	Central Division.	Southern Division.	REMARKS.
75	?	?	
76	?	-	An old variety. A desirable early sweet apple. Not widely grown.
77	h. r.	h. r.	More extensively grown than any other winter sweet apple. Tree hardy, prolific. <i>Am.</i>
78	r.	r.	Tree hardy everywhere.
79	†	†	A good fruit. Tree not a free grower nor abundant bearer, and for these reasons cannot be recommended.
80	†	†	Large, coarse, acid, not rich.
81	?	r.	Late keeper. Skin thin and tough. Flesh crisp, aromatic.
82	h. r.	h. r.	Succeeds well in portions of Northern Division.
83	r.	r.	One of our best native varieties. Desirable in many respects. <i>Am.</i>
84	r.	r.	Hardy, giving good satisfaction in many localities. On favorable soils an abundant bearer, when it is crisp, juicy and rich. When not well grown, quality as inferior as its size.
85	?	?	Not extensively grown. In some instances proving well.

III—PEARS.

The columns explain as follows: "Size"—s., small; m., medium; l., large. "Form"—p., pyriform; ob. p., obtuse pyriform; ob. o. p., oblong obtuse pyriform; r., roundish; r. ob., roundish obtuse. "Color"—y. g., yellowish green; y. g. r., yellowish green with red cheek; y. r., yellow russet; y., yellow. "Quality"—g. good; v. g., very good; b., best. "Use"—F., family; F. M., family and market; M., market; K., kitchen. "Season"—S., summer; A., autumn; E. A., early autumn; L. A., late autumn; W., winter. The letter q affixed to the name of a variety indicates that it is adapted to be grown on the quince stock.

Number.	NAMES.	Size.	Form.	Color.	Quality.	Use.	Season.
1	Bartlett.....	l.	ob. o. p.	y.	v. g.	F. M.	E. A.
2	Belle Lucrative, q.	m.	r. o. p.	y. g.	b.	F.	E. A.
3	Beurre Bosq.	l.	p.	y. r.	b.	F. M.	L. A.
4	Beurre Clairgeau.	l.	p.	y. r.	g.	M.	L. A.
5	Beurre d'Anjou, q.	l.	ob. p.	y. g. r.	b.	F. M.	L. A.
6	Beurre Diel, q.	l.	r. ob. p.	y. r.	v. g.	F. M.	L. A.
7	Beurre Giffard, q.	m.	p.	y. g.	v. g.	F. M.	S.
8	Beurre Superfin, q.	m.	r. p.	y. r.	v. g.	F.	A.
9	Beurre Hardy, q.	l.	ob. p.	y. g.	g.	F. M.	A.
10	Clapp's Favorite, q.	l.	ob. o. p.	y. g. r.	v. g.	F. M.	E. A.
11	Dearborn's Seedling.	s.	r. p.	y.	v. g.	F. M.	E. A.
12	Doyenne d'Ete.	s.	r. o. p.	y. g. r.	v. g.	F.	S.
13	Duchess d'Angouleme, q.	l.	ob. o. p.	y.	v. g.	F. M.	L. A.
14	Eastern Belle.	m.	r. o. p.	y.	b.	F.	A.
15	Fulton.	s.	r. ob.	y. r.	b.	F. M.	A.
16	Gloot Morceau, q.	l.	ob. p.	y.	g.	—	L. A.
17	Goodale.	l.	ob. o. p.	y. g.	v. g.	F. M.	A.
18	Howell, q.	l.	r. p.	y. g.	v. g.	F. M.	A.
19	Lawrence.	m.	r. o. p.	y. g. r.	v. g.	F.	W.
20	Louise Bonne de Jersey, q.	l.	ob. p.	y. g.	v. g.	F. M.	A.
21	Manning's Elizabeth.	s.	ob. p.	y. r.	v. g.	F.	S.
22	Rostiezer.	s.	p.	y. g. r.	b.	F.	E. A.
23	Sheldon.	m.	r.	y. r.	v. g.	F. M.	A.
24	Urbaniste, q.	m.	p.	y. g.	v. g.	F. M.	L. A.
25	Vicar of Winkfield, q.	l.	p.	y. g.	g.	K. M.	W.
26	Winter Nelis.	s.	ob. p.	y. r.	b.	F.	W.

REMARKS ON THE LIST OF PEARS.

Nos. 10, 11, 14, 15, 17, 18, 19 and 23, are of American origin; the others foreign. Nos. 14, 15 and 17 are native of Maine.

No. 1—*Bartlett*. Tree somewhat tender, and hence liable to injury from sudden changes of temperature in winter.

No. 2—*Belle Lucrative*. One of the best at its season as a single variety for home use.

No. 3—*Beurre Bosq.* Tree vigorous and a regular bearer. Fruit generally perfect and of uniform size and high color.

No. 4—*Beurre Clairgeau*. Succeeds best on light, warm soils. Forms a fine, thrifty tree, and bears early. Valuable for market.

No. 5—*Beurre d' Anjou*. In some localities bears lightly,—otherwise nearly faultless, both in tree and fruit.

No. 6—*Beurre Diel*. First rate in every respect in favorable situations; but on young trees and in cold soils the fruit is apt to be coarse and astringent.

No. 7—*Beurre Giffard*. Tree of moderate growth, spreading, slender. Like all early pears, this should be gathered before fully ripe, otherwise it is liable to lack quality and decay at the core.

No. 8—*Beurre Superfin*. Trees very healthy—inclined to be thorny. Not an early bearer.

No. 9—*Beurre Hardy*. Trees remarkably vigorous.

No. 10—*Clapp's Favorite*. Fruit showy and attractive. Tree a vigorous grower. Very popular.

No. 11—*Dearborn's Seedling*. Regular and abundant bearer. Fruit sweet and sprightly in flavor.

No. 12—*Doyenne d' Ele*. Must be gathered before fully ripe.

No. 13—*Duchess d' Angouleme*. Gives its best fruit on quince stock, with garden culture.

No. 14—*Eastern Belle*. Native of Bangor. Promising.

No. 15—*Fulton*. Should be grafted into vigorous trees.

No. 16—*Glout Morceau*. Tree of spreading habit. Unreliable in heavy soils.

No. 17—*Goodale*. Very vigorous and productive; fruit having a short stem, is liable to blow off.

No. 18—*Howell*. Tree hardy, and an upright and free grower.

No. 19—*Lawrence*. Succeeds in more sandy soils than most pears.

No. 20—*Lousie Bonne de Jersey*. As No. 13.

No. 21—*Manning's Elizabeth*. A beautiful dessert fruit; desirable for amateurs; very productive; growth moderate.

No. 22—*Rostiezer*. Tree vigorous, but of irregular and straggly growth.

No. 23—*Sheldon*. Tree vigorous, hardy and a good bearer.

No. 24—*Urbaniste*. Of slow growth on quince, but when grown is one of the best in quality, and most permanent and productive.

No. 25—*Vicar of Winkfield*. The best cooking pear. When of large size, by suitable thinning, and ripened yellow, is good for eating.

No. 26—*Winter Nelis*. Should be grafted into vigorous trees.

III—QUINCES.

Angers. Fruit very large, oblate pyriform, yellowish, tender. This variety is grown and known chiefly as a stock for dwarf pears.

Apple or Orange. Fruit large, roundish, yellowish green, half tender. Valuable for home use or in market, for preserves, &c.

IV—PLUMS.

ABBREVIATIONS: "Size"—l., large; m., medium; s., small. "Form"—r., roundish; o., oval; r. o., roundish oval; o. ob., oval obovate. "Color"—p., purplish or very dark; r., reddish or copper color; y., yellow; g. y., greenish yellow; y. r., yellowish with shades or spots of red. "Quality"—g., good; v. g., very good; b., best. "Use"—F., Family; M., market. "Season"—E., early; M., medium; L., late.

Number.	NAMES.	Size.	Form.	Color.	Quality.	Use.	Season.
1	Bavay's Green Gage..... <i>Reine Claude de Bavay</i>	l.	r.	g. y.	b.	F.	L.
2	Bleeker's Gage.....	m.	r. o.	y.	v. g.	F. M.	M.
3	Bradshaw.....	l.	o. ob.	r. p.	g.	M.	M.
4	Coe's Golden Drop	l.	o.	y. r.	v. g.	F. M.	L.
5	Coe's Late Red	m.	r.	p.	v. g.	F. M.	L.
6	Columbia.....	l.	r.	p.	g.	M.	M.
7	Damson.....	s.	o.	p.	g.	M.	L.
8	Duane's Purple.....	l.	o.	r. p.	g.	F. M.	E.
9	Green Gage.....	s.	r.	g. y.	b.	F.	M.
10	Huling's Superb.....	l.	r. o.	g. y.	g.	F. M.	M.
11	Imperial Gage.....	l.	o.	g. y.	b.	F. M.	M.
12	Jefferson.....	l.	o.	y. r.	b.	F. M.	M.
13	Lombard.....	m.	r. o.	r. p.	g.	M.	M.
14	McLaughlin.....	l.	r.	y. r.	b.	F. M.	M.
15	Purple Gage	m.	r.	p.	v. g.	F. M.	M.
16	Smith's Orleans.....	l.	o.	r. p.	v. g.	F. M.	M.
17	Washington.....	l.	r. o.	g. y.	v. g.	F. M.	E.
18	Yellow Egg.....	l.	o.	y.	g.	F. M.	M.
	<i>White Magnum Bonum</i>						

V—CHERRIES.

ABBREVIATIONS: "Size"—l., large; m., medium; s., small. "Form"—ob. h., obtuse heart shape; r. ob. h., roundish obtuse heart shape; r. h., roundish heart shape; r., roundish or round. "Color"—l. r., lively bright red; d. r., red, almost black; a. m., amber mottled with red; y. r., yellow ground shaded with red. "Class"—H., Hearts, or tender fleshed sweet cherries; B., Bigarreau, or firm fleshed; D., Dukes, having a character in tree and fruit midway between the Hearts and Morellos; M., Morellos, having acid fruit, and the trees of small, slender growth. "Use"—F., family, for dessert; F. M., family or market; K. M., cooking or market; M., market. "Season"—E. early; M., medium; L., late.

Number.	NAMES.	Size.	Form.	Color.	Class.	Use.	Season.
1	Belle de Choisy.....	m.	r.	a. m.	D.	F.	E. M.
2	Belle Magnifique	l.	r. h.	l. r.	D.	K. M.	L.
3	Black Heart.....	l.	r. h.	d. r.	H.	F. M.	M.
4	Black Tartarian	l.	r. h.	d. r.	H.	F. M.	M.
5	Coe's Transparent.....	m.	r.	a. m.	H.	F.	M.
6	Early Purple Guigne.....	m.	r. h.	d. r.	H.	F. M.	E.
7	Early Richmond.....	s.	r.	l. r.	M.	K. M.	E.
8	Elton.....	l.	r. h.	y. r.	B.	F. M.	M.
9	Governor Wood.....	l	r. h.	y. r.	H.	F. M.	M.
10	Late Duke.....	l.	ob. h.	d. r.	D.	K. M.	L.
11	Louis Phillippe.....	l.	r.	d. r.	D.	K. M.	L.
12	May Duke.....	l.	r. ob. h.	d. r.	D.	K. M.	E.
13	Morello.....	l.	r. h.	d. r.	M.	K. M.	L.
14	Napoleon	l.	r. ob. h.	y. r.	B.	F. M.	M.
15	Reine Hortense	l.	r.	l. r.	D.	F. M.	L.

VII—NATIVE GRAPES.

ABBREVIATIONS: "Size"—with reference to the berry, l., large; m., medium; s., small. "Form"—with reference to bunch and berry, s. r., short bunch, round berry; l. r., large and round; m. r. o., medium bunch, roundish oval berry; m. r., medium bunch, round berry. "Color" (when fully ripe)—b., black, or nearly so; r., reddish; g., greenish white or yellowish. "Quality"—p., poor; g., good; v. g., very good; b. best. "Use"—T., Table; M., market; W., wine.

Number.	NAMES.	Size.	Form.	Color.	Quality.	Use.	Season.
1	Allen's Hybrid	l.	l. r.	g.	v. g.	T. M.	M.
2	Adirondac	m.	m. r.	b.	v. g.	T.	E.
3	Agawam..... Rogers' No. 15.	l.	s. r. o.	r.	v. g.	—	M.
4	Black Hawk.....	m.	m. r.	b.	v. g.	—	M.
5	Clinton	s.	m. r.	b.	p.	T. W.	L.
6	Concord.....	l.	l. r.	b.	g.	T. M. W.	M.
7	Creveling.....	m.	m. r. o.	b.	v. g.	T.	E.
8	Delaware	s.	s. r.	r.	b.	T. M. W.	E.
9	Diana.....	m.	s. r. o.	r.	v. g.	T. M.	L.
10	Eumelan.....	m.	r.	b.	g.	T.	M.
11	Hartford Prolific	l.	m. r. o.	b.	g.	M.	E.
12	Iona	m.	m. r. o.	r.	b.	T. M. W.	L.
13	Isabella.....	l.	m. r. o.	b.	g.	T. M.	L.
14	Israella	m.	s. r. o.	b.	p.	T.	M.
15	Lindley	m.	m. r. o.	r.	v. g.	T.	M.
	Rogers' No. 9.						
16	Merrimack..... Rogers' No. 19.	l.	s. r.	b.	v. g.	M.	M.
17	Miles	s.	m. r.	b.	g.	T.	E.
18	Rebecca	m.	s. r.	g.	v. g.	T.	M.
19	Salem..... Rogers' No. 22.	l.	r.	p.	g.	M.	M.
20	Telegraph	l.	m. r. o.	b.	v. g.	T. M.	E.
	Christine.						
21	Wilder	l.	l. r.	b.	v. g.	T. M.	M.
	Rogers' No. 4.						

REMARKS ON THE LIST OF GRAPES.

No. 1—*Allen's Hybrid*. A luxuriant grower and abundant bearer, and when well ripened one of the most delicious varieties of the Sweetwater class; but rather too late to be recommended for general culture in this State.

No. 2—*Adirondac*. A feeble grower while young. Fruit free from pulp, and of fine flavor. Needs further trial. Not uniformly reliable thus far.

No. 3—*Agawam*. Very handsome, and a good keeping variety. Flavor rich, spicy and good.

No. 4—*Black Hawk*. A seedling of the Concord. Vine hardy and vigorous. Bunches compact, shouldered. Fruit juicy and sweet.

No. 5—*Clinton*. Fruit small, late and harsh. Valuable only for wine. Vine hardy. Not recommended.

No. 6—*Concord*. A free grower, and bears heavily, but does not generally mature its fruit in this State.

No. 7—*Creveling*. Of excellent quality, not rich, but entirely free from foxiness. Mildews badly in some localities.

No. 8—*Delaware*. Bunch and berry small, and not a good keeper, but in all other respects one of the most desirable varieties for general cultivation. Vine healthy and hardy, and an early and constant bearer. Requires rich soil and high culture.

No. 9—*Diana*. Rather late for Maine, but of fine quality, and the best keeping variety.

No. 10—*Eumelan*. Has not given full satisfaction in this State.

No. 11—*Hartford Prolific*. Early, hardy, vigorous and productive, but fruit ripens unevenly and drops from the bunch.

No. 12—*Iona*. Of high flavor and a good keeper, but too late for general cultivation in Maine. Requires rich, warm soil. Vine and foliage healthy.

No. 13—*Isabella*. An old, standard variety. Largely superseded by earlier and better sorts. A free grower, and hardy.

No. 14—*Israella*. A thick skinned variety and a good keeper. Not desirable, being of inferior quality.

No. 15—*Lindley*. One of the earliest and best of Rogers' hybrids. Bunch and berry handsome. Of good quality and excellent keeper.

No. 16—*Merrimack*. Ripens uniformly and well, and gives general satisfaction. Vigorous and productive.

No. 17—*Miles*. Very early. Fruit too small for market.

No. 18—*Rebecca*. Of fine flavor and keeps well. Of slender growth and tender when young, but a healthy grower when established.

No. 19—*Salem*. Not as reliable in this State, as the other well known varieties of the same class. Foliage liable to mildew. Flavor rich, aromatic and sweet. Needs further trial.

No. 20—*Telegraph*. Not much known in this State, but highly recommended elsewhere for earliness and general good qualities.

No. 21—*Wilder*. Vigorous. Foliage strong and healthy. Requires a strong, rich soil. A reliable and valuable variety but a little later than some others of its class.

VIII—FOREIGN GRAPES.

The catalogue of the American Pomological Society contains thirty-three varieties of foreign grapes, nearly all of which, with many others, are grown in this State; and being cultivated exclusively under glass they are exempt from the variations induced by climate and soil, and therefore equally adapted to all localities. The description embraces color, flavor, season, and the character of the viney—whether hot or cold—in which they may be grown. It is not perceived that the insertion of such a list will be of material service to cultivators of this class of grapes, the information which it would contain being within their reach in other forms; hence it is omitted.

VIII—BLACKBERRIES.

ABBREVIATIONS: "Size"—l., large; m., medium. "Form"—ob. c., oblong conic; ov., oval; ob. ov., oblong oval. "Quality"—v. g., very good; b., best. "Season"—E., early; M., medium; L., late.

Number.	NAMES.	Size.	Form.	Quality.	Season.
1	Dorchester.....	m.	ob. c.	b.	M.
2	Kittatinny.....	l.	ov.	b.	M.
3	Wilson's Early	l.	ob. ov.	v. g.	E.

IX—CURRANTS.

ABBREVIATIONS: "Size"—l., large; m., medium; s., small. "Form of bunch"—m., medium; s., short. "Color"—r., red; b., black; w., white. "Quality"—a., acid; m. a., moderately acid; v. a., very acid. "Season"—E., early; M., medium; L., late.

Number.	NAMES.	Size.	Form of bunch.	Color.	Quality.	Season.
1	Black Naples.....	l.	s.	b.	m. a.	M.
2	Black Grapo. <i>Ogden's Black</i>	l.	m.	b.	m. a.	M.
3	Cherry.....	l.	s.	r.	v. a.	M.
4	Imperial Red.....	l.	s.	r.	a.	M.
5	La Versaillaise.....	l.	s.	r.	a.	M.
6	White Grape.....	m.	m.	w.	m. a.	E.

2 Resembles Black Naples, but more vigorous and productive; fruit larger and of better quality. 3 Shy bearer, and very sour. 4 Generally supposed to be identical with No. 5; but inserted by vote of the Society for further investigation. 6 The best white currant.

X—GOOSEBERRIES.

ABBREVIATIONS: "Size"—l., large; m., medium; s., small. "Form"—o., oval; r. o., roundish oval. "Color"—r., reddish; g., greenish yellow. "Quality"—g., good; v. g., very good. "Season"—E., early; M., medium; L., late.

No.	NAMES.	Size.	Form.	Color.	Quality.	Season.
1	Downing	m.	r. o.	g.	v. g.	M. L.
2	Houghton.....	s.	r. o.	r.	g.	E.
3	Smith's Improved	l.	o.	g:	v. g.	M.

1 Of upright habit, productive, desirable. 2 Drooping, vigorous. 3 New; promises well.

XI—RASPBERRIES.

ABBREVIATIONS: "Size"—l., large; m., medium. "Form"—r., roundish; c., conical; ob. c., obtuse conical. "Color"—r., reddish; p., purplish; y., yellow; b., black. "Quality"—g., good; v. g., very good; b., best. "Use"—M., market; F. M., family and market. "Season"—E., early; M., medium; L., late

No.	NAMES.	Size.	Form.	Color.	Quality.	Use.	Season.
1	Clarke.....	l.	r.	r.	v. g.	F. M.	M.
2	Knevett's Giant.....	l.	ob. c.	r.	b.	F.	M.
3	Orange. <i>Brinckle's Orange</i>	l.	c.	y.	b.	F.	M.
4	Philadelphia	m.	r.	p.	g.	M.	E.
	CAP VARIETIES.						
5	Davison's Thornless.....	m.	r.	b.	g.	F. M.	E.
6	Golden Thornless.....	m.	r.	y.	g.	F.	M.
7	McCormick.....	m.	ob. c.	b.	v. g.	F. M.	L.
	<i>Mammoth Cluster.</i>						

1 Canes strong, vigorous and upright; more nearly hardy than any foreign kind; fruit rather soft, juicy, sweet and excellent; better for light soils than any other variety of its class. 2 Strong grower and very productive. 3 Fruit tender; valuable for family use. 4 Very productive. 7 Profitable for market.

XII—STRAWBERRIES.

ABBREVIATIONS: "Size"—l., large. "Form"—o. c., obtuse conical; r. c., roundish conical; r. o. c., roundish, obtuse conical. "Color"—b. s., bright scarlet; l. c., light crimson; d. c., deep crimson. "Quality"—g., good; v. g., very good. "Season"—E., early; M., medium; L., late.

No.	NAMES.	Size.	Form.	Color.	Quality.	Season.
1	Col. Cheney.....	m. to l.	r. c.	l. c.	v. g.	M. to L.
2	Hovey's Seedling.....	l.	r.	b. s.	v. g.	M.
3	Nicanor.....	m.	r. o. c.	b. s.	v. g.	E. to L.
4	President Wilder.....	l.	r. o. c.	b. s.	v. g.	M.
5	Triomphe de Gand.....	l.	o. c.	l. c.	g.	M.
6	Wilson's Albany.....	l.	r. c.	d. c.	g.	E. to L.

1 A promising new kind. Pistillate. 2 An old and highly valued sort. Pistillate. 3 New. Plants vigorous, moderately productive. Flesh firm, sweet and juicy. Fine for canning. 4 One of the best, of recent introduction. 5 Uneven in size. 6 Hardy and productive; of fair quality when fully ripe.

COUNTY AGRICULTURAL SOCIETIES.

LINCOLN COUNTY.

BY J. J. A. HOFFSES, SECRETARY.

The Twenty-Second Exhibition of this Society was held at the Jefferson Trotting Park, Jefferson, October 3d, 4th and 5th. It was feared by those having the exhibition in charge, that in consequence of the Centennial Exhibition and the heated Presidential contest, the minds of the people would be so attracted and absorbed, that our show would be a failure ; but in this they were happily disappointed, for so far as the exhibition went it was a perfect success—the entries exceeding those of several years past; but financially it was not so successful, owing to the last day—which was to have been the “big day”—being stormy, consequently the receipts were very much smaller, as it gave us, practically, only one paying day. The show of live stock was very good. It is true, they were less in number than in some former years, but were of superior excellence. The show of Shorthorns and Ayrshires was very fine ; some very nice Cotswold sheep were on exhibition, also splendid specimens of pork producers. The show of corn has not been excelled, I think, in this county. The wheat crop was not a success. Barley was fair ; of rye none is grown. Oats generally were an average yield. The display of fruit was quite large and the specimens were very fine and nice. Geo. B. Sawyer of Wiscasset, as usual, made a very fine display of foreign and native grapes. Of apples, T. J. Simmons, Waldoboro', exhibited 65 varieties ; Alfred Besse, Jefferson, 60 ; John Avery, Whitefield, 34 ; Samuel Kennedy, Whitefield, 30 ; L. M. Kennedy, Jefferson, 25 ; and many others smaller lots. The dairy was well represented, the show of butter being very good. The display of household manufactures, fancy articles, flowers, &c., was very fine.

The Cheese Factory, at East Jefferson,—the only one in the county,—is giving general satisfaction.

One of the hindrances to our greater success is the fact that the fair is a "travelling show," going from town to town each year, and the receipts are nearly all absorbed in fitting up grounds and rooms for exhibition. At the present time Jefferson, with its Park, is the only town in the county with facilities to obviate this unavoidable expenditure; but this town, being in an extreme part of the county, would accommodate only a small part of the towns, while a large proportion, being so remote would be left out in the cold.

The receipts this year were not up to last year, owing to the rain storm the last day; but the amount of premiums awarded were double those of each of the three years previous.

KENNEBEC COUNTY.

BY GEORGE A. RUSSELL, SECRETARY.

The year ending the first Wednesday of December, 1876, has been, on the whole, favorable to the agriculturist; and the farmers within our limits have well stored barns and granaries as a result of their season's labor.

The hay crop was better than the average yield, of excellent quality and well secured. Wheat was below the average in yield, but of superior quality; while barley and oats were both abundant and heavy. Potatoes were injured by the drouth during the months of July and August, but make up the deficiency in bushels, in some measure, by their extra fine quality for table purposes and high price in the market. The season has been most propitious for corn, and the cribs are crowded with the long, yellow, well-filled ears, giving evidence that the farmers are returning to their former practice of raising their own corn, instead of sending such vast sums to the West, with no corresponding increase in other crops to make good the deficiency; a practice well worthy of imitation throughout the State and encouragement by every agricultural society in the land. The raising of beets and turnips is receiving considerable attention for stock purposes, and in my judgment should be especially encouraged, as valuable forage assistants and in the highest degree beneficial to the animals through the long winters to which we are subjected. The fruit

crop was very unequally distributed within our jurisdiction by reason of the devastation of the army worm, but the low price of apples assisted very materially to assuage our disappointment in not being able to pick this healthful and much needed fruit from our own trees, by placing them within the reach of all. Stock is in fair condition and ample in number both to supply the wants of the people and consume the forage in store.

It is somewhat suggestive to us as farmers that beef is imported from the West, and calls upon us to inquire into the *cause*, and supply our home consumption if nothing more.

The Kennebec County Agricultural Society is in a prosperous condition, and doing much for the improvement of the farms as well as the methods of carrying them on, and in the introduction of blooded animals. The Annual Exhibition in October, was one of the best, both in quantity and quality of exhibits, which it has been my privilege to attend—the great interest manifested by all, and friendly manner in which the exhibitors contested for the palm, being a noticeable feature. Altogether, we have every reason to render thanksgiving and praise to Him, “Who giveth rain upon the earth, and sendeth waters upon the fields.”

KENNEBEC UNION SOCIETY.

By C. S. WHARFF, SECRETARY.

For several years previous to last year this Society has held no exhibition, but has retained its organization. Last season it ventured on holding one, and was so encouraged by the interest manifested by several of our leading agriculturists that the Society again repeated the experiment this year. The exhibition was holden on the grounds of the Oakland Park Association, in Gardiner, on Wednesday and Thursday, September 27th and 28th. The weather was very favorable but for rain the previous night, which prevented the appearance of many animals from a distance. As a whole the exhibition was very good. Among the stock on exhibition were six full-blood Holsteins and five Jerseys, exhibited by Gen. Wm. S. Tilton of Chelsea, which were all fine animals and attracted much notice. F. G. Richards of Gardiner, exhibited

some fine Jerseys; W. H. Moores of Hallowell, had six Short Horns, while S. Otis of the same place exhibited a lot of five of this breed, one of which, a bull, was the largest one exhibited at the State Fair. J. R. Bodwell of Hallowell, exhibited his Jersey bull, which he imported from the Queen's farm in England.

In the hall there was quite a good show of fruits and vegetables. R. H. Gardiner of Oaklands, shew 32 varieties of apples and pears; and W. R. Wharff of Gardiner, exhibited 33 varieties of apples. J. M. Carpenter of Pittston, had 15 varieties, and E. A. Lapham of the same place, exhibited 20 varieties. There were many other exhibits of stock and fruit which were good. The amount of premiums offered was \$700; the sum awarded \$361.50.

NORTH FRANKLIN SOCIETY.

BY J. MORRISON, JR., SECRETARY.

The Annual Cattle Show and Fair of this Society was held at Phillips on Tuesday and Wednesday, October 10th and 11th. The weather was quite clear, but very cold and windy, particularly on the last day. The cold, however, did not seem to chill the ardor of the farmers and farmers' wives, sons and daughters of North Franklin, for they turned out in large numbers, and the exhibition compared favorably with exhibitions of former years. One very noticeable feature was the increased amount of neat stock presented as compared with horses. The farmers in this vicinity have become convinced that it pays better to invest their time and money in that which promises the surest returns. Sheep husbandry is also receiving a great deal of attention, and there were some very nice specimens on exhibition. There was a very fine full-blood Ayrshire herd exhibited by Maj. Seward Dill of Phillips, also a full-blood Jersey herd by Benjamin Johnson of the same town. Messrs. A. L. Bradbury and W. C. Howland of Avon, each had on exhibition a very fine grade herd. Full-blood bulls were well represented, prominent among which was a full-blood Shorthorn entered by N. B. Beal & Co. There were oxen and steers too numerous to mention, showing plainly that our farmers do not believe in the one-horse system of farming.

The articles exhibited in the hall were of excellent quality and attractively arranged. Farm and garden vegetables were represented in a thorough and satisfactory manner. Although we have again been scourged with caterpillars, still the display of fruit was greater than the most sanguine could have expected. This is owing to the interest which our farmers have taken in procuring and planting superior kinds of apple trees within the past ten or twelve years,—many young orchards having commenced to bear. With regard to the domestic department I have this to say, viz., that the display was all that could be desired; the maids and matrons of North Franklin fully sustained their ancient reputation for intelligence, industry and skill in the various branches of their handiwork.

WESTERN PISCATAQUIS SOCIETY.

BY J. F. THOMBS, SECRETARY.

Notwithstanding the many difficulties under which this Society has had to labor for the past few years, its exhibition, holden at Monson village, September 28th and 29th, 1876, was quite successful, and the members of the Society feel greatly encouraged in their labors.

The season has not been one of the best for the farmer in this part of the county, the spring being late and cold, with frequent heavy rains, which retarded the work of putting in the crops, the one extreme being followed by another. Finally the weather came off hot and dry so that many crops suffered from the drouth, which on the whole made the returns of the season somewhat less than usual, although fair crops have been harvested where the farmer has been faithful in the discharge of his requirements.

Hay was rather less than last year, but was harvested in much better condition. Wheat was fair and of very good quality. Corn yielded light, but ripened in good shape. Potatoes were under an average yield, but of the very best quality; and other crops in like proportion. Fruit of all kinds was plenty.

This part of the county has been so largely engaged in the lumber and slate manufacture that agriculture has been somewhat neglected, but the tide is slowly turning and the interest in farm-

ing will soon be in the ascendant. During the present crisis in business many are turning their attention to agriculture as a pursuit, and we hope to see at no distant day more farmers and better farming.

The insect pests have not been very plenty the past season, and the orchardists are rejoicing in an abundant crop of fruit; but we fear the Colorado beetle, as it has made its appearance in some localities the present season and will doubtless put on a full force next year. Being in this matter forewarned, let us be forearmed and prepare to fight them manfully, as we all must work for what we raise in Maine.

Here let me say, that the farmers of Maine should raise more wheat, corn, potatoes, and more oxen, cows and sheep, and pay less attention to the "fast horse." By so doing they will not have to send so much money "out West" for corn and other grains to keep up a business that pays not more than one in every hundred that engages in it. Then shall we cease to hear the cry of "hard times, hard times," among the farmers of Maine. Try it, brother farmers, and report the results.

WALDO AND PENOBCOT SOCIETY.

BY E. H. NEALLEY, SECRETARY.

The Eighth Annual Cattle Show, Exhibition and Fair of the Waldo and Penobscot Agricultural Society, was held, as usual, on the grounds of the Society, formerly the Monroe Trotting Park, October 4th and 7th, 1876.

The first day opened with fine weather, and the show was attended with good success in each department. A very large audience assembled, bringing with them some article to contribute to the exhibition, the number of entries being over two hundred. There was a very fine show of working oxen, draft oxen, three, two and one year old steers and steer calves. The display of town teams from Jackson, Frankfort and Monroe, was the finest ever presented on exhibition at our fairs. Stallions (with specimens of their stock) were presented from almost every town included within the limits of the Society, which made a show

worthy of attention. The display of swine, poultry and sheep was fully up to that of former years.

In the hall recently built upon the grounds by the Society, more entries were made for this department of the fair than ever before, and many articles were put on exhibition that were not entered for a premium. Taking these together with entries made for premium, the show in the hall was far better than in former years, and very interesting. The ladies' department was a perfect success, their space in the hall being more than full, and with a very superior class of articles.

The forenoon was devoted principally to the entering of stock and articles for premium, and the appointing and arranging of the different committees in the several classes. The afternoon was devoted to the exhibition of stock and other articles entered.

The second day, October 5th, being very stormy, the fair was postponed until the Saturday following, October 7th, which opened cloudy and cold, and on account of this many were prevented from attending the last day. Although the weather proved bad, the fair was attended by a large number of people, to witness the trial of speed of horses already entered to start, also the showing of the matched horses, family, carriage and draft horses, and other business left over from the first day. The fair closed with its usual success in every respect, and if good weather had prevailed both days, the Society would undoubtedly have had the largest and most successful show ever held. The Society is yet new, and has just finished paying for the grounds bought of the Monroe Trotting Park Association, but bids fair to be one of the largest agricultural societies outside of the old county societies in this State. They intend to offer further inducements the coming season, which will call out a much larger interest.

SHAPLEIGH AND ACTON SOCIETY.

BY HORACE BODWELL, SECRETARY.

Our Eleventh Annual Fair and Exhibition was held on the Acton Fair Grounds, October 17th, 18th and 19th, 1876. Although the opening day and the one following were the coldest for the month, there was no lack of interest manifested on the part of the members and their families, who were prompt and early upon the grounds with their stock and field crops; while the ladies proved themselves equal to the task required of them in their department, making the whole thing a live exhibition. Every department was well represented, and the exhibition proved all the officers anticipated. We cannot speak in too much commendation of the wives and daughters of the members, who make up a large share of the entries in the hall with their manufactured goods.

The display of cattle on exhibition was fully up to any former year, although many of the members had disposed of their surplus stock. The sheep, swine and live fowl department was well represented, while that of dairy products was fully up to the choicest offered in our markets. The field and garden crops exceeded any former year, fully demonstrating what the soil will do when rightly cared for by the industry of the husbandman. The fruit consisted of the choicest kinds and was shown in large varieties. The third and last day, which is known as the "horse day," being very pleasant, called out a large crowd from the adjoining towns, bringing up our receipts to some eight hundred and fifty dollars. The largest specimens of field and garden crops ever exhibited here were on exhibition. The centennial department was well represented with articles bearing upon them good and authentic history of antiquity.

The hay crop was good to fair, and well secured in July; grain crops below an average, damaged by the drouth in July; potatoes of good quality, but in many fields a light yield was obtained; the potato beetle made its appearance on the writer's Early Rose; fruit in abundance, the largest yield of apples for many years. Our crops in the aggregate are quite if not fully up to former years, and in many instances, in fact, showing a larger yield per acre.

WEST PENOBCOT SOCIETY.

By T. P. BATCHELDER, SECRETARY.

The Twenty-Second Annual Show of this Society, was held on the Grounds of the Society in Exeter, September 26th, 27th and 28th, 1876. The attendance was large, and the receipts very satisfactory. The show in the hall was a fair average of former years. Fine specimens of crops and fruits, dairy products, agricultural implements, domestic manufactures, needle-work, fancy articles, paintings, &c., made up a very attractive exhibition. The show of neat stock, horses, sheep, swine and poultry was hardly up to former years, although many fine specimens were on the ground, more especially in young stock.

The season has been uncommonly favorable for the farmers in this section of the country ; fruit and all kinds of crops have been very satisfactory, both as to quantity and quality, and although our grain did not prove as heavy as usual, yet there seems to be no lack of interest in agricultural improvements or in raising stock.

The address was given by our President, George S. Hill, Esq., and was well received.

EAST OXFORD SOCIETY.

By B. W. STOCKWELL, SECRETARY.

The Sixteenth Annual Exhibition of this Society was held on the Fair Grounds at Dixfield Village, September 28th, 29th and 30th. The weather was very fine and warm.

The show of neat stock was large compared with former years. Some very fine stock was exhibited, and was worthy of much higher premiums than the Society could give them. There were seventy-nine entries of neat stock. One pair of oxen, entered by Abel Farrington of Mexico, weighed 4,200 pounds and girted 7 feet 11 inches. They were well matched and handsome, and took the first premium for beef cattle. One pair of calves entered by Benjamin Lovejoy of Peru, were the best ever entered at a fair of the East Oxford Society. The entries for steers, and matched steers and matched oxen were very large ; some very nice steers

were shown. It speaks well for the farmers of East Oxford. There were two entries for flocks of sheep; seven entries for bucks. A one-year old buck, entered by Charles Kiebeber of Dixfield Center, the weight of which was 240 lbs., received the first premium. The entries for horses and colts were the largest that was ever made in this Society in one year. Fine samples of corn, wheat, rye and beans were exhibited. I think it would be well for farmers to raise more corn and wheat, and not go West to buy so much corn and flour. Good samples of potatoes, beets, cabbage and pumpkins, were on exhibition. The potato crop was light, not an average crop. Fruit received its merited interest, and the samples were more numerous than could have been expected. But very few trees escaped the ravages of the caterpillars. In view of the threatened destruction of the orchards and the great value of its fruit, we wish such premiums might be offered as would induce fruit growers to kill off all the caterpillars. John J. Towle of Dixfield, had on exhibition forty-five varieties of apples and six varieties of grapes. The ladies' department was not up to what we would like to see it.

Many of our farmers go in largely to raising hops, some of them growing from 4,000 to 4,500 pounds of hops yearly; the average price when sold being about thirty cents per pound. There are more hops raised within the limits of this society than in the rest of the State. The crop brings a large amount of money to our farmers yearly.

In reviewing the products of the farm as compared with last year, I will report as follows: The hay crop was abundant, of good quality, harvested in good condition, and in every respect all that could be wished. Taken altogether we have no reason to complain; our crops as far as my observation extends, will compare favorably with other sections of the State. We feel satisfied that the agricultural interests should be fostered, and receive the hearty coöperation of the farmers of our county, very much more than is now manifested. We have many good farmers who do not seem disposed to aid our society in its efforts to cherish the enterprise, thereby throwing the burden on a few persons instead of the many.

WEST OXFORD SOCIETY.

BY D. LOWELL LAMSON, SECRETARY.

The Twenty-Sixth Exhibition of this Society was held on their grounds at Fryeburg, October 10th, 11th and 12th, 1876. The weather was tolerably favoring, and we are able to report the exhibition as holding a fair average with those of preceding years. Nearly all the departments, numbering fifteen, were very well filled, and satisfactorily demonstrated the intelligence, industry and progress of the farmer. It was noted that the exhibit of live stock was considerably above the average, and in this class there were \$253.50 awarded in premiums.

In the Hall there was a good display of fruit, vegetables, butter and cheese, but the departments assigned to household manufactures, needlework and fancy articles, were rather sparingly filled. The tables were loaded with choice qualities and extensive varieties of apples. One exhibitor claimed almost an endless variety, away up among the nineties, (?) and there were several other exhibits of forty to sixty kinds. We think orcharding has been considerably stimulated within the limits of this society by the special premiums offered therefor under the direction of the Board of Agriculture. Several nurseries of native stock have been planted out, and are entered in competition for the premiums, which will be awarded at the next fair. At the fall meeting of the Board of Agriculture held in Fryeburg, the subject of fruit culture in all its scope was fully discussed, which also was productive of good; more than one farmer was thereby incited to set a few rods of his comparatively worthless land with the cranberry vine. There are thousands of low acres in Fryeburg and Brownfield alone, subject to the flowage of the Saco, adapted to just this sort of husbandry.

Farming in western Oxford County has been conducted with fair success the past season. The spring was rather backward, and a fraction of the summer very dry, but all crops came in with an average yield, with the exception of oats, which perhaps were sown to less extent. Farmers in this region are especially turning their attention now to potato raising for shipment. Thousands of bushels have been shipped from Fryeburg station this fall, the producer realizing fifty cents per bushel at the depot. The Early Rose is the variety mainly cultivated.

The Society offered cash premiums to the amount of \$576.25, and at the close of the show the several committees of award reported the total amount of \$374.10 awarded. This is over and above the amount expended in accordance with directions from the Board of Agriculture. Incidental expenses of the fair \$238.37, making a total disbursement on the part of the Society of \$612.47. The receipts from all sources (State stipend not included) \$743.03.

OXFORD COUNTY.

BY A. C. THOMAS KING, SECRETARY.

This Society held its Thirty-Fourth Exhibition, October 3d, 4th and 7th, 1876, with more than an average attendance. The weather was unfavorable, and the Fair was adjourned, which caused a less attendance on the last day; but notwithstanding this, the exhibition was financially successful. There were ninety-nine entries in neat stock, twenty-nine in trials of speed, and thirty-nine in horses. A general satisfaction was manifested with the display in all branches. One crop of corn was entered, consisting of one acre, which produced $60\frac{3}{4}$ bushels; and one crop of wheat (Lost Nation) which yielded 28 bushels to the acre.

No entries were made in planting orchards or in raising nursery stock, and but one in thorough drainage. The introduction of thoroughbred stock seems to be increasing, which gives more than usual interest to our exhibitions.

KNOX COUNTY.

BY F. W. SMITH, SECRETARY.

The Tenth Annual Cattle Show and Fair of the Knox Agricultural and Horticultural Society was held at Rockland, October 10th, 11th and 12th, 1876. For the second time in eight years three pleasant days smiled upon the efforts of the Society, and contributed greatly to its prosperity and financial success.

The show of stock was separate from the fair, being at the Trotting Park, $1\frac{1}{2}$ miles out from the city, (an inconvenience much to be dreaded). The number of horses and cattle was probably greater than the usual average, some of which were of improved breeds and very valuable. Rockland and Cushing presented two fine town teams of oxen; beside these there were several pairs of matched, beef, and draught oxen; the whole number of oxen, however, was not so large as in some former years. Of cows and heifers there were about twenty-five or thirty entries. There were displayed a much larger number of improved herds than usual, being several full blooded Jerseys, Ayrshires and Herefords, besides many grades. A great advancement is going on in this section in the introduction of improved and full-blooded stock. A larger number and a greater variety of different kinds of poultry was exhibited, than ever before. Of sheep and swine there were but few entries.

At the hall the display of fruit, farm and garden products was large and of excellent quality, some farmers filling tables fifteen feet long with their own productions. The exhibition of corn was larger than ever seen previously at our fairs. A variety of kinds were shown, all of excellent quality. Edward Kelleran of Cushing, exhibited fifty ears of a very long, large 16 rowed variety, which has been raised on his farm every season during the past eighty years. Mr. K. says that it can be raised with as much ease and certainty as potatoes. William Kelleran, from the same town, brought in a huge variety, upon which he has been improving for years, until now it grows with from 18 to 24 rows upon an ear. Fine specimens of beans, peas, wheat, barley, potatoes, beets, cabbage, turnips, onions, tomatoes, pumpkins, squashes, &c., were tastefully displayed. The ladies' department was well filled, and many articles of antiquity and curiosity were to be seen. The display of dairy products, for some unknown reason, was smaller than ever before.

Prior to this season it has been customary to offer premiums in the five towns embraced in the limits of the North Knox Society, which towns were formerly comprised within our limits. This gave those farmers in their limits who were opposed to the creation of that Society, and who refused to patronize it, an opportunity to exhibit at our fairs. The officers of the North Knox Society complained that this was unfair and unjust, whereupon our Trustees decided to consider the above five towns outside of our boundaries, and to allow none from that Society to compete in ours. This action cuts off the above mentioned dissatisfied class of farmers, and compels them to exhibit at the North Knox or not at all. They feel that this is hard usage, as it deprives them from exhibiting their produce where larger premiums are offered, and where they can find a ready sale at remunerative prices for all products carried in. A union of the two societies is the only remedy for this state of things.

On the whole our fair was a success financially and otherwise; the Society is out of debt and has a small fund in the treasury. During the last half day there was a baby show, in which forty little innocents figured conspicuously, drawing a crowded house, and adding very materially to the receipts of the fair.

The farmers of Knox county are gradually turning their attention to a better and more scientific manner of conducting farm operations; are introducing better stock, and manifesting a determination to rely more exclusively upon agriculture as a means of livelihood than heretofore. They are quite certain to succeed, as we have all the needed facilities to insure prosperity in this most honorable and health giving employment.

WEST WASHINGTON SOCIETY.

BY JAMES L. BUCKNAM, SECRETARY.

The Seventeenth Annual Exhibition of this Society was held in Jonesborough, September 27th and 29th. The weather being stormy on the 28th, the Society postponed the exhibition to the following day.

The attendance on the first day was fully up to the average, and the exhibition was in all respects superior to any ever held by this

Society. The attendance on the last day was not so large as that of some of the former shows, yet it was, perhaps, as large as the average, and the fair might justly be considered successful. The farm products on exhibition were much finer and in much larger quantities than at any previous show of this Society. The live stock was in excellent condition and driven up in greater numbers than usual; their fine appearance adding much to the interest of the exhibition. The evidence was unmistakable, at this show, that the influence of this Society will result in a general improvement of the agricultural operations of the people within its limits. There is an increasing manifestation from year to year that the farmers are determined to spare no pains to improve in the cultivation of their lands, to secure the best breed of stock, to cultivate the best paying crops, and to adopt that system of farm management which shall result in the greatest improvement of their farms, and best remunerate them for their labor. The people in attendance were never more orderly, or showed greater interest or determination on their part to make the exhibition successful; and I think I may safely say they were well rewarded for their efforts, in the satisfaction derived from looking upon so fine a display of farm productions and fancy articles of domestic handiwork.

There was exhibited a collection of articles of ancient manufacture, some of them of great antiquity, which added not a little to the interest of the occasion. The productions of the dairy was not quite so largely entered as at some former shows, there being no cheese on exhibition. The establishment of a cheese factory in this vicinity would give a new impetus to this branch of industry.

The season was very favorable to agricultural operations. Some crops on high ground suffered a little from want of moisture, but not enough to prevent an average yield. The spring was very favorable for planting, and more land was cultivated than before for many years. The weather was very favorable for securing the hay crop, and an average quantity was cut and housed in excellent condition. There will be no scarcity of fodder for the stock that will be wintered. Owing to the general depression in business and scarcity of money, stock is bringing a less price than it has for many years, consequently the number wintered will be larger than usual. The potato crop was excellent in yield, and very fine in quality; market good, and price remunerating. More has been

shipped from here than ever before. The crop was not damaged by insects, the beetle not putting in an appearance. A greater breadth of land was sown to wheat than usual this season, consequently more breadstuffs were harvested than for many years, and less will be wanted from other parts to carry the inhabitants in this section through the coming winter; thus enriching the community by retaining that which usually went to some other people to pay for flour and corn. The yield was good, in some instances twenty bushels from one acre are reported. Barley was sown to some extent and did well; the yield was good and quality fine. Root crops of all kinds were fine, and the yield heavy. The farmer has been abundantly rewarded for his labors the present season.

PENOBCOT CENTRAL SOCIETY.

By M. S. PALMER, SECRETARY.

The Annual Cattle Show and Fair of this Society was held at East Corinth, on Friday and Saturday, September 23d and 24th, instead of Tuesday and Wednesday, 19th and 20th, as advertised; and notwithstanding the storm on the early days of the week, the elements apparently settled all differences of opinion, and on Friday the sun looked cheerfully upon the husbandman and his sons with herds and flocks, and wives and daughters with dairy products and household fabrics,—all happily wending their way to the grounds and hall, and when arrived, the grounds shew a large show of stock, and the hall was literally filled with butter, cheese, apples, pears and preserves, and the department for fine needle-work well represented. If it be true that we have at previous shows had as many cattle upon our grounds, it is certainly true that never have we had cattle of so good quality. Aside from the fine herds shown by J. Morison, and E. S. Hunting,—George Elden, F. B. Trickey, Charles Pearson, J. Chandler, G. W. Hall, W. Cheney, A. W. Libbey, Jr., B. Sanborn, S. Skillens and many others, shew stock of excellent character and in fine condition. R. B. Smith, J. Chandler, William Spratt, C. Cochran and others, shew sheep of best grades, fine in size and fleece, while Moses Chandler, William Bean and Charles Bagley, sup-

plied the pork department. The show of horses excelled all previous shows. Entire horses, mares and colts, matched, carriage, team and drawing horses, were well represented.

Never before have our tables been so bountifully loaded with choice fruit—and among the thriving orchards which never before gave the Society their fruitage, are those of Jotham Junkins of Corinth, and Moulton O. Dodge of Exeter, which gave large varieties of samples, and for quality never excelled. Butter and cheese was abundant and of usual good quality; and while cheese made by our farmer's wives defies competition, yet samples from the Corinth Cheese Factory were on exhibition, (but not for premium) and good judges pronounced them of good quality, better than any previously made. Kitchen gardens, specimens of corn, wheat, barley, potatoes, beans, pumpkins, and every variety of squash, lay temptingly before us, while honey, syrup, and maple sugar, created a mouth freshet; and bread in comely loaves, both white and brown, from childhood's bakery, told of mother's timely care and daughter's skilful training. Notwithstanding the hall was tastefully decorated with fine needle-work, showing taste, skill and industry, yet we fancied we saw evidences that utility was supplanting ornament in the cloths, comforters and woolen fabrics on exhibition, and that the farmers are living Proverbs, "known in the gates" to be husbands of those who "seeketh wool and flax, and worketh willingly with their hands."

The address of Rev. Mr. Pitts of East Corinth, was an able and timely production;—listened to by a large concourse of people, and duly appreciated.

WASHINGTON COUNTY.

By H. F. PORTER, SECRETARY.

The Fall Meeting of this Society was held at Pembroke, September 28th and 29th, and notwithstanding the hard times the attendance was good. Some of the farmers drove their stock a long distance, and brought many other worthy articles which went toward filling up the hall and making an interesting show on the grounds.

In neat cattle the show was respectable, although we do not find so many working oxen and fat cattle as would seem desirable.

The town teams, which used to attract so much attention in other years, have of late disappeared entirely from our fairs. The plowing matches and drawing matches are also left out of our programme, and the time and the money paid in premiums has been devoted to other interests. There were shown twenty-five milch cows, eighteen yearling heifers, twenty-two calves, thirty-three yoke of oxen and steers, and fifteen bulls. Jersey, Short-horn, and Ayrshire were represented. The horses entered for exhibition included six breeding mares and colts, four three-year olds, eight four-year-olds, one five-year-old, three stock horses, five family horses, one team horse, and a pair of matched horses. The much abused trotting horse was there too, and bore a conspicuous part in the exhibition.

Some nice looking flocks of sheep, and some good specimens of swine were shown. A Poultry Show, held in connection with, and under the auspices of the Agricultural Society, added somewhat to the attractions, and gave evidence that the breeders of pure blood fowl had taken great care in selecting the best strains, and succeeded in producing handsome and well proportioned birds, including Brahma, Leghorn, Cochin, Plymouth Rock, Seabrights, &c. Some Pekin and Aylesbury ducks were remarkable for size and beauty. An excellent show of roots and vegetables was presented in the hall. Potatoes were shown in great abundance, and of enormous size. The drought during the latter part of the summer threatened to severely injure this crop, but farmers report that at digging time the quantity was found to be fully up to the average, and the quality unsurpassed. Our hall is not large enough to display all the articles brought to our fairs to the best advantage. We need more room on the tables and counters for the benefit of exhibitors, judges and spectators. A large number of specimens of beans were shown, also peas, and some good lots of oats, barley, and buckwheat. Premiums and gratuities were paid on thirteen different lots of apples, besides many other specimens of fruits.

The ladies' department was full of the useful as well as the ornamental articles of their production, and it reflected credit on their skill and industry. C. W. Hersey presented for examination a deed and a will, one written in 1659, and the other more than a hundred years old, and some other articles which were in use a century ago.

An address, written by J. M. Livermore, Esq., of Eastport, was read before the Society on the afternoon of the second day. It was plain and practical, and contained many interesting statistics and encouraging words to the farmers of the county.

Farmers report the grain crops light, hay crop about three-fourths an average yield, but of superior quality. The weather on both days of the Fair was fine, and the receipts were sufficient to defray the expenses. The Society stands well financially; all premiums having been paid up in full, with a balance in the treasury.

PENOBCOT AND AROOSTOOK UNION SOCIETY.

By L. ROGERS, SECRETARY.

The Exhibition of the Penobscot and Aroostook Union Agricultural Society was held at Patten, on the 28th and 29th days of September. On the first day the stock was exhibited, and the committees on stock attended to their several duties. The display of stock, though not large, shew many improved and valuable animals. The Society's full-blood Shorthorn was the best bull on the ground, though not entered for a premium. The stock of this bull was on exhibition, and showed a manifest improvement in size—being square built, large and thrifty animals—over the old stock. There were several valuable oxen and cows, horses and colts, on exhibition. There were but two flocks of sheep on the ground, as farmers that have good sheep did not take the trouble to exhibit them.

On the second day, Rev. Mr. Kinney delivered an excellent address, which was well received; and in the afternoon the trial of speed horses excited, as usual, some interest. The exhibition at the hall was satisfactory, shewing many specimens of farm productions, grains, vegetables, fruits, &c. In the household department were many articles worthy of notice. In the Ladies' fair were many articles of taste, needle work, flowers, &c. The display of manufactured articles, though not large was good, and creditable to our mechanics. On the whole, the Fair was a good success, productive of kind feeling and social intercourse.

The hay crop the past season was abundant; and the wheat crop was good. Mr. B. T. Elwell of Patten raised 56 bushels of wheat on two acres, and was awarded the first premium. Mr. A. McCourt raised 48 bushels; Mr. L. B. Rogers, 32 bushels—mostly of Lost Nation variety. This is not a corn climate, though good sound corn is raised. Mr. J. S. Hall of Patten was awarded the first premium. The potato crop was good; there was a large yield, and we believe good potatoes can be raised for from 8 to 10 cents per bushel.

The question is often asked "Does the farm pay?" Our farms in Patten and vicinity usually contain 150 acres or more; on which are large pastures and large grass fields. If a farmer keeps thirty sheep, his yearly income from them will be \$100 or more in cash. If he keeps six cows, his yearly income from them may be \$300. If he slaughters two or three good hogs yearly—if he raises forty or fifty bushels of wheat yearly, and twenty or thirty bushels of corn, he will not be obliged to sell or mortgage his farm to pay his yearly bills. These facts we believe answer the question.

NORTH KENNEBEC.

By J. M. GARLAND, SECRETARY.

The Annual Show and Fair was held Tuesday and Wednesday, October 3d and 4th, and according to the programme was to be continued through the 5th, but a heavy rain storm coming on the second day night, the proceedings of the third day were indefinitely postponed, and have not been transacted.

Tuesday, October 3d, was a pleasant, delightful day, so the exhibition of neat cattle, sheep, swine, poultry and driving horses and oxen was a complete success. The exhibition of neat stock was not so large as in some former years, but was superior to those exhibited last year; there were more of them, and I think better animals. There were twenty-one entries made to compete for the prizes offered for the best bulls; the thoroughbreds of course take the first premiums offered. The Herefords from the farms of William P. Blake and H. C. Burleigh were prominent, and were good animals; Jerseys, by Dr. N. R. Boutelle and U. P. Cummings, looked well and were nice animals; the Durham

family of thoroughbreds were shown by G. A. Parker, C. H. Goodhue and C. H. Mayo. Some grades were shown by T. Osborne of Fairfield, and C. Hallett of Sidney, that commanded much attention. Eight pairs of fat cattle were entered for premiums, and they were in good flesh and large—two or three pairs of them about eight feet in girth. This is a gain on last year, as there were none presented last year. There were eight pairs of drawing oxen presented for drawing prizes, and Andrew J. Libby of West Waterville, was thought to have the best pair of four years old steers in the State of Maine to draw a load on the drag; he challenges their equals. An extra purse of \$25 was offered in premiums of \$12, \$8 and \$5. Mr. Libby took two of them, and there was no competition for the third. Two herds of Herefords were exhibited by William P. Blake of West Waterville, and William and John Burleigh of Fairfield. They were most excellent animals; the former took the first premium and the latter the second. Three town teams were shown, two from West Waterville, and one from Fairfield; the average girth of the Fairfield team was $7\frac{1}{2}$ feet, and of the West Waterville team 7 feet 5 inches—the steer team of average girth. Two entries of Dairy Cows were made of grade Jerseys by Jos. Percival and Mrs. H. C. Burleigh. Mr. Secretary, you know it is hard for many of the dairymen to beat Mr. Percival, for you well remember the statement he made before the State Board at its session in this place two years ago this winter, when he stated than from January 1st, 1873, to January 1st, 1874, his two Jersey grades (mother and daughter) made 930 pounds of nice yellow butter, which he sold at 40 cents a pound. Suffice it to say he has got the same two animals, and they are standard bearers in this county in this branch of husbandry. Mrs. Burleigh takes the second premium. Fourteen stock cows were shown, and some of their progeny, by Dr. J. H. Hanson, our venerable Principal of the Classical Institute; also by Messrs. L. A. Dow, W. P. Blake, Burleigh Sons, M. N. Corson, C. H. Mayo and Timothy Osborne of Fairfield. Fifteen pairs of one, two and three years old steers were exhibited by nine different persons, an increase of nine pairs over 1875, and competent authority pronounced them as nice steers as were ever shown on the ground. Mr. Nahum Tozier of Fairfield, owned four pairs, and is the farmer who is trying to adhere to the good old times of raising big steers and few colts. Would there were more farmers who would imitate his example. We ought to raise

more neat stock ; our farms need their dressing, and our farmers their sure, steady work. There was a good variety of sheep exhibited ; South Downs, by William C. Pearson, William P. Blake and the Burleigh Brothers ; Merinos, by A. G. Ricker and William H. Pullen ; Cotswold, by William P. Blake and G. G. Hanscom of China. These were all thoroughbred of each kind, and were very handsome animals. I forgot to mention two flocks of thoroughbred South Downs, by Dr. N. R. Boutelle and E. A. Cilley. I think the flock of Dr. Boutelle is the most perfect flock I ever viewed, and I entertain doubts if its equal can be anywhere found in the State of Maine. The desire to raise large sized early lambs, is increasing in this part of the county, consequently the farmers sell off their smallest ewe lambs and their buck lambs, and save the largest sized ewe lambs to increase the size of their sheep. Sheep-raising is receiving closer care and attention from the members of this Society. The Trustees divided the swine into large and small breeds. Mr. Joseph Percival exhibited some thoroughbred Yorkshire, and John Mathews some Essex, (though of the small breed) while Messrs. William V. Hayden and J. P. Ellis produced Chesters that were very nice. Mr. Hayden's pigs, (ten in number, four weeks old) weighed, some of them, from 25 to 30 pounds each, and found ready purchasers, and I think they were all sold before they left the show ground. There was one Berkshire, one Yorkshire and one Essex boar entered ; all were good of their breed. Four breeding sows, one Yorkshire, one Chester, one Berkshire and one Essex, all of them, with their litters of pigs, as good as desirable. Big porkers are on the increase in this Society. I hardly know how to do anywhere near justice to the department of poultry. There were forty coops entered upon the Committees' book ; nearly all the same coops had been exhibited the week before at the Somerset Fair, at Skowhegan, and as I understand, came under your observation at that place. I hesitate not to say, it was the finest display of poultry ever exhibited at this fair. The Cochin family of fowls was well exhibited by the Jones Bros., of Winslow, also by B. Hersom, West Waterville, A. L. McFadden, A. J. Alden, Waterville, E. A. Cilley, Dr. G. M. Twitchell, E. R. Mayo, F. E. McFadden and C. V. Lawrence, Fairfield, also C. D. Miller and Flagg Bros., Skowhegan. I cannot describe them, but it was decided by competent judges to be the best show ever seen here at Waterville, and the best exhibition outside of a special poultry show. Since our show

and fair last October, there has been formed at Fairfield an Association called the Central Maine Poultry Association, and its first exhibition is this very week being held in Fairfield; so that it is to be presumed, hereafter we shall not have so much poultry as we have had heretofore at our show and fair. Our Society pays \$40 in premiums this year for poultry.

Of horses there were twelve stallions entered for premiums, eleven breeding mares, seven family horses, four pairs of drawing horses, eleven trotting horses, six 3-year old, eleven 2-year olds, ten yearling colts and twelve sucking colts, making a total of 92 horses and colts on exhibition and contesting for awards. The largest share of these were of the Knox family. The pedigree of some of them was called for and clearly shown, while some of the stock of nearly all of them was exhibited to prove their value for breeding purposes. I think the display of horses was not as large as last year, but perhaps a better assortment, and full as much if not more valuable than last year. There were exhibited some very valuable and promising colts. The examination of horses and colts was on Wednesday the 4th, also the trotting of mares and geldings for the \$35 purse; the three-year old colts for the \$15 purse, and of stallions owned within the limits of the society for the \$35 purse. There was a programme for the third day, and purses offered to the amount of \$130, but a severe storm prevented the fulfilment of the same.

In conclusion, I would say, the past year has been rather a hard one for the Society, financially, but it has raised more money than last year—has property to the estimated value of \$2,500, and I believe owes literally nothing. If the farmers of this Society will look out for their interests in these fairs, and discountenance more and more the practice of horse trotting, by limiting the premiums offered, and offering larger premiums for the best products from the farm, garden, house and dairy, they will see more interest taken, and the ideas of the founders of these societies propagated and made a blessing to the laboring classes whom they were designed to help and befriend.

The Fair at the hall was not up to the standard of former years, owing to the fact that the State Pomological Society held their annual exhibition on the 3d, 4th, 5th and 6th of the same month, and occupied the upper room of the same building, so that the Agricultural Society offered no premiums for fruits, but let the fruit growers compete in the Pomological Show. The attendance

at the Pomological Society tended to draw away patronizers of our Society. There were some good samples of the garden, house and farm, and had the above named society been holden at the same time there would have been the usual interest manifested.

EAST SOMERSET SOCIETY.

BY JOHN FINSON, SECRETARY.

The financial condition of the East Somerset Society is not much changed from what it was one year ago. The Society has reduced its indebtedness somewhat, paid all premiums, and other expenses incurred during the past year, maintained a good degree of interest among its members, and increased its membership by adding the names of several new life members and several yearly members. The indebtedness of the Society at the present time was incurred a few years since by building a hall on the grounds of the society; a building 30 by 70 feet, and well finished, the whole costing some fifteen hundred dollars.

The Society held its Annual Cattle Show and Fair in September, at both of which there was a very large attendance, and a liberal patronage bestowed by the people in the vicinity and surrounding country. The amount of stock on exhibition was very large, and of excellent quality, particularly that of neat stock and horses. The most prominent breeds to be noticed among the neat stock on exhibition were the Shorthorns, Herefords, Jerseys, Ayrshires and Devons, all of which were held in high estimation by their owners, who were earnest competitors for the premiums offered on the same.

Horses were well represented on the grounds by several very fine stock horses, a large number of breeding mares, and colts of all ages, the most of which were very fine animals. The laws governing the process of breeding any class of animals are so intricate and difficult to be understood, that it is quite impossible for any one who has not given the matter much thought and study and gone into actual tests, to become very successful in it. Hence, the business of raising horses is very expensive, much more so than the raising of any other kind of stock kept on the farm; so expensive that very few ever receive more than a fair

compensation for the outlay and expense attending the business. A few lots of sheep and swine were exhibited, some of which were most excellent. Of the swine there were the Yorkshire, Essex and Prince Albert, with several other breeds of less note. In the selection of sheep, less care and attention is paid to the breed than in the selection of any other kinds of stock. Sheep and swine are two branches of stock raising too much neglected in this part of Somerset, though many farmers have increased their flocks of sheep within the last few years.

Farming in this section was attended with very good success the past season, crops were a good average compared with former years. The hay crop was quite an abundant one, of excellent quality, and as good weather prevailed most of the time during the haying season it was secured in excellent condition. The grass in this section has been damaged very much for several years by a grub worm that works just under the surface, eating off the roots that connect the sod with the moist earth below. This grub is a white worm, from one inch and a half to two inches long, and generally very numerous. In the fall of 1875 they did great damage to the grass fields; in many instances the destruction was so complete the farmers were obliged to plow up those fields in order to re-seed them to grass again. This enemy to vegetation is more to be dreaded than all others together. The wheat crop the past season was rather more than an average, and had it not been for the severe drouth that occurred the last of August and first of September, I think it would have been the largest crop, and the grain of a better quality, than any crop for several years,—in proportion to the number of acres devoted to wheat. Corn was excellent in quality, and the yield per acre very good. Wheat and corn are two of the prime necessities of life, and to farmers two of the most important crops to which they can give their attention. Failing to raise these, two of the most staple and necessary crops known to agriculture, has much to do with the present hard times which prevail throughout the agricultural districts of the State of Maine.

NORTH KNOX SOCIETY.

NORTH KNOX SOCIETY.

BY WILLIAM GLEASON, SECRETARY.

The Eighth Annual Exhibition of this Society was held at McLain's Mills in Appleton, on the 3d, 4th and 5th of October.

Entries were made as follows: field crops, 23; dairy, 15; horses and colts, 41; beef, 3; sheep, swine and poultry, 20; cows and heifers, 22; town teams, 3; matched oxen and steers, 5 yoke; fruit, 35; steers, 13; cabinet work, 6; household manufactures, 92; flowers, 23; preserves, jellies and honey, 36; bulls, 17; herds, 4; agricultural implements, 5; roots and vegetables, 42.

Field crops, as represented by samples, were good. John Pierpont reports $61\frac{1}{2}$ bushels wheat on 300 rods; L. Keating, corn, 28 bushels, 78 rods; Charles Titus, 7 bushels beans, 40 rods; and others whose crops were probably equal. Some very fine horses and colts were on exhibition. D. A. Payson, G. S. Pendleton, E. A. Payson, and N. Gould were exhibitors. Dr. Clough of Liberty, had a two years old colt on exhibition weighing 1,330 pounds.

Some very fine butter and cheese was presented. Mrs. Nathaniel Alford obtained first premium on sage cheese, also on butter; Mr. F. A. Gushee on cheese.

In sheep, etc., there was a lively contest, some excellent animals being presented. The department of cows and heifers was well represented but not as numerously as would be desirable. Butter and cheese consumers need not despair. All is well.

Of town teams, only two were present, and those were sufficient to cause the knights of the goad stick to give an approving smile. Some fine pairs of matched oxen and steers were presented, and although the cattle were fat, the number was lean. In fruits, we do not think that the department has been so well represented since the fair at Warren, in 1870. The plan adopted by the present board of trustees will serve to bring forward new kinds to add to the list of fruit.

Bulls—some splendid animals. We noticed two two-years old grade Durhams, by Leander Eastman, and J. T. Creighton; two grade calves, J. T. Creighton and Silas Hawes.

Agricultural implements entries small. Eagle Mower, by H. M. Cole, a cultivator by H. Glidden; hand rakes by H. N. Titus; all good articles. The Advance Mower, which was put on exhibi-

tion by E. H. Burkett, has found a ready sale and is ranked among the best.

Roots and vegetables. A very good exhibit. There were 100 bushels potatoes per acre by M. Wentworth; 200 bushels turnips per 40 rods; 200 bushels beets per 40 rods, both by G. H. Payson; squash, 133 pounds, by C. Titus; two squashes, about 50 pounds each, by Marcellus Metcalf.

Household manufacture and miscellaneous departments, fully satisfy the Trustees that the ladies are wide awake. The articles exhibited were of the first-class; rarely equalled, never excelled. In this department a very fine display of cut and pot flowers was presented. The artificial wing of this department, it is said, could have been as well represented as the two first, had the Secretary understood by the name the value and class of the article presented. All such were sent to the miscellaneous committee, and thus injustice has probably been done to many contributors.

The fair of 1876 is an entire success, and we need no further proof that our success is mainly attributable to the practice of this Society's holding its fairs alternately in the several towns within its limits, thus enlisting new interests, perhaps competition, as to who shall best work in the cause of agriculture.

CUMBERLAND COUNTY.

BY SAMUEL DINGLEY, SECRETARY.

I hardly know what to say of interest this year, as agricultural matters run in about the same groove from year to year, except in some instances—and such instances are very few—where the modern farmer has stepped out of the tracks of his ancestors and has gone in for general improvements. We hope to see a more determined and continued effort among farmers to adopt broader and more liberal views to secure the success belonging to this class of our fellow citizens.

The Cumberland County Agricultural Society is in a very satisfactory condition; pays its awards in full, and always has a good surplus in its treasury. The Exhibition of the present year was a success in all directions. Perhaps this is enough to say in relation to our affairs. The amount of premiums offered was about \$1,200, the amount awarded about \$1,000.

EAST PISCATAQUIS SOCIETY.

BY O. S. BISHOP, SECRETARY.

The Annual Exhibition of this Society was holden in Milo, September 26th and 27th. The first day the weather was fine, the attendance large and the receipts larger than last year. The first day was devoted to the exhibition of neat stock, the trial of draft oxen and town teams. We had a good show of stock, better than that of last year. Oxen and steers are not plenty in this section, and farmers are doing their work with horses, as a rule. There is but very little thoroughbred stock owned within the limits of this Society. F. W. Brown exhibited a full blood Durham bull, also a full blood Jersey bull. William Severance exhibited a Durham bull, full blood; these three animals were the only thoroughbreds exhibited.

The second day commenced rainy in the morning, but cleared off about eleven o'clock A. M. The exhibition at the Hall, display of carriage horses, the trial of draft horses and the report of committees, closed the fair. There was a good display of farm products. Of household manufactures, fancy work and flowers, there was the usual variety.

The hay crop this year was very large, of excellent quality, and secured in good condition. The crop of grain was under an average; wheat about an average; oats were light owing to the severe drouth. Corn was excellent, far above the average in quantity and quality; it is a crop that pays well. The potato crop was up to the average in quantity, and more than average quality. The fruit crop was hardly an average.

I think the farmers in this Society, as a whole, till too much land; they do not work their ground enough. If they would put their labor and dressing on one-half the ground, they would realize more profit from it. Another thing, they do not make their pasturing equal to their mowing fields. They hire too much stock pastured away, and lose a large amount of dressing that ought to be saved on their farms; besides a hired pasture is usually overstocked, so we loose a large per cent. on the growth of our animals. The keeping of too many horses, and not a sufficient number of oxen, is another bad practice which our farmers follow. They should change their hand at once.

SAGADAHOC COUNTY.

BY I. E. MALLETT, SECRETARY.

The Twenty-second Annual Fair of this Society was held October 10th, 11th and 12th; and we were favored with very good weather, on the whole, it being a little rough and windy the first two days, but not so bad but that we had a very good display of cattle, sheep and swine upon the grounds the first day. There were five town teams of oxen and five of steers, and they would compare very favorably with the teams of former shows. There were five entries of farm stock, comprising some thoroughbreds, and some of all grades, and we judge by the statements of the owners that they are among the best in our good old State.

I think I can safely say, that sheep and swine were never so fully represented at any former show, there being of the former the Downs, which predominated, the Cotswolds, Lincolns and their grades; of the latter, White Chester, which is the leading variety, Essex and Berkshire; and, judging from the report of the chairman, who by the way is styled "Prof. of Grease," from his long acquaintance with, and slaughtering of pork, there never was so nice a collection together in any one place. The dairy was fully represented by cows, as well as by the products in the hall, which excelled in quantity that of any previous show; and the thought occurred to me, that perhaps it might be owing to the meeting of the Board of Agriculture within our borders last winter, by the interest its discussions awakened. The display of horses and colts was also very good, especially of colts, and attracted a great deal of attention, the Knox blood being more generally shown.

The exhibition in the hall was fully up to the average, and we must say, that through the excellent taste of the chairman of the committee of arrangements and his assistants, the articles were never so well arranged, or the hall so beautifully trimmed, which added very much to the beauty and appearance of the hall and exhibits. The display of farm products was very good. Of wheat there were two entries, for crop premium, of about thirty bushels to the acre. Crops of the other grains, and corn, potatoes, turnips, &c., beside entries as samples, which were about the same as usual. We had, as last year, the exhibition of poultry in the lower hall during the fair, and it proved a very fine display. Farming implements were very fully represented by Messrs. Ken-

dall & Whitney of Portland, Furbish & Goddard of Brunswick; each showing plows of different patterns, mowing machines, &c.

We have succeeded financially, as well as in the exhibit, having received in cash the sum of \$2,053.19, besides the stipend from the State; and every one seems to be satisfied, who comes to the fair, that they get their money's worth. It is the object of the executive officers to throw out inducements that will excite the farmers to competition, and make a good show, and then people will come to see it. Our motto is still "Onward."

NORTH WALDO SOCIETY.

BY WESLEY WEBB, SECRETARY.

The Annual Exhibition of this Society was held at Unity, October 13th and 14th. The weather was favorable and all departments of the show were well filled. Much interest was manifested by the leading farmers of this section in the neat stock exhibited. The oxen and steers on the grounds, pointed plainly to one of our most profitable branches of industry. The chief defect of the fair was the absence of much valuable stock of all kinds. One could not help thinking that if all the good farmers had been present with their families and various agricultural products, the exhibition would have been vastly more interesting and instructive. More liberal premiums should be offered upon cows, sheep, grain, root crops, and dairy products, that farmers may realize the importance of both raising and exhibiting first-class articles.

The season has been favorable for most crops, hay being especially good. The cheese factory system, lately introduced into this section, is destined to work a decided change for the better. Ill kept pastures will be improved, old horses will be sold out of the county, and thrift and intelligence among farmers will be promoted. As we look back a few years we can see that the wheel of progress does not stand still. As we look forward we may well hope for greater advances than have yet rewarded our efforts.

ANDROSCOGGIN COUNTY.

BY W. R. WRIGHT, SECRETARY.

The Twenty-fifth Annual Cattle Show and Fair was held in Lewiston, September 26th, 27th and 28th, 1876, and was a decided success.

The first day on the grounds was devoted to the exhibition of neat stock and swine, which was well represented in quality and numbers. The discipline of oxen and steers was very satisfactory. Farm stock, cows and heifers, and young stock combined, made the show well worthy of observation. There were some nice sheep and lambs exhibited of different breeds, yet not as many as there should have been. Of swine there were thoroughbreds by H. B. Bartlett, Essex, Yorkshire, Cheshire boars, sows and pigs, also White Chester sow with progeny, by C. H. Haley.

The second day was devoted to the exhibition of horses and colts, of which there were a large number, embracing stallions, breeding mares, family and matched horses, the whole making a fine display of horse-flesh. The display of poultry was in the small hall, and consisted of 108 coops, comprising the various classes and breeds raised by fowl and bird fanciers, and making of itself alone a good show, and adding very much to the attractions of the fair. In the agricultural department there was a good exhibition of the products of the farm and garden, showing the fruits of a favorable season.

In the main hall the exhibition exceeded any ever witnessed in our county, comprising the products of our manufactories, our artisans, farmers, orchardists, tradesmen, florists, and a large display of household goods. The show of fruit gave evidence that Androscoggin is not easily excelled in quality or quantity. In floriculture much interest was manifested, and a good display was the result. Of bread, butter and cheese a fair exhibit was made. Of household manufactures a commendable display was made, also of the various labor-saving machines, &c. There were a third more entries of goods, &c., in the hall this year than at any previous county show, making the in-door exhibition a success, and satisfactory to all.

In response to the requirement of the Board of Agriculture, the Society offered one hundred and fifty dollars on orcharding and draining, which has encouraged quite a number to compete for the premiums and make improvements in the right direction.

Our President, Dr. A. Garcelon, delivered an address before the Society on Thursday A. M., at 10 o'clock, which was listened to attentively by all present. Its design was to show that agricultural pursuits stand at the foundation of true prosperity.

In our fairs we need the united coöperation of all farmers, manufacturers and tradesmen:—then we may not fear hard times, as mother earth is as ready as ever to reward our toils and grant good harvests, proper attention being paid to good cultivation.

REPORT OF COMMITTEE ON UNDERDRAINING.

There were four competitors on drainage and two on orcharding and fruit tree planting, viz: W. R. Wright, Lewiston, J. H. Jordan, Webster, D. J. Briggs, Turner, and John Goss, Lewiston, on drainage; G. H. Dillingham, North Auburn, and Z. A. Gilbert, Greene, on orchards.

Your committee, on the 22d day of last June, visited the premises of W. R. Wright and examined his land, which had been drained by him. It is naturally a wet, clayey soil, but at the time of our visit it was dry enough for a healthy growth of vegetables. I give his account of drainage. Mr. Wright says: "I commenced work in the latter part of October, 1875, in my garden, which is a clayey loam, quite retentive of moisture, yet with no springs of water, and dug seven trenches 12 feet apart and nearly 100 feet in length; also a depth of $2\frac{1}{2}$ feet, going $1\frac{1}{4}$ feet into the solid sub-soil. I also dug a cross drain 200 feet in length, which, with the covering, &c., cost me \$17.85; the tile and freight, \$19.36; plank for cross drain, 200 feet, for receiving upright drain, \$3.00; allowing for my own work, \$10.00; total, \$50.21; which is the whole cost for 700 feet of tile drain and 200 feet of plank drain. After the trenches were dug, in six of them I laid two inch tile, and in one of them three inch tile, making about 700 feet, and covered joints with birch bark and strips of oil cloth, covered with straw and then soil. The receiving cross drain 200 feet of wood for the time being, into which the seven upright drains entered, was eight inches square. The heads of the upright drains were left open so that a current of air is passing at all times, and in May, 1876, my garden was as dry and suitable for working as any other except sandy soil. These facts give conclusive evidence that drainage pays."

We next went to Mr. J. H. Jordan's, and were shown his field through which he had completed an underdrain. His statement

is: "I have laid 23 rods of stone drain, depth of trench $2\frac{1}{2}$ feet, width at the top 3 feet, at the bottom 2 feet; laid stones at the sides and at the bottom, then laid stone covering on same, making a course for water about 12 inches by 6 inches. The drain is on land with very little descent. Should it prove sufficient to keep the drain passage always open, no doubt great benefit will be derived therefrom. This drain cost for digging, \$11.50; laying stones and filling, \$11.50; hauling stones, \$17.00; total, \$40.00; being \$1.73 per rod."

John Goss' statement: "I have completed sixteen rods of under-drain on a wet, springy piece of land. Depth of trench 3 feet, width at top 2 feet, at bottom $1\frac{1}{2}$ feet, filled with small stones, the largest being placed at the bottom. They were thrown in promiscuously, to the depth of $1\frac{1}{2}$ feet, then covered with small brush and straw, and then completed by filling with the dirt from the ditch. Whole cost \$12.50, being 78 cents per rod."

D. J. Briggs says: "I have dug 40 rods of underdrain, depth 3 feet, width 3 feet at the top, and 2 feet at the bottom. The drain was made by laying stones at the sides of the trench, at the bottom, and then covering them with flat stones, so as to form a course or duct six inches square. Whole cost \$28.50, being 71 cents per rod." This drain will, we think, do good service, being on land of a hard subsoil, and having a slope sufficient to insure a free passage of water, a very important consideration in successful drainage.

We also visited the farm of G. H. Dillingham of North Auburn, one of the competitors on orcharding. We were shown a number of young apple trees (State of Maine growth) that had been planted for an orchard. They were well cared for, and were set upon underdrained and good orchard land. We cannot give an account of Mr. Dillingham's method of setting and caring for his trees, as the committee have not received a statement from him, a circumstance that we much regret.

Your committee are of the opinion that underdraining is practicable, and should be encouraged only where the difference in the value of the crops grown on lands drained and underdrained will compensate for the cost of drainage. This can be done on much of the land in our county. In many fields where the surplus stones have accumulated since their first plowing, and where low and wet places exist, trenches can be dug into which these stones should be placed, and when properly covered up will make a very efficient

drain, thus forever getting rid of the stones, oftentimes at less cost than dumping them by the roadside—always a nuisance. On farms free from small stones, no doubt tile drainage is the most economical and efficient. Whatever material is used in making underdrains, great care should be taken in having the ducts, or courses, in as direct and straight line as possible. All angles should be avoided, as dirt will accumulate in them, and soon fill the passage. In the absence of a better plan for loosening the dirt in the trenches, we could recommend the following: After the first or second plowing, take a large plow and attach a strong whiffletree to it, long enough to hitch a pair of oxen or horses at each end and leave space for the ditch between them. Then hitch to the plow with a chain, to be lengthened as the ditch becomes deeper. It is a slow, tiresome job to dig all the dirt by hand. The above method is a great improvement over it.

It is hoped that more attention will be paid to draining our wet lands, some of which when freed from the surplus water become the most profitable of any, ensuring from two to three weeks earlier seed time, and a greater difference in the maturity of the crops.

Our awards are as follows: D. J. Briggs, 1st premium, \$25.00; W. R. Wright, 2d, \$20.00; J. H. Jordan, 3d, \$15.00; John Goss, 4th premium, \$10.00.

Respectfully submitted.

N. HAM,
V. H. SPRAGUE, } Committee.

WEST SOMERSET SOCIETY.

BY BEN. MOORE, SECRETARY.

The Annual Show and Fair of the West Somerset Agricultural Society, was holden on the Society's grounds at North Anson, October 10th, 11th and 12th. The weather was so very cold and windy that it was impracticable for farmers at a distance to drive their cattle, and doubtless kept many people away. There were entered for exhibition and premium, seventy-four oxen, seventy-four steers, eleven cows, twenty heifers, five flocks of sheep, five flocks of lambs, a good exhibition of poultry, and some swine. The exhibition of oxen was excellent, being pronounced the best

for a number of years, both in numbers and character, the young stock was in good condition and made a good show.

The display of horses and colts on the second day was good, there being five stallions, twenty colts, twelve breeding mares, and thirteen family horses exhibited.

The Fair in Carrabasset Hall the third day was good, and fairly attended. The severity of the weather made the attendance small, so that financially the exhibition was nearly a failure.

The farmers of West Somerset have met with average success in their agricultural pursuits the past year. The hay crop was above the average, the grain fair, the potatoes few, but of good quality.

NORTH AROOSTOOK SOCIETY.

By C. F. COLLINS, SECRETARY.

I can only say in making up my report for this year, that our Society is in a measure doing something towards awakening an interest in agriculture, and encouraging the raising of good stock, crops, &c.; but owing to limited means and want of interest by the majority of farmers, the attendance at our show and fair is not what it ought to be. The show of cattle, sheep, swine, horses, was small in number, but most excellent in quality. The show of crops of all kinds, fruit, household manufactures, &c., was better than for some years past. The officers of the Society are doing all they can to bring out an interest and get up a good exhibition, such as the county is capable of doing if disposed; and we hope that the interest will increase in time so that we may be able to report a large show of all kinds of agricultural products.

FRANKLIN CENTRAL SOCIETY.

BY J. M. KEMPTON, SECRETARY.

The Second Annual Show and Fair of this Society was held the first week in October, in Strong. This town is situated in the centre of Franklin County, eleven miles above Farmington, in the Sandy river valley. It is noted for its enterprise and thrift. J. W. Porter and William H. Dyer's steam mills are doing a large and thriving business. The Sandy River Cheese Company was the first cheese company chartered, and built the first factory in the State. We have a good Starch Factory, where the farmers may dispose of their potatoes when the market is too low for shipment. The Society the present season has purchased and permanently fenced a good ground for the use of the Society, costing about seven hundred dollars, and at its last meeting a committee was chosen to draft a plan for a building upon the ground, to report at the annual meeting in March. The towns represented in our membership are Strong, Avon, Phillips, Salem, Freeman and New Vineyard. The Society has a membership of over one hundred.

The season has been a prosperous one for the farmers. Hay has been above an average, and was secured in excellent condition. More wheat was sown the past season than usual, and a good yield was secured. Isaiah Welch reported forty bushels and James L. Boston twenty-seven bushels to the acre. Of corn, Pliminton Daggett raised 156 bushels of good, sound ears to the acre, and S. W. Weymouth 58 bushels of good ears, five bushels of beans and six cart loads of pumpkins on one-half acre. The potato crop was a good yield. True & Dodge reported 160 bushels to the half acre, J. L. Boston 300 to the acre, and Wm. W. Smith reported 125 bushels of Orono potatoes and five bushels of beans to the half acre.

The display of all kinds of stock at the exhibition was very good. Our people are doing a good thing in the line of full bloods. Stephen Morrill presented a full blood Jersey bull, a most excellent animal; Seward Dill, full blood Ayrshire; Silas Burbank a full blood Durham, and John Hoyt a full blood Hereford. Two fine herds were presented, one by S. Dill and the other by William C. Howland. The sheep department was represented by both fine and coarse wool. The exhibition of swine and poultry was rather meagre, but the display of horses and colts

was excellent. William E. Bates and Rufus Graffam took the premiums on stallions; Thomas G. Sanborn on matched horses; True & Dodge on gentlemen's driving horses, and John Hoyt and J. M. Kempton on breeding mares. The Society offers no premiums on trotting horses.

The exhibition at the Hall the second day did credit to the Society. Seed corn, vegetables, fruit, honey, butter, cheese and bread, made a rich display, while the ladies' manufactured articles did much credit to the fair ones. A new feature to the exhibition was the children's department, and children under twelve years old took twenty-two premiums.

The address was delivered by Rev. O. H. Johnson of Jay. It was an able production, did credit to the man, and was listened to with marked attention by a crowded house. A Divine Providence has smiled upon the honest toil of the husbandman and mechanic in Franklin Central, and the reward is sure.

NORTH PENOBCOT SOCIETY.

BY W. B. PINKHAM, SECRETARY.

The Annual Cattle Show and Fair of this Society, was held at Lincoln, September 28th and 29th, and was a decided success. The number of cattle on exhibition was not so large as at some of our former shows, but I think they made up in quality what they lacked in numbers, which goes to show that our farmers are awake to improving the quality of their stock, although it may be at the sacrifice of numbers. Among the different breeds exhibited were the Shorthorn, the Dutch and Herefords, (for the larger breeds) and the gentle Jersey with accompanying specimens of gilt edged butter. Among the most noticeable of the stock on exhibition, was a three years old Hereford bull, exhibited by James C. Emerson of Lincoln, which for size and beauty I think can hardly be excelled in the State, girding seven feet four inches, and weighing 2,000 pounds. He has been kept for service by Mr. Emerson, the two past seasons, and judging from the number of white faced calves and yearlings on exhibition, I think we may reasonably expect good specimens of this stock for years to come. There was not so large a number of sheep entered as at some of

our former shows, but among them were some very good flocks. John B. Porter of Lowell, exhibited a full blooded Cotswold buck lamb, which took the first premium in his class. We missed the long town teams of sleek oxen of former years; the noble ox, on too many of our farms, has been superseded by the horse, consequently no town teams were entered.

Our show of fruit and vegetables was never surpassed by any former show, and I think could hardly be excelled even in older agricultural districts. Much credit is due to the ladies of our Society for their untiring effort in so tastefully arranging the hall, and for specimens of their handiwork, both ornamental and useful, which added very much to our shows in the hall, and while we are not ready, perhaps, for the question of woman's rights, we certainly must concede to them the right to participate in our agricultural fairs, for without their coöperation and presence, our exhibitions would lose one of their greatest attractions.

The collection of domestic wines, preserves and jellies, exhibited by Mrs. John F. Robinson of Lincoln, was very attractive, showed much skill in their preparation, and we hope will prompt many others to go and do likewise.

In the evening of the first day of the fair, an able address was delivered by the Hon. A. M. Robinson of Dover, which was listened to by a large and intelligent audience, with much interest and profit. Mr. Robinson, although a lawyer by profession, is a practical agriculturist, and his suggestions in relation to farming are well worthy of adoption.

Farming in this section the past year has been attended with very good results, and wherever the farmer has applied his time and talents to his profession with judicious management, his labors have generally been rewarded with bountiful crops. The hay crop was fully an average one, and was secured in good season and in excellent condition. Potatoes were a fair crop and of excellent quality. Oats were below an average of former years. Barley is but little sown, but some very good crops have been reported; W. B. Pinkham raised on two acres of land, sixty-five bushels of the two rowed variety, and was awarded the first premium. There was probably a larger breadth of wheat sown this season in this section of the country than for many years past, but owing to the dry weather in midsummer the growth was somewhat retarded, consequently the yield was not what it would have been under more favorable circumstance. The crop, how-

ever, was an average one, and I think the most profitable crop the farmer can raise. To give some idea of the amount of wheat raised in North Penobscot, I will state that one mill in Lincoln, ground in six months, from October to April, 1875-6, 4,174 bushels of wheat; and another mill only two miles distant, probably ground as much more, which would make an aggregate of 8,348 bushels ground at these two mills alone in six months, and all grown within the limits of our Society. Corn was but little planted, consequently but little raised; but samples shown at our Fair proved that it ripened well and attained a fair growth.

PISCATAQUIS CENTRAL SOCIETY.

By D. W. BROCKWAY, SECRETARY.

The Twenty-Third Annual Exhibition of this Society, was held at the Fair Grounds, Foxcroft, October 4th and 9th. Special efforts were made by the officers and others, to make the show creditable in each of the several departments. The weather on the morning of the opening day was cloudy, with indications of rain, which prevented many from bringing in contributions of stock and products to the show. The whole number of entries was 347, being an increase above former years. In the arrangements of this Society, the first day is mainly devoted to examination of stock and farm products, trials of strength and discipline of teams, and general committee work; reserving the closing day for trials of speed horses.

Stock—In this department the show was unusually full. Of thoroughbreds a larger number were exhibited than were ever shown at any previous fair. Gilman Brown & Son of Sangerville, exhibited thoroughbred Shorthorns; Luther Chamberlain of Foxcroft, thoroughbred Jerseys. The long line of magnificent oxen and thrifty steers shown, proves that farmers are not ready to exchange the slow and sturdy ox, for farm labor, for the faster but more expensive horse. Town teams were entered by Dover and Foxcroft—Foxcroft bearing off the palm for excellence. There were eleven entries of bulls, several being thoroughbreds. Capt. Daniel Spooner, Chairman of the Committee on these animals, in his report says:—"Those of us who can look back forty years

and compare the stock in the county then with what it now is, cannot fail to notice that a great improvement has been made." There were thirty-two entries of cows and heifers; for herds, two entries. For stock-raising and general farm purposes, the large breeds of cows are preferred. For dairy purposes the Jerseys are being largely introduced. The show of sheep was very creditable. Nearly all shown were of the large breeds, they being thought the most profitable. Capt. P. M. Jefferds has at different times brought into the county thoroughbred Cotswolds, and farmers have availed themselves of this favorable opportunity offered, to improve their flocks. Of swine there were several entries, all good specimens of the improved breeds; and there were quite a large number of poultry shown, including hens, turkeys, geese and ducks, showing that this branch of rural economy is not being neglected.

HALL. In the Society's large hall was exhibited a very full and fine collection of the products of the dairy, the garden, the orchard and vineyard. Occupying one side of the hall was a splendid display of household manufactures, exhibited by the ladies, comprising many specimens of useful, ornamental and fancy articles. A very attractive feature of the show was the centennial department, in which were exhibited many relics of "ye olden time."

Fruit. There were on the tables 116 plates of apples, nearly all of which were splendid specimens of varieties adapted to the climate. The largest exhibitors of fruit were J. L. Leighton, who exhibited thirty-seven varieties of apples. In his collection was a seedling, a valuable variety, which he calls the Eastern Queen. James Plummer of Dover, exhibited thirty-five varieties; Capt. W. S. Place, twenty-four varieties, among which was the Rolfe, a large red apple, which originated in Guilford in this county. H. L. Leland of Sangerville, exhibited twenty carefully selected varieties. Luther Chamberlain, Foxcroft, exhibited sixteen varieties of grapes, well ripened. There were also on exhibition several plates of pears. The products of the vegetable garden were exhibited in large quantity and of excellent quality. The splendid traces of corn exhibited, ought to teach farmers that with suitable effort corn may be produced sufficient for home needs. At present we are largely dependent on the West for this valuable cereal.

Dairy products. There were shown eleven jars of butter; what with Jersey cows and good dairy women, the several samples shown were of such high excellence and equal uniformity, that to

show suitable appreciation the committee, after awarding the several premiums; recommended gratuities to several other samples of equal excellence.

Farm Implements. A very superior plow was shown by J. R. & W. B. Holmes; baskets, by C. Weston. J. L. Leighton exhibited a patent apple picker, a very convenient implement in gathering valuable fruit. Mr. O. Sanders exhibited a Davis Rock Lifter with an improved spring, very much facilitating the lowering of the rock after being raised.

Manufactures. Carriage work was exhibited by B. A. Hammond; harnesses by Curtis & Laffaty, and organs by Dyer & Hughes.

On the morning of the second day rain commenced to fall, and continuing wet compelled an adjournment till Monday the 9th. On the closing day came the trials of speed horses on the track. As usual a large crowd was in attendance to witness these exciting contests.

The season, as a whole, has been a propitious one for the farmer. The hay crop was abundant and secured in excellent condition. Of wheat a larger breadth was sown than in any previous year in the past twenty years. The yield per acre was above an average. Potatoes above an average crop, and of excellent quality. The corn crop was good. Fruit abundant. Within the limits of our Society improvements are noticeable in the erection of new buildings, and the improvement of old ones; in the planting of fruit trees, clearing up waste places on the farm, and in other works of rural industry. These annual gatherings from year to year, clearly indicate the growth, thrift and general intelligence of the people, and are worthy the earnest support of all.

AROOSTOOK COUNTY.

By J. FRANK HOLLAND, SECRETARY.

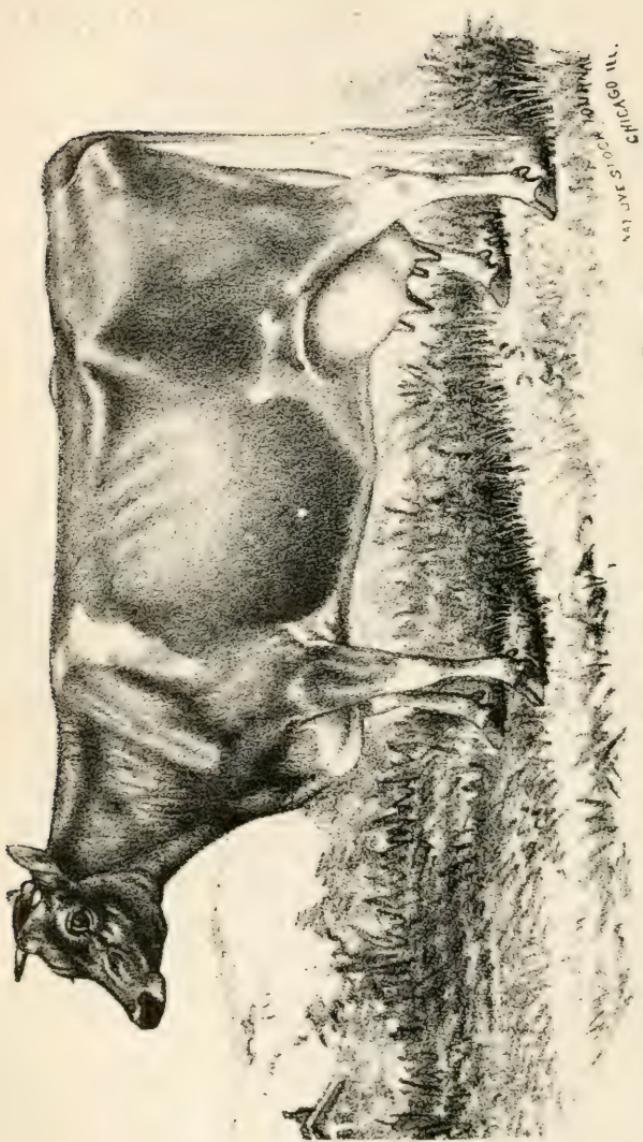
The Aroostook County Agricultural Society held its Annual Cattle Show and Fair at Houlton, on Thursday and Friday, September 28th and 29th, with favorable weather and a good degree of success generally; although the exhibits were not so full in some departments as in some former years, owing probably

somewhat to the brisk trade in farm produce then engrossing the attention of our farmers.

The show of stock on Thursday was excellent in all classes, and the entries were as follows: of neat stock 102, being 12 bulls, 20 oxen and steers, and 70 cows and heifers; of horses 50, being 36 draft and 24 roadsters; 68 sheep, and 15 each of swine and fowls. There were among cattle quite a number of thoroughbred Short-horns and numerous grade Jerseys, but entries were mostly grade Durham and Hereford, many of which show very fine breeding. The exhibition of horses showed that our farmers are steadily seeking fine and serviceable horses, rather than the fancy and speed animals more in favor some years ago. The showing of sheep was larger and better than usual; mostly grade Cotswold, but some Leicester and Merino blood, and one Lincolnshire buck. J. Dean Gove of Linneus, showed one prolific ewe, seven years old, of Leicester and Cotswold blood, with triplet lambs five months old, weighing respectively 100, 85 and 80 pounds. The Fair on Friday was rather light in both entries and attendance, but the display of fruit, though small, contained the finest specimens of Aroostook apples yet shown here, especially the beautiful Alexander, Duchess of Oldenburg and Summer Harvest varieties. These, together with the Red Astrachan and Fameuse, and different grafted crabs, all seem to thrive well in this county.

The address was given, for a second time, by Rev. R. R. McLeod of Houlton, and was given in the nature of a plea for higher mental culture, and more and better scientific knowledge among farmers generally.

There was no trotting or premiums for "fast horses," and the "agricultural horse trotting" feature may be considered as fully abandoned by this Society.



HIGH TYPE OF A JERSEY COW,
LUSTRE, SELECTED FROM THE HERD OF C.S. DOLE ESQ.
CRYSTAL LAKE, ILL.

NAT. JIVE STOCK CO.
CHICAGO ILL.

SELECTED PAPERS.

IMPROVEMENT OF DAIRY STOCK.

A PAPER READ AT THE MEETING OF THE MAINE DAIRYMAN'S ASSOCIATION AT NEWPORT,
By SEWARD DILL, PRESIDENT OF THE ASSOCIATION.

There are three great branches of industry for which our State affords rare facilities: they are Agriculture, Commerce and Manufactures. The two last are so intimately connected with the first, and so dependent upon it, that without its prosperity they must languish and die. It is presumed this proposition is self-evident to all who have given the subject even a casual consideration.

Now, inasmuch as Dairying at the present time constitutes one of the leading branches of agriculture, it will be readily seen that its interests are of the highest moment to all. Any system, then, which in practice will give us better cows for dairy purposes, will confer an immense benefit upon mankind. If you go among many farmers and suggest an improvement in their cows, they will reply, "My cows are good enough, first rate," &c. And if you intimate that the cows need a little better care, they reply, that they understand their own business, and insinuate gently the propriety of your attention to yours; and all this, too, in the face of the facts that the average of cows in this State are not worth fifty per cent. of a first-class animal, and that more than half of them are not properly cared for.

Thanks, however, to our schools and press, the most of our farmers are interested in improvements. The grazing lands of Europe are each year becoming less in proportion to the population; the dairy products are those that few families will do without. Our exports are destined to be larger; the dairying interest is yet to be second to none in Maine, and hence it is one all farmers should regard as of the highest moment.

The Jersey and Ayrshire cows have been acknowledged for the past hundred years as the leading dairy cows—the former for butter, the latter for cheese. In this age of cheese factories, while

the milk during the summer is converted into cheese, (and the Ayrshire cow is a great cheese producer,) it is also true that the fall and winter months will require the Jerseys, with their admirable butter-making qualities. Now, if dairymen could be induced to spend more time in investigating successfully and answering the question, How shall we obtain more and better milk? it is evident that the cheese and butter interests, comparatively speaking, would take care of themselves.

What stock shall we breed from? It is said by those who ought to know, that many years ago Alderney stock was imported into Ayr county, Scotland. This blood mingled with the native, resulted in what we know as Ayrshires. The native stock gave the breed its vigor, the Alderney gave it improved quality of milk. The fame of the Ayrshires is too well known to need any special mention here, and these characteristics are so firmly established that this preserves its high reputation, although carried far from home.

Let us refer briefly to one other breed, the Jerseys. They originated on a group of rough, rocky islands off the northwestern coast of France; the larger of these islands are named Guernsey, Jersey and Alderney. On these islands a breed has originated, whose milk is justly celebrated for its richness, especially for its butter-making qualities. The superiority of the Ayrshire and Jersey cows in this country, as cheese and butter makers, is no longer a question, but a well settled fact. Both these breeds, (the Ayrshire and Jersey) when crossed with our native stock, add to it qualities which are so rightly renowned. It would seem, then, that by judicious crossing, the matter of raising cheese and butter cows is one of very easy attainment.

In breeding cows, great care should be taken to select the best animals on both sides. In crossing the Ayrshire and Jersey, we combine both butter and cheese qualities in the same cow; so, when through making cheese in summer, we are ready for the manufacture of butter in fall and winter. If there is to be a cross on other breeds or native cows, use the full-blood Ayrshire or Jersey bull. Be careful to select cows that are healthy, have good udders, and especially good sized teats. Raise no calves but such as have good points and bid fair to make good cows.

Now, for the care of cows, have stables fitted up so as to be clean, warm, well ventilated, and plenty of pure water. Do not forget good clean bedding; keep them clean and tidy; card with

a coarse and fine card every day, (the common wood card is just the thing for the fine one). Take them carefully to the place where they are to be tied. Don't scream at them, talk in a low, kind way, and above all do not strike or kick. They very soon appreciate kindness, and after two or three times tying up will go to their places. Water twice a day, unless they are allowed to run out where they have access to it. Feed regular what they will eat up. Feed breeding cows with just such feed as you would while in milk. In this way you are developing milking organs of the calf. For this, roots are of great value, especially the sugar beet—shorts or bran—one of the best feeds. Cut your hay, mix and wet with hot water if convenient, and let it stand a few hours. If no cutter, sprinkle the hay with water and put the bran on it. This is much better than feeding separate and dry. Where cows are fed in this way, the calves will eat bran at three days old. When bran is freely used, the calves are more intelligent, and will learn much quicker than when the cows are kept in the ordinary way. A calf from a cow that has always been kindly treated, is worth much more than from one that has been ill used. Be kind to the little calf, and all the way along until it becomes a cow, don't abuse it any way. Look out for the hired men. It has been their practice to kick and thrash the cattle, and many of them think it all right to do so. It is an easy matter to spoil a young high-strung cow. I will relate one instance :

A neighbor raised a nervous cow. He treated her very kindly, so that she was gentle. At five years old, on account of a short crop of hay, he sold her. He told the purchaser that he must be very careful and kind, for she would be wild if badly used. This advice was not heeded. The cow was driven home, tied up, and when the man went to milk he yelled out, and gave her a slap which frightened the creature, and as he grabbed hold to milk, her hind feet flew up. On that the milking stool was broken to pieces over the cow. She held up her milk, and dried off in a few weeks. This was the last of a good milker, which was fattened and sent to the shambles.

In the first of this paper it is said that the cows in Maine are not worth fifty per cent. of a first-rate cow; and why should we be surprised at that? Twenty seasons' trading in cattle from this State to Brighton, Mass., gave me an opportunity to observe that the farmers generally would sell their best heifers, because they could get a dollar or two more for them than for a mean one. The

latter would do to give milk and raise calves ; no notice taken as to any points for a cow, not even to see if she had any teats at all. On the other side, if there were some bull calves, all that were worth raising were made steers of ; and some miserable little scrimp kept to breed from, no matter what his ancestors were. And I am sorry to say many farmers to-day will patronize that little sneak rather than pay one dollar for the use of a first-rate animal. There is one case worth naming :

A farmer used a scrub because he sold his calves to the butcher. He purchased a cow that had been served by a good bull. This calf at six weeks old sold for eleven dollars, while his others sold from five to seven. This opened his eyes, and he became converted to better stock. Yet there are thousands like unbelieving Thomas.

The dairy is yet to be, if it is not already so, an important branch of national industry. It is rapidly spreading over our fields. The foreign demand for American dairy products is yearly increasing. To this may be added the fact of a reliable home market. The system of associated dairies is now so highly perfected, that the business can be readily introduced into new sections with the greatest ease, and with almost certain success. All we need, to put our State to the front in dairy productions is, to have in the right direction a *long pull*, a strong pull, and a pull all together.

PREJUDICE AGAINST INDUSTRIAL SCHOOLS.

BY T. C. ABBOTT, LL.D., PRESIDENT OF THE MICHIGAN STATE AGRICULTURAL COLLEGE.

A few winters ago I met in Washington a very pleasant and intelligent gentleman, who from his large wealth was about to give some sixty or seventy thousand dollars for the advancement of higher education. He had been for some years, and was still, the president of a State Agricultural Society, and was commissioned by the Governor, under a State law, with almost despotic power over cattle suspected of a prevalent disease. These were evidences of the high esteem in which he was held.

He was a farmer. Did he then endow some chair of agriculture, or agricultural chemistry, of veterinary science, of horticulture, of zoölogy, or entomology, in some institution? Did he fit out an experiment station, like some of those in Germany, to analyze fertilizers, to study the fattening properties of different kinds of food, and their digestibility, or to study any other of the perplexing problems which his own business could have suggested to him? Did he exemplify on some farm the effects of high culture, like Mechi, or of thorough drainage, or in some such way make the lessons of an advanced agriculture visible to less informed farmers? Did he help along an agricultural college, or establish an agricultural library?

None of these. He found the science that was the most advanced of any, the one that government supports at a great annual tax upon the people, and nobody complains,—the science that had last year (1874) an additional sum of \$150,000 from the public treasury and the command of our navy; ignoring the struggling endeavors of agriculture to become a science, this farmer gave his thousands to endow another workshop of astronomy.

He is no sinner above the rest of us. We are willing to be fed by agriculture, and clothed by practical machinery, but if these and kindred industrial arts claim any place beside the Greek and Latin, mathematics and its applications, especially astronomy, beside metaphysics, law, medicine, theology, literature, they are frowned away because of their working-day clothes.

Supremacy of the Classics. A course of study made up mostly of Greek, Latin, and mathematics and its applications, and philosophy, usually goes by the name of the classical course. Until a recent period no course of study, however thorough and protracted, was supposed to give that discipline of mind, that culture, that acquaintance with what a scholar should know, that would entitle one to be called educated. This term, educated, had a technical and limited, and as I believe far too narrow an application. The prejudice is by no means gone by, but to a great degree domineers over both the educated and the unlearned people of this day. But the educational problem has broken out afresh, and this time it is the battle of the classics and the sciences.

Statement of the case. While the sciences, other than the application of mathematics, have been of immense importance in modern life, they have been slow in fighting their way into modern courses of study. "Ten years ago," says *Nature*, a London weekly scientific journal of the highest authority, in its volume for 1869, vol. 1, p. 25: "Rugby was the only public school that taught science at all. No school was assigned to it. It was an extra, and heavily weighted by extra payment." The great universities, rich in their rewards to those who came from the schools with high scholarship, ignored proficiency in sciences almost altogether; so the whole influence of social standing and great wealth were on the side of the classics. This is still so, to a great, a very great, extent. The schools and universities, backed by the customs of a long past and the prejudices of the day, wait for a miracle to set things right. They say they wait for each other. The schools say they must prepare scholars for what will take the prizes; the universities, that they must give their rewards to those who are properly qualified. The slow workings of public opinion will in time, however, call Cinderella from beside the ashes to her proper place, the equal of her sisters.

American colleges copied the English. They were designed chiefly to educate clergymen. I hold in my hand a Yale College catalogue for 1841-2. There was then no scientific school at Yale. The catalogue speaks of certain limited courses of lectures in the natural sciences, delivered to different classes, but if we look to the one course of study which all students were obliged to pursue, we find in that no chemistry, no botany, no zoölogy, no geology, nor anatomy, physiology, mineralogy, meteorology. It is all

Greek, Latin, mathematics and its applications, philosophy, logic, and the like. The man who graduated then, however ignorant of his bodily system, of the earth and its productions, was educated.

When, at a later date, scientific courses were adopted, they were put on an inferior footing, and inductive sciences were admitted unwittingly to any fair share of attention.

Examples could be multiplied extensively to show the grudging way the claims of science were admitted, and the inferior discipline that was required of students of scientific courses, while on the other hand these students were expected to sustain themselves against others who had received three more years of instruction in the schools.

In more recent years a great change has been made in the courses of study that colleges present to the choice of students. Harvard and Yale, and a large number of colleges have their scientific schools and courses. As yet, however, the scientific courses are held in inferior estimation. In most institutions this lower rank is forced upon the course by its inferior standard for admission. The University of Michigan, always in the advance guard of progress in educational matters, is one of the very few, if not the only one that has put scientific and classical education on an equality of rank, and the prejudice that still lingers against the scientific courses as inferior, will soon die out when the preparatory schools that feed the University begin to take a like pride in fitting for the scientific courses that they do for the classical ones, and when the college students in the sciences exhibit a like discipline and power with the others.

In part just. A part of this predilection for the classics is just. Our civilization, our literary culture, our philosophy comes so largely from the Latin and Greek that no other ancient languages and literature can compare with them in interest and usefulness to us. The Grecian models are in their limited way so faultless that they delight and instruct us. Nor as fountains of knowledge are they by any means exhausted. When we thought we knew Athenian history aright, and that it warned us against democracy, then there comes a Grote, who, reading the same old Greek books under the influences of a new age, and with the experience of a statesman, shows us how this same history tells for republican institutions and freedom. Classical courses besides have been found efficient means of education in the past. It is the meat on which

the statesmen, lawyers, theologians and scholars of the past have been fed.

In part historical. In part this predominance of classical studies is an inheritance from times so unlike ours, that the reasons for it no longer exist. In the Dark Ages people did not read. Turn to Hallam for the picture of the dense darkness of the times. According to Pauli, in his life of King Alfred, judges could not read the laws they administered. The revival of learning, and the taking of Constantinople by the Turks, filled Europe with scholars and with books. In what languages should they read and study? In Latin and Greek, for there were no other. In what should they write? In Latin; for English, German, and French were then unshaped, or at least thought to be narrow and unsettled. Latin became the language of scholars; and so late is the sway of this language, that Bacon wrote his *Philosophy*, Newton his *Principia*, Milton the Republic's official letters, and Berkley his *Theory of Vision* in it. It still lingers in Triennial catalogues and Commencement addresses. Formerly these ancient languages were essential to the educated man, for without them literature, science, and professional knowledge were not to be had. It is so no longer. German and French will open more treasures of learning than all the languages the earth possessed fifty years ago. The English alone will do it. If Latin and Greek still deserve the predominance they possessed it must be on new grounds, and the fact that what was best educationally in former times is still so in changed conditions, if it be a fact, is, as Goldwin Smith has pointed out, a simple, although remarkable coincidence.

The Greek and Latin books that furnished all the matter of education in old times had much to do with the relative esteem in which science and literature were held. What could the scholars of those times read? Certainly what the classics contained, not what they did not afford. These books contained treasures of history and poetry; they discoursed of rhetoric, politics, morals, philosophy, and art. They had comparatively little of science, and almost nothing of the practical affairs of life. The curious may see this matter clearly set forth in John Mason Good's *Book of Nature*, Series 2, Lecture eleven. Aristotle, translated from the Arabic, introduced the scholastic philosophy; Greek and Latin brought metaphysics, literature and languages to the schools, and poetry, painting, and sculpture became the pride of courts; but science, and even mathematics, languished. When Oxford had

thirty thousand students, and Paris still more, Roger Bacon could find but two good mathematicians in the world.

Craik (English Literature, Vol. 1), says metaphysics and logic, together with divinity,—which was converted into little else than a subject of metaphysical and logical contention,—so occupied the crowd of intellectual inquirers, that except the professional branches of law and medicine, scarcely any other studies were attended to. Down from times when this was a true picture of its educated men, our universities and colleges have come impressed with no inconsiderable portion, so to speak, of the old neglect of natural science. Great schools are conservative, and with a haughty disdain of learning not imparted by themselves, they adhere to their first definition of learning, and the veneration every man pays to the institution where he took his degree, helps to preserve the notion that there is but one way to the ranks of the educated, and that is by the beaten track of a collegiate course of Latin, Greek, and philosophy. It is an old saying, that possession is nine points of the law.

Discipline. It is said that scientific studies do not discipline the mind. Sir William Hamilton thinks the physical sciences are good for those dull alumni who are incapable of thought.—(Discussions, Harper's Ed., p. 705). He and such as he, know the educating effects of the studies they have themselves pursued, but do not know the value of studies into the spirit of which they have not entered. All things seem easy to him who has not tried them, and every youth would drive the chariot of the sun if he could. Science seems a mere committing of facts from a book,—that is the idea these scholars have of it. Dr. Wayland, formerly of Kalamazoo, overheard a graduate expressing regret that he had had but four weeks' study of geology. He heard his classical friend, an able and well informed man, reply, "Well, I presume that in that time you learned all that is to be known about geology."

An able educator once passed with me an hour in a class in zoölogy, and on leaving remarked, "Do you call that education? I," he said, "certainly do not." It seemed to him a tax on the memory alone. There is a way, of course, to make any study a process of memorizing. It is not confined to natural history. Carlyle thus thunders his condemnation of the routine study of the languages, in his *Sartor Resartus*: "My teachers," said he, "were

hide-bound pedants, without knowledge of man's nature or of boys'; or of aught save their lexicons and their account books. Innumerable dead vocables they crammed into us, and called it fostering the growth of mind. How can an inanimate, mechanical gerund-grinder foster the growth of anything: much more of mind, which grows, not like a vegetable (by having its roots littered with etymological compost), but like a spirit, by mysterious contact with spirit; thought kindling itself at the fire of living thought. * * The Hinterschlag professors knew syntax enough, and of human soul thus much: that it had a faculty called memory, and could be acted on through the muscular integuments by appliance of birch root."—*Pedagogy*, p. 84. Or come down to this very winter of 1875-6, when the distinguished professor of Greek in Edinburgh complains of the great University of Oxford, that "a great deal of harm is done to young men, who are merely drilled like a parcel of old Prussian pipe-clay sergeants."—*Weekly Scotsman*, Nov. 20, 1875, p. 6.

Of course, when the methods used in the languages rule in the study of science the results are not satisfactory. "This, therefore," said Bacon, "is the first distemper of learning, when men study words and not matter." Science, to be disciplinary, has its own methods. Properly pursued, they have probably no superiors in the development of the perceptive and discriminative faculties, of the judgment, the imagination, and the power of generalization. Their influence over the moral emotions is profound and healthy. The subject has received so much discussion of late years that I forbear to enter it farther at this time.

A contrast. Here, then, is a man who has been classically educated. He expatiates free o'er all this scene of man. He understands the languages in which the literature of the world is written. He writes histories, guides thought on many subjects. Shall we not call him learned? The world does so and justly. And yet perhaps nature seals from his eyes its mysteries. He knows no chemistry, nor botany, nor geology. The enlargement of the sun as it rises in the east, the shifting colors and scenes of animal and vegetable life are outside of his thoughts and knowledge. Learned and cultured as he is, it is after all in a confined sphere of thought and enjoyment. He goes to spend his vacation at the sea-side. What takes he for his thoughts and study? a pocket volume of the Greek poet Euripides, and writes us the thoughts that arise as he reads, in prose so beautiful that we are constrained to read,

and to look again at the Grecian tragedies in his guidance. Froude may know more science than I credit him with. I make his name stand only to represent the kind of culture which many have who are called cultured and learned.

Here is another. He walks the sea-shore in his vacation, and a piece of chalk at his feet awakens a train of thought that goes back to centuries before Homer wrote, recalls to his mind the action of forces which in their wild, and varied, and yet law-abiding action, have made the world what it is to-day; not a motion of cloud or condition of the air, but recalls the results of the investigations of hundreds of observing and comparing students, who have, besides, supplied from deeper sources within themselves, through the exercise of high powers of insight, the key by which nature's workings are entered into and comprehended. He needs no book. Like Shakspeare's Jaques he finds

“Tongues in trees, books in the running brooks,
Sermons in stones, and good in everything.”

But his thoughts are not rambling. The sciences he has studied have method in them. Their principles are not made up, but discovered; and although hidden at first, and the reward of laborious research, are when found usually simple, always sublime, and far-reaching in their relationships. He feels as he looks through this book of nature that he is reading the very thoughts of God.

He knows English, and German, and French—and they have brought to his use the observations, the speculations of the foremost philosophers of our time. They serve him, too, to express in clear terms, facts, theories, and principles. Should he be found ignorant of Greek and Latin will you term him uneducated?

The truth is, he who has not had physical sciences in his course of study lacks a kind of discipline that is very important. The problem of reducing the process of induction to the form of an aristotelian syllogism is yet unsolved. The power of learning directly from nature herself, of observing, comparing, and making an induction cannot be learned by any use of books. A little geology here and a little physiology there in a classical course, cannot serve the uses of science as an educating power. Courses of study must be lengthened, or some students must be allowed to choose the sciences to the neglect, say, of Greek and Latin, and credit must be given for its equal educational power. Classical courses usually contain astronomy, whose higher use, educationally, is in a certain discipline of the imagination, the imparting of

a power to hold steadily in mind circles great and small cutting the sky, while we reason on the relation of their parts and movements. The physical sciences make a constant demand on this kind of imagination. Some of the subjects of physics—like polarity—cannot be comprehended without this discipline. The same is true of the classificatory sciences when carried beyond the rudiments. Properly pursued, a term's study of science ought to be worth as much educationally, as a term of Greek.

Bread-and-butter Schools. Industrial schools have been looked down upon, as of a grade altogether inferior to those of a literary, classical, or philosophical kind. They have been considered as in some sort bread-and-butter schools, whose highest aim was to clothe and feed this miserable body, while literature and science were wont to strike their sublime heads against the stars.

Let us look a little into this matter of dignity. I freely admit that the educated man finds, or ought to find, in his studies, a happiness superior to that of mere bodily comfort and enjoyment. These are not to be despised, but above them are the needs of our intellectual, moral, and æsthetic natures. I spent part of my youth in most intimate association with young men, several of whom now hold high positions in schools of theology, science and literature, and I know they enjoyed a good dinner as became them. But their delight was in the dramas of Sophocles, and other masterpieces of literature and philosophy. They would have thought themselves insulted by the insinuation that they sought truth but for truth's sake, or felt otherwise than that beauty is its own excuse for being. I believe this is the true spirit of the scholar, even in this working world. The dignity of philosophy, of literature, of history, I do not deny. What I claim is that these have no monopoly of this true spirit. Pure mathematics and astronomy, indeed, have been long admitted into the select company. Plato was a geometer, and made his science religious by saying God himself geometrizes.

But the same spirit that makes philosophy food for the soul may and does make all other studies a like food. It is not the bread that nourishes, but the blessing. It is not the text-book, but the man that determines the result of intellectual digestion. Philosophy, even theology, may be pursued in a sordid spirit, while pomology, geology and zoölogy, may receive the purest devotion to truth.

I walked over acres of ripening peaches with its proprietor. Peaches were made to eat. He knew the delicate flavor of his George the Fourth or his Douay, but he seldom tasted a peach,—they had become common to him. Peaches are made to sell. He understood his Hales, Crawfords, and Barnards. But over and above all this he had other delights. In work well done; in cultivation that kept his grounds clean of weeds, in having his labor performed up to the very requirement of his needs, in the success attending his efforts, there was the gratification of much higher than mercenary desires. He enjoyed the deliciousness of taste more in an æsthetic than in a sensuous way, and yet the enjoyment was real. He saw beauty in form, in color, in fragrance, in bloom, in rows of well-formed trees, and delighted in that beauty; and why should you say that this appreciation of beauty is not as pure and ennobling as in looking at a landscape painting of Cole, Turner, or Troyon?

I walked about the farm and barns of a successful farmer in Oakland county. As he showed me the barns he had planned with manifold peculiar conveniences, the well cleared fields and farm roads, all of which had come from out a dense forest, the product of labor, to be sure, but of labor joined with thought, and with the creation and upholding of an ideal, I could see that the ideal, and the partial success he had in attaining it, were a much larger portion of his daily enjoyment than was the competence he had acquired. Of course the competence, the success, gave free scope to this higher enjoyment. That, indeed, is the best use of material success.

The best promise of improved machinery is that it shall save time and strength that may be used to develop an interior excellence and enjoyment. If education and machinery will feed and clothe me in one half the time that was required without them, I have so much more time and strength for the achievement of further success. So of the nation, provided always that moral development keep pace with physical; for otherwise time means drunkenness and rowdyism. Nothing is of more importance, therefore, than that that education which can give employment to thought, to imagination, to taste, should keep pace with physical developments in a nation. In truth, sad to say, it always lags far behind.

But to return. These higher enjoyments are no exclusive prerogative of any class. The pomologist, the wheat-grower, the

stock-breeder in the midst of his straight-backed cattle, the machinist, the architect, are endowed with the same truth-loving, beauty-seeing nature as the architect, the landscape gardener, and the poet.

And this nature finds play in a scientific course of study. The unity in variety that appears in the vegetable world; the development of a few primordial forms into all the infinite diversity of shrub and tree and lesser plants; the plan of structure revealed in their comparison and classification; the laws of growth, fructification, and dissemination,—these intellectual parts are still more wonderful than what appears to the eye, beautiful as may be the blossoms of trees and flowering shrubs, or grand as are the monarchs of Mariposa.

As for study for its own sake, surely literature can show no more disinterested zeal than science in any of its departments. See Agassiz having, in his own words, "no time to waste in making money." See Faraday casting aside the certainties of wealth as a practical chemist for the external poverty and rich internal wealth of a life devoted to the discovery of truths of science. See Linnaeus, who seemed to care for nothing but his favorite science. See anywhere in the biography of scientific men a devotion to science as strong as ever bound a miser or inspired a poet. The same kind of enthusiasm, which in one place I have seen kindled by Greek literature, I have seen in another bestowed upon anatomy, or zoölogy, or geology, or botany, or chemistry. It doesn't hurt these studies that they are useful. We are not quite to the day, but we are approaching it, when men will not apologize for being useful. And now the whole division between useful and useless needs revision. If music cultivates the taste, bestows a refined pleasure, it is in its high way as useful as that which adds an increase of flavor to the peach or grape, for the less refined pleasure of the tongue. If Greek seems remote from our modern needs, it is only our ignorance of its relations thereto. I find, indeed, on turning to a work entitled "Classical Study, its value illustrated by extracts from the writing of eminent scholars," edited by Dr. Taylor of Philip Academy, that no argument for the study of Greek and Latin is oftener urged than their usefulness. Yet the book was purposely made to combat the aggressions of a scientific upon the classical courses of study. In my library there stands, peacefully unconscious of inner repulsion, a book compiled by Mr. Youmans, entitled "The Culture Demanded

by Modern Life." Its purpose is to recommend the study of science, and yet its pages are full of arguments drawn from the dignity of these objects of study, the true discipline the study affords, the deep pleasure it bestows. No one can say abstractly whether Greek or chemistry will be of the most use to a young man just entering upon a course of study, nor is there any reason why those who are in one course should look down in the least upon those in any other. Nor does one course any more than another overlook the true disciplinary ends of study.

The motives that operate to keep a person to a course of study are seldom simple and one. They are oftener mixed and of variable strength. The expectation of greater power through the two endowments of study, that is, through mental discipline, and through knowledge, is one strong element in probably the larger part of a body of students, and it is as honorable in the chemical laboratory, or the agricultural school, as it is in him who takes a literary and classical course that he may be the better speaker or writer. One studies to be a more successful practitioner, another to be a better engineer or farmer; where is the odds as regards the dignity of the motive? Then there is the sense of the dignity of our nature, and its obligation to *know*, and to develop within itself beauty and power. There is the native curiosity of man out of which comes philosophy and science, and which craves satisfaction in the pursuit of truth, as much as taste and imagination seek it in poems and marble. There is the desire to be useful, to forward society in its comforts, in the dignity of its employments, in its higher welfare. All these impulses find a fitting preparation in different lines of study; with some in classical studies, in a larger number in a knowledge of spoken languages and of the sciences. The proper ground it seems to me was taken by the eminent founder of Cornell University in his desire to spread his table with the elements of all knowledge, and then to count none of them common or unclean. There is no study which cannot be narrowing if studied in a narrow spirit, none without such relationships as make it ennobling. To the lean mind the highest truths of theology remain thin. Like the lean kine of the Nile, the mere knowing faculties may feed upon the fat kine, and never be the fuller. But to the generous mind all knowledge is sacred, and so connected with other knowledge as virtually to be a center of all truth. A Goethe can say of so meagre a thing as book-keeping by double entry, that "it is amongst the finest inventions

of the human mind.”* To learn all truth you may begin anywhere, and with any one. “All the arts” says Cicero, “which pertain to humanity have a common bond, and are united to each other in close relationship.”†

To do away with the prejudices against scientific courses, it will be necessary in the first place to put them on a par with the classical courses in the same institution so far as amount of previous preparation is concerned. Four years’ course with almost no previous preparation, can never be equivalent to a four years’ course preceded by three years of preparatory study. The tables would be turned, if the conditions were exchanged.

Again, the sciences must be taught in a way to make their study truly disciplinary. It is an advantage of ancient languages that they cannot be learned by the memory alone. Geometry may be learned by heart, the construing of Virgil cannot. The charge of teaching the sciences must be committed to those who are enthusiastic students and investigators, who will take their pupils into their own ardor, and make them learn directly from nature, not of course one out of a thousand of the facts of science, but enough to understand the processes of investigation and principles of classification.

Again, the students of science must have some general acquaintance with the affairs of men, and especially must be able to use language well. It is a mistaken economy of time that finds no place for long continued drill in the use of language. Critical reading of standard authors, exercises in the statement of facts, in arrangement of matter, in condensation, illustration, should be insisted upon in scientific schools. Besides the uses of language in communicating ideas, it has an educational one that ought not to be overlooked. Clearness of expression, and clearness of thinking usually go together. The attempt to put into language what we know, makes that knowledge more definite, sifts out the vague elements that we thought were clear until we attempted to give them expression. Thought and expression have a reflex influence on each other.

There is a prejudice against schools of science on the part also of those who think the practical results of an education should be more direct and marked. Men dislike a roundabout way to their purposes, even though it be the surest in the end. Teach us the

* Meister’s Apprenticeship. † Pro Archia.

art, the practice at all events, and let principles take care of themselves, they say. I said to a lawyer of a growing practice in one of our cities, you took a course in a law school? Yes, he replied, but I would not do it again, had I my law education to seek. It is a long way into the practice, and those who passed into the business through the simple training of a law office find themselves ahead. A professor of chemistry, a friend of mine, visited a soda factory in the West, and was received by the proprietor with the announcement that chemists were of no use to the world.

But scientific schools are founded on the principle of faith in the utility of science. Nothing is more useful than pure science. No one knows where it will reveal its utility. Because Galvani played with the leg of a frog we have the electric telegraph; and because others have watched the sands upon a plate above sounding strings, we can send music from Detroit to Chicago, and are like to be able to send several messages at once over the same wire. Hooke was ridiculed for his ‘swing-swangs,’ but the pendulum clock is the result of his experiments. It is to persons deeply versed in the principles of things, that we owe our great inventions. Lawyer Tull, returning to England after travel for his health, invents the seed drill, and when its introducer into the United States wished to simplify it he applied to the President of Yale college, whose mathematical genius sufficed for the task. Rev. Patrick Bell invented the mower; Whitney, a college graduate, the cotton gin; and so on through a large part of the catalogue of inventions. But it is no part of my purpose to vindicate the practical nature of science. “To a sound mind,” says Emerson, “the most abstract truth is the most practical.”

Science in the Course of Study. What should the schools do? Some are disposed to say, Give us practical manual training first, then, if time admits, go deeper. But the general opinion of educators is, give us the underlying principles thoroughly, and skill will add itself to knowledge with great rapidity. The accomplished mariner, engineer, builder, know the principles of their business. Difficulties that are insurmountable to the man of mere practice, give way readily to the man who joins a knowledge of principles to his practical skill. Burke pointed out, in his delineation of the character of Lord Grenville, the helplessness of a man of mere office training, in the perplexing circumstances where no precedents exist for him to follow.

You will find, then, in the catalogues of almost all schools of engineering, mining, and the like, full courses in the sciences on which the arts depend, and an introduction into the French and German, in which languages a large proportion of our best scientific works are written.

"All the polytechnic schools in Germany are rapidly approaching the university type. The teaching of the principles, and not the application, is becoming more and more the main object."* Prof. Hilgard, formerly of the Michigan, now of California University, speaking of agricultural schools, says, the "model farm system on the old plan is rapidly giving way everywhere before that system which, while affording abundant opportunity to the student to become an expert in all kinds of agricultural operations, directs his attention chiefly to the *principles* upon which a successful practice must be based, and which are applicable everywhere and always."—Address on Progressive Agriculture, p. 30. The Carlsruhe Agricultural School, one of the most prosperous and useful in Europe, has among its regulations, posted in large type the announcement, "This school is concerned with the cultivation of the mind of the student; not with learning the technical operations of agriculture."†

Liebig says, "I have found, in all those attending my laboratory who intended to pursue a technical course of study, a general predisposition to devote themselves to some branch of applied chemistry. It is only with feelings of fear and trepidation that they consent to follow my advice, and give up the time they thus waste on mere drudgery to making themselves acquainted with the methods by which pure scientific problems are soluble, and by which alone they can be solved. There are many of my pupils now at the head of many departments of manufacturing industry, who, having had no previous acquaintance with the processes, were in half an hour perfectly *au fait* with all the details of the manufacture, while in a short time they saw and introduced all kinds of necessary reforms and improvements."

By means of the international exhibition of 1851 in London, and 1867 in Paris, Great Britain perceived that she was being outstripped in the quality of the fabrics and wares on which her wealth so largely depended. She appointed a commission, she interrogated her consuls, a council of arts sent eighty skilled

* Nature, vol. 2, p. 42, 1870 (leader).

† Nature, vol. 1, p. 476.

workmen, representing many industries, to France. But one answer came back from every quarter,—that the rapid progress of manufactures on the continent is to be “ascribed, especially, to the scientific training of the proprietors and managers of France, Switzerland, Germany and Belgium, and to the elementary instruction which is universal among the working population of Germany and Switzerland.” England is already reaping the results of the education of her artisans, which this investigation prompted.

It might at first view seem hopeless to attempt the improvement of great masses of workmen by means of schools, inasmuch as comparatively few can attend. But experience proves it feasible, as I have just shown. Knowledge is like light, and diffuses itself on every side.

The profound thinkers that are essential to the highest progress of any science are rare, but they appear oftenest in those callings that have a large body of educated men, and this body of educated men require the existence of industrial schools, where the teaching of the sciences shall not be put on a footing inferior to the practical training. It has not been my purpose to mark out the organization of industrial schools, but simply to discuss the estimation in which they are held. As in the first part of the address, I showed the feeling that has existed against them partly with and partly without reason, on the part of classically educated men, so now I have attempted to deal with the feeling that merely practical men have against them from the prominence they give to pure science. Those who ask these schools, agricultural, professional, or technological, to teach only practice, and applications of science, ask them to fly in the face of the experience of all industrial schools and to deny the large faith they have in science.

PLANT-FOOD AND AGRICULTURE.

BY E. LEWIS STURTEVANT, M.D.

[From the Report of the Connecticut Board of Agriculture, 1876.]

The soil contains the food of plants. The plants assimilate this food, and combining it with supplies obtained from the air, through their vital forces, build up their structure which is to supply food for man. There is therefore a close relation between the soil and the plant, and between the plant and the man.

We have a difference between the natural field and the agricultural field, and the difference is brought about through the relations of man. In the natural field there is no renewal of product by man, while in the agricultural field there is renewal. The natural field wastes little or none of the food elements, but rather accumulates; the natural crop containing but little plant-food compared to the artificial. The artificial field has to annually supply large quantities of its fertile elements to the plants for removal from the land. A ton of wood contains about three pounds of potash, the ton of barley fodder about eighteen pounds; the ton of leaves returns to the soil say four pounds of potash, the ton of growing wheat removes fifteen pounds. We may, therefore, cut woodland and yet grow woodland without fear of failure from deficient plant-food, for the growth of our wood contains but little ash element and but little nitrogen, and disintegration more than keeps apace with the wants of the trees. The cultivated crop, on the other hand, removes considerable ash element, and much nitrogen. In the one case the farmer removes principally what is furnished by the air, in cheap abundance; in the other case he is removing what is very costly.

Hence in Nature a continual addition to the surface mould from the falling leaf and the decaying growth, and a gradual thickening of the surface soil or loam. Fertility is being continually stored in a form which protects against loss by evaporation and drainage in large degree. Under cultivation a continual abstraction, for man's use, of the fertility which has been prepared by the natural agencies of the past, and which is being added through decompositions and rainfall. Under this process, not only is there an

exhaustion of plant-food going on, but the physical quality of the soil tends to change, and the oxidation of the humus disturbs the relations which have existed between the soil and the plant-food, and affects the retaining power and preparation power of the soil on the food to fit it for the plant.

It is this disturbance of relation, the removal of plant-food beyond the annual supply of the weathering of the soil, and from atmospheric agencies, which constitutes the perils of agriculture. It is in the recognition of this difference between the history of the natural and the agricultural field that true agricultural science has its foundation. It is in the application of the facts of plant feeding and plant growth, as applicable to the artificial or man-created pursuit of agriculture, that we must expect that science applied to practice which shall develop profit for ourselves, without robbing our grand-children.

As concerning plant-food and agriculture, we have the following to consider: plant-food, the soil, the plant, and man's interests and relations.

Our attention being thus called to plant-food, we first note that we cannot consider it agriculturally as apart from its relations, and that its most striking feature, as a subject for thought, is in its changeability and variability; its gains and its losses; its Protean facilities for change. It is now a chemical element in the soil, inert and useless; again a food to an agricultural plant; soon formed into growth-tissue, and affording sustenance to man or beast, and again returned to the land. It now has one relation with the plant, and soon again another. Its position in the soil changes; its form is continually changing; its relative proportions, and then again passing downward with the water, is wasted, to be again saved in part by physical actions in the soil, and by the agency of plant-roots.

Agriculturally we must define the capacity of our land by its relations to plant-food, and as in mechanics we require the measure of length, before we can give accurate expression to our ideas, so here we must have a measure for the agricultural capacity of our land; yet from the varying nature of the case, we cannot expect that exactness which is given by our foot-rule. The measure which we shall use for our purpose is the natural fertility and the maximum fertility of our land. We will therefore define these terms, so that we may not only see what they mean, but also realize their importance.

The natural fertility of a soil is measured by the crop that may be grown out of the plant-food, which is liberated each year by the atmospheric and other natural actions in the soil, and which is supplied to the soil through the rainfall. It may often be measured by a fallow.

The maximum fertility of a soil is measured by the crop which can be grown from plant-food present in as great a quantity as the soil can retain without unnecessary waste. It may often be measured by that amount of crop which, labor being equal, can be raised most economically by an ample supply of fertilizer or manure.

In ascertaining the value of a manurial application, it must be recognized that much of the effect depends on the season, on the culture, and on the seed. In practice, therefore, in order to determine the limit of production to our land, which we have defined as the maximum, we must take the average produce of a series of years, under well-defined and similarly-conditioned circumstances. Let us illustrate by supposed cases. I have a field which, with the ordinary rainfall of my locality, will retain during the season of growth sufficient plant-food for the formation of a given crop of corn, and this fertility is thoroughly distributed through the soil, in such a manner that the roots of the plants will always be in contact at the proper time with the fertilizer, and can absorb sufficient to produce one hundred bushels of grain. Then the one hundred bushel yield may be assumed as the maximum fertility of my field. My neighbor has a field, of a different character of soil, and applies the same quantity of fertilizer that I do, but his field has not the retaining power on the plant-food, and much is carried downward out of reach of the roots with the spring rains. He therefore harvests but fifty bushels of grain, and this represents the maximum fertility of his field. Now, if he fertilizes beyond the needs of this fifty bushels, he is meeting with a loss; if I fertilize beyond the one hundred bushels, I am meeting with a loss. If either of us fertilize below this respective maximum capacity of our fields, we are equally suffering a loss.

Very likely in practice we both might get larger yields by applying more fertilizer than this maximum quantity, but in my case, all obtained over the one hundred bushels would be at a cost greater than the cost of the first one hundred bushels; in his case, all he obtained beyond fifty bushels would be at an enhanced cost over that of his first fifty bushels. In practice, however, no farmer

could figure as absolutely close as this illustration ; but if we have clinched the idea, our purpose is accomplished.

We now shall offer a few propositions concerning plant-food, agriculturally considered, which have been conclusively proved, and may be accepted as facts :

- 1st. The soil contains plant-food.
- 2d. The plant removes this plant-food from the soil.
- 3d. Analyses of plants will show the character and quantity of the plant-food removed from the land.
- 4th. A supply of the elements removed by the plants to the soil, in such a way that they can be appropriated by the plants, will produce the plant-growth, under proper conditions.
- 5th. Plants remove varying quantities of plant-food from the soil, according to their species, their manner of growth, and the proportions and quantities of plant-food present in the soil.
- 6th. The constituents of plants furnished from the atmosphere being beyond our control, in studying plant-growth and food-supply, we can limit ourselves to the earth alone, and study the air-supply only as modified by our control over the elements supplied to our land.
- 7th. The soil contains the elements of plant-growth in varying proportions and conditions; some elements far in excess of the needs of our plant, other elements in quantities sufficient only to support a scant growth.
- 8th. The plant-food in the land must, to be of service to the crop, be in a soluble state, or in a state capable of being taken up by the rootlets of our plants.
- 9th. When the elements of plant-food, in the form of chemicals or dung, are added to our soil, there is a chemical action taking place between them and the soil constituents, in the presence of moisture.
- 10th. The soil has the power of decomposing most of the chemicals which are applied, and has a retaining power on their compounds, varying with the character of the element.
- 11th. As a rule, phosphoric acid is firmly held by the soil, and is not subject to loss through drainage, and has a limited diffusibility; potash is strongly retained, but has a greater diffusibility; nitrogen, in its various forms, is less strongly retained, and has a ready diffusibility.
- 12th. In proportion to the presence of, and diffusion of these fertile elements in our soil, other conditions being favorable, will be the amount of our crop.

13th. Waste of fertility in our land arises from drainage, and the changing of soluble plant-food into insoluble forms.

14th. Plants require different proportions of plant-food, and different combinations, at different periods of their growth.

15th. The presence of certain elements in excess has an influence on the growth and composition of the plant.

16th. The seed has an influence, in itself, in determining the crop, an influence apart from the presence of a full supply of food, or the climatic features of the season.

Let us see what are the logical deductions from these propositions. We cannot say that an application of a given quantity of plant-food to a given area of land will produce a given crop, because the crop depends not on the fertilizer which is applied to the land, but on that which is within reach of the crop, and which the crop can appropriate, besides the other questions of variety of seed, and the corresponding habit of the plant which is grown, and the influence of the culture, and the character of the season. We cannot advise the application of a single element of fertility, because the plant must have all the required elements to succeed, and we cannot know which one is deficient, or whether in applying the single element proposed, we are not destroying the balancement of fertility present in the field, or are not applying an excess of this element, which is to be wasteful. Indeed, by the application of a single fertilizer continuously, as superphosphate of lime, we are certain in the long run to injuriously disturb the balancement of food-supply, and cause in time a deficiency of some other element requisite for plant-food, which we have not supplied. As a matter of fact, we have heard of the use of fish-guano for a series of years, as having completely exhausted a field, notwithstanding the great crops produced by the first or second applications.

Under this practice of the application of single elements of fertility to our land, an erroneous idea concerning manures and fertilizers has become popularized. Many, perhaps the majority of our farmers, regard commercial fertilizers as having peculiar and distinct properties from manures, and regard their use as either experimental, or else as fitted only for use in connection with barn-yard manure, or as they express it, as "stimulants." Now, an enlarged common-sense, founded on experience and reflection, must convince that plant-food is plant-food, whether supplied in fertilizer or dung: that a pound of soluble phosphoric acid,

supplied to the plant by superphosphate, is an exact equivalent to a pound of soluble phosphoric acid supplied to the plant by dung, and so with the other elements. That it is an incorrect reasoning which compares dung, in its effects, which is a furnisher of a complete plant-food, with a single fertilizer which contains but one element of plant-food. The true criticism of fertilizers for general use must be based on their containing plant-food of all the kinds required by our crops: the true comparison must be between dung and a complete fertilizer.

Our numbered facts, however, indicate an application of a fertilizer which cannot fail of success in growing our crops, even in competition with dung. If it is kept in mind that plant-food is plant-food, irrespective of source of supply, it cannot fail to be apprehended that crops may be successfully grown by the application of either dung or fertilizer of the proper kind, and that the conditions of success must rest on the methods we practice to bring our food within reach of the plants, and in that form which will enable them to be appropriated by the plant.

The first essential to success must be in the use, the continued use, of a complete fertilizer in the quantity required by our crops. This fertilizer may be either dung or a mixture of chemicals, which shall contain the needed constituents. If we use dung, we apply similar proportions of plant-food to all our crops, because the composition of the dung depends not on what we desire, but upon the material upon which the animals have been fed who have produced it. It is a waste product of our barn economy. We mean nothing derogatory in this term, but simply the expression of a fact, a fact notwithstanding the leading importance of this product in our farm operations. In a chemically complete fertilizer we have a manufactured article in which the elements of the dung are present, and grouped according to the needs of our plants. We here reduce the chances of loss to a minimum, and escape the possibly injurious effect of an excess of one element producing a growth we do not calculate upon or desire.

These are practical and theoretical views combined, and it lessens not their importance that New England farmers usually use their dung for crops which they feed out and convert into dung.

Let us see now, what we may expect reasonably, in accordance with our numbered propositions, from a complete manure.

When our land is already at its maximum fertility, if we apply to this land annually the plant-food elements in the quantity removed by our crops, and in that form in which they can be appropriated by the crops, and in the form in which they will retain their appropriability, then we shall annually obtain the maximum crop from our land, and in this sense we can apply a given quantity of fertilizer for a given amount of crop, and expect that amount of crop at harvest.

If our land is agriculturally barren, by the application of a complete fertilizer once, we may obtain a crop; but it may not be that amount of crop which we would figure from the proportionate elements supplied, because the elements would not be so distributed throughout the land as to be available, in their whole effect, to the plant. Yet the continued application of the complete fertilizer would, in the course of time, bring this land to its maximum fertility, and then we should expect to obtain a given increase from a given application, the given application being all along graduated to the agricultural capacity of the land.

If the land be in an intermediate state, as most of our land is, the same principles apply.

We thus see that, whether we use dung or a complete fertilizer, we may expect satisfactory results, provided we claim only those results which are justified by reason.

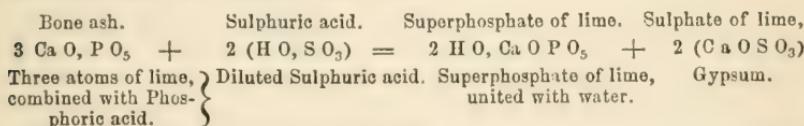
It may be interesting to some to know how far experience corroborates these claims, which are the logical deduction from our tabulated facts. We are pleased to state that they are in exact accordance, and confirm our results at every step. The careful and exact experiments of Mr. Lawes, at Rothamstead, continued now for thirty or more years, show that on the dunged and chemically-fertilized plots, side by side, there is no difference in the amount of crop, but both alike produce the maximum capacity of the land. The same facts are indicated in the farm practice of Mr. Prout, at Sawbridgeworth, England, a practice which has now been continuous for many years. The experience on Wau-shakum farm, South Framingham, although limited to two years, is also strongly confirmatory.

It is certain that our reasoning is correct, thus confirmed by experience, but it is equally certain that to obtain the best results from either dung or fertilizer, some knowledge must be used. Let us consider the subject further, then, and see upon what principles our using of fertilizers must be based.

The land must contain its fertile elements diffused throughout the root area, so that the plant may be provided with food at each absorbing rootlet during each period of its growth. To accomplish it, we must have some knowledge of the action of each of the principal elements of fertilizers in the soil.

The elements ordinarily requisite to be supplied to our land are phosphoric acid, potash, and nitrogen; the other elements of plant-growth being either present in the soil in sufficient abundance, or not concerning us as necessarily being applied in the mixtures which we must use, in order to furnish the above named substances.

Phosphoric acid is one of the principal compounds of bone, in the form of a phosphate of lime, and is furnished to commerce either in bone, phosphate guanos, phosphate rock, or in the wastes of commerce. It occurs in three forms: an insoluble condition, in which it is unassimilable by the plant, a soluble form, wherein it is readily absorbed, and an intermediate form, the reduced or reverted form, of the soluble, wherein its adaptability as plant-food is questioned, but which we esteem of some value, on account of the condition in which it occurs, and the conditions under which it is usually presented to the plant rootlets. It is commercially prepared from bone or phosphate rock, by the addition of sulphuric acid, which, uniting with a portion of the lime with which the phosphorus is combined, leaves a soluble form. The reaction may be expressed as below:



This product, the superphosphate, is the valuable portion of the fertilizers placed on the market under this name, and it may compose from $\frac{1}{2}$ per cent. to 23 per cent. of their mass by weight of soluble phosphoric acid. We thus see the importance of the sale of fertilizers by guaranteed analysis under government control. Ordinarily, a good superphosphate will contain about 10 per cent. of soluble phosphoric acid, and a few per cent. of nitrogen, in addition to insoluble and reverted phosphoric acid. We can estimate its value on the basis of 12 cents a pound for the soluble phosphoric acid, from 4 to 6 cents a pound for the reverted, and 1 or 2 cents for the insoluble. Yet these figures are subject to changes.

When this fertilizer is applied to our land, and the rains fall, it is washed into the soil, but only to a certain distance. The soil has a retaining power on this element, and holds it firmly against washing. So far as the phosphoric acid extends through the soil, it is diffused: that is, it is evenly distributed, and the soil holds it in saturation, but in a quantity for a given area dependent on the nature of the soil. What follows from this? If we apply a given quantity to the surface of our land, a quantity sufficient if applied to our plant to raise a maximum crop, so far as this constituent is concerned, the rains wash it down, and it is retained, we will suppose, by the first inch of our soil. Now, as it is retained by the soil in the position, despite the rainfalls, it is evident that in this supposed case, *only the root fibers which enter this upper inch of earth can feed on it.* If a double quantity be applied then it will extend down two inches, and the same facts about the plant feeding holds for this two inches and so on. It is evident that it can only be by applying phosphoric acid in large quantites, or repeatedly during a series of seasons, that we can so saturate our land with this element, *under these assumed conditions,* as to furnish the whole root-area with plant-food.

These considerations would lead us into the practice of looking for the full effect of this fertile element from repeated applications, rather than from a single trial. They would also lead us to apply this element within reach of the principal plant fibers in all cases. They show us that it is safe to apply a superphosphate at any period of the year, so far as loss by drainage is concerned. In applying on sod for corn, we like to apply this element of our fertilizer on the surface, so that it may be washed in by the rains before ploughing. Then when the sod is inverted, shallow, as is our custom, the fertile strata of the earth is in the right position for the roots. We also have an action of the acids of our combined fertilizers in rendering more soluble the phosphoric acid which has reverted in the soil, but space will not admit of further considerations.

Potash, as supplied in commerce, occurs in three forms,—the carbonate, sulphate, and muriate. The first form occurs in ashes, and we will suppose a bushel of ashes to weigh 48 lbs. to the bushel, as has been determined as the average for house ashes as they usually occur. Now ashes contain about 6 per cent. of potash, and about 2 per cent. of phosphoric acid, in a reduced or insoluble form. Hence a bushel of ashes would be held as of the

value of 2.8 pounds of potash and .9 pounds of phosphoric acid. If these ashes are worth 30 cents a bushel, and we consider the phosphoric acid worth 6 cents a pound, the potash in our ashes stands us at about $8\frac{3}{4}$ cents a pound. If leached ashes are used, at 10 cents a bushel, the potash supply is costing about 20 cents a pound. Carbonate of potash is, however, a good form in which to use potash, as the carbonic acid has an action of itself in the soil, in aiding the solution of plant-food.

Of late years, however, the principal agricultural supply of potash is looked for in Kainite or German potash salts. These are the product of the salt mines of Germany, and are put on the market in the form of sulphate of potash and muriate of potash of varying strength. The most economical for the farmer are the high grades. The sulphate of potash which contains 78-80 per cent. of the pure salt, furnishes about 43 per cent. of actual potash, and when the commercial salt is quoted at 4 cents a pound, the actual potash therefrom is costing about $9\frac{1}{3}$ cents a pound. Muriate of potash, the other potash salt of these mines, when of 80 to 85 per cent. muriate, contains about 50 pounds of actual potash, and furnishes, when the commercial article is selling at 3 cents a pound, the potash at about 6 cents a pound. We thus find that the cheapest supply of potash is in the high grade muriate. To furnish the potash at the price it is procured for in the muriate, we should buy the sulphate of the same grade at about $2\frac{1}{2}$ cents a pound, and wood ashes at about 17 cents a bushel.

These salts of potash are supposed to act differently on crops, but we do not consider the matter at all proved at present. Indeed, at present prices, we prefer to apply the muriate in nearly every case, or, better still, two-thirds muriate and one-third sulphate. This for reasons that we shall not attempt here to offer.

When we apply our potash compounds to the land, they become dissolved by the rains, and wash into the soil. They are then decomposed into their constituent parts, separating into sulphuric or muriatic or carbonic acid, and potash, and while the acids are not retained at all closely by the soil, but follow the water of drainage until they meet new compounds, and are subject to different actions, the potash is quite strongly retained. It is, hence, easier to saturate our soil with potash than with phosphoric acid, and if our soil is deficient in this element, we can hope to more speedily cause it to be diffused through the soil, and thus become more accessible to the crops. In applying potash, then, we desire to

keep it near the surface at first, as we are quite certain it will pass downward into the root pasture, and we are never quite sure against a small waste.

Nitrogen is the expensive element of plant-food. As usually supplied, it is in the form of ammonia, or a nitrate, generally nitrate of soda. When sulphate of ammonia is the source of supply, and our crude material contains about 25 per cent. of ammonia, each 100 pounds furnishes 21 pounds of nitrogen, which costs, when the crude material is selling at $5\frac{1}{2}$ cents a pound, about 26 cents a pound. Nitrate of soda of commerce, 95 per cent. purity, furnishes about 17 per cent. of nitrogen, which, when the nitrate is selling at 4 cents a pound, stands us in at about 24 cents a pound. Nitrogen is also obtained from many wastes, notably from dried blood. When dried blood contains 14 per cent. of ammonia, it furnishes about $11\frac{3}{4}$ per cent. of nitrogen, and this costs about 24 cents a pound, the blood being purchased at 3 cents a pound.

It makes some difference to the crop in what form of combination our nitrogen occurs, because some plants feed on different combinations at different periods of their growth. Yet the discussion of this point further is outside of the scheme we have laid down for this essay.

When a nitrogen salt is added to the soil, it becomes decomposed in the presence of moisture, the acid constituent passes quickly through the soil, while the base, if ammonia, is retained to a certain extent, but not as strongly as phosphoric acid or potash. It is, hence, quite readily diffused through the soil, and is quickly supplied to the roots of our plants. Hence, in using a nitrogenous fertilizer, we can anticipate speedy results. It is, however, on this very account, subject to waste, and on account of its costly nature, it is the farmer's duty, while supplying it in abundance for the wants of the plant, to beware of any excess.*

Having now treated briefly these three important elements of plant nutrition—phosphoric acid, potash, and nitrogen—we will remark that, oftentimes, their price may be cheapened by buying

* To show the effect of exposure on the ammonia in manures, as previously discussed, we give Dr. Veeckers's determination on fresh horse-dung as gathered from stables, before being mixed with the heap.

In his experiment, the percentage of ammonia, which was drawn out by *long-continued* boiling, amounted to 0.0033. This would be .066 lbs. of ammonia a ton. As ammonia can be purchased for about 20 cts. a lb., the greatest possible loss would be 1 32-100 cts. a ton. The loss in practice, however, would not equal this which was obtained by means of boiling water.

them in combination, as in ammoniated superphosphate, animal fertilizers, or Peruvian guano. Oftentimes they may be procured in a local waste, as in the refuse of powder factories, of woolen mills, etc.; often, indeed, in purchasing dung, for, be it remembered, the agricultural value of all fertilizers, including dung, is largely in the plant-food they contain.

We have now completed the line of thought which we laid out at the commencement, but we cannot close without a brief recapitulation of a few of the points that are certainly true. First, that it is the plant-food which concerns the farmer, not the name. Second, that chemicals are capable of being profitably used on the farm. Third, that the good farmer can afford to buy and use fertilizers whenever he desires to till more land than his dung-heap will admit of his doing.

One word more. Scientific farming, the bugbear of the practical man—what is it? Why, only this, and nothing more. The applying of knowledge gained from experience in an understanding way. Is there anything very bad about this? The man who knows what to expect from his acts, of necessity acts with more advantage than the man who acts at hap-hazard, and trusts to Providence.

This paper, friends, was written for a purpose. Not only to show what may be expected from the judicious teachings of science, as demonstrated by practice; not only to point out to you additional ways of deriving more profit from farming, but for a personal reason in addition. By some, by many parties who have read my writings with too little care, I have been classed as a disciple of a certain theory, which has occupied much of the public attention for the past few years. I desire to put my own views on record, in order that you all, who are interested, may see just what my views are on this important subject of fertilizers and fertilization. I desire it to be plainly understood that I am the disciple of no one theory or set of theories but my own, which are deduced from the actual facts of experiment and research, as I

A second sample of hot fermenting horse-dung, emitting a strong and pungent smell, contained in like manner 0.049 per cent. of free ammonia in .98 lb., which would be worth, if all lost, 39 2-10 cts. per ton of dung. Yet as this dung is soon cooled, when spread, and the land is absorptive, would indicate a loss in practice, too small to be taken into consideration when the increased economy of spreading dung when convenient, instead of a fixed time, is taken into consideration.

In ordinary barn manure, the loss would be even less than here represented.

interpret them. Professor Stockbridge is doing notable work for agriculture, and deserves high praise for his practical success. We differ from him friendly in his explanations of his results, but we agree with him cordially in the belief in the beneficial effects which follow from his system of fertilization. In a word, the facts of his methods mark a new departure, and open a revival of agriculture, which will soon, we trust, become so general as make our fields pour forth of their harvest, and our barns swell with their fullness, and the farmers' hearths light up families joyous in their successes and prideful of their opportunities.

THE ART OF THE FARRIER.

By DANIEL DENNISON SLADE, M. D.

[From the Bulletin of the Bussey Institution.]

There is no portion of the animal frame that exhibits a more wonderful adaptation of means to the ends proposed, than the horse's foot; and it is only by careful observation and study that we can appreciate the wisdom therein displayed.

In a state of nature, the growth and wear of the hoof are maintained in perfect equilibrium. When, however, the animal is subjected to the service of man, this equilibrium is destroyed and the wear exceeds the growth; a condition which of course necessitates the protection of those parts which are exposed to this undue wear. This very protection, however, again destroys the balance between the growth and the wear, for the former soon exceeds the latter, requiring the removal of the protecting shoe and the reduction of the growth of horn either by natural wear, or by artificial means. This simple operation constituted the art of the farrier in the earliest ages; and such would it have continued, had not this simplicity been interfered with by numerous whims and superstitions which, gradually creeping in from generation to generation, have greatly obscured the original purpose of the art, and have converted a beneficial operation into one which, in many cases, is fraught with serious injury to the health and usefulness of the animal.

While much may be accomplished, by the publication of books and essays upon Farriery, to diffuse useful information upon this subject, it is evident that, if it is desirable that a sure and steady progress should be made in all that pertains to the art, those who practise it must be instructed by others who have made the organization of the foot their study, and can base their teaching upon knowledge thus obtained.

Inasmuch as in the natural condition all parts of the foot come to the ground, the hoof of the young animal, which is brought to the forge for the first time, requires little or no preparation, beyond rendering the ground surface of the wall or crust perfectly level to receive the web of the shoe. The entire foot is in that

condition best adapted for the artificial protection which, in his new relations to man, is hereafter to become a necessity to the animal.

The foot that has already been shod requires the removal not only of the shoe with its nails, but also of its ground surface, in order that it may be brought to a proper level. In the majority of cases, the growth of the wall downwards from the coronary cushion is greatest at the toe, which is to be accounted for by the firm attachment of the shoe at this point, not allowing the motion between the iron and the horn, and the consequent wear which takes place at the heels, where the attachment is much less. In levelling the wall, we must be guided by the following rules. The ground surface of the foot should be transverse to the direction of the pasterns, a condition which in most cases can be brought about by simply reducing the hoof at the toe to a level with the unpared sole. Too great obliquity of the foot, which is produced by the undue amount of horn at the toe, increases the general obliquity of the pastern, and this condition increases the strain thrown upon the flexor tendons or back sinews. This undue obliquity of the foot constitutes one of the chief evils which follows the too frequent custom among farmers and others of allowing the shoe to remain on the foot for an indefinite length of time without removal. This period should never exceed a month.

If, through neglect, the heels have been allowed to grow down beyond a natural limit, they must be lowered to an extent which will restore the ground surface to the desired level. Too great a height of heel renders the pasterns more upright, and consequently too great weight is thrown upon the pastern bones.

The operation so universally adopted by farriers of "opening up" the heels, is one of the most barbarous, senseless, and useless proceedings that could possibly be devised. It consists in making two deep incisions into the angles of the hoof at the heels, just as it turns inward to form the bars. The process destroys that portion of the foot which was expressly designed by nature as a buttress or defence against its contraction, and nothing could lead more surely to the destruction of the fulness and roundness which are distinguishing marks of a well-formed, normal foot. This important defence, then, should never, on any consideration, be mutilated.

The equally useless and unreasonable method of paring the sole, and of destroying the bars, of whose existence many are pro-

foundly ignorant, should not be practised where the parts are in a healthy condition. By the removal of this portion of the foot, we expose the sensitive parts beneath to injury, by coming in contact with foreign bodies in travelling. If we examine carefully the structure of the sole, we shall find that its constant growth is removed by exfoliation, and that the parts beneath the external layer are not fitted to take the place of the latter until it has been removed by the natural wear. Paring out the sole of the healthy foot cannot be defended on any ground, neither can any artificial substitute be employed that can supply the place of the natural protection. In the event of casting a shoe while upon the road, no evil can befall the unmutilated sole ; while that which has been subjected to the "paring out" process is liable to become seriously impaired, especially if this operation has been recently performed.

A better knowledge of the functions of the frog now prevents in a measure that destruction which was formerly so extensively practised upon this portion of the foot. There still exists, however, an innate desire on the part of many farriers to cut away not only the shreds, but also the substance, of this organ. This should never be done, as the parts beneath are immaturely called upon to assume functions for which they are not prepared ; this process of exfoliation in the unshod hoof being the result of gradual wear. The frog, then, should be retained in its original integrity, if we would wish to prevent the diseases to which it is liable, and which are sure to follow its reduction by the knife.

Raspings the wall, before or after the application of the shoe, cannot be too strongly condemned. By this practice, the delicate external layer of horn which not only gives the beautiful polish to the part,—a polish not to be imitated by any artificial means,—but which protects the layers of horn beneath, is removed, thereby rendering the crust more brittle and less well fitted for holding the nails. If the shoe is accurately fitted to the foot, and not the foot to the shoe, there will be no necessity for reducing the wall with the rasp at the toe, which gives a stubbed appearance, instead of the natural graceful outline.

"It should be ever most strenuously insisted upon, that the whole lower face of the hoof, except the border of the wall, must be left in a state of nature ; the horn of the sole frog and bars has an important duty to fulfil ; it is the natural protection to this part of the hoof ; and no protection of iron, leather or other material,

is half so efficacious ; in addition, it is a capital agent in sustaining weight, and in keeping the whole foot healthy and perfect in form.''*

It will thus be seen to what a simple matter the preparation of the healthy foot for the shoe is reduced. To maintain this organ in a sound and perfectly healthy condition, we must guard especially against its mutilation.

The particular form of the shoe to be applied is of far less importance than a strict adherence to the rules which we have laid down for the preparation of the foot. There are, however, several points to be considered. The shoe most frequently adopted presents a concave surface to the foot, and a flat surface to the ground ; a construction evidently called forth by the mutilation to which the sole has been subjected, and which renders it totally unfit to sustain any pressure whatever. Exactly the opposite characteristics are exhibited by the shoe best adapted to the protection of the foot which has been preserved in its natural condition. It presents a concave surface to the ground, while the plain surface is attached to the foot. In this way, the wall and a portion of the sole are called upon to sustain a proportionate part of the weight, and there is much less chance afforded for the lodgement of stones and other foreign bodies between the web of the shoe and the foot. Whatever form be adopted, it is most essential that the shoe should fit the foot, and in its outline follow the exact shape of its ground surface. The usual method of shoeing, which allows considerable projection of the heels of the shoe, both in length and breadth, is in many cases objectionable, especially as no benefit can be derived therefrom, and, when speed is required, there is always more or less danger of the shoe being torn off, by the other feet coming in contact with it.

The weight of the shoe must depend upon circumstances, but it should in all cases be made as light as the nature of the services of the animal will permit. Some curious statistics made by a French veterinary professor, show the importance of this consideration. He says, "If, at the termination of a day's work, we calculate the weight represented by the mass of iron in the heavy shoes a horse is condemned to carry at each step, we shall arrive at a formidable array of figures, and in this way be able to estimate the amount of force uselessly expended by the animal in

* Practical Horseshoeing, by G. Fleming, F.R.G.S., &c.

raising the shoes that overload his feet. The calculation I have made possesses an eloquence that dispenses with very long commentaries. Suppose the weight of a shoe is two pounds, it is not excessive to admit that a horse trots at the rate of one step every second, or sixty steps a minute. In a minute, then, the limb of a horse whose foot carries two pounds, makes efforts sufficient to raise a weight of one hundred and twenty pounds. For the four limbs this weight in a minute is represented by $120 + 4 = 480$ pounds; for the four feet during an hour the weight is 28,800 pounds; and for four hours, the mean duration of a day's work, in the French omnibuses, the total amount of weight raised has reached the enormous figure of 115,200 pounds. But the movement communicated to these 115,200 pounds, represents an expenditure of the power employed by the motor without any useful result; and, as the motor is a living one, this expenditure of strength represents an exhaustion, or, if you like it better, a degree of fatigue proportioned to the effort necessary for its manifestation."

It is essential that the shoe should be of the same thickness throughout, for this insures a natural position to the foot and limb. Where carks are deemed necessary, they should be of equal height at the toe and heel. The number of nails necessary to retain the shoe in its place is a matter of consideration, but hardly merits the controversies to which the subject has given rise from time to time. Regarding every nail-hole as an injury to the hoof, which it certainly is, it is at once evident that the number should not exceed that which is absolutely necessary. For the saddle or light-draught horse, not more than five or six in the fore, and seven in the hind, are required, and these should be more widely distributed than is the usual custom. In driving the nails, it is of importance that the hold should be short, including within the group a comparatively small portion of the crust. The shoe is thus held more securely, and the injury to the horn is more speedily removed by the natural growth downward.

It would seem unprofitable to enter into the discussions which have arisen from time to time as to the propriety of applying the shoe and fitting it to the foot in a hot rather than in a cold condition. It must suffice here to say that experience has amply shown that the hot fitting will alone secure the proper and accurate application of the shoe, and that the slight scorching of the horn-

fibres has rather the effect to preserve them against untoward influences, than to inflict injury.

Our remarks have been directed to the method of shoeing which is especially applicable to the healthy foot. Disease not unfrequently brings about changes which compel us to modify the system which we have advocated. Of these changes we do not propose here to speak.

The general management of the feet demands a few words. The right way of caring for the feet is the simplest possible, requiring nothing beyond a strict attention to cleanliness. Washing the feet daily with clear water by means of a sponge, taking care afterwards to rub dry the parts above the hoof, and to avoid the use of any application in the form of oil or stimulant, &c., constitute all that is absolutely essential. The unmutilated sole forms in itself the best defence against the extremes of dryness or moisture; and the "stuffing" and other artificial measures so universally adopted are worse than useless, if the natural sole has been preserved. Neither can anything be substituted for the beautiful polish which the unrasped wall presents in its healthy condition.

Placing the animal on a perfectly level floor, if he stands in a stall, or, still better, giving him the freedom of a loose box, will promote a sound condition of the feet and conduce to the general health.

THE PROSPECTS OF AMERICAN AGRICULTURE.

BY JOSEPH HARRIS.

Read at the Session of the National Agricultural Congress, at Philadelphia, Sept. 1876.

I have been asked to write a short paper on the prospects of American Agriculture. I did not select the subject myself. I am not a prophet or the son of a prophet, and can only judge of the future from the past and the tendencies of the present.

To me the signs of the times are favorable and the prospects bright. Given a soil in the same condition and with a similar season, no one, I think, will dispute the assertion that a given amount of time and labor will produce *more* wheat, barley, oats, corn, hay, roots, clover and grass seed; more cotton, rice, hemp, flax and tobacco; and more beef, mutton, wool, pork, milk, butter and cheese to-day than it would 25, 50, or 100 years ago.

And the same is true, as a rule, of the articles for which a farmer wishes to exchange his surplus products. A given amount of time and labor will produce more and better implements and machines; more woolen, linen and cotton cloth; more boots, shoes, stockings and gloves; more pins, needles, buttons and thread.

The same amount of labor will dig more coal, iron and silver, and will saw and plane more boards, and give us more nails, hammers, glass, putty and paint; will give us more furniture for our houses, and more and better light, and more, if not better, books, papers and pictures. In short, owing to the discoveries of science, to increased skill, and to mechanical and chemical inventions, a given amount of labor will produce more of the necessities and luxuries of life which a farmer needs to procure in exchange for his farm products than it would 25, 50 or 100 years ago.

So far as material prosperity is concerned, therefore, we are, as a nation, or a community of nations, better off than we were 25, 50, or 100 years ago. We need not work so hard, or, if we work as hard, we can have more of the necessities and luxuries of life. I am speaking now of all classes.

But, of course, it does not necessarily follow that one class in exchanging its products for the products of another class gets, at all times, a fair and just equivalent. And no acts of legislation

will make a man just and liberal. If a barber in Kansas refuses to shave a farmer for less than two bushels of corn, the farmer can let his beard grow. And if a shoemaker wants 50 bushels of potatoes for a pair of boots the farmer *may* have to submit to the exchange. But such a state of things in a free and intelligent community will not last long. The farmer or his son will turn shoemaker, and by and by the shoemaker will want to turn farmer. This matter of the exchange of labor or its products must be left to regulate itself. Monopoly, extortion, and all forms of injustice seldom prosper in the end.

To me, the prospects of American agriculture never were so bright as at the present time. There is *plenty of work to be done*. The greatest curse that can befall a man or nation is voluntary or involuntary idleness. "Nothing to do" means poverty and misery. The less a man does the less he is inclined to do. The more he does the more he can do. Idleness leads to weakness and inability. Work gives strength and skill, it banishes despondency and brings in hope, and hope leads to continued effort. If we fail one year we try again. We get to have faith in the soil and in ourselves. We have to compete with our brother farmers and with the farmers of the world. We feel that farming is no child's play and we must try to acquit ourselves like men and be strong.

Of our many blessings, therefore, not the least is the fact that we have now, and shall have for years to come, plenty of work to do on our farms.

There are farmers who thought that when their farms were cleared of the forest, and when the barns and fences were built and roads made, there would be little to do. Philosophers also told us, and truly, that trees absorbed carbonic acid from the atmosphere, and that when we cleared up a district we not only removed these natural purifiers of the atmosphere, but when the trees were burnt or decayed, large quantities of carbonic acid were thrown off, and also that man and beast were daily and hourly polluting the atmosphere in the same way. All the processes and operations of civilized life produce enormous quantities of carbonic acid, and we at the same time were removing the trees which nature had provided to purify the atmosphere. Now all this was true enough, but the great fact was not then known, that an acre of corn would take up probably five times as much carbonic acid as an acre of forest trees, and that wheat, barley, oats, grass and clover, and all our cultivated plants were much more efficient

purifiers of the atmosphere than the native forests. The fear that this continent would become a black hole of Calcutta has proved groundless; and so the idea, that when we have done the pioneer work of agriculture there will be little to do, is equally erroneous. The better we farm, the farther we advance; the more improvements we make, the more work will there be to do. Let us be thankful. On my own farm I have little or no wood to chop in winter, and yet I find no difficulty in keeping nearly as many men at work in the winter and spring months as during the month of harvest. In fact, wages being much less, I employ more men in the spring than during the summer.

Few farmers, 25 or 50 years ago, could have anticipated such a result. The truth is, there is scarcely any limit to the amount of work to be done on the farm. The more we do the more there is to be done. Work makes work. And as a rule our profits come not from land but from labor.

When the duties were taken off foreign grain the English farmers thought their occupation was gone. They thought it was impossible for them to compete with the owners of cheap land. They really believed that there was land so rich, that, in the language of Douglas Jerrold, it "needed only to be tickled with a hoe to make it laugh with a harvest." Experience has proved their fears groundless. It will be so in this country. Many of us who reside in the older settled States, think we cannot compete with the cheap, rich lands of the West. And no doubt this competition demands our best thoughts, and will tax our skill and energy. We may have to make many and frequent changes in our rotations and general management. But we need not despair. We shall be able to make a living. There is no paradise on earth. "By the sweat of thy face shalt thou eat bread." There will be found advantages and disadvantages in all sections. More depends on the man than on the situation.

I read a remark a few weeks ago, in one of our leading papers, that owing to the enormous amount of land in this country, it would be 250 years before there was any real necessity for scientific agriculture. The writer evidently attached some technical and definite meaning to the phrase "scientific agriculture." The truth is, however, that what would be scientific farming in England, might not be scientific farming in America; what would be scientific farming in New England or New York might not be scientific

farming in Kansas or California. He is the scientific farmer who makes the most of his labor and capital. And there is just as much necessity for scientific farming to-day as there will be 250 years hence. And true scientific farming will be just as profitable at the present time as it ever has been in the past or ever will be in the future.

I greatly mistake the signs of the times if, in the near future, we shall not find as many, and as true scientific farmers in America as are to be found anywhere in the world.

Take up an English agricultural paper and, no matter what subject is under discussion, you will not read far before allusion will be made to the question of "Tenant Rights." A farmer's club cannot discuss the science and practice of feeding stock without getting excited over the malt-tax. "If we could feed malt," they say, we could then raise cheap beef and mutton. If we could get compensation for our exhausted improvements we could employ our skill and capital to advantage. We are not without our troubles here. We have some burdens that are hard to bear. But, at any rate, we are our own land owners. Any improvements we make are made on our own land. Our land is not entailed. We can transfer it as easily as any other property.

We sometimes grumble because our best farm laborers so soon leave us. They want farms of their own. I have a man who has worked for me 12 years, and who has now, out of his savings, bought a nice farm of his own. I lose a good man, but he will work quite as hard for himself as he did for me and put more thought, care and skill into his labor. It may be a loss to me but it is a gain to the country. He will be able to earn more money and will have more to spend.

American farmers, as a class, work harder than any other farmers in the world. We occasionally find a drone in the hive, but on the whole, we are a nation of workers, and it makes a great difference whether a man is working for himself or for others. We all know what a difference it makes in the amount of work done whether a man is working by the day or by the piece. Last autumn I had men digging potatoes by the day, I paid them \$1.25 per day. Digging, picking up and pitting, cost me over 6 cents a bushel. I then told two of the men I would give them 5 cents a bushel to do the work. They took the job, and these two men dug and pitted 100 bushels every day and then went home, they sometimes got through by 4 o'clock in the afternoon. I got the work done

cheaper and the men earned double the money. Now just think what this means; these men were earning \$1.25 per day. If we assume that it cost them \$1.00 per day for family expenses, they made 25 cents a day. Now with a little more energy, care and skill they earned \$2.50 per day, and, instead of making 25 cents over and above expenses, they made \$1.50 or six times as much. In other words, they really made as much money in one day as they were previously making in a week.

I mention this merely to illustrate my idea in regard to the great advantage it is to us as a nation to have such a large proportion of those engaged in agricultural pursuits directly interested in the results of their labors. They are the owners and occupiers and workers of the land. Self-interest calls out all their energy and skill. They make every stroke tell. A nation of such farmers ought to be a rich nation.

The American agriculture of the future will not be English agriculture, or European or Chinese agriculture, it will be American agriculture. We shall think for ourselves. One of the oldest and most successful farmers in the State of New York is a Scotchman. But he does not use Scotch plows or adopt the Scotch system of rotation. He uses his Scotch knowledge and experience. But his farming is essentially American. We have many good English farmers among us but we have no English farming.

We have to think for ourselves; we have to study principles and apply them. Liebig has more readers here than in Germany.

The results of Lawes and Gilbert's experiments at Rothamstead are more carefully studied in this country than in England. And there is a reason for this. The English farmer can apply Lawes' superphosphate to his turnip crop without studying Lawes and Gilbert's account of their 30 years' experiments. But here if we would get any benefit from these wonderful investigations we must study them and master the principles of agricultural science.

This we are to some extent doing. The large circulation of our numerous agricultural papers proves that American farmers are great readers as well as great workers. They do not spend their evenings at the village tavern. Their houses may be isolated, but they are the homes of much that is noble and true. We need have no fears in regard to the rising generation of American farmers.

"But are not your sons leaving the farm?" Certainly, and do not English farmers' sons leave the farm? The sons and daughters

of Queen Victoria cannot all be kings and queens, and the sons and daughters of farmers cannot all be farmers and farmer's wives. I do not object to young men leaving the farm for the cities, nor to successful business men turning farmers. We need more of the latter class in the country.

But what of the active, enterprising, well-educated young man who sticks to the farm or who adopts agriculture as the business of his life; what are his prospects? The farmer's son who leaves the farm and turns carpenter, brick-layer or mason may become a builder and contractor and the owner of a dozen blocks, the quarterly rent from any one of which would buy his father's or his brother's farm.

Another farmer's son turns blacksmith, and having learned to make nails and horse-shoes by hand, thinks he can make them by machinery, and becomes a millionaire. Another is a shoemaker but does not stick solely to his last. He becomes, after a few years, the President of one of the largest boot and shoe manufacturing companies in the world. Another studies law and becomes an O'Connor or an Evarts.

But I need not go through the list. We all know, and the young men on the farm know, that there are great prizes to be won in the learned professions and in trade, commerce and manufactures. And they will try for them and work for them, and I do not object to it, and if I did it would make no sort of difference. A business in which there are no prizes, will have little attraction for a young man full of hope and energy.

Are there any prizes to be won in the field of agriculture, and, if so, how shall we go to work in order to get them?

Farming is said to be a slow business, but sure. The man who cannot work and wait will not succeed. But the agriculture of to-day or of the future is very different from the agriculture of the past.

The improvement in agricultural implements and machines is something wonderful. We can hardly realize the advantages which the men of science, inventors and manufacturers, have bestowed on agriculture. Many of the operations of agriculture are dependent on the weather. A large factory making shingles goes on, no matter what the weather may be, but a single shower will stop a whole field of hay makers.

Twenty-five or thirty years ago a farmer with a hundred acres of hay to cut and a hundred acres of grain, had to hire extra men

for a month or six weeks, paying extra wages and converting his home into a large boarding house. And he could not cut all his grass and grain just at the right time. But now how is it?

We start a couple of mowing machines in the afternoon ; ted the grass the next morning ; rake it into windrows ; ted it again once or twice, if it need be in the windrows ; put it into good cocks and it is safe. We can draw it in the next day, or as soon as we can get at it. In my own case this year, though the weather was unusually catching, we were all through haying and harvesting by the last week in July, the grain all thrashed and safe in the barn ready for market.

We have a bad climate for a poor farmer who gets behind-hand with his work. But we have as good a climate as any to be found in the world if we know how to take advantage of it.

I thrash my grain in the field by steam. I find that we can get in a field of grain much more expeditiously than if we put it in a stack or barn, simply because the man on the wagon can throw the grain to the machine easier than he can throw it up on a stack or bay. And when we are through we are through ; the straw stack built, the grain in the barn, and men and horses ready to fight the weeds during our splendid August and September weather, when even quack grass is not difficult to kill.

This is what machinery has done for us. And it has done much more ; but it is not necessary to allude to it. Machinery makes us far less dependent on the weather than formerly, and *better farming* also helps us in the same direction. When I first went to Rothamstead Mr. Lawes asked me about my father's farm, the character of the soil, the rotation and yield per acre. "It is rather light land," I said, "but yields good crops, if the season is not too dry."

"I suspect," said Mr. Lawes, "that your father is not a very good farmer. There is nothing which a good farmer dreads so much as a wet season."

This was a new idea to me. I have an English foreman, and our climate is a sore trouble to him. From May till November, he is always wanting rain. "The mangles are growing surprisingly," he said, some weeks since, "but another shower of rain would help them."

"Perhaps so," I replied ; "but as we cannot get rain when we want it, let us keep the cultivators going and kill the weeds."

For my part, I like our climate. But it makes no sort of difference whether we like it or not. We cannot change it. What we need to do is to study the climate and adapt our crops and our methods of cultivation and manuring to it. One thing may be safely said, that at least three-fourths of our seasons are very bad seasons for bad farmers, but good seasons for good farmers.

Take the barley crops as an illustration. In Western New York 20 bushels per acre, weighing 48 lbs. per bushel, is a good average. It probably will not average more than this the present year. And yet we had rather an unusually favorable season; so favorable indeed, that the maltsters expect to get barley at a low figure, say 75 cents per bushel.

Now I feel safe in saying that on well-drained, well-prepared and properly enriched soil our climate is capable of giving us an average yield of 40 bushels of barley per acre; and I think the average price of six-rowed barley is fully \$1 per bushel.

I have said that 20 bushels is a fair average crop; and this is taking good and bad crops together. There are many crops which yield 30 bushels, and consequently there must be many that are not over 10 bushels. But we will take 15 bushels as the average crop of a rather indifferent farmer. He sows two bushels, and will be very apt to leave two bushels on the ground in harvesting the crop, and so, after deducting seed and scatterings in harvesting, he has 11 bushels to sell, which, at 75 cents is \$8.25 per acre.

The good farmer has 40 bushels. He sows two bushels, and we will reckon that he loses two bushels of scatterings, though a good crop does not scatter half as much as a poor crop. This leaves 36 bushels, which, at 75 cents is \$27 per acre, or over three times as much as from the poor crop; and this, mark you, is in a *good* season.

Now, how is it in what we call a bad season, that is, in a season unfavorable for the growth of barley on ordinary land.

In such a season we have hundreds of farmers whose barley crops will not be ever 12 bushels per acre. Deducting, as before, 2 bushels for seed and 2 bushels for scatterings, we have 8 bushels of merchantable barley, of rather an inferior quality, weighing perhaps, 46 lbs. to the bushel.

Owing to the unfavorable season, barley will be likely to bring \$1.50 per bushel. The net returns from such a crop, therefore, will be (8 bushels of 46 lbs. at \$1.50 per bushel of 48 lbs. \$11.50) \$11.50.

The good farmer, on well-drained, well-prepared and properly enriched land, will have, say 36 bushels per acre of 48 lbs. per bushel. Deducting 2 bushels for seed and 2 bushels for scatterings we have for sale 32 bushels at \$1.50 per bushel, or \$48 per acre.

In the case of potatoes the advantage of raising a good crop in an unfavorable season is even still more striking. And since the advent of the Colorado beetle, rich land and better cultivation are absolutely essential, for the reason that it costs no more to kill the "bugs" on a crop that will yield 250 bushels per acre than on a crop that will yield only 100.

I live in a great potato-growing section. One hundred bushels per acre is a fair average crop. Last year (1875) the season was remarkably favorable for the growth of potatoes in nearly all sections of the country, and millions of bushels were sold for less than it had cost to dig and market them. In my neighborhood, I have seen many pits of potatoes that were left in the field to rot. The year before we got \$1.00 per bushel for potatoes, and it need not surprise any one if they are \$1.00 per bushel again before next spring. Such a season as this is the good potato grower's opportunity. With potatoes at \$1.00 a bushel, a good farmer can make money, and make enough to more than compensate for the loss he suffers from low prices in seasons when the average farmer has a fair crop. But I must not dwell on this point. The truth of the matter is this. With our large area, a fair average crop, such as we have in a highly favorable season, means low prices and small profits. A poor general crop means high prices for everything we consume at home, such as beans, potatoes, barley, oats, buckwheat, &c. A poor crop of wheat and corn does not always result in high prices, for the reason that we export largely, and the price is dependent on the price in England and on the cost of transportation. As a rule, we should aim to produce those articles which we import, rather than those which we export. A short crop of barley, beans or potatoes always gives us good prices. But such is not the case with wheat and corn unless the failure is so general and so severe as to entirely stop exportation. When the price of these articles is determined by the price at which it can be delivered in our markets from foreign countries, rather than by what it is worth to export to foreign markets, the American farmer is sure of getting full compensation for his labor. And in this connection let me say that it seems strange that we have so long let the foreign seed-growers supply us with such a large proportion of the vast aggre-

gate amount of field, vegetable and flower seeds which we annually use in this country. Depend upon it, in the near future we shall grow our own seeds.

As I have said before, the agricultural outlook in America is an inviting and prosperous one. There is plenty of work to be done. We own our own farms. We are surrounded by an active, energetic and intelligent business, commercial, and manufacturing people. And our own prosperity will be in proportion to the energy, skill and intelligence we put into our work. We shall not confine ourselves to raising wheat and corn, pork and beef. Many will do this. But others will raise products which require more capital and skill, and afford larger profits.

Our first object must be to make our farms cleaner and richer. Draining when necessary, and thorough cultivation, especially on the heavier soils, are the first steps. The real source of fertilizing matter is the soil. Draining and cultivation render a portion of the plant-food, which lies dormant in the soil, available. Mr. Lawes has raised 15 bushels of wheat every year for over thirty years, without manure, the grain and straw being all removed. In other words, on his heavy lands, cultivation renders enough plant-food available every year for 15 bushels of wheat and straw. This is the normal yield of his soil. On lighter and poorer soils, the normal, annual supply of plant-food would not be so much, and on richer alluvial soils it is often much greater. But whatever the exact amount, it is evident that this annual supply is the real manurial income of the farm. Our object must be to use this annual income to the best advantage. If we sell all our crops we live up to our income, and the farm gets no richer. And if we lose any by leaching or evaporation the soil becomes to that extent poorer. If we retain half the crop at home on the farm, and use it judiciously, we add so much to our manurial capital.

Many of our farmers sow land to wheat and seed it down with clover. They then plow under the clover and sow wheat again. In this way they raise a crop of wheat every other year, and, theoretically, if the normal yield or the annual supply of plant-food is equal to 15 bushels of wheat per acre, the yield in such a case every other year should be 30 bushels per acre. You get no more wheat in one case than in the other, and the only advantage is the saving in seed and in the labor of preparing for and harvesting the crop. I admit that these are very great advantages. Summer fallowing on some soils would have equal advantages.

But I have not time to dwell on this part of the subject. I have said that, theoretically, if the normal yield of a soil is 15 bushels per acre, if we plow under a year's growth of clover we ought to get 30 bushels, because we have two year's supply of plant-food in the soil. There is a principle, however, which interferes with this result. The soil is very conservative. It is not easy to get out of it all we put into it. A dressing of farm-yard manure or a crop of clover plowed under, is not by any means taken up by the growing plants in a single season. In heavy soils, especially, decomposition proceeds very slowly, and it may be several years before all the plant-food supplied by a crop of clover is given up to the plants. Still the fact remains that when we plow under a year's growth of clover we have accumulated in the soil an extra quantity of plant-food equal to the annual supply rendered available by the processes of agriculture and the decomposing and disintegrating action of the sun and air, heat and cold. And it is this fact that lies at the basis of all judicious rotations of crops. I cannot but feel that we are on the eve of many important discoveries which will enable us to add greatly to the yield of our crops and the profits of our farming.

We have learned how to make a sheep produce as much mutton from one year's feed, as was obtained from three or four year's feed less than a century ago. We shall learn how to get out of our farm-yard manure all, or nearly all, its valuable plant-food in a single year, if we so wish, and consequently be able to raise a much larger crop. We shall have the matter more under control.

We plow under a crop of clover for wheat, and in this way get two year's supply of plant-food for the wheat. We ought to double our crop of wheat. We ought to get as much wheat from the one crop every other year as from two crops of wheat grown successively on the same land. The advantage of the plan, as I have said, is in saving the seed for one crop and the labor of putting in the crop and cutting it.

But I feel sure that growing a crop and plowing it under, merely to enrich another crop, is not always the most economical plan. It is good as far as it goes. It is far better than growing grain crops year after year on the same land.

But there is a better way. There is much nutrient in the clover, and this nutrient can be taken from the clover and still leave nearly all the elements of plant-food in the excrements of the animals that have eaten the clover. And what is true of

clover is true of all other food. Bran is sometimes used for manure, and so are malt roots, and a few years ago some of the Connecticut tobacco-growers used corn meal as manure. Now if a sheep only takes out from 5 to 10 per cent. of nitrogen, and a still less proportion of phosphoric acid, potash and other valuable elements of manure from the food, and if these elements are left in a more available condition in the manure than in the food itself, I think we shall be able to make a profit in feeding the clover and other food to sheep, rather than to plow it under merely for manure. I am well aware that when we feed a ton of clover, containing 100 lbs. of nitrogen, to sheep, we do not always get back 90 to 95 lbs. of nitrogen in the manure. A careless farmer might lose half the value of the manure by leaching. But there is no necessity for this. The elements are in the manure when it leaves the animal, and we shall learn how to preserve them, and I feel sure we shall soon learn how to make them more immediately available to our crops. How to get out of our soil more of the large amount of dormant elements of plant-food which it contains, and then when we have got those elements, how best to use them and save them should be the great aim of scientific and practical agriculturists. I know of no better plan than the one I have suggested:—

1st. Draining and thorough cultivation. These operations, by letting in the air and sun, decompose and disintegrates the organic and inorganic elements of plant-food.

2d. To grow such crops as will take up the largest proportion of this plant-food from the soil and sub-soil. Clover, on many soils, is one of the best plants for this purpose. Peas and beans, in favorable latitudes, are also good. Grass and oats are less valuable for the purpose, but still useful, and our grand, national cereal, Indian corn, can be used with immense advantage. But we have much to learn in regard to the peculiar requirements and uses of this magnificent crop.

3d. After we have taken up and organized into useful, nutritious food the annual supply of plant-food furnished by the soil, we have to study the best method of extracting this nutriment and turning it into meat, and at the same time save the elements of plant-food in the shape of manure for future crops.

Of course, in a paper of this kind, I cannot go into details. The crying necessity of the age is more and better meat. The better our education, the more skillful and intelligent our popula-

tion; the harder we work with our brains, the more animal food we seem to require. Improved animals, like the Shorthorns for instance, require richer food than Texan cattle, and bright, active, energetic men, as a rule, require, and perhaps will have, more nutritious and more easily digestible food than the slow, plodding farm laborer of the past. In all civilized countries the demand for animal food is increasing much more rapidly than the supply. England is searching the world over for meat. And, what is still more strange, with all our immense area of cultivated land, New England, New York and Pennsylvania sends thousands of miles for beef cattle. This is very well, but we shall soon learn that we must look to improved agriculture, rather than to cheap land and semi-wild animals, for a steady supply of good meat. The farmers of New York, Pennsylvania, Ohio, Michigan, Indiana, Illinois, Wisconsin and Minnesota need have no fears that Texan cattle will crowd out Shorthorns and their grades from our markets. We shall produce better meat and we shall get better prices for it. Poor meat is the dearest of all food. Many of our farmers think they cannot afford to produce beef and mutton. And this is probably true, unless they produce beef and mutton of better than average quality. There is an astonishing amount of poor meat raised and sold in the better farmed portions of the country. We must raise good beef and good mutton. To do this with profit we must furnish richer food and this will afford richer manure. And taking meat and manure into account we can make a profit.

A few years ago the wool from Leicester, Cotswold and other long-wooled English sheep sold for from 20 to 30 per cent. less than Merino wool. Now all this is changed. Desirable combing wool brings from 20 to 30 per cent more than Merino. This is a great change. Congress was at one time urged to take off the duty on combing wool because it was said the farmers of the United States could not produce this kind of wool. It could be grown in Canada but not here. On the west side of the suspension Bridge, over Niagara River, combing wool could be produced of excellent quality, but not on the east side. And while the Canadian farmers on the east side of the Detroit river could produce the best of combing wool, the farmers of Michigan on the west side of the river could not do so. And a member of Congress, a lawyer from the State of New York, and in many respects a very intelligent and able man, actually asked me in all sincerity

and earnestness whether this was not really the fact. I need not say that there is not a particle of truth in the idea. We *can* raise just as good combing wool in the United States as can be raised in Canada. And the only reason why Canada combing wool sells for from 15 to 20 per cent. higher than our combing wool is, that the Canadian farmers understand the management of long-wooled English sheep better than we do. They raise more roots and feed better. It is not any difference in soil or climate. We can raise just as good combing wool as can be raised in Canada, and we are learning how to do it.

Some time since I read an article in the London Agricultural Gazette headed "The most profitable flock in Essex, England." Merino sheep were imported into England nearly a century ago when fine wool commanded high prices. But it was found that, owing to the demand for mutton, the coarser-wooled sheep were much more profitable. Still the sheep were kept for many years. Finally, however, the attempt to raise the fine wool was abandoned, and these Merino sheep were crossed with the English mutton sheep. And it was a flock of these cross-bred English and Merino sheep that was pronounced the most profitable flock in the County of Essex. My own experience in this country is in the same direction. By selecting a flock of common Merino ewes, which averaged at full maturity 80 pounds each, and which cost me \$2.40 per head, and by putting them to a high-bred, pure Cotswold ram, I got a lot of strong, healthy lambs which, with good feed, grew rapidly and afforded excellent mutton, and the wool, even the first cross, sold for combing. A second cross, that is, by taking the ewe lambs from the first cross and putting them, when about 18 months old, to a pure-bred Cotswold ram, produced lambs which approximated closely to the Cotswold in size and in length of wool, while the lambs are harder and stronger, and the wool finer, and the mutton of better quality than the pure-bred Cotswolds. I killed one of these $\frac{3}{4}$ Cotswold-Merino sheep, which, at 15 months old, dressed 25 pounds per quarter.

We have millions of these hardy, common Merino ewes, which can be bought at from \$2 to \$4 per head, and two or three crosses of Cotswold or Leicester blood will, with good feed, give us not "the most profitable flock in Essex" merely, but, in certain sections, the best and most profitable flocks in the world. The Cotswolds and Leicesters are too fat. The Merinos are too thin. The Cotswold wool is too coarse and unnecessarily long. The

Merino wool is very fine but too short. By crossing, we can get just the wool and mutton most in demand. And the sheep are admirably adapted to our climate. Of course we must feed better than we are in habit of feeding common Merino flocks, but that is precisely what the requirements of our agriculture demands. We shall feed higher and make much richer manure.

Good mutton in England brings a higher price than beef. We are shipping beef quarters to England, we shall ship mutton carcasses also just as soon as the farmers of the United States raise such sheep as I have alluded to. Well fatted mutton will keep longer and better than beef, and I should think there would be no difficulty in transporting it across the Atlantic. And if I can trust my own taste the mutton of these grade Cotswold-Merino sheep, when well fatted, will be found nearly, or quite equal to South Down mutton, especially when kept till nearly two years old. I have just weighed (Aug. 24) one of my two-year old grade ewes that has been running with the rest of the flock, but which did not have a lamb last spring and is consequently almost fat enough to kill. She has two crosses of Cotswold blood in her, she is perfect in shape, except that her legs are a little too long, but she is a remarkably strong, vigorous sheep, admirably adapted to our climate and mode of farming. She weighed $200\frac{1}{2}$ lbs., and would probably dress 28 lbs. to the quarter. I do not wash my own sheep, but I sold some grade lambs to one of my neighbors who washes his sheep. He told me that one of these grade Cotswold-Merino lambs this spring sheared 12 lbs. of *washed* wool.

Now if we can raise such sheep, and I am sure we can, and if we can send the surplus mutton to England after we have supplied our own markets, I see no reason why we cannot adopt a higher and better system of farming—why, in other words, we cannot keep more stock, feed higher, and make more and richer manure.

There are only two points to be observed: 1st. We must use *pure-bred long-wooled rams*, and 2nd. We must feed the ewes and lambs liberally. We have plenty of corn, and clover is easily raised, and bran is usually cheap. I hope to live to see the time when we shall send less corn and more mutton across the Atlantic, and when we can raise nearly all our own combing wool.

Hitherto we have raised few turnips or other roots for our sheep. Much has been written and said in their favor, and many farmers have tried them, only to give them up. The English farmers, to a great extent, feed their turnips on the land as they grow. In our

own severe climate we have to keep them in pits or cellars. We get our seed largely from England, and sow the English improved varieties.

Twenty-nine years ago I was walking with Mr. Lawes in a turnip field at Rothamstead. We came to a part of the field where, up to a certain row on the right hand, the turnips were much better and larger than on the left hand. "What is the reason?" I asked. "Has one part of the field been dressed with superphosphate, or manured more heavily than the other part?" "No, both were treated alike, but this fine crop is 'Skirving's Improved Purple-top Swede,' while the other is a common variety which has been grown for some years in this neighborhood. And I wish," said Mr. Lawes, "you would take a sample from both and analyze them." I did so, and we found the 'improvement' consisted principally of water. The English seed growers have for years made great efforts to improve the varieties of turnips and mangels. They have bred for size and shape, and they have attained wonderful success. But the increased size is to a large extent merely an increase of water. They have got varieties so much improved that they can grow 84 tons per acre, nearly 80 tons of which is water.

Now, in this country we do not wish to pull up, top, draw home, pit and slice up 80 tons of water to get four tons of food. We can pump water far cheaper with a wind mill. And turnips and mangels will never be generally grown in this country till we begin to breed for quality rather than for size. When we can get mangel wurzel that contains but little more water than fresh grass or fresh clover, we shall then be able to gather, store away, cut and feed out the crop at one-third the expense, and the roots would keep better. We should then be able to grow them for winter and early spring use as a substitute for grass. But as long as we are caught by size and sound: as long as we select varieties such as 'Norbiton Giant,' because it grows big and has a big name, we shall find little profit in root culture. I am in great hopes, now that there is a prospect of having experimental stations as fast as the means and men can be obtained to establish them, that American seed growers will breed for quality rather than for size. It is a comparatively easy matter to 'improve' a variety the wrong way; it is easy to take a sugar-beet and breed it back to a mangel wurzel. The reverse process may not be so easy, but it can be done. Our roots seldom grow so large or so

watery as the same varieties do in England, and by growing our own seed and selecting bulbs that will give us the largest yield of real food per acre with the least water, we may hope to make some real improvement that will far more than pay the cost of all our experimental stations for the next twenty years. We shall then export mangel wurzel seed to England and France instead of importing it.

And I hope, and firmly believe, that we shall do the same thing with herds of sheep and swine. There is a grand chance for intelligent, skillful, scientific and honest breeders in this country. But we must breed for real merit and not for show. Our experimental stations must test our work as we proceed, showing us the right direction, and checking us when we are going wrong.

We have, for years, been importing the best cattle and sheep, and best swine that England could produce. We have been able to hold our own in the case of pedigreed cattle. But we have not attained like success in the case of English breeds of sheep and pigs. An English-bred sheep or pig almost always makes a better appearance in the show-yard than the home-bred, even though descended directly from the very choicest imported stock. It is worth our while to ask why this is the case. Why cannot we succeed as well with English sheep as with English Shorthorns?

I think we may find an answer, at least in part, in the fact that Shorthorns have a recorded pedigree, the sheep and swine have not. The Shorthorns are kept as pure in England as they are here. We compete on common ground. But how is it with sheep and swine? If I wish to show a sheep or pig at the Centennial, I am required to furnish evidence that it is "imported or descended from imported animals, and that the home-bred shall be of pure blood as far back as the fifth generation."

No real American breeder will object to this rule. With my own sheep and swine I can comply with the conditions, but in reply to a request for suggestions I remarked that the same rule ought to be applied to English breeders and to imported stock as to American breeders and home-bred animals. If not, why not?

I have got Cotswold sheep imported from the best breeders in England, but I have never yet happened to see a pedigree of English sheep or of English pigs that was worth the paper on which it was written. I do not say that English sheep and pigs are not pure, but I do say that, as a rule, the records do not prove it. And I think that far greater latitude is allowed the English breed-

ers of sheep and swine than is allowed to American breeders. When we get imported animals we put numbers in their ears, and keep the stock pure. No reputable breeder resorts to crosses. And we can furnish longer pedigrees of Cotswold sheep, Essex, Berkshire and Suffolk pigs in this country than are usually furnished by English breeders.

I saw sometime since the pedigree of an imported Essex boar. The dam took this and that prize—the sire was never beaten at any show, and so of the grand dam, and the grand sire was the celebrated boar something-or-other, “the progenitor of the race.”

Talk of short pedigrees! Why, it has been claimed, and perhaps justly, that Chester White and Poland China pigs are not established breeds, because ten or a dozen or a score generations back the pedigree, if they have any, runs back into the American woods; and yet here is a pig, bought in England at a high price, that two or three generations carries him back to the “progenitor of the race.”

To the American breeder the future looks bright. If we keep our sheep and swine pure; if we weed out vigorously; if we keep accurate records, and breed for definite, correct and useful objects, it will not be many years before we shall not only have a great demand from our own widely-extended land, but from Europe, Asia and Australia, and that at prices which will liberally compensate us for all our skill, labor and patient waiting. We shall not be able to make as fine a display in the show-yard, but our animals will be far more valuable for the purpose of improving common stock than those which are more promiscuously bred, and intelligent farmers and breeders will not be long in finding it out.

We all feel that America is destined to be the greatest country in the world. There is nothing lacking. We have abundance of coal and iron and wood and stone, and so much silver that our creditors are afraid we shall pay our debts with it. We have railroads running in every direction, which must depend on agriculture largely for their future dividends. We have a rapidly increasing population, with free schools and the ballot-box for all.

And the taste of our people is for other pursuits rather than agriculture. Those who stick to the farm, study the best methods of cultivation and manuring, and aim to produce the best articles at the least cost, would seem to be certain of their reward.

We shall have periods of depression in the future as in the past. But as long as people need food, the farmer is sure of a market

for his products. He is sure of a fair compensation for his labor, skill and intelligence.

But this does not satisfy our young farmers. They see their brother and friends winning wealth and distinction in other pursuits, and they ask if there are any prizes to be won in agriculture.

I believe there are in farming as great and as many opportunities for "doing good and making money," as in any other business of life. We are apt to think that all the past discoveries and inventions have been made. We think that Bakewell, the Collings, Ellman, Jonas Webb, Hammond and others in the past have so improved on cattle and sheep that there is nothing more for us to do except to retain and perpetuate the improvement. There cannot be a greater mistake. Notwithstanding all that science and art have done, the production of flesh, meat and fat is still a very costly operation. To convert the carbon of grass and corn into the carbon of fat and butter, we have at present to submit to a great loss. Even with our best breeds of cattle and sheep, our most experienced feeders have to submit to a loss of at least 90 per cent. of the albuminoids of the food. In other words, if you feed a steer or a sheep a quantity of grass and grain containing 100 pounds of nitrogen, you rarely get in the growth of the animal consuming the food an amount of flesh, skin, hair and wool containing 10 pounds of nitrogen. The other 90 pounds are, to a large extent, used to "run the machine." Is there no chance for improvement here? We have the experience of the past and the science of the future to aid us. We have not to grope our way in the dark as Bakewell did. We know what we want, and in what direction to look for it. Depend upon it, we shall yet have breeds of cattle, sheep, swine and poultry far superior as meat, milk and wool producers to anything the world has yet seen. There are great opportunities for the young farmer of the present and the future. We have in this country seen a single cow sell at public auction for over \$40,000; and I suppose it is a fact that the late Mr. Hammond refused \$30,000 for one of his rams. In one of the northern counties of New York, where the thermometer goes down 40 degrees below zero, an American breeder had a choice herd of Shorthorn cattle. An English breeder purchased part of the herd at a high figure, by telegraph. And only a few days ago an American breeder "cabled" to a brother breeder in England

and bought his entire herd of thoroughbred Berkshire swine. A few pounds of potatoes have been sold for \$500, and the seed of a well-bred tomato for a much higher sum. In England the offspring of a Yorkshire sow was sold for money enough to build a church, and in this country a breeder of Essex pigs has done nearly as well. The purchaser of a single pair of pure bred Essex swine has sold pigs for over \$10,000, and has a large herd left. And there is a real, substantial basis to all this. A good, pure bred boar, when put to common sows will get pigs that at five weeks old are certainly well worth one dollar a head more than common pigs; and such a boar as can be often purchased for \$20 or \$25 can directly increase this additional value to at least a thousand pigs. The breeder who sells him for \$20 gets pay for his skill and labor, and the purchaser and his neighbors obtain even still further profits. There are, therefore, *prizes*—grand prizes in agriculture, and they are obtained, not at the loss of some one else, but to the benefit of all concerned.

THE ADAPTABILITY OF MAINE TO DAIRYING.

By J. W. LANG, SECRETARY MAINE DAIRYMAN'S ASSOCIATION.

The adaptability of Maine to dairying is attracting considerable attention at present, not only from our own citizens and farmers, but also of those of other States. This being the fact, the object, aim, and province of this paper is to show in a clear and concise manner that adaptability in as full and complete proof as may be under the circumstances. It is confidently believed and has been urged by the writer, and others, for years, that dairying was specially adapted to the soil, climate, condition, and locality of Maine. We believe that dairying ought to become, and shortly will be the leading branch of our farm industry and economy. The three specialties of dairying, sheep husbandry and orcharding are eventually, and at no distant day, to assume their rightful and leading place. That they are to become the three about which all other branches and farm operations will cluster and become auxiliary to.

Adaptability means fitness for, suitableness to, qualification and just appropriateness in all its parts. The scope of this paper will embrace this as applied to our subject. The adaptability of Maine to dairying as a whole State taken together is meant. It is not to show that separately of any section, or even of the older settled parts. That some portions of the State are better adapted to dairying than others is a well known fact, but this is not what we are called upon to show ; but rather we are to show the suitableness of Maine to dairying in all its branches, from the forest to the ocean, from the fertile fields of Aroostook to the green valleys of the Saco and the Piscataqua and the St. Croix. In all the length and breadth of the land the Androscoggin, the Kennebec, the Penobscot valleys, amid the green hills and vales of Waldo, Franklin and Oxford, and in all the limits of the Dirigo State, no portion of our goodly and far-reaching domain is to be omitted. The adaptability of all the parts are to be shown and proven beyond the shadow of a reasonable doubt. There is no town that has not cows, and which is not more or less interested in dairying.

There is no town in which more or less milk is not produced, but there are whole sections where dairying as a business is not known. There are whole sections where the name and object of a cheese factory is scarcely known or thought of, sections too, that are well adapted to their location and successful operation, and where associated dairying would pay a larger per cent. than any branch of farming now pursued in those sections, and it is the province and privilege of this paper to prove to such that dairying is not only adapted to Maine as a whole, but to those in particular by the judicious showing up of its many promising points of superiority, and publishing it broadcast over the State. Public attention will be called to investigate and individuals led to experiment, and investigation and experiment go to help establish and endow that which is beneficial. They whom money stimulates and whose pens write and aid will be recognized as public benefactors.

Maine is situated between the 43d and the 47th parallel north latitude, and between the Piscataqua and the St. Croix rivers, one upon its western, the other upon its eastern boundary. It is at the extreme northeast part of the United States. Only one-half the State is settled as yet, a dense lumber forest covering all the unsettled part of the north and northwestern portion of its territory. Maine is covered with a complete net-work of ponds, lakes and streams, forming noble rivers, as may be seen by a glance at the map. It is drained by several river systems, the principal of which are the Saco, the Kennebec, the Penobscot, the St. John's, the Androscoggin, Sandy, Piscataqua, Aroostook, Union, Machias, and others on a smaller scale. Maine is neither flat nor mountainous, but rather moderately hilly, with a general high, rolling surface, well watered, wooded, and easily accessible. It is crossed from east to west by a line of railroad, and has numerous connecting branches either built and operating as contemplated, opening up every section more or less; and its sea-coast line with numerous good harbors and navigable rivers, place the whole settled portion in easy and direct communication with the rest of the world and open up its home or foreign markets to an extent not surpassed or equalled by other States or countries in the world. The climate is free from malarious diseases nearly, and though fevers and pulmonary diseases prevail more or less, is as healthy in this as most other places, and exceeds many in this respect.

In no State or country are cattle so free from disease of all kinds and so little risk in loss by death from destructive distempers.

This is so plain and apparent and so strongly backed up by statistics, it needs no argument to prove it. .

Maine lies within the best portion of the great American dairy belt and at its eastern or best extremity. X. A. Willard of New York, says: "The American dairy belt lies between the fortieth and the forty-fifth parallels of latitude. It stretches from the Atlantic to the Mississippi, and possibly to the Pacific. Within its limits are New York, Pennsylvania, New England, the northern parts of Ohio, Indiana and Illinois, the greater portion of Michigan and Wisconsin, Iowa, Minnesota and a part of the Canadas. Of all this belt, probably not more than a third of the land is adapted to dairying. The dairy lands are quite irregular in outline, not always continuously together but often detached and not unfrequently, if represented on the map, would have the appearance of islands." Mr. Willard further says, "The characteristics of a good dairy country are high, undulating surface, numerous springs and streams of never failing water; a soil retentive of moisture, a sweet and nutritious herbage that springs up spontaneously and continues to grow with great tenacity; a rather low average temperature, frequent showers rather than periodical rains or droughts; sufficient covering of the ground in winter to protect the grass roots, so that the herbage may be permanent and enduring." These characteristics and conditions are each and all as fully carried out in the climate, soil and location of Maine as in any other locality in the dairy belt, and in many of them our State is decidedly ahead.

The geological formation of Maine is peculiarly appropriate for a good dairying country, with its granite and slate, its lime and sandstone, and its mineral wealth, the developing of which makes employment for many hands and opens good home markets for all the products of the dairy.

The history of Eastern farm lands goes to show that no class of farming has paid so well, as no other lands bear so high price as those of the dairy districts; the reasons why the dairy lands bear so high price and are so valuable are that they are of more limited extent. Second, The grasses are of great value and have fewer enemies to contend with, and they give the most valuable results for the labor and capital expended; and they give the most valuable results for any series of years. Third, That dairy farms can be carried on at less expense. Fourth, That they are constantly increasing in fertility and so in value. Fifth, That the products

of the dairy are earlier and more readily turned into cash. Sixth, That the product of the farm is concentrated into small compass and hence the cost of transportation is reduced to a minimum. Lastly, That an increased and permanent foreign demand renders prices stable, so that the dairyman can always count upon the income from his dairy farm.

The location of Maine is so favorable for the carrying on of dairying, that we doubt if any more desirable locality can be found in which to prosecute this important branch of farming, when we consider its climate, its soil, its grasses, its accessibility and its markets.

There are now about sixty cheese factories operating in this State the present season; and they will average some five or more tons of cheese apiece; returns give over twelve tons each on an average. This will amount in the aggregate to some 300 tons of cheese. Suppose the private make amounts to one-half this, or 150 tons—and we think this a very liberal estimate—the sum total would be 450 tons. The population of Maine as given by the last census is 626,400. This would be only about one and a half pounds of cheese to each person. Nine factories in Waldo county, last year (1876) made 91 tons of cheese, on an average of ten tons per factory. On this basis there would be made in the State some 600 tons of cheese at the factories, and raising the private make to 200 tons the total would be 800 tons or 1,600,000 pounds, which would give almost three pounds to each inhabitant of the State. This will show whether we are likely very soon to supply even the home market for cheese. We are largely dependent upon Western manufacturers for our cheese, even with our 60 factories and our numerous private dairies. In butter, the supply, such as it is, is nearer the demand in quantity, but not so near in quality, as is the case with the cheese.

The last census gives the number of milch cows in Maine at 133,556. Now suppose one-eighth of these wholly engaged in cheese making, there would be left 116,862 for milk supply and for butter making. Suppose again that each of these cows produces 100 pounds of butter per annum, and they ought to produce very much more, there would be 11,686,200 pounds of butter made or 5,843 tons. The census gives the amount of butter made in Maine at 11,636,482 pounds, and of cheese 1,152,590. The census also gives the number of gallons of milk sold at 1,374,091, enough to make 13,800,000 pounds of cheese or 6,870,455 pounds of butter.

Putting it all together to find the sum total of the dairy products of Maine, we have of butter and milk sold if made into butter, $11,636,482 \times 6,870,455 = 18,506,937$ pounds of butter, at an average of say 25 cents per pound = \$1,626,731, and of cheese we have 1,152,590, at an average of say 15 cents per pound, which would be \$172,888 $\frac{1}{2}$, or a grand total of \$4,799,622 $\frac{1}{2}$.

We give below a table, showing by the census report, the number of cows, pounds of cheese and butter made, and also number of gallons of milk sold in ten of the best dairy States.

STATE.	No. of Cows.	Pounds of Butter.	Pounds of Cheese.	Galls. of Milk sold.
Maine	133,556	11,636,482	1,152,590	1,374,091
New Hampshire.....	94,227	5,965,080	849,118	2,352,884
Vermont.....	146,128	17,844,396	4,830,700	3,835,810
Massachusetts.....	130,099	6,559,161	2,245,873	15,284,057
Rhode Island	18,698	941,199	81,976	1,944,044
Connecticut.....	85,461	6,716,007	33,626	3,693,021
New York.....	931,324	107,147,526	22,769,964	135,775,919
Pennsylvania.....	530,224	60,834,644	1,145,209	14,411,729
Ohio.....	544,499	50,266,372	8,169,372	22,275,344
Wisconsin	64,339	22,473,036	1,591,798	2,059,105
Rank of Maine.....	5th	6th	5th	10th

Without going into an analysis of the table, it is apparent even upon a cursory examination that Maine appears as well adapted, and is so proved by the returns, to dairying as any other State and better than most. It must also be borne in mind that at the time this census was taken, (1870,) based on results of 1869, Maine had not a solitary cheese factory, hence does not show in cheese returns nearly as well as she would to-day.

The grasses are peculiarly at home in our State, especially the more common and more beneficial, and hence more valuable ones. Not only are a great many indigenous to the soil and grow with great rapidity and luxuriance, but the best English grasses grow and thrive and yield a luxuriant feed or an abundant hay harvest. The soil of Maine is such that nature can easily re-clothe denuded spots, and grass grows everywhere, in the streets, in the fields and pastures, in the valleys and upon the hills. Grass, the most common and beneficial of all plants, and which furnishes sustenance to all beasts we rear about the barn-yard. Herds-grass or Timothy, red top in all its varieties; orchard grass and sweet vernal grass, Kentucky blue or June grass, fowl meadow and blue joint, and the noble forage plants of the clover family are all here perfectly at home, and as hardy and sure a crop as anywhere

else. In the spring, summer or autumn, one may ride from one bound of the State to an opposite one, anywhere and everywhere, that the hand of cultivation has been, and no greener or better grazing country can be found. Indeed, the contrast to the parched fields and drouth-scorched plains of the West and South, destitute comparatively as they are of the richest and most beautiful carpet ever woven—fresh green grass—is strikingly apparent, and is a glad, welcome sight to the eye and refreshing to the heart and soul. Grass, green and luxuriant, up-springing everywhere, is the sure foundation of an improved agriculture, and without it no system of farming can thrive. We little appreciate the advantage and blessing conferred on us by a climate and soil, and location that gives us such universal good pasturage and hay crops. No cattle, no crop ; no grass, no cattle, is the cause and effect and the connection one has with the other. Special forage crops are easily raised to lengthen our pastures to tide over a fall drouth, should one occur. Fodder corn, oats to cut green in their succulent state, Hungarian grass, cabbage, roots, second crop on some convenient spot near the stables, are all easily raised.

Help is cheap and plenty here as any where, and even cheaper and more abundant than in many localities West, for many of our citizens go West for employment. The item of help, though of not so much importance to the dairy farmer as to the stock-breeder, grower, or grain farmer, is nevertheless one of considerable consequence and should be taken into consideration and allowed its due weight.

That there is considerable work connected with dairying, we will not attempt to dispute, nor could we successfully do so if we wished ; but most of the work is light, pleasant and profitable, which makes it agreeable. With the dairy, pork raising can be successfully prosecuted and the farm soon be put in a high state of fertility by reason of increased revenues of rich manure.

We have seen the grand capabilities of our Aroostook for dairying. Nowhere on this continent are there better chances, for on that deep, rich, cheap soil grows the grasses in greatest perfection.

Here help is cheap, and money goes a great ways, judiciously expended. Here dairy products find ready market, or are easily transported to markets outside—to Bangor, Portland and Boston. Cheese factories are being established there, and also starch factories, which two go hand in hand in this fertile county. The

winters are long, but of even temperature and enjoyable. The snow falls early in November and lies deep, covering the grass before it is frost-killed, and preserving it fresh and green in its rich luxuriance, till Spring, with the warm breathings of her balmy breath, uncovers it; so cows get their living till snow falls, and then soon as it is gone again in the Spring. We know of no section so truly inviting to the dairyman as the Aroostook section of Maine.

Fencing is an item of no small consideration to the dairyman, and he must erect and maintain fences, unless it be that he practices whole soiling, and this we do not believe is ever profitable, except near large cities where land is very valuable and fencing and room scarce. Here we have abundance of the very best material for fencing, and fences are easily constructed. Stone, wood and hedges can be had or grown on every farm, or very near to it; enough to supply all demands for fencing. In some places hedges and ditches will be found useful for fencing, and in connection as wind breaks and drains.

Cows are more easily fenced against than most other kinds of farm stock. This is also an inducement to engage in dairying, and dairying also requires less fencing than other kinds of stock husbandry.

A good cedar stake and yoke fence, well put up, will last a life time. A good wall the same; either need not cost over a dollar per rod, outside the farmer's own labor—often nothing—and pastures once well fenced with either are always fenced. Post and board fence will last very many years, and post and wire fence is cheaply built and does not harbor vermin or drift of snow. Hedges are easily set out and grow rapidly, soon forming an effectual barrier to cows.

The Soil of Maine is quite uniform, yet varies in different localities from sand to clay, and from loam to muck or vegetable debris. There is a good deal of washed soil or "made land" in valleys and beside streams. These lands, known as meadows and inter-vales, are among the very best grass lands we have. Swales with muck soil, or wet, dark loam, are abundant. Clay loam prevails along the seaboard and by the river courses. The soil of the Aroostook is a dark, coarse loam, very rich and productive. Naturally, the soils of Maine are "strong," and richer than those of New Hampshire or Massachusetts, or even large portions of New York. There is no soil in Maine so poor, but if rightly

treated will give a crop of grass worth feeding off or cutting for hay. There is but little waste land that cannot be profitably utilized in grazing dairy cows. Many of the richest portions of the farms, and the best grass lands upon them, are not yet developed, having been considered waste and worthless. Swales, swamps, mucky ravines, wet, low lying lands, wanting only the thrifty hand and judicious head to develop them, clear them of obstructions and drain them perhaps of surplus water, and to re-seed them to the proper varieties of grasses. This done, they will become the source of rich returns for labor expended.

Associated Dairying. The factory system has encouraged the use of science and of skill, and now a much better article is produced than formerly. The effect has been, that new markets have opened for our dairy products both at home and in foreign countries. The facilities, also, for the marketing of the product are much better than under the old system or private dairy plan. The advantages in this are becoming yearly more apparent. The system of associated dairying has stimulated enterprise in the whole pursuit of agriculture wherever the system has been introduced. The statistics show a larger aggregate of farm products raised than previously, thus proving the general benefit resulting from the introduction of the system.

The States of New Hampshire, Massachusetts, Connecticut and Rhode Island have not made great progress in associate dairying, owing to the good home market for milk and butter, and the hard task to break from old customs; but Maine is well on the way. Four years ago a solitary cheese factory started, under much apprehension and misgiving, at Strong, in Franklin County, and the next year three more joined hands with it, located at Dixfield, Glenburn and Northport. The third year, or two years ago, twenty more went into operation, and now we have between fifty and sixty in successful operation. Such has been the wonderful growth of the associated system in Maine.

Here we would say a word in connection, showing the relations this system may sustain to that powerful organization that has also so rapidly banded together the farmers under its noble banner. The Grange is almost a necessary adjunct to the associated dairy. The same building can, often now does, contain the Grange hall, as well as the work and curing rooms of the cheese factory company. The one strengthens the other. They go hand in hand.

The one supplies the head, the other the hand. Together they are invincible, and form one complete whole.

So far we have had only cheese factories on the associated plan. The associated system embraces not only this, but the making of butter and the condensing of milk. The time is not distant when we shall have creameries, or butter factories, and also condensed milk factories. This is assumed, as much as that the march of improvement is to be onward.

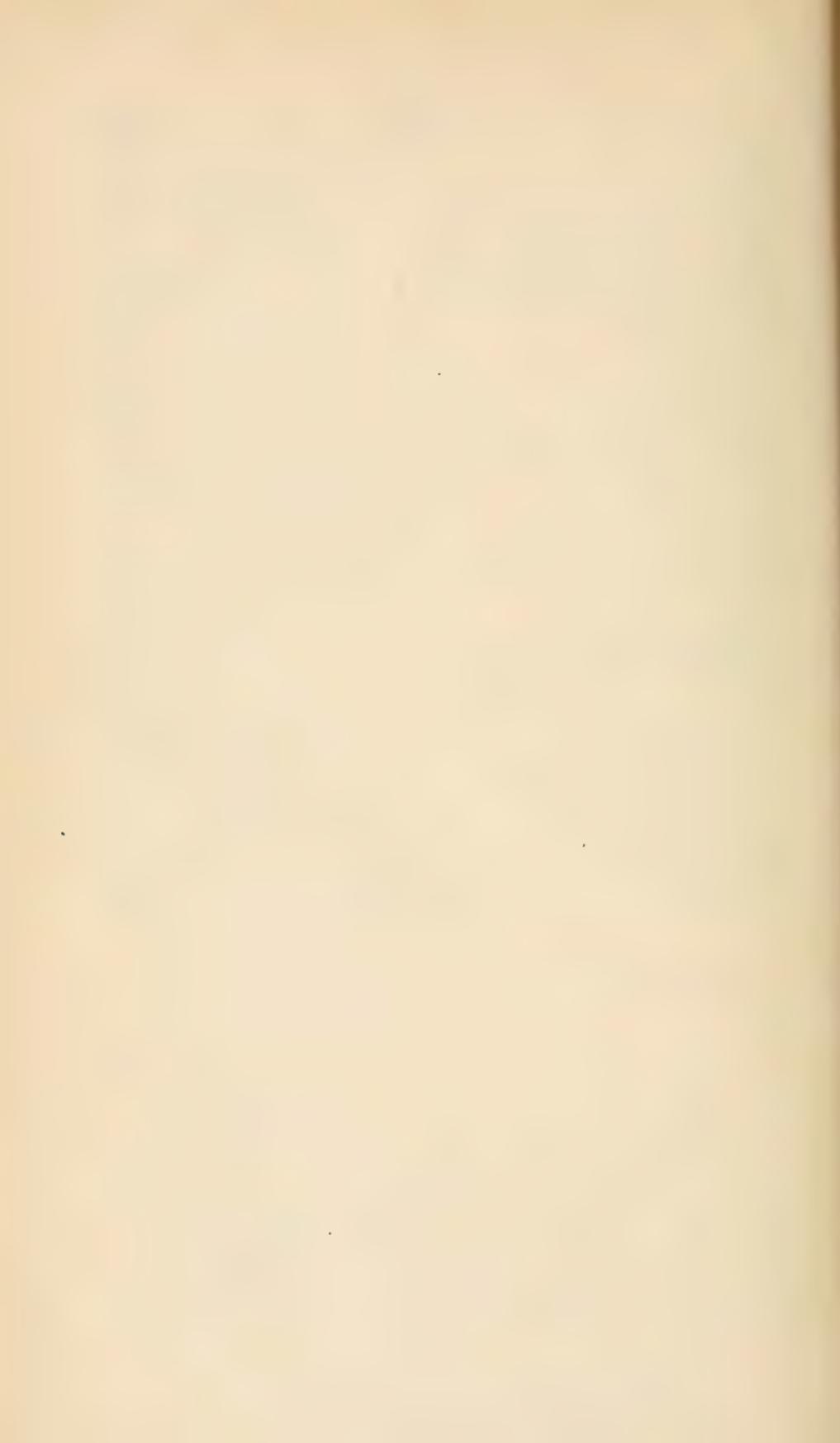
The tendency of the times is toward co-operation and associated effort. The farmers have been the latest and last class to avail themselves of its benefits; and its capabilities were never so plainly apparent as now, in the form of associated dairying. There is also another plain fact apparent to the keen observer, and that is, that the tendency is also toward specialties. Not that the farmer is to devote himself wholly to one thing, but that he is to make one branch the leading one about which all the other farm operations shall cluster as auxiliaries and helpers. In the past history of New England agriculture we recognize first one specialty, then another, cropping out. The first was that of grain, the second was wool growing, the third was potato culture, and the last, noblest and best, yet in its infancy as a specialty, is dairying. We would not be understood as advocating this as the whole business of the farmer, or for all farmers, for this would be without wisdom. But, for a large class, and for even whole sections, to make this the leading branch of farm operations we feel assured is sound sense and based on evidence conclusive.

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