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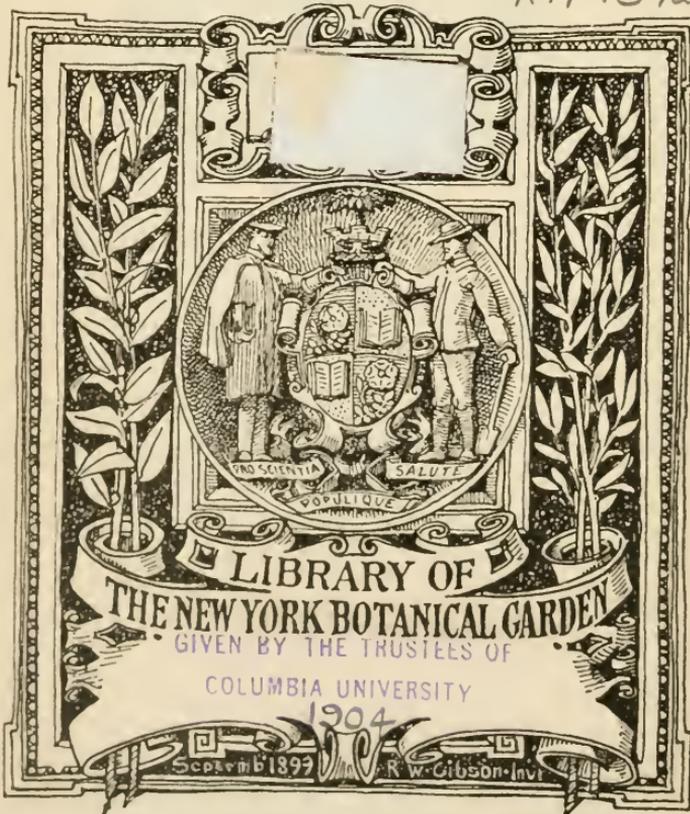
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AGRICULTURE OF MAINE.

TWENTY-SIXTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

MAINE-BOARD OF AGRICULTURE,

FOR THE YEAR

1882.

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To the Honorable the Governor
and Council of Maine:

In accordance with the law of the State, I have the honor to present the Report of the doings of the Maine Board of Agriculture for 1882.

Z. A. GILBERT, *Secretary.*

EAST TURNER, January 17, 1883.

MAINE BOARD OF AGRICULTURE — 1882.

OFFICERS.

A. R. LINCOLN, PRESIDENT.

T. B. HUNTER, VICE PRESIDENT.

Z. A. GILBERT, SECRETARY.

MEMBERS CHOSEN BY COUNTY SOCIETIES.

Term expires Dec. 31.

Aroostook county,	J. D. Gove,	Linneus,	1882
Franklin	“ T. B. Hunter,	Phillips,	1882
Penobscot	“ A. O. Ingersoll,	Lincoln,	1882
Piscataquis	“ O. T. Goodridge,	Milo,	1882
Knox	“ Erastus Lermond,	Thomaston,	1882
Androscooggin	“ C. H. Cobb,	East Poland.	1883
Kennebec	“ W. H. Pearson,	Vassalboro’.	1883.
Lincoln	“ E. W. Stetson,	Damariscotta,	1883
Waldo	“ George E. Brackett,	Belfast,	1883
Washington	“ A. R. Lincoln,	Dennysville,	1883
Cumberland	“ W. W. Harris,	Cumberland Centre,	1884
Oxford	“ J. K. Hammond,	Paris,	1884
Sagadahoc	“ S. L. Holbrook,	Brunswick,	1884
Somerset	“ A. R. Smiley,	Skowhegan,	1884
York	“ Horace Bodwell,	Acton,	1884.
Hancock	“ Vacancy.		

MEMBERS FROM STATE COLLEGE.

President, M. C. Fernald, Orono.

Professor of Agriculture, Walter Balentine, Orono..

ELECTED BY THE BOARD.

Z. A. Gilbert, East Turner, Secretary.

REPORT.

The annual meeting of the Maine Board of Agriculture was held at the office of the Secretary at the State House, January 18, 1882. Somerset county was not represented, the term of office of the old member having expired, and the election of a member to fill the place had not then been made. Subsequent action of the agricultural societies of the county resulted in the election of A. R. Smiley, of Skowhegan, for the place. Hancock county is still without representation, from there being no active incorporated agricultural society in the county, through which alone, according to the law, a member can be elected.

The meeting was called to order by the Secretary at 10 o'clock A. M., and T. B. Hunter, the member from Franklin county, was called to the chair. A committee on credentials was appointed, consisting of A. R. Lincoln, Walter Balentine and A. O. Ingersoll.

This committee subsequently reported as duly authenticated new members, elected to fill the vacancies occasioned by the expiration of the terms of office of old members :

S. L. HOLBROOK, Brunswick, Sagadahoc county.

J. K. HAMMOND, Paris, Oxford county.

W. W. HARRIS, Cumberland Centre, Cumberland county.

The case of the member appearing from York county was referred to the full Board which gave the seat to Horace Bodwell, of Acton.

The organization was effected in the election of

A. R. LINCOLN, *President*.

T. B. HUNTER, *Vice President*.

Committee on Pay Roll — E. W. Stetson, W. H. Pearson, A. O. Ingersoll.

Advisory Committee — A. R. Lincoln, M. C. Fernald, Geo. E. Brackett.

The member from Cumberland county moved and it was

Voted, That the disposition of that part of the State stipend to agricultural societies subject to the disposition of the Board be

left in the hands of the several agricultural societies, the purpose for which the same shall be expended being subject to the approval of the local member of the Board.

On motion of M. C. Fernald, a committee consisting of M. C. Fernald, W. W. Harris, E. W. Stetson, was raised for the purpose of taking into consideration the matter of *crop statistics*, with instructions to report before the close of the session. This committee subsequently reported the following preamble and resolution :

WHEREAS, The forecasting of crops has proved serviceable in the States where such system has been adopted, and

WHEREAS, Early and reliable statistics of agricultural products furnish information of great value to farmers, therefore

Resolved, That this Board hereby instructs its Secretary to adopt a system of crop forecasts, and of gathering early and trustworthy statistics of farm products, and to disseminate the information thus gained by bulletins or otherwise among the farmers of the State.

The report was accepted and the resolution adopted.

The member from Kennebec presented the following, which after a full and free discussion received the unanimous support of the Board.

Resolved, That the establishment of an experiment station at the State College at Orono, for the analysis of fertilizers and of stock feeds, and the testing of the purity and vitality of seeds is in the estimation of this Board a movement in the direction of the best interests of the State.

A committee consisting of W. W. Harris, W. H. Pearson, E. W. Stetson, was raised to introduce the matter to the people and present the same to the Legislature at its next session.

The member from Cumberland presented the following :

Resolved, That in the opinion of this Board there should be a law enacted requiring sellers and retailers of oleomargarine and all forms of adulterated butter to plainly label every package or parcel sold with its true name, and imposing a fine for violating the same.

This was given a passage and referred to the committee on experiment station for presentation to the next Legislature.

The member from Kennebec presented the following :

Resolved, That in the judgment of this Board the common farmers of Maine should await the results of experiments now in progress on the ensilage of corn and other forage crops before adopting the system on a scale involving any considerable expense. Adopted.

The remaining time of the session was devoted to the devising of means and methods by which the work of the Board should be made in the highest degree useful in disseminating a knowledge of the best practices and encouraging the introduction of the best methods without which the agriculture of our State cannot maintain that importance nor experience that prosperity which so largely contribute to the welfare of the State at large.

REVIEW OF THE SEASON.

The spring was unusually backward. Cold weather lingered late. All through the northerly half of the State snow remained to cover the ground till late in April, and in the extreme north till several days into May. Vegetation of all descriptions was correspondingly late. Farm work, delayed by the lateness of the season, was still further delayed by heavy and repeated rains the last half of May. The first of June found a wide breadth still unseeded. The planting of corn and potatoes was kept up till the twelfth of the month. Some lands even at this late date were still too wet to work, and the sowing of barley and the planting of beans was continued till the twentieth. Much land designed for corn was planted in beans, and the breadth devoted to this crop was correspondingly increased over former years.

The heavy rains of May were followed by a season of drought in July and August. In the southerly part of the State embracing the territory south of a line running through Lewiston, Augusta and Bangor, the drought was of great severity, and a large area in corn, potatoes, and vegetables failed entirely of making a crop. North of the line mentioned the drought was not so severe and good crops were there harvested.

The early part of the summer was unfavorable in the extreme for the corn crop. Up to the first of August it was backward, but hot weather following and holding late in autumn an average crop was harvested save in the southern part of the State where the drought cut it off. The sweet corn crop for canning, now taking the place of the yellow corn in many localities, was unexpectedly heavy in yield, being a full average crop, notwithstanding its unpromising aspect the first of August.

The area devoted to grass, being much more than that devoted to all other crops combined, is not essentially varied by any slight increase or falling off in the area devoted to any or all of the culti-

vated crops. The crop this year was ten per cent. above the average in quantity. Throughout the entire State the weather was remarkably favorable for curing it, and as a result the entire crop was housed in good condition. It is safe to make the record that the barns of Maine never before contained so large a quantity of first-class hay as at the close of the harvest of 1882. The quality may be put down as twenty per cent. better than the average. We have no data by which the number of tons harvested can be determined.

The area in cereals and potatoes and the amount of each produced in the State the present year will be found in another part of this report.

The fruit crop was only twenty-five per cent. of the bountiful crop harvested in 1881. There have been a larger number than usual of fruit trees set this year, and orchardists generally are taking better care of their orchards than formerly. A better understanding of the business in all its requirements is found prevailing. This greater care and the larger number of trees will in the near future result in largely increasing this valuable crop.

The extremely high price for fat cattle, ten dollars per hundred, and upward for extra choice, dressed weight, in the spring and summer months resulted in moving a large part of the fat cattle and reduced the stock on hand, of this description, to about seventy-five per cent. of the amount held a year ago. An increased number of steers, however, are coming on to take the place of the cattle sold off.

Dairying, in limited districts where co-operation had been introduced, is on the increase, but in the State at large the number of cows has slightly fallen off. Co-operative cheese-making has furnished about the same amount of product as last year. A few factories have increased their make, and new factories have been put in operation at Turner Centre, Wayne, and Monmouth, while some others have slightly fallen off in their make. The work of the Board has been directed, in a large measure, as will be seen by the reports given, to the encouragement of this important branch of our farming, believing that in adaptation and in facilities for marketing the product our State is not excelled by any other locality.

Wool has ruled low, especially for medium and coarse grades, and as a consequence sheep husbandry is somewhat depressed. The flocks have not been seriously reduced as yet, but the number carried through the winter will be something less than a year ago. Twenty-five cents a pound for unwashed medium wool is not con-

sidered a paying price by our flock masters. The fine wools of Franklin and Somerset counties have sold five cents a pound higher than coarse wools.

The horse interests in our State never were in a more flourishing condition than at the present time. Maine is conceded to be second only to famed Kentucky in the quality of her stock and in the number of choice animals furnished the trade and the turf. A large revenue is annually realized for stock sold from the State, and indications are that it will rapidly increase.

The county "cattle shows" were well attended and the societies, as will be seen by the statistics appended, are in good working condition. The State Agricultural Society has purchased the grounds at Lewiston on which their exhibitions have recently been held, and is now in better condition for carrying out its mission than ever before. The quality and extent of its exhibits were a credit to the agriculture of the State. The present success of the society, shown by the report of the treasurer given, is ample proof that the people of the State will give their patronage in ample measure to a well conducted State Fair.

The State Pomological Society is in a vigorous working condition and is still doing good work for the fruit growing interests of the State. Its annual exhibition was held in connection with the State Fair at Lewiston, an arrangement which meets the wishes of both exhibitors and visitors. It is desirable that this arrangement be continued.

The Institute work of the Board has been carried on to the extent of the means provided for the purpose. In response to the increase of calls for the same more Institutes have been held than in either of the years since the present provisions were enacted and a larger attendance of interested farmers has been met. The work has been done by members of the Board more largely than heretofore. The Secretary has been present at every Institute held and has had a part in each programme. A brief report of each Institute is here given with such a part of the papers read and lectures given as the space will allow.

FARMERS' INSTITUTES.

AROOSTOOK COUNTY.

The season's work of holding Farmers' Institutes was opened in Aroostook county, at the town hall in Maysville, September 15th, by invitation of the Maysville Grange. This was made the occasion of an excursion to the county which brought large numbers of visitors, a goodly number of whom were present at the meeting. The hospitality of the citizens of the town was extended to all visitors from abroad and was amply sufficient for all.

COLUMBUS HAYFORD, of Maysville, presided, and introduced as first in order the following

ADDRESS OF WELCOME.

BY EDWARD WIGGIN, ESQ.

Mr. President, Gentlemen of the Board of Agriculture and Visiting Friends: I have been invited to speak a word of welcome to these friends who are here with us to-day from other parts of the State, and who have come here to instruct us and confer with us in regard to the interests of agriculture. And, my friends, in behalf of Maysville Centre Grange, and in behalf of the citizens of this Aroostook valley, I bid you a cordial welcome. We meet, I say, to consult together in regard to matters which pertain to our calling as tillers of the soil, the oldest and noblest occupation of man. The heat of the political contest is over. The last partizan speech has been made. The last vote cast. The dust and smoke of the battle has cleared away. The dead have been buried with appropriate honors, the wounded have been tenderly cared for. And to-day we meet amid these scenes of peace and moral quietude not as partizans but as friends, as brothers and sisters, for the common purpose of giving and receiving instruction, and conferring together in regard to those matters which have a common interest to us all. I welcome you not only to a land of peace but to a land of plenty. I do not mean

to a land of wealth as the term is commonly used, but certainly to a land of plenty. You have but to look around to be convinced of this. I do not say this as a boast, but rather in a spirit of gratitude. The earth has been good to us, and has given us bountifully of her fruits in reward for our faithful toil. Though the spring time seemed cold and backward, and some whose faith was weak began to be filled with gloomy forebodings, yet in the hope of a coming harvest we buried the seed in the soil and the slender promise of the spring was renewed and increased by the genial warmth of the advancing summer and has been far more than realized in a most glorious harvest. Our mows are piled high and broad with the most ample crop of hay ever stored in this region. Our broad fields of potatoes whose exuberance of foliage the beetle, that pest of other sections, has vainly tried to devour, and has about given up the task in despair, contain hidden beneath their surface mines of honest wealth for the producer and stores of healthful food for the toilers with hand and brain in other localities. The drouth of the latter summer which so parched and dried other sections of the State has not visited us here, but our meadows are clothed in the thick verdure of June and our flocks and herds are literally living in clover. Ride where you may through all this region, and upon every hillside and in every valley, skirting the highways and stretching far away over the landscape, broad acres of rich yellow wheat will meet your eye, in some places already cut and stood in large and close-adjoining shocks waiting the song of the "harvest home," while in others the smooth rich glistening stalks stand thick and strong, ripe already for the harvest, and their heavy golden heads bow gracefully before the passing breeze, and kissing each other tenderly in the mellow sunlight speak of peace, plenty and prosperity. No plague or pestilence has visited us, no blight or frost has troubled us. No howling tempest with destructive breath has swept over us to devastate our fields. The early and the latter rain have generously descended upon our crops and meadows. Nature has certainly been unsparing in her gifts to us and as we look around upon the land in which our lot is cast we can truly say "it is very good." Have I overdrawn the picture? Well let those who are disposed find the dark side if they will, but to me it seems the part of wisdom, and of true philosophy to look ever upon the bright side, and not strive continually to discover the dark and gloomy places which will appear to those who seek for them in any condition of life however favorable.

But a word in regard to this young and growing County of Aroostook, which is every year increasing in interest and attracting more and more the attention of the outside world. Notwithstanding the many articles that have been written about this county by members of the editorial fraternity and others who have visited it from time to time, it is still but little known to the citizens of the older portions of the State, and oftentimes our friends from the other counties who have the courage to visit us are surprised to find that we are not living in log houses in a trackless wilderness, and that the bear and wolf and other wild denizens of the forest do not appear at our doors by day or prowl around our dwellings by night. Aroostook county, originally a part of Penobscot and Washington counties, was first incorporated on the 16th of March, 1839. It then contained but little more than 9,000 inhabitants. On the 21st of March, 1843, it was enlarged by additions from Penobscot and on March 12th, 1844, it was further enlarged by additions from Piscataquis and Somerset, giving it its present vast area of 6,800 square miles or considerably more than one-fifth of the whole area of the State of Maine. But few even of those who have visited this county have any idea of its vast extent. It is truly a county of magnificent distances. It is equal in area to the States of Connecticut and Delaware combined, hardly one-seventh less than the old State of Massachusetts, while the State of Rhode Island could be hidden in the depths of its northern forests and perhaps remain for years undiscovered.

The population of the county has increased from little more than 9,000 at the date of incorporation in 1839, to 29,609 in 1870, and 41,700 in 1880, being a gain of nearly forty per cent. in ten years. And reckoning the same relative ratio of increase we must have to-day a population of very nearly 45,000 or five times as many as when the county was first formed.

In 1860, the valuation of the county was \$1,105,796. In 1870 it had increased to \$4,995,685, having more than quadrupled in those ten years. In 1880, the total valuation was \$7,564,932, which would give us to-day safely \$8,000,000 as the valuation of the estates of Aroostook county. This liberal increase, seven-fold in twenty years, will give some idea of the possibilities of this fertile region when its resources shall have been fully developed.

It is hardly necessary for me to speak at this time of the advantages of Aroostook for agricultural purposes. These have been

written and spoken of so much of late that the subject would seem to be familiar to all present. That our soil is exceptionally fertile is beyond dispute. It is an objection with some that our climate is too severe, that our summers are too short and our winters too long and cold, and that almost impenetrable snow drifts maintain a virtual blockade against all travel and business for a large part of every year. Though this is to some extent true yet it has been much exaggerated by those who are not well acquainted with this section, and it is a matter of fact that very often an Aroostook winter is much more pleasant and enjoyable than a winter in any other part of the State of Maine. It is true that the ground is covered with snow here much later in the spring than in localities farther south and nearer the seaboard, but this we consider an advantage as we thereby escape the long season of mud or frozen ground which those sections are afflicted with, and when our snows melt and disappear the frost is usually gone from the soil and we are able at once to begin our farming operations. And indeed it almost seems like the work of magic as we see the fields which one week were white with their wintry mantle, in the next rejoicing in the richness of a freshly springing verdure.

The crops which can be raised with profit here are perhaps fewer in number than in the more southern parts of the State. Corn receives but little attention with us, and but little breadth is devoted to this crop, but the different kinds of grain take kindly to our soil and for years the wheat crop has been a success in this county. Nowhere in New England does the potato flourish as it does in Aroostook. The yield is large and the quality excellent as is shown by the market quotations, Aroostook potatoes always taking the lead in price. I should have been glad if I had had the time at my disposal to have given some figures in regard to this crop, showing the number of bushels of potatoes shipped and the amount of starch manufactured in the county. Starch factories have multiplied throughout the county during the last few years and have proved a great benefit to the farmers, giving them a ready and sure market for potatoes at a price which has proved to be remunerative. The raising of large breadths of potatoes has caused our farmers to bring under cultivation much rough and stumpy land, removing the stumps and smoothing the ground, and fitting it nicely for a good crop of wheat, and after the wheat a smooth grass field. How long the production of potatoes on a large scale can be continued without detri-

ment to the soil is a question which our best farmers have been carefully considering, and many of them now hesitate about plowing up good smooth grass land to plant to potatoes without manure.

The business of dairying is receiving increasing attention among the farmers of this valley, and the amount of dairy products is yearly increasing. Our distance from the great cities is a drawback as regards the business of butter making, as the market now demands a freshly made article, but in the matter of cheese we can compete with other portions of the State. The business of stock raising for market has not yet engaged the attention of farmers in this section to the extent which the natural advantages of Aroostook for this branch of farming would seem to warrant. With our abundance of feed during the summer and fall and our large crops of hay, grain and straw, it would seem that Aroostook should send to market large droves of fat cattle, and that the business should be one which could be conducted with profit. This question I believe is to be fully discussed to-day and I hope we may be able to get many facts and lessons from the discussion which will be of advantage to us in regard to this important branch of our business. The great need of this section has been a better market and better means of transportation for our surplus products. This need has been met to a certain extent, by the extension of the N. B. Railway up the valley of Aroostook as far as Presque Isle. This gives us an outlet to be sure and is a very great help to the farmers of this region. But it is a long, circuitous route, through a foreign country, and though much better than no outlet, still it does not meet the needs of the county as would a direct route to Bangor running wholly through our own territory.

The mistaken policy of the State in giving its lands to a road which barely touches our county at its southernmost point, has probably postponed for many years the building of the line which Aroostook so much needs. But, gentlemen, I will trespass no farther upon the time which I feel can otherwise be more profitably employed. The remarks which I have made, you will readily see, have hardly done justice either to myself or to the occasion. But I trust the hearty and cordial reception which I know you will meet with at the hands of our warm-hearted citizens, will be a more acceptable welcome to you than any formal words of mine. We are most happy to receive this visit from so many of our friends from the outer world, and trust that the occasion will be one of pleasure to you as we know it will be one of interest and profit to us.

Secretary GILBERT responded in behalf of the board, and W. B. LAPHAM, editor of the *Maine Farmer*, and W. S. GILMAN of the *Aroostook Pioneer*, in behalf of the press.

The feeding of straw to stock was the subject assigned for the forenoon, and was presented by the Secretary in a familiar lecture, filling the time, in which he called attention to the fact that Aroostook county is the great grain growing section of the State, and that upwards of fifty thousand tons of straw were harvested in the grain crop of the present year. In a State where stock had to be fed from the barns at least one-half of the year, it becomes necessary to utilize all fodders which can be economically used. It was shown that straw contains a large amount of nutrition, and that it could be so fed to stock as to secure satisfactory and profitable results.

AFTERNOON.

DAIRY FARMING AND DAIRY COWS.

By A. W. CHEEVER, Editor of the *New England Farmer*.

As a general rule, the profits to be derived from any form of industry will be found to correspond very closely to the amount of intelligence and skill required for the successful prosecution of such industry. The architect who plans a building, and the builder who executes the plans, each gets higher pay for his labor than does the man who knows merely enough about carpentering to turn an auger, drive a chisel, or push his jack-plane and saw by the marks and lines made by a master mechanic or overseer. The highest salaries paid in this country go to men who superintend the construction of railroads, or the running of trains where a single miscalculation or a careless act might involve many thousands, and possibly millions of dollars, while the lowest paid laborer is probably the man who has just enough skill to wield a pick and swing a spade. This rule applies to agriculture no less than to any other industry.

Before the days of the potato rot and the Colorado beetle, growing potatoes, it seems to me, must have represented the extreme of unskilled farm labor. Any simpleton could dig a shallow hole in the ground, put in a small potato, or a piece of a large one, and after waiting a few months dig up the increase. Better culture

might give larger returns, for even potato growing was a business that would reward the laborer, in a measure, in proportion to the degree of skill and intelligence brought to bear upon it. To-day it requires a high degree of skill and intelligence to grow a good crop of potatoes upon ordinary farming lands, but a good crop pays a much greater profit now than it did fifty or sixty years ago.

Market gardening and the production of choice fruits and flowers requires a very high degree of skill, but if asked to indicate the branch of agriculture which stands at the opposite extreme from potato growing I should have little hesitation in pointing to the dairy. Butter making, if carried on in a manner approaching anywhere near towards perfection, is surely a very high art. The choicest butter, new from the churn and worker, may, in delicacy of shade and fineness of aroma vie with the florist's highest work, while the choicest fruits are improved by the addition of a coating of fresh, sweet cream. Do not understand me as claiming that the production of any particular crop is either more or less honorable than the production of any other crop that is worthy the best efforts of the cultivator.

The growing of tobacco and the production of grain to be converted into intoxicating drinks are occupations that I am not ready to admit as being worthy the efforts of any cultivator. But the point I wish now to establish is, that skilled labor pays better than unskilled labor, and that, as dairying calls for more skill and more intelligence than any other branch of agriculture, so it may be expected that it will, as I believe it does, pay better than any other of equal magnitude.

It is a curious fact, but a fact nevertheless, that men seem willing to pay the most money for those things which they least need, or which are perhaps positively injurious. It is not the cigar bills nor the wine bills at which consumers grumble so much, but it is the advance of a dime on a bushel of potatoes or a penny on a pound of flour.

Looking at it from the stand point of a practical dairyman, I cannot complain that customers will pay ten times as much for a pound of butter as for a pound of bread grain, even though I may know that the grain has actually ten times the food value of the butter.

Were it not for our habits and tastes, butter could be dispensed with from our tables with perhaps less actual loss than from the denial of any other common article of food, and yet we pay here in

America more for our butter than for the bread we spread it over, twice as much as for our sugar and more than for all our other foods combined with the single exception of meat. Butter making is to the farmer what steel making is to the iron smelter. Both change the cheapest form of raw material into products of the highest market value. The value of a week's pasturage for a milch cow in summer varies, according to locality, from twenty-five to fifty cents. Her butter product alone, aside from the remaining skimmed milk, should represent from four to seven or eight times those figures.

In making choice of any specialty in agriculture a farmer should be governed or guided in that choice by such circumstances and conditions as he may find surrounding him. If he is not located, but has decided upon some particular branch, as market gardening, fruit growing, dairying or cattle husbandry in any of its forms, he should select a location that is believed to be well adapted to the special line he intends to follow. If, on the other hand, he is already located, he should aim to select such a branch of the business of farming as is, or may be, best adapted to that locality.

It is true that conditions may change; that circumstances over which one has little or no control may so modify one's surroundings as to require one to change his methods of action, after having adopted a certain course. This locality has already become famous for its bountiful crops of excellent potatoes. The earlier settlers of these lands who selected the potato as their main dependence did not choose unwisely. The potato is the pioneer's main stay where he is not located too remote from civilization. As I have told you already, the potato does not call for a very high order of skill in its production. It will thrive on fertile soil though that soil may be in its very roughest and rawest state. But potato farming must not be carried too far. New lands, upon which heavy growths of timber have been burned for the ashes and to clear it for cultivation may produce for a while without the application of fertilizers, but there is no land in the world, I care not how rich it may be, that can be cropped repeatedly for an unlimited term without having its fertility reduced or exhausted. It was claimed, and I doubt not honestly believed by many of those who first cultivated the rich prairie lands of the West, that the fertility of those lands was inexhaustible, but the constantly declining yields of wheat and corn per acre on farms that have been long cultivated without manuring has convinced

even the owners of those lands of their mistake. Replenishment must offset draught, or, sooner or later, exhaustion will surely result.

I doubt if there is any crop in general cultivation that will reduce the fertility of a soil more rapidly than the potato. One hundred bushels of potatoes will weigh 6,000 lbs., or three tons. For every ton of potatoes grown there must be supplied from the soil between eleven and twelve pounds of potash, nearly seven pounds of nitrogen and over three pounds of phosphoric acid. An acre of potatoes, producing at the rate of three hundred bushels, including both large and small—and I presume that is by no means considered an extravagant yield here—is reduced in its potash more than one hundred pounds, in its soluble phosphoric acid about thirty-three pounds, and in its nitrogen sixty-three pounds. To produce such a crop in Massachusetts we would expect to have to apply at least a ton of commercial fertilizer worth forty or fifty dollars, or its equivalent, in animal manure, and I know that there is land in Massachusetts, now comparatively barren, which would once have produced three hundred bushels of potatoes per acre with very little manure, and without greatly surprising the producer. The same methods which have reduced the fertility of our soils will sooner or later, if persisted in, reduce yours also.

Now, how much fertility do you suppose is carried off from a farm in a ton of well made butter? Practically none; absolutely none, except what is contained in the small amount of buttermilk or caseine which remains even in the most thoroughly worked butter. All the fat in butter, the carbon, comes from the atmosphere and draws nothing from the fertility of the soil.

I do not pretend to say that there are no wastes of fertility upon dairy farms. When a cow is sold for beef, a calf for veal, or a pig raised upon the skimmed milk, is sold off the farm, a certain amount of plant food is sold with each of these animals. From most dairy farms there are some other products besides butter sold, grain, fruits or vegetables to a limited extent. When milk is sold direct, or first made into cheese, there is a heavy draught upon the fertility of the soil. There may be wastes, too, from carelessness in saving the manure from the stock, or in unwise methods of applying it to the soil. I do not claim that dairy farming is simple or easy. It is not like potato raising, something that anyone can do without learning how. It is a business that requires for the highest attainment the very highest degree of intelligence, of skill and of taste. It

involves a knowledge of cattle breeding, cattle feeding and giving forage crops in considerable variety, in addition to the nice work of clean milking, judicious handling of the milk, cream and butter and the final placing of the finished product on the market. And yet there is nothing in all this to deter a New England yankee from the undertaking, and it will as surely pay better than potato raising as intelligence and skill judiciously applied is always sure to pay better than ignorance and inefficiency anywhere and everywhere.

If, in the more or less distant future, the population of our country should become many times more dense than it is at present, it is not impossible that animal foods may have to be dispensed with, and their places taken by such foods as can be produced directly from the soil without the intervention of animals. A forced economy of food production and food consumption would hardly allow the feeding to animals of substances like grain, having already a high food value, and which when converted into beef or pork or poultry shall contain a much smaller food value than when in their original condition. Even now it is difficult to figure out any real economy in making food from an exclusive grain diet.

An acre of ground devoted to wheat and producing a full crop of forty bushels, or more, would afford a family over six and a half pounds of grain per day for a year, which when made into bread would be several times increased in weight. An acre of pasture land must be in high condition to keep an ox or steer six months during the summer season, and three hundred pounds of beef, including bone, would be considered a very satisfactory gain for an ox or steer to make in the six months of pasturing. This would give a family an allowance of less than twelve ounces of beef clear of bone per day for a year.

Pigs fed on grain will require on the average about five pounds of grain to make one of meat, so that true economy would require us to take our grain foods in their original condition. But there is, however, a true economy in using an animal as a machine to convert coarse vegetable products like grass and the straw of grain which neither are nor can be used as human food, and also all waste products which by this means can be returned to us in the form of wholesome and palatable supplies for our tables. To produce wheat requires labor, cultivation; but grass grows spontaneously to a great extent, and its conversion into human food through the medium of the animal requires comparatively little labor, so it is reasonable

to expect that cattle husbandry will be one of the leading industries of our people for many generations yet to come. But among all the animals used by men for converting coarse vegetation into good human food, the dairy cow excells them all. As a machine she is capable of being run at a comparatively high rate of speed.

We have seen that a thrifty ox or steer feeding in a good pasture for six months in the year is capable of returning to his keeper three hundred pounds of beef, including bone. If the steer would have dressed nine hundred pounds at the beginning of the season, this is yielding an increase equal to one-third his original weight. A good cow kept in the same pasture would be capable of returning in the form of human food not one-third her dressed weight, but two or three times her gross weight, in the same number of months, while exceptional cows have given a quantity of milk equal to their own weight in periods varying from a single month down to eleven days. Old Creamer, owned by Mr. Hungerford of New York, gave three hundred and two pounds in three days, her own weight being 1083 pounds. Good herds yield from four to five times their weight yearly. A good cow feeding in a good pasture and consuming a hundred pounds of green grass per day, equal to twenty-five or thirty pounds of dry hay, will easily yield twenty-five pounds of milk, that will contain three pounds of solid nutrient matter, or as much as is found in twelve pounds of round steak.

As an agent for sustaining life and repairing the wastes of the body from the cradle to the grave, milk is excelled by no single known substance, and its worth as an article of food should be much better known and appreciated by the American people than it ever yet has been. Its food value is never greater than when it first comes pure and fresh from the udder of the cow. Every process of manipulation entails more or less waste. The waste is least when converted into cheese, greatest when made into butter. Millions of dollars would be saved to the people of the United States every year could some practical method be devised whereby the pure milk of the country could be brought directly to the homes of the consumers, where the cream could be made to take the place of butter and the remaining skimmed milk be used for drink or in cooking instead of being fed to hogs. But until such methods can be devised and put in operation we may well give our attention to adapting our labors to such conditions as we find ourselves surrounded by.

With the existing tastes and customs of our people and the people of other countries, we find a great and gaining demand for the manufactured products of milk, and especially for butter. Viewing butter solely as an article for sustaining life, its value, compared to the milk from which it is made, is exceedingly small, but viewing it in its financial aspect it is the very concentration of milk. At long distances from market whole milk may have a commercial value scarcely above the rank, spontaneous vegetation from which it is produced, for it is as natural a product as grass itself. Milk can be carried but a comparatively short distance before its original value will be consumed by the cost of transportation; but in the form of butter or cheese it may find its way half round the world and then be sold at a profit on the cost of its production. It is but a few years since we might have heard some of the most prominent lecturers on dairy topics telling their hearers that the dairy belt of the United States was comparatively both short and narrow. It did not extend very far in either direction from central New York, eastward a little way into New England, particularly Vermont, southward into northern Pennsylvania, extending west into Ohio and a little way into Canada. Within this circle was to be found the sweet perennial grasses, the pure spring water and, except for a short period in mid-summer, the cool clear air, and also the refined tastes and high degree of intelligence required for the successful prosecution of this most difficult of all the agricultural arts. But things have changed. Those who flattered themselves that they held the monopoly of butter and cheese making, soon learned that even at the West, where the water is supposed to be too hard or too muddy for either man or beast, and where the grasses grow too rank to be sweet, the young men who learned how to make good butter here have also learned after going West how to make good butter there. The farmers of some of the Western States have learned that good corn stalks, either green or dry, with plenty of sweet corn meal to go with them will make butter that will bring the highest prices in summer or in winter, and even in the Southern States the people are some of them finding that with suitable appliances dairying can be carried on successfully even under their hot suns. The result has been a general waking up of the dairy interest all through the country. Consumers have found that bad butter is not a necessity; that good butter can be made in sections where inferior goods were formerly the rule, and they will no longer

put up with such rank, rancid stuff as they once believed they had got to swallow or swallow none.

The standard of good butter has been greatly elevated. With increased facilities for transportation, the city and village buyer has been able to get a taste of butter as it comes fresh from the churn, and he now demands it brought to him weekly instead of annually or semi-annually, as formerly. This has created new life at the farm. Many farmers have changed their summer dairies to winter dairies and find an increased profit from the change, while others continue the business through the entire year. Butter making, instead of being a rather insignificant side matter for a short period in the summer, on many farms, has risen to the dignity of a manufacturing operation of high importance. When New England soil was, on the average, much richer in fertility than it is to-day, and when the farmers were apparently using their best efforts in the endeavor to deplete it of its fertility, when they were selling hay and potatoes and corn and oats and tobacco from their tillage land, they seemed to use their dairy cows and their young cattle and sheep chiefly in order to reduce their pastures also of their native fertility.

The science or art of agriculture, by whichever name we may choose to call it, has taken many advance steps since our grandfathers first broke the soil of these New England hills. They may not have known better than to take repeated crops without making adequate returns to the lands they worked; but we, their grandchildren, have learned better. We know now that if we would leave these lands a worthy inheritance to our children we must treat them by a better method.

In considering the question, what products it will be most desirable to give our attention to, we may well take into account the cost of transporting those products to market. The actual cost to a transportation company of shipping a ton of potatoes or a ton of butter to Boston or New York can vary but little. Ice may be required in summer to keep butter from melting and fuel may also be needed in winter to prevent potatoes from freezing. If the railroads take your freight and guarantee its safety while in their possession it may be perfectly right to charge a higher rate per ton than would be asked for carrying less valuable freight; but if rates are based on weight or bulk alone, you will see that the shipper of butter or cheese has a great advantage over him who sends hay or potatoes to market. I do not

know what freight charges you may have to pay in this section to get your products to Boston. I am located thirty miles from the city and pay about two dollars per ton on freights carried over the railroad in either direction. If you have to pay at the same rate per mile it must cost you at least twenty-five dollars per ton to get your products landed in the city. That would be about seventy-five cents per bushel for potatoes, and if they were worth a dollar or a dollar and a quarter per bushel, as they have been during the past winter, you perhaps might afford to ship them; but if the price runs as low as it often does in favorable seasons your potatoes would not pay for shipping. If potatoes bring but seventy-five cents on the cars delivered in Boston, they can be worth nothing here unless you are favored above us in shipping rates. But supposing you send us butter at the same rate of transportation. It would be twenty-five dollars per ton, the same as for potatoes; but instead of selling it at a cent and a quarter per pound, just the cost of freight, you may certainly calculate on getting not less than fifteen to twenty cents per pound, and often considerable more than that, provided the quality is good. In seasons of low prices your potatoes are practically shut out from our markets unless you are specially favored by transportation companies, while your butter can never be shut out, simply because the difference in the cost of freight on a ton, or on a pound of butter carried from northern Maine, four hundred miles, or from western Massachusetts, one hundred miles, is so very small that it is scarcely felt. To carry a ton of potatoes to market may require another ton in payment of freight, while a ton of butter may pay the freight charges upon ten, fifteen or twenty tons.

The farmers of the West understand this matter of freight charges and have been laying their plans accordingly. They formerly sent corn to us here at the East and paid two bushels for bringing one, getting perhaps only ten or twelve cents per bushel at home for the products of their corn-fields. Lately they have learned to feed their corn, to concentrate it, "boil it down," as it were, into beef, pork and lard, and now they are reducing it to still greater value, in the form of butter, and they are feeling very happy about it, too, more so than are the dairy farmers of the older States who are thus brought anew into close competition with the cheap virgin soils of the prairies.

The subject of dairying is one that might well occupy the attention of a meeting like this, not for a day only but for a week.

There would be little danger of exhausting the subject. The selection of animals, the production of foods and the handling of the milk during its course from the pail to the final product placed in market, are topics full of interest to every dairy man, and you will doubtless discuss all these questions in future meetings, perhaps at dates not far distant. Several years ago when I first caught a glimpse of Maine agriculture, during a winter trip towards the interior of your State, I was strongly impressed with the thought that your farmers and our farmers ought to have a better understanding of each others wants, than I believe they have had or do have.

“Adaptation” is a word that would make a text for a long lecture in dairy meetings or in any meeting of farmers. We should learn to do those things which from our situation, ability or tastes we can learn to do best. Maine has long been a sort of a back pasture for Massachusetts, where the beef is grown and fattened and the working oxen trained and fitted for Brighton market. A great deal of young stock has also been sent down there some years. Sometimes the prices received have been satisfactory, but often they have been low, occasionally in seasons of drought, less than the cost of raising.

As I remember the market years ago, most of your surplus stock came as oxen and young animals, with a few old cows. More recently there has grown up a considerable trade in dairy cows, chiefly for the milk farmers living near Boston or the large manufacturing towns in the eastern portion of the State.

The milk sold in Boston and in the scores of large manufacturing cities and towns in southern New England is produced upon farms located not very far from its place of sale. There is a circle near every large town or city within which farm operations are confined chiefly to the production of garden vegetables and perishable small fruits. Further out is a wider circle devoted largely to the making of milk, and still further another in which butter making becomes a leading industry. Maine is chiefly in this outer circle. My farm lies in the milk belt, almost every neighbor being a milk producer. Now, these milk producers do not as a rule raise their cows, for they do not believe they can afford to do so. It requires about all the energy they can command to secure a comfortable living by selling milk at the prices they have thus far been compelled to accept. The one all absorbing aim is to make the greatest possible number of quarts of milk that is just good enough to pass examination

under the tests of the milk contractor. There is little or no butter making on milk farms, and consequently no skimmed milk that can be fed either to calves or to pigs. There are many milk farmers who do not keep even a single hog but give all the swill that accumulates to their milch cows. Such an extreme division of labor and adherence to a specialty may be of doubtful utility but such are the facts as we find them at the present time. The milkman buys his cows, and as he can make nothing unless he feeds high and crowds them very near to their utmost capacity, he is constantly wearing them out, and in some cases at a pretty rapid rate. There are many farmers near the large cities who rarely keep their cows after their milk yield falls below a certain point, but trade them off for new milch cows or sell to the butcher and buy again outright. This may seem strange to a Maine farmer, but it must be remembered that the milk supply for the cities comes chiefly from sections where hay is dear and good pasture land is very scarce and expensive. The soiling system or stall-feeding is practiced very extensively by milk farmers, and while it is well adapted to the keeping of cows that are in full flow it may not always pay in the case of dry cows or young growing stock.

Now where does this supply of new milch cows come from which are required to keep the stalls of the milk producer full at all times? It comes in part from farmers living where selling milk is inconvenient. Some of it comes from farmers who will not be tied up to a milk farm, or who have pastures that are better adapted to dry cows than to milking stock, and a considerable portion is furnished by dealers who come up here into northern New England and buy up your new milch cows, or those which are soon coming in, and ear them down to the milk producing districts. I suppose that quite a large percentage of cows that are sold to go out of your State are sold while in their prime as milking stock.

Now I believe the butter makers of this State should become acquainted with the demands of this trade in new milch cows for the milk producing districts, for with your excellent pasture land, your cheaper hay, and especially your adopted business of dairying you can supply this demand with advantage both to yourselves and to the buyers. There are a few farmers who raise good calves without giving them much milk; but the practice is attended with considerable risk and a good deal of trouble, and you may rest well assured that in the matter of raising milch cows you can never come into very close

competition with those farmers who live near the large cities and who make a specialty of producing milk for the city or village trade. The milkmen do not as a rule keep their calves till they are old enough to make decent veal, but sell them the second or third day for the first offer they can get. I suppose, too, that this annual slaughter of the innocents may be carried on upon many of the dairy farms here.

You are furnishing, it is true, a large number of cows every year to our milk farmers, but I want you to become convinced that it will be to your interest to make this trade in new milch cows more of a business, more of a specialty if you please, or at least one of your specialties. You have all the facilities, while we in Massachusetts have comparatively none. Remember that I am not speaking for myself personally, but for the milk producer. I became heartily disgusted with the new milch cow trade some years ago and commenced breeding them for my own use, and hope never to be compelled to purchase another. I found that I had to buy about five cows to get one good one, and I can do better than that by breeding them. The cows you are sending us now are too often the animals you are most willing to spare, and I think you sometimes neglect to inform the dealer why you let them go, or, if you do give a reason, it is apt to be, "short of hay," "more eattle than room to keep them in," "want money to pay taxes," or, "to pay interest on a mortgage." The best cows we ever buy are those which happen to come in at a time of the year considered by you unseasonable, as in the late fall or early winter. Cows that you are anxious to sell in spring I have not much confidence in. They probably kick, or milk hard, or give poor milk, or little of it, or they have had the garget and partly lost the use of a portion of the udder, or they have aborted, had trouble in calving or an attack of the "horn-ail," or they like to practice jumping over or tearing down fences. You do not sell your best cows just at the beginning of the dairy season, nor do I blame you for it. I would not advise you to sell your best cows at any time so long as they can profitably be kept as breeders. We want you to keep your best cows to raise other good cows from for supplying our never ending demand. We willingly will take a few lots of your inferior animals, such as you know ought to be weeded out of every good breeding herd, provided you will save all the promising heifer calves from your best cows and raise them for us. Your inferior cows if bought for what they are worth, and fed high and

milked for a year or more till they become fat, can be sold to the butcher without much loss and possibly with a little profit; but the greatest profit both to you and to us will come from the cutting off of the line of descent so that poor cows shall not be allowed to produce more poor cows. We want you to keep your best animals for breeders, and we also want you to improve your stock every year until you shall have no very bad cows either to sell or to keep. You can do this if you will and it will be of mutual benefit. You have many good cows now. You are making butter and have an abundance of skimmed milk for feeding to calves, and you have, or may have, by taking proper care of them, as good pastures as there are in the world. With all these facilities you can raise good milch cows at a profit to yourselves and sell them to us for a sum less than we can possibly afford to raise them.

You must, however, raise such a class of cows as our market calls for—good, healthy, hearty, fair sized animals that will give a large quantity of good milk and capable of laying on fat with good keeping and be in demand with the butchers as soon as they are passed their prime as milkers. You may have such cows now among your Jerseys, your Durhams, your Devons or your Ayrshires. If so, keep them and breed from them with care. Our milkmen will take their progeny as tenderly and kindly as President Lincoln received the foreign minister, who, on coming forward to be presented to the members of the cabinet, took the President aside and whispered in his ear that he came from a distinguished family of earls and counts. “Never mind,” said Mr. Lincoln with an air of assurance that must have been very consoling to the young man, “Never mind, you will be treated just as well.” If you will send us good cows that will fill the pail morning and night, week in and week out, month after month, and not put their foot in it just as the last strippings are drawn, we will pay you just as much for them as though their pedigree were long enough to cover a whole page in the herd book. Taking into consideration the present condition of the milk market and the beef market, I cannot believe that you had best confine yourselves to the extravagantly high priced Jerseys for breeding the kind of cows which the milk farmers want. The milkmen desire more of a “general purpose” cow than the Jersey has the reputation of being. They want a cow that will give a large quantity of milk of fair quality, and one that will at the end of her career make good saleable beef. You have

such cows now, I believe, on most of your farms and they have not cost you so high that you cannot afford to sell their progeny at living prices, nor so high that you cannot be honest enough to send an inferior heifer to the butcher just as soon as she can be fattened after her inferiority has become known.

I am not addressing these remarks to the few, so styled, fancy farmers, scattered here and there over the country who complain of great "sacrifice" if their animals are knocked off by auction for less than a thousand dollars per head; but the thousand real, practical working farmers who do not on the average make ten dollars per head clear profit on the stock they now raise and sell. To such farmers of northern New England the milk producers around the large cities are looking for their supply of cows, and they ask that you shall raise cows better adapted to the wants of the milkman and that you shall raise more of them. You can improve your cows for our use without injuring them for yourselves, and I believe you can raise enough to supply the wants of both. I have not a doubt that by judicious selection and the use of the best bulls you can get, you can so improve the character of your cows that they will readily sell at an advance of twenty-five per cent above present prices, and that such cows while retained in your own hands will pay at least twenty-five per cent. more profit than the average cow pays now.

Never let a promising heifer calf, born of a superior cow, go to the butcher for veal, but keep the best and so treat them that they will grow to be the best cows in your herd. Let them have new milk a few days, or so long as you think you can afford it. If you must leave them in the care of boys or thoughtless men, the longer they are fed new milk the safer they will be; but if you will take the entire care of them yourself, and will watch them closely for the very first indications of indigestion, you may get them to taking skimmed or partly skimmed milk quite early, especially if your cows are very rich milkers. Be very sure to give a young calf its mother's milk or the milk of cows that have recently calved during its first month. Farrow cows' milk is not safe to feed to very young calves. See to it also that the milk is fed at the same temperature that it would be if drawn by the calf from its mother in the natural way. A thermometer is as indispensable in the calf nursery as in the churning room. Thousands of calves are annually spoiled or seriously checked in their growth by being fed when young with milk that is either too hot or too cold.

Feed at regular intervals and do not on any account over-feed. Over-loading the stomach after a long fast is almost sure to be followed by indigestion and scours, diseases which are very common among young calves, but nevertheless dangerous and much to be dreaded. If scours makes its appearance in the slightest degree, then reduce the quantity of the feed at once. If it continues three or four days, then you have a sick calf to doctor. It is not only better but cheaper to keep a calf or any other animal healthy than to cure it after disease sets in. Animals that are treated as they should be, fed with suitable, nutritious food, housed in comfortable, dry quarters, and given frequent access to pure water, will seldom be attacked by any form of disease. Were I a Maine farmer I think I would do as I do now, raise most of my calves in the fall and winter, and make most of my butter in the winter season when I would have plenty of time to do both well.

If every other farmer made butter in the winter I presume I should change to a summer dairy, for I find that it is often better to keep out of beaten paths, and do that which others forget or neglect to do. Winter dairying now pays better than summer dairying for those who can take their choice in seasons, and I am sure the fall is the best time to begin to raise a crop of calves. If dropped in the fall they early learn to eat dry hay, which is much better for them than grass so long as they are freely fed upon milk; they are easily cared for, no flies are tormenting them, and by the opening of spring they are ready to turn away to pasture to feed and grow. With six to eight months of feeding upon skimmed milk, good hay and a little grain they are ready to make the very best use of their summer pasture, and will at eighteen months old be larger and in better shape than most heifers at two years old, raised in the spring and treated during the summer in the usual way. By feeding and treating such heifers well you will at two and a half or three years old have animals that will give as much milk, make as much butter, or, if they should prove too beefy, make as much good beef as some of your inferior old cows. There are always some animals in every herd that ought to be turned into beef, and when such are found the earlier they are fattened and sold the more profitable their fattening will be. If we are to make anything in New England now by feeding for beef it must be with young animals that have not completed their growth. It is claimed by some that the one great failing in the practice of Jersey breeders is in not killing one-half the calves that

are dropped before they are allowed to perpetuate their kind. You who have less costly stock, which you are desirous to improve, have no such temptation to keep to sell what is not worth raising to keep. When your good heifers come to be from four to seven years old you may put a price upon them that will pay you well for raising. Some farmer living in the outer portion of the milk producing belt will probably want them to keep a few years; but if they are not taken until they have reached their highest condition as dairy cows and are getting to that point where they will soon begin to go the other way, then put a price upon them that will place them in the inner portion of the milk producing belt, where they will for a period of eighteen months be fed all they will bear and then turned off well fattened for the butcher. If you will buy but a single ton of good fine bone fertilizer for each animal sold off the farm you can increase the productive capacity of your land so that you will be enabled to keep not only the dairy herd of milk cows but also another herd of young growing cattle. I would give the pastures to the young stock and grow more forage for feeding at the stable to the maturer cows. In marking out this course for Maine farmers I am only describing a system which I have followed many years with satisfactory results, though I doubt not with much less profit than might be obtained from the same system introduced and carried out upon the better lands of your State.

EVENING.

A lecture was given in the evening on the "Profits of Dairying," by Francis Barnes, of Houlton, owner and operator of the Nickerson Cheese Factory. Mr. Barnes took the ground that dairying is the most profitable branch of stock husbandry for Aroostook county, and that associated cheese making offered the best facilities for converting their milk into a cash product. The success of the several factories in the county was ample proof of this. The business, then, should be intensified and extended. The county has natural facilities for the business, where they are developed, equal to any of the famous dairy sections of the country.

After an exchange of courtesies the Institute adjourned.

PENOBSCOT COUNTY.

Institute at Carroll.

The Institute for the north part of Penobscot county was held at Carroll, by invitation of the Baskahegan Grange, at their Grange hall, Oct. 19. This Grange embraces in its membership all the principal citizens of the town. It has built for its use a large and commodious hall, which affords in addition to the uses of the organization, a central place for the social and religious gatherings of the town.

A. O. INGERSOLL, Esq., member of the Board for that county, called to order, and after preliminary remarks introduced

SECRETARY GILBERT, who congratulated the farmers present on the cooperative efforts which had secured to their use the hall in which the meeting was assembled, and expressed his pleasure to be able to respond to their earnest invitation, and to bring to their attention a programme which, while it bears directly upon the practical farming of those present, also contributes in a small measure towards furnishing a social and intellectual entertainment, which many times is of great value to the farming towns remote from social centres. The example here goes to show that the wants of a community can

in a measure be supplied when earnest individuals put forth an effort for the public good.

Following the introductory exercises a familiar lecture was given upon the subject, "Maintaining the Fertility of the Soil," by Prof. WALTER BALENTINE, of the State College.

Mr. INGERSOLL, in reviewing the lecture said that even in a soil so exhausted by cropping as to no longer produce paying crops, there was still an abundance of plant food remaining, but it was in insoluble forms and therefore unavailable to plant growth. This could be liberated or rendered soluble and available by a thorough cultivation or pulverization. This is not theoretical, but is proved in practice. Repeated plowings are needed in place of the single plowing now given and should become the general practice. Harrowings, too, with the implements now in use may in part take the place of plowing, and should be more frequently done than is now the general practice.

In the afternoon, Hiram Stevens, Esq., Master of the Grange, occupied the chair. J. E. Shaw, Secretary of the County Farmers' Club, read a paper on "Feeding Hay," which will be found in full in another place.

After the reading of the paper, Mr. Charles Brown of Carroll, said he was much interested in the subject of the forenoon. As to the question of feeding hay, he supposed there was no question in the minds of any one but selling the hay from the farm would soon manifest itself by a reduced fertility. When a man was so situated that he could purchase manure to take upon the farm, it might be possible to pursue such a course. Among them it was simply impossible. The important question with them is: if they are not to sell their crops, how to secure the value of those products when they are fed out on the farm.

Mr. MALLETT, Lakeville: It has been said there is no argument in favor of selling hay. The desire to sell this crop can be accounted for in no other way than that less intelligence is required. This intelligence is what is wanted to be applied to the operations of the farm. It was proved this forenoon that we could not only maintain the fertility of the soil, but we could also improve the fertility of the soil we are now in possession of. This can only be done through the application of intelligence, and by careful attention to all the details of the business. The fertilizing material

is in such forms that it requires foresight and preparation for its saving.

Mr. INGERSOLL: A proper course to pursue in order to increase the fertility of the soil, is to purchase grain, or to appropriate that which is raised, and feed, with other fodders, to the stock of the farm. This can be done at a profit, and at the same time add greatly to the fertility of the farm. The cost of this purchased food is much more than made up by the increased value of the animals, and the fertilizing value is clear gain. A rapid growth is easily secured by such feed, and may be made continuous every day the animal is on your hands. This is easily demonstrable with good animals.

The evening was devoted, by request, to the subject of "Fruit Growing for the Locality," by the Secretary, no report being here given.

After the completion of the programme, Mr. Brown gave expression to the deep interest felt in the exercises on the part of the people, and moved a vote of thanks for accepting their invitation to meet with them.

Institute at Bangor.

A second Institute was held at Bangor City Hall, in connection with the Penobscot County Farmers' Club, November 21. A large gathering of the farmers of the county, and their wives, were present. The hospitalities of the club were extended to all present, dinner and supper being served in bountiful supply.

FORENOON.

R. W. MURCH of Hampden, President of the Club, called to order and announced the order of exercises.

RELATIONS OF FEEDING TO FERTILITY.

By Z. A. GILBERT, Secretary of the Board.

Mr. President, and Ladies and Gentlemen: Allow me, before proceeding with my part in the exercises this forenoon, to express the pleasure I feel in being able to meet with an organization which has attained the distinction which has for some time been accorded to this Penobscot County Farmers' Club, a club, which, we who have watched its work, are aware, is doing a deal of good work in encouraging the agricultural interests of Penobscot county and of the State at large; encouraging investigation into the methods and practices out of which come the highest success; encouraging a deeper interest in prosecuting this industry as a business; encouraging greater efforts toward making it a successful business, rather than simply a means of daily income, out of which the daily expenses are to be met, and elevating it to a standard comparing favorably with other business interests in the county. It is a pleasure for us to meet with an organization of this kind.

A meeting of this kind can be made, and should be made, in the hands of such an organization as this, of more benefit, than it otherwise could be. This Board of Agriculture only wishes that every county in the State had as wide-awake, active, and efficient an organization as is here at work. We wish, and certainly we shall expect there will be, years of usefulness for this club in the future.

The work of the Farmers' Institute is familiar to you all, and it needs no introduction here, you having held a joint meeting with us once before, so no time need be spent in introducing our methods of

work. It becomes necessary only for us to introduce the work of to-day.

We desire to make of this meeting something different from a mass meeting of farmers for the purpose of listening to windy speeches or wordy talks. It is a meeting for investigation, a mutual effort to search for, and find, if possible, a deeper, fuller and better knowledge of these questions which are yet unsolved, these problems in agriculture. In order to carry this on successfully we must make it as informal as possible. We want you to consider that this is your meeting as much as ours; that it is a meeting for mutual benefit; that we, the members of the Board of Agriculture, have come here to meet with the members of the Farmers' Club, and hold a joint Farmers' Institute, for our mutual benefit and for the benefit of the agricultural public, and, through that, the benefit of the State at large.

The programme we have arranged has been pretty well advertised in this section, the outline has been scanned by every one present; yet in opening the meeting it may be well to refer to it somewhat, and point out directly the course of investigation which we propose to introduce here to-day.

We have a great deal of superficial discussion; I think you will allow that term to be used here; it is an easy thing for farmers to present opinions; but opinions, without being based upon principles, lose a large part of their force; and sometimes I fear we give them more weight than they are worth. We should search for the foundation principle. It is said of Lord Bacon that in looking over his agricultural library he ordered this book and that book burned, because, said he, "they contain no principle and therefore are without value." If, then, a book containing no principle, is without value, may we not say the same of an opinion or of a discussion, public though it may be. We want to develop principles, facts; so we must try to dig deeper, to plow deeper, and turn up the hitherto untried soil.

The leading subject, as announced for the meeting, is, "How to market the products of the farm." It is an accepted fact, I think, which goes through every man's experience, that crops can be produced on the farm at a profit. We will take the farm crops of the present year; they have been produced on your farms at a profit; that is, the cost of planting, caring for, and harvesting the crops has been less than the value of the crops; therefore those crops

have been produced at a profit. If we take only a superficial observation, all our staple products can be produced at a handsome profit; the impression prevails among farmers all about, that, if they could carry on this system of cropping indefinitely, farming would be remarkably remunerative. If, I say, this system of cropping and selling off the raw products, at the value which they bear year after year on the market, could be carried on indefinitely, without regard to anything further, then there would come from it a handsome profit, and the wealth of the farming community would be built up easily and rapidly.

But there follows this fact; these crops cannot be sold off from the farm without reducing its fertility. This system of cropping and of selling those raw products in the market at their cash market value cannot be carried on indefinitely. The time comes, and very soon we are admonished that it is at hand, when those crops no longer respond to the effort we have been making; we find there is a question of fertility and infertility there which demands attention, which sooner or later must be attended to, if these crops are to be produced in any paying quantities. We very soon arrive at that condition where we must take into consideration this second question, of fertility.

We want to lay down the proposition to start with this morning, that the most successful course in marketing the crops of the farm is to do it through the introduction of stock husbandry,—feeding these farm products to the stock, and realizing the income from the sale of the products resulting from the keeping of this stock,—meat, wool, butter, cheese, etc. I say we lay down the proposition this morning, that the more successful course for a farming community, the better course, instead of selling the raw products on the market and realizing the money on them, is to introduce stock husbandry and feed off these crops, and realize the money returns from the stock in such form as one may choose to select.

Having laid this foundation principle down we propose to go to work and show this afternoon that feeding these farm products to animals can be carried on at a profit, from a money point of view. The discussion will bear upon the vital question, how to feed these products at a profit. We shall produce testimony that it is done in the hands of active farmers, and can be done in the hands of every farmer who introduces intelligent management in the handling of the stock and of the products all through. In the evening we propose to discuss the methods by which these results can be most economi-

cally secured. Thus we have a line of thought running through the entire exercises of the day.

I say we lay down the proposition that the better course for the farmer is to rely upon the income from the stock rather than upon the sale of the raw products. It is a fact which has been very forcibly impressed upon my observation in my circulation through the State, that, go abroad, up and down the State where we may, whenever you strike a community of farmers who have been in the practice for a series of years, of marketing their products in the raw state, selling their hay, growing their crops for the market instead of introducing stock husbandry as a strong feature of their farming, we find unmistakable evidences that there is not that degree of prosperity among them that there is in other localities where the system of stock husbandry is the absorbing interest among the farmers. These facts are so plainly written on the face of these farms and their surroundings that he who runs may read, if he but carefully notice what he may observe.

Let us if we can, in our work to-day, disclose the reason of this, that others, seeing it, may profit thereby.

With these preliminary remarks we will proceed to the relation of the feeding of the farm crops to the fertility of the soil. If we get an intelligent view of the bearing of this it may aid us in understanding the whole question better, and in comprehending the work of the afternoon more completely. We want, then, this morning, to show the relation of feeding these farm crops to the fertility of the farm, bearing in mind all the time that these crops have been grown at a profit, that they have not cost the farmer what they are worth as they are stored in his barn and granary at the present time.

I think I spoke before this Farmers' Club last spring, briefly, of the elements of fertility. I want to allude to it again, and I will do it as briefly as possible, in order to cover the ground and make the work intelligible. You are aware that plants are made up of certain elementary substances, and that those plants obtain that material from some source. Nature builds up from certain elementary materials a structure which we call a stock of corn, a stock of wheat, or a hill of potatoes. The builder takes of brick, of mortar, of wood, of nails, and constructs a building. So nature takes of material within her reach and, with the sunshine and the rain, constructs a stock of corn. If there is not the material to be obtained the stock of corn cannot be builded; there must be the elementary material within its reach, out of which the plant can be constructed.

If any of these elementary materials be wanting nature cannot construct a plant any more than a builder from brick alone can erect his substantial structure ; he must have the mortar to cement it. So a plant refuses absolutely to grow if even only one of these elementary materials is not within its reach. For instance, there is but an atom of lime in a plant of corn, yet if that atom of lime be not within the reach of the roots of the plant, that plant never can be made to grow : all the sunshine that may be thrown upon it, all the rain that may be showered down upon it cannot produce a corn plant without that little atom of lime. It is so with all the other twelve elements ; if any are wanting the plant refuses to grow.

Practice has proved that our New England soils have a sufficiency of all these elementary materials with the exception of one or more of these three : nitrogen, phosphoric acid, and potash. The supplying of the necessary elements of fertility to the soil becomes, then, a more simple affair than it would be if we had to supply the whole. The farmer, having an infertile soil, need look out for only one or more of these three materials : nitrogen, phosphoric acid and potash. These are frequently, in our unproductive soil, all three wanting ; sometimes only one is wanting, but if my previous statement is correct, you see that is equally fatal.

Nature takes these materials from the soil and atmosphere and builds the plant ; so you see at once that these very elementary materials which we call fertilizing materials, when we apply them to the soil, are the very identical substances that are found in the plant ; the very identical substances that go to make up the structure of the plant. The plant, during its growth, has taken them from the soil, or from the atmosphere. These materials that I am speaking of, nitrogen, phosphoric acid, and potash, come to the plant through the soil. The atmospheric portions it is not necessary to allude to, because the farmer has not to look out for them at all. Our farm crops, then, take up out of the soil nitrogen, phosphoric acid, and potash, and we find the same stored in the plant.

You will see at once something of the relation of the plant to the fertility of the soil. I want to enforce the point, that if these crops are sold off in their raw state, from the farm, every mite of the material that they have taken from the soil goes with them, and you are exhausting the soil to that extent. If these raw products in the whole are sold from the farm away goes with them just that fertilizing material which is so necessary to the production of another crop.

Consequently you see at once the impossibility of carrying on unlimited production without looking to this question of fertility. A system of exhaustion would prevail if that should be carried on. We find this proved in practice. Undertake year after year to produce crops from your soil without returning these fertilizing materials to it, and the crops refuse to grow because you have carried off the material which was within their reach. It has been sold from the farm by the carrying away of these raw productions. There may be an immediate profit in doing this, and if you have a strong soil, exceedingly rich in fertilizing material, a succession of crops possibly may be grown and removed in a raw state from the farm, but sooner or later with any soil, I care not how rich it may be, the solemn fact will present itself that you have sold the fertility of your farm, and that the privilege of securing paying crops from the soil has been sold with it.

Here comes in the advantage of feeding. If stock husbandry be introduced upon the farm and these crops are marketed by feeding to the stock, a different result is secured. In feeding these crops to the stock, only a part of the elements of fertility are appropriated in the animal economy; that is, only a portion of the nitrogen, phosphoric acid and potash which these animals masticate and digest, is assimilated in the animal economy. Far the larger part of it is passed off as waste material and is left upon the farm. The amount and kind of material that is assimilated by the animal varies considerably with what the animal is doing, but far the larger part of it in every case remains upon the farm.

Plant Food taken from Soil by One Ton.

NAME.	Nitrogen — Lbs.	Phosphoric Acid.	Ash.	Potash.
English hay.....	31.	8.2	-	26.4
Clover.....	39.4	11.2	-	36.8
Potatoes.....	6.8	3.2	-	11.4
Corn.....	32.0	11.8	-	7.4
Barley.....	32.0	15.4	-	9.0
Oats.....	38.4	12.4	-	8.8
Peas.....	70.6	17.2	-	19.6
Beans.....	81.6	23.8	-	26.2
Fat beef, alive.....	50.0	31.2	-	2.8
Fat mutton.....	44.0	22.6	-	2.8
Fat swine.....	34.8	14.6	-	2.0
Fine butter.....	.55	-	23.6	-
Cheese.....	90.0	23.0	-	5.0
Milk.....	10.2	3.4	-	3.0
Unwashed wool.....	108.0	8.0	-	147.2
Washed wool.....	188.8	0.6	-	3.6

Perhaps it may be well here to illustrate the point, of the variation through feeding for different purposes.

A common crop, one which we are all growing, and which we calculate lies at the foundation of successful agriculture, is English hay. A ton of English hay contains 31 pounds of nitrogen, the same material we have been speaking of, and which is an element of fertility, and as I said before, an element existing in the structure of the plant. In addition it contains 8.2 pounds of phosphoric acid, and 26.4 pounds of potash. Now you see if that ton of English hay is sold from the farm all that amount of fertilizing material goes with it, and is lost to the farm.

In a ton of clover hay there is found 39.4 pounds of nitrogen, 11.2 pounds of phosphoric acid, and 36.8 pounds of potash.

Let me say here that these figures are no myth; you may just as well settle right down to the conviction that they are facts. These figures are derived from a large number of examinations and are the averages; and whether you have already accepted them or not, it is a fact that the sooner you accept them as approximately reliable the better it will be for you and your farm. It is not theory; but a matter of fact, proved from examinations, which cannot be disputed. The amount of these several ingredients contained by the different kinds of farm crops can be read from the table.

If these farm crops are fed to the stock only a portion of the ingredients named is retained by the animal; the larger part remains upon the farm. Let us, as a starting point in this connection, see what percentage of the 31 pounds of nitrogen in a ton of English hay will remain after having been fed. It will make a difference as to what you are feeding for. For instance, you are growing a steer and feeding English hay. Now what are you doing? Instead of building a corn plant you are building a steer, and you are building that steer out of the same material that you would build a corn plant. You are building up bone structure. What do you use in building up bone structure? You use a portion of the phosphoric acid to form the bone of the steer. You are also building up the muscular tissue of the animal, and you are using nitrogen for that purpose.

Supposing you are fattening a beef, what are you doing? Are you growing bone? Not all; the bone has been previously grown; you are now only laying on fat. And what is this fat really—where does it come from—that you are putting upon the ox? It is mostly

carbon which comes from the atmosphere. The farmer has nothing to do with that, only to take what nature gives him. He is not to supply that at all; and need not trouble himself about it. So that, when you are putting fat on your animals, instead of using up the phosphoric acid and the nitrogen of your fodder, the animal is throwing it out in the waste, and it all remains upon the farm.

With a growing steer a portion of the phosphoric acid of the fodder is assimilated by the animal, but only a small percentage of it; so that far the larger part of all of that material which was in your fodder remains upon the farm. Of the nitrogen, fed to a young steer, possibly fifteen per cent. may be used up, leaving eighty-five per cent. upon the farm. Fed to a cow in milk a considerable amount of the nitrogen is also used up, but never, probably in any case, does it exceed twenty or twenty-five per cent.

Now you raise the question right here, if you are an inquisitive man, is this all theory, is it platform oratory, or is it fact? Let me assure you that this has been under examination through feeding trials, carried on by scientific men. They have recorded the figures, but the results have been derived from actual feeding trials, where an examination of the food was made before the feeding commenced, and an examination of every particle of the voidings of these animals was made after the food had been consumed. This has been carried on in hundreds of experiments, and the averages are the figures that we give to you. These are facts derived from practical work you will see. There is nothing of theory about them.

I would not have it understood, however, that the percentages named anything more than approximate correctness, for it would be quite difficult when so many varying conditions obtain to express it with accuracy. But it is plainly seen that a large part of the elements of fertility existing in our stock fodder is still left to the farm after the animals fed have assimilated that which their system calls for. Thus of the one element, nitrogen, the amount used up in the animal economy varies, with what the animal is doing, from nearly nothing up to possibly twenty per cent., and probably never greatly exceeds that amount. With the other elements the range would not be as great. Of all the fertilizing material then fed out on the farm to stock, in the form of farm products, probably eighty-five or more per cent. remains on your hands after it is fed.

You will see from this the bearing of this matter of feeding upon the farm the products of the farm. Let us look a little further to

the difference in feeding for different purposes. Let us determine through the comparison of these figures upon the chart, the difference that will occur between the selling of the raw products, in a series of years, and the selling of the resulting products. A ton of fat beef, live weight, contains fifty pounds of nitrogen. Suppose you are realizing the money for your crops through the making and selling of fat beef. If you sell a ton of English hay you sell thirty-one pounds of nitrogen. If you sell a ton of fat beef, live weight, you sell only fifty pounds of nitrogen; only about fifty per cent. more in a ton of live weight of fat beef than there is in a single ton of English hay; and yet that represents the amount of fertilizing material that you remove when that ton of live beef goes from the farm. A ton of fat mutton shows still better; only forty-four pounds of nitrogen is removed with a ton of fat mutton, twenty-two pounds of phosphoric acid, and two pounds of potash. A ton of fat swine removed from the farm carries away only thirty-four pounds of nitrogen, just about the amount that is removed by selling one ton of English hay; yet the ton of English hay is sold for twelve dollars, and the ton of fat swine for one hundred and sixty. There is sold only about the same amount of fertilizing material with this one hundred and sixty dollars worth of fat swine that goes with a single ton of English hay. With butter, it is seen, the showing is still better.

Let us understand the philosophy of that. Why is it that so little of fertilizing material goes with the fat hogs when sold from the farm? Look at the philosophy of it and you will see at once. There is but little bone structure compared to the full weight of the fat hog, and consequently there has been but little phosphate of lime used in making up this growth. There is but little of lean meat, and consequently there has been but little of nitrogenous material stored up there. Far the greater part of it is fat, and this fat comes from the atmosphere, and you have nothing to do with it. Hence you see but very little fertilizing material goes from the farm when your pig is taken away.

With butter practically speaking there is nothing of a fertilizing nature that goes with it when it is sold from the farm. The butter itself like all of this fatty material, comes from the atmosphere, and when sold from the farm it carries only that material with it. In carrying on a butter dairy practically all the fertilizing material is

left on the farm. Of course there comes in the question of skim-milk which is left on the farm. That skim-milk is fed to the pigs and fat swine, and that carries off but a very small amount. So that the system of butter making and the fattening of pigs for market, carried on together, as they usually are, leave upon the farm the greater part of the elements of fertility which have been taken from the soil by the crops, to be returned to the soil and aid in producing succeeding crops.

Cheese, being of a different nature from butter, carries off more of the fertilizing material; yet the showing with cheese is far ahead of the sale of raw products. For instance, a ton of beans or a ton of peas would carry off nearly as much of the elements of fertility as will a ton of cheese, and yet the ton of cheese is worth far more money than is the ton of peas. With milk the showing is just about the same as it is with cheese.

A ton of unwashed wool, another of our farm products, worth at the present time five hundred dollars or a little more, carries with it only one hundred and eight pounds of nitrogen, eight pounds of phosphoric acid and one hundred and forty-nine pounds of potash; carrying off a large amount of potash, you see, but only a small amount of these other materials in proportion to its market value.

This, then, is something of an indication of the practical working of the feeding out of these products as compared with the selling of them in the market in the raw form.

QUESTION. I would like to know what it would cost to replace the fertilizing material that there is in a ton of English hay by purchasing commercial fertilizers.

SEC. GILBERT. That is the point that I was proposing to take up if you do not care to pursue this any further. I think there was something said last spring when I was here at a meeting of this club, in regard to the values of manures, but I will repeat it.

A manure is valuable for the amount of nitrogen, phosphoric acid and potash there is in it. These materials are what give value to the fertilizer, whether commercial or from the barn. So if we know what a pound of nitrogen is worth we can reckon and determine what a manure costs. In commercial fertilizers this available material, available nitrogen, phosphoric acid and potash, has a market value, which is just as plainly fixed as the market value of a bushel of salt in the market in your own city; and it sells for its market value, just the same as any other commodity sells for its

market value. Available nitrogen is worth in the market, in small quantities, twenty-five cents a pound. And if you buy a superphosphate on the wharf in Bangor you pay twenty-five cents a pound for every pound of available nitrogen there is in it. If you are cheated in the quality of the superphosphate you may be paying a great deal more than that; it is worth the price named in the market and you do not often buy things for less than they are worth.

Phosphoric acid, soluble, that is, available for plant food, is worth twelve and a half cents a pound,—so reckoned at the experiment stations. A pound of potash is reckoned at seven cents a pound. Where potash can be purchased in hard wood ashes at the prevailing price where they are for sale in this State, the potash can be secured at a less rate than the price named; but that is the usual rate placed upon it at the experiment stations.

The following are the prices of nitrogen, phosphoric acid and potash in their various forms used by the Massachusetts State inspector of fertilizers, Prof. C. A. Goessman, in his calculation of the value of the various brands of fertilizers examined by him during the year 1882 :

	Price per lb. in cts.
Nitrogen, in form of nitric acid.....	25
in form of ammonia.....	26
in form of dried ground meat and blood, finely pulverized and steamed bones, finely ground fish guano, Peruvian guano, urates, poudrettes and artificial guano.....	24
in form of finely ground bone and bat guano.....	22
in form of fine ground horn, wool-dust, etc.....	15
in form of horn shavings, and woolen rags, human excretions and barn-yard manure, fish scraps, animal refuse matter from glue factories and tanneries, etc.....	12
Phosphoric acid, soluble in water, as contained in alkaline phosphates and superphosphates.....	12.5
in Peruvian guano and urates.....	9
in form of so-called reduced or reverted acid.....	9
in precipitated bone phosphate, steamed fine bones, fish guano, according to size and disintegration, from.....	6 to 8
in form of bone black waste, wood ash, Caribbean guano, ground bone ash, coarsely ground bones, poudrette, barn-yard manure, etc.....	4
in form of finely ground South Carolina and Navassa phosphates.....	3
Potassium oxide, in form of muriate of potash or chloride of potassium.....	5
in form of sulphate of potassa in natural and artificial kainits.....	5
in form of higher grades of sulphates of potassa.....	7 to 7.5

So, when you go out and buy a superphosphate, you pay at least twenty-five cents a pound for the available nitrogen, twelve and a

half cents for the phosphoric acid, and seven cents for the potash there is in it; and if you know how many pounds of nitrogen you are paying for and getting, how many pounds of phosphoric acid you are buying, and how many pounds of potash you are buying, you know whether you are getting your money's worth or not.

Now the question is, what it would cost to replace the amount of fertilizing material that there is in a ton of English hay by the purchase of commercial fertilizers.

In a ton of English hay there are thirty-one pounds of nitrogen. If that was worth twenty-five cents a pound, the rate I have named, you see there would be seven dollars and seventy-five cents worth in a ton of hay. But there must be a deduction, for in this English hay the nitrogen is in a different form from what it is in superphosphate; it is in a form not readily available for plant food, and consequently it cannot be reckoned at its full value. The form in which it exists in English hay is about the same as it comes in raw porgy chum; and the nitrogen in that is reckoned at the experiment station and at phosphate manufactories, in that condition, about twenty cents per pound. For a like reason, the phosphoric acid is rated at about seven cents per pound, and potash at about four cents. At the rate of using these values the fertilizing elements in one ton of hay would be worth seven dollars and sixty-three cents.

In feeding this hay to stock, a portion of this material as we have seen is retained by the animal, and the remainder is thrown off in the voidings, and is retained on the farm in the form of barn manure. This reduction through feeding reduces the available manure to a less value than that of the total contents of the material before being fed. When comparing the same with commercial manures it is also proper to discount for the bulkier form of the barn manures. With their valuable contents is a large amount of material of no value which must be handled and applied in order to avail ourselves of this small quantity of fertilizing material. Making a discount of twenty per cent. for this, and we have the manure value of hay and other stock fodders fed out to our farm stock as in the following table:

MONEY VALUE FROM ONE TON OF

English hay	\$5 86
Clover	7 60
Young grass	2 67
Green fodder corn	1 04
Potatoes	1 58
Fodder beets	0 87
Sugar beets	0 84
Turnips	0 87
Sugar beet pulp	1 26
Wheat straw	2 61
Rye straw	2 77
Barley straw	2 71
Oat straw	2 46
Corn	5 55
Barley	5 95
Oats	6 63
Buckwheat	5 10
Peas	12 00
Beans	14 15
Wheat bran	11 37
Cotton seed meal	16 18
Linseed cake	16 00

The fertilizing material left after feeding a ton of English hay is worth, as compared with the price of commercial fertilizers, five dollars and eighty-six cents. So you will see that when you sell a ton of English hay from your farm you sell approximately six dollars worth of fertilizing material, and if you would go out and purchase commercial fertilizers to replace it you must pay that amount for it. That is another fact that we should not lose sight of.

Here are other materials figured out in the same way. Clover hay, being richer in nitrogen, and also in phosphoric acid and potash, the manure from feeding a ton of it is more valuable than that from a ton of English hay, and is worth seven dollars and sixty cents. You will draw a practical lesson from that. A ton of clover hay is worth more to feed than a ton of English hay, and then, after you have fed it, you have seven dollars and sixty cents worth of fertilizing material left on the farm, whereas, in English hay you have only five dollars and eighty-six cents worth. Yet the market will pay

more for English hay than for clover hay, and sometimes farmers will too, being unaware of this difference.

From a ton of young grass, fed in the green state, the result is two dollars and sixty-seven cents. The fertilizing material left after feeding a ton of turnips is worth eighty-seven cents. We have heard the practice advocated sometimes of keeping swine and feeding them on turnips, as an operation for manufacturing manure. I would like you to figure, some of these leisure winter evenings, how many dollars' worth of manure you would get from a flock of hogs fed on raw turnips through the winter months.

QUESTION. What would be the difference between a ton of English hay and what we call stock hay, or swale hay?

SEC. GILBERT. A ton of what we call low ground meadow hay, in place of the thirty-one pounds of nitrogen that we find in English hay, would contain no more than half that amount and possibly less, varying with the quality of the grasses. The manurial value and the feeding value are closely allied to each other. The low feeding value of these grasses comes from the fact that these valuable elements are not found in them to any great extent. If a fodder has a poor feeding value, it is low in the amount of these elements of fertility. We find that illustrated in practice. In my own vicinity there are extensive meadows, cutting thousands of tons of hay every year; the farmers all around in that vicinity cut large quantities of that hay each, and haul it back to their farms. They have done it year after year for seventy-five years, yet there is no perceptible increase in the fertility of those farms, although this hay, together with their English hay, has been fed out upon these farms all these years. Why not? It comes from the fact that there is but an extremely small percentage of these materials in it, and if not there the farm cannot be benefitted through feeding it or rotting it down. It contributes but little to the fertilizing material on the farm, for that material does not exist in it when it is hauled there, to any great extent.

QUESTION. Do you think that clover hay has more feeding value in it than what we call common herdsgrass, or red-top?

SEC. GILBERT. From the tone which the gentleman gives to the question I judge he is appealing to my conscience, and therefore I will answer him from my own experience in that direction, as well as from the study I have given it; and will say, that clover hay is no exception to the statement I have made, that you may rely upon

the figures given ; and that when fed properly there is in it more of feeding value, which you can get out of it by feeding it to your stock, than you realize out of a ton of English hay.

[Several of the farmers present testified that that was in accordance with their experience.]

Sec. GILBERT. So we find, when we come down to practical experience, that our intelligent, thoughtful farmers are proving every day of their lives the correctness of the figures which scientific men are giving to us.

I want to call your attention, while we are upon the subject of fertilizing material, to some of these other products. Here we see that a ton of fodder beets gives only eighty-seven cents worth of manure ; sugar beets eighty-four ; turnips eighty-seven. These are three of our root crops, you will see, which are very low in the value of the fertilizing material resulting from their feeding. The straws give more ; and the grains, you will see, leave considerable value in fertilizing materials. Peas are a crop which is sometimes raised in Maine, and a crop, too, which may well receive more attention than it is receiving at the hands of our farmers, as a feeding crop, especially in connection with oats, raising the old crop of oats and peas that was formerly in practice years ago. From a ton of peas fed out the resulting manure is worth twelve dollars ; and those peas are a rich feeding crop, easily grown, furnishing a goodly yield to the acre, besides leaving, as you will see, a rich manure for the purpose of contributing to the growth of succeeding crops.

Wheat bran is a fodder that is being used to a great extent. Fed out to stock, it leaves as a result eleven dollars and thirty-seven cents worth of fertilizing material for the benefit of the farm,—a figure but little below what the bran can be bought for, some years, in the market.

QUESTION. Isn't what is left of the bran worth more than what the animal gets out of it ?

Sec. GILBERT. That is always the case with all these fodders. I said that never more than twenty per cent. is appropriated by the animal.

Cotton seed meal is given a high manurial value after being fed. It is a fact that cotton seed meal is profitable as a fertilizer, applied directly to the soil, without being fed, and many car loads are now being used in that way. It is found to be more profitable, many

times, than to purchase commercial fertilizers in the form of superphosphates. Some of our manufacturers of fertilizers are using cotton seed meal as a source of nitrogen, buying it at the low rates prevailing and incorporating it in an improved form into their commercial manures.

QUESTION. Is the reason of the small value of the dressing from turnips and beets, because the animal appropriates all the balance, or wasn't there anything there?

Sec. GILBERT. There was but little there, and that little was not in the nature of fertilizing material.

QUESTION. Can we take that for granted right through these figures? Is one thing worth more than another for feed in the same proportion?

Sec. GILBERT. Certainly.

QUESTION. If the English hay was rotted down in the yard, would there still remain the value of manure which you have mentioned, of five dollars and fifty-eight cents?

Sec. GILBERT. Yes; if the English hay is rotted down in the yard, without waste, from excessive fermentation or otherwise, it would then have the manurial value which I have indicated, and even more, since it has not been reduced to supply the animal wants.

QUESTIONER. That seems to be a fact of some practical bearing, for we are sometimes so unfortunate as to get our hay spoiled in the field.

Sec. GILBERT. I think we can show you this evening, a more profitable course to pursue with that hay, and still reach the result of saving the fertilizing material.

QUESTION. You have spoken of a difference in the feeding of steers and fat beef; I would like to know how much manure value we are likely to get from giving a ton of English hay to horses.

Sec. GILBERT. Resulting fertilizing material from feeding a horse does not vary in any marked degree from that in feeding other kinds of animals. In feeding a growing colt the resulting fertilizing material would be about the same as it would from a growing steer, provided you feed the same fodders; and with a working horse the result would be about the same as with a working ox; in feeding the horse and the ox for fattening, the result would be about the same in the two.

QUESTION. Do you think there is anything like that amount saved by our common farmers?

Sec. GILBERT. One individual can judge of that as well as another. It certainly cannot be realized unless it is saved. Farmers sometimes think they cannot dispense with the keeping of hogs—they say they are so valuable for making manure, they realize so much value in manure from the feeding of hogs. Let me say this, that it matters not practically, whether you feed a hundred bushels of corn to hogs or cattle, so far as the resulting manure is concerned; only your practice is such with the hogs that you save practically all of it, while the practice of some farmers is such in the case of feeding it to cattle, that they lose the most of it; and consequently the two practices give widely different results. It makes but little difference what class of animals you feed your fodder to as regards the resulting manures. Our practices make a deal of difference as to the amount we realize from them.

AFTERNOON.

The exercises were opened with music, after which a paper on "Profits of Feeding Hay" was read by Mr. J. E. Shaw, secretary of the club, which will be found in the report of another Institute.

The subject of the paper was taken up and further discussed by C. H. Cobb, member from Androscoggin county.

MR. COBB :

Mr. President, and Ladies and Gentlemen:—I feel somewhat embarrassed in attempting to speak upon this subject this afternoon before this club, made up of farmers of so high a reputation, and many of whom have had a larger experience than myself. The subject of discussion is, whether we shall sell the hay from our farms or feed it to stock. The paper has shown that it should be, and has been in many cases, fed profitably. In the section of the State which I represent, the farmers generally feed their hay to their stock and then sell the product in the manufactured form. This has proved satisfactory in the majority of cases, and the manner in which this has been done is by keeping such stock as would pay them best. An important point for every farmer to consider is, which is the most profitable stock for him to keep upon his farm.

I well know that when I commenced keeping stock in earnest, some seventeen years ago, I thought I knew how to feed first-rate—that no one knew about that better than myself. I have found out since that I then knew hardly anything about feeding. When we come to speak upon such questions as this before such an intelligent audience as this, it becomes the duty of every man to speak whereof he knows.

In discussing this question we are not only to consider the hay which is raised upon the farm, but all other crops that are worth as much to feed as they are for any other purpose. The farmer that raises a crop of potatoes has more or less refuse potatoes to feed to his hogs or his cattle, which are profitable to either, but those which are merchantable are worth more to sell, of course. I wish to speak mainly in relation to feeding to milch cows, and to show, as nearly as I can, the cost of producing milk; and then you, who make the milk, may do just as you please with it. By actual experience by seven different farmers in my own county during the past two years, by feeding the hay that is raised on the farm, reckoning it at twelve dollars per ton, and the corn fodder in that proportion, and the straw at eight dollars per ton in the barn, with grain at the price it was last year, the average cost of the milk amounted to a fraction over two cents per quart by the year. Now do not understand me that every man that owns five cows or twenty cows has done this or is able to do it without the very best of care. In the first place I will state that every man that keeps stock should use the very best of judgment in selecting them, and know what kind is the most profitable for him to keep. For instance, the price of a cow in the market is, say fifty dollars; every man who has one for sale asks that price, while as a matter of fact Mr. A's cow is as well worth seventy-five dollars as Mr. B's is fifty. The price of the two is the same, because the difference between the two is not appreciated. Take a good, well-selected herd of cows, good in size, nearly six feet in girth, good milkers, and feed them well and tend them well, and each of them will produce in a year 2,700 quarts of milk. Now in the cost of keeping these there is one item to be considered which varies about every year, and that is the price of grain—the concentrated food which you feed. For instance, a year ago last spring you could obtain all the wheat bran you wished to for fifteen dollars a ton delivered in our county; this year it has not been less than twenty dollars. There is five dollars

a ton variation in the price of that. A year ago last spring cotton seed meal was twenty-seven dollars a ton; this year, up to within a few weeks, it could not be bought for less than thirty-two dollars a ton by the car load. Corn a year ago last June was bought for fifty-eight cents a bushel delivered at our place. Of course, on account of the difference in freight the prices would not be the same at all points.

Now the cost of keeping a cow last year, reckoning hay at twelve dollars a ton, and grain at the price it was bought for last year, amounted to \$54.32. That would be the cost of keeping good cows per head in a herd of fifteen or twenty. That means liberal feeding, not stinting them, as many farmers do at this season of the year, taking their cows to the tie up and saying, "I have you tied up before me; my hay now is just so large and you cannot have but just so much per day, if you do you will have to go without in the spring." No man should expect to realize a profit on such feeding as that. Don't your cows return abundant pay when they come to get the good feed in the pasture? It is the same when they are tied up in the barn and are fed bountifully.

Reckoning the milk at three and a half cents a quart, which I estimate as the average price, taking it for the year round, you will see that a cow will produce \$94.50 worth of milk. This would leave you, according to the figures I have given, a real income of \$40 from each cow, besides the value of the dressing. It has been shown to you by the chart how much that may be. If you reckon the amount of fodder that is fed, and the amount of concentrated food, it gives you something over thirty dollars worth of resulting manure, providing it is all saved.

I wish to make this a little plainer to you by telling you the experience of a man in my town. Commencing eleven years ago with four cows and one horse upon his farm, which was a poorish one of fifty acres, he planted and raised considerable southern corn for fodder to carry his stock through; from that he commenced planting sweet corn, a number of acres, and keeping a few more cows, and every year increasing the fertility of his farm, until at the present time, as the result of his farming operations done in a small way, a close business, he is able to keep eighteen cows, four large oxen, a pair of horses and some sheep and other stock. These results were due chiefly to the raising of corn fodder. I do not mean "fodder corn," but corn was planted for a crop of corn and the fod-

der was fed to the stock, together with all the straw that was raised upon the farm and the concentrated food that was necessary.

QUESTION. Was this sweet corn fodder?

MR. COBB. It was; seven-eighths of it. Perhaps one-eighth of it may have been yellow corn. Sweet corn fodder is more palatable than yellow. The cattle will eat it clean and it seems to do them good. The crop of sweet corn that was taken off was sold for enough to buy what concentrated food was necessary.

Now it might seem that any man, starting out as he did and pursuing the same course with his crops, would do equally well. But it is not always so. There were other persons in that neighborhood who tried, as they supposed, equally hard who met with no such success. The main secret of this success was that he saved every mite of the dressing that the stock made while the others let it run to waste. It is like the farmer who was so eager to get his pocket full of money, and when it came night he took it out and counted it, and laid it down in a careless place and lost it. Many are buying food, even hay, and feeding it out to their stock while they let the fertilizing elements which come from the stock run to waste.

QUESTION. Were these cows allowed to run in the pasture?

MR. COBB. They were, from early spring till late in the fall, and I presume they are in the pasture now three hours of the day. They ought to be if they are not. But this time of year I am not a believer in letting cattle stay out, unless they are at work, more than two or three hours a day. How many farmers are there today that are saving all the manure that comes from their stock. The account which I have given shows that if it is saved it will make a farmer well off, if not rich, in time. While a farmer is allowing this waste he is certainly going the other way. Every farmer that has not a chance to do this can have a chance very easily and readily if he wishes. It can be saved in the barn cellar. In many cases this is the cheapest way; in all cases, perhaps, it is the handiest. Those who have not the convenience for a barn cellar can save the manure very well by a tight floor in the tie-up, where absorbents can be used.

What does this do? It makes the farm worth more year by year, and makes the work, as you may see, a little harder, because the crops that are produced every year are a little larger, and consequently more stock must be kept each year to eat up the fodder that has been raised the year before.

In travelling along the roads in the winter months, how many places do you see where the farmers throw the dressing out of the tie-up windows, under the eaves of their barns. That which they throw out is only the solids which come from their stock while the liquid portions have gone under their barns and are lost. In the spring the rain comes from the eaves and drenches these heaps, the snow begins to thaw, and all the goodness that is in them begins to run out, and close by is a little brook, where all these streams run in. So, nearly all the manure from the stock which is accumulated through the winter and thrown out those windows is lost to the farm. When planting time comes the farmer finds he can plant but little corn, because he has but little dressing.

The farming operation is a larger business than many farmers consider. It is a business that needs a great deal of care and the strictest attention, especially in connection with the barn work; that is the key to success on the farm. Any farmer that wants to get rid of work, by disposing of his crops in the easiest way, selling them off in the fall of the year for what they will bring, is the man that wants to sell out and leave the business. Every man that sells off his crops—as these charts represent to you—is selling so much of his farm every year, and in a few years it is all gone. I judge by your looks to-day that none of you believe in selling off the crops from your farms. I know that you believe there is more profit in manufacturing them into some other product by keeping stock. But it is so much work to do it. It pays to hire men to carry this work on, but there must be somebody to see to it in order to make it pay.

I wish to say one word more, as to the cost of the production of milk. I would say that from the experiments last winter of seven different dairymen it was ascertained that we could not raise milk in the winter months, from the middle of November to the middle of May, for less than three cents per quart, while in the summer months it is produced for a fraction less than one cent per quart, when the cows have a good pasture; and you will find by the figures that have been made that it amounts to a small fraction over two cents per quart, taking it the year through.

Sec. GILBERT. Your estimate is on the basis that you will produce about the same amount of milk in the winter months as in the summer months?

Mr. COBB. Yes.

QUESTION. How much for pasturing?

MR. COBB. Six to eight dollars for the season.

QUESTION. Do you take into account the depreciation in the cow, in the cost of your milk?

MR. COBB. Yes, we do. I don't say but that other stock can be kept at a greater profit than this. I have a boy who is eleven years old. Last spring he was pleased with the idea of buying a pair of calves. I bought them and gave thirty-two dollars for them. They gained in ten months, up to cattle show time, fourteen inches, and he was offered eighty-six dollars for them. They weighed 1,725 pounds, a pair of yearlings. They have had corn fodder and straw through the winter, and a pint apiece of cotton seed meal with two quarts of bran mixed with it. Five months in the summer they fed in the pasture; \$7.50 was paid for pasturing during those five months, and they had nothing else to eat for that time.

SEC. GILBERT. Mr. Cobb has indicated to you something of what may be secured from cows by getting a goodly flow of milk. He has stated that he sells his milk, a market which is not open to all farmers in the State. Mr. Harris will indicate to you whether farmers, located where they cannot sell their milk in that form, can secure paying returns for the fodder fed out through the other forms into which it can be put.

W. W. HARRIS, member of the board from Cumberland County: I feel that I cannot give you much light upon this matter, after listening to what has been said in the paper to which we have listened and in the discussion which has followed.

There is one thing that I believe I know, and I think farmers here will endorse it, and that is that the man does not live in the State of Maine, who practices selling hay year by year, who is not at the same time selling his farm so that sooner or later he will seriously reduce its capacity for hay production. Of course a farmer living near Portland or any other city, where he has extra facilities for buying fertilizers, can sell his hay and still keep his farm up; but my observation has been that the man usually forgets to buy the fertilizers; he puts the money in the bank, or does something else with it, aside from putting the fertility back upon his farm.

I have had some experience in selling milk, like my friend, Mr. Cobb. I ran for seven or eight years a milk farm near Portland. I bought an old farm pretty well run out, and at that time did not live on it. I hired help, stocked it with cows and sold milk. I

found I could pay for my labor employed on the farm and make the institution run on its own resources by selling milk. At the same time I was improving the fertility of my farm, which was badly run out from the fact of the hay having been sold from it for many years and nothing returned.

After a time I became tired of the business of selling milk, there were so many inconveniences about it, and I commenced experimenting a little in the way of making butter. At first I supposed it was no sort of use to reckon butter making by the side of the selling of milk, located as I was, so near a market. I made some experiments in that direction. I learned the amount of milk it took to make a pound of butter. I found that we could make good butter. I soon learned what I could get for it. The investigations that I made after a time assured me that I would get about the same money return from the butter that I did from the milk, and that I would have the skim-milk and buttermilk for other purposes. As I said before, my help on the farm is hired help entirely. I talked with the woman who was in charge then. She happened to be a sensible woman, a good butter maker, and I found she readily took to the idea of making butter. I supplied her with the modern facilities for handling the milk, got a creamery and fitted up for it, and she was better satisfied to run the butter department than she had been with the care of the milk selling business. As all of you know, who know anything about the milk trade, there is a certain amount of hard work attending the cleaning of the milk cans. They must be kept clean. Milk is a very sensitive article and must be handled with a great deal of care. So I changed the business entirely, from selling milk to making butter. I do not think I get quite as much for my butter, but the difference in the actual profit is very slight, indeed. In the first place I made a trade with a prominent grocer to take my butter for the year, and I made a hard trade. I might have realized five or ten cents more per pound. I get thirty cents by the year, but can do better next year.

I never knew a woman who made butter who did not claim that she made good butter. Many of them do, and all would with the proper facilities for making it; but no woman can always make the same grade of butter unless she has the proper facilities. With a good creamery, plenty of ice, and with all the facilities for making butter the same at all times, there is no reason why your churning to-day shall not be precisely the same as it was yesterday or last

week. If you have two or three different churnings of butter it will all be just the same under this creamery system.

A man keeping good cows, feeding them well, caring for them well, treating them gently, and managing a dairy intelligently, can make his hay pay him in that way fifteen dollars a ton. I have figured the thing in my own practice and find that to be a fact.

I want to lay down this foundation principle, which every farmer should be governed by, and that is, he should regard himself as a manufacturer; he should never sell the raw products from his farm, but should manufacture the rough, coarse material into some finer form. By that course, you see by the chart, you take little or nothing really away from the farm, and you have your skim-milk and your buttermilk for your pigs. I sold a pig the other day for forty-five dollars, that I am sure did not cost me anything like that sum. I feed them largely from skim-milk and shorts.

Another thing I regard of very great importance: if a man has a heifer calf from a choice cow it is best to raise her on this skim-milk. I have raised thirteen good skim-milk calves this year, and I think they are just as good as if I had given them new milk all the time. I have fed something else with it.

If a farmer will regard himself as a manufacturer, and turn his raw products into the finer products, and sell them, retaining all the fertilizing properties of the crops raised on the farm, it does not take much figuring to show where he will bring up by and by. It makes all the difference between a successful farmer and an unsuccessful one, whether the fertility of the farm is utilized and saved, or allowed to run to waste.

QUESTION. How do you use the skim-milk in raising calves on it?

Mr. HARRIS. When the calves are two days old I take them from the cows, but for a week give them all they need of new milk; then I begin gradually to add skim-milk to it. And anyone who has a creamery will agree with me that skim-milk saved with them is a very different thing from skim-milk saved in shallow pans. I take this skim-milk, heat it milk warm, put in a little oatmeal and a little shorts, and I find no difficulty at all. Sometimes I have been troubled a little by the calves having the scours, but there are ways to obviate that.

Before I commenced making butter I found that one can of such milk as I sold just about made a pound of butter. The cans are

reckoned at two gallons. but they are strong measure. I never have weighed my milk, but Mr. Cobb says a can of milk will weigh twenty-three pounds.

I was running an Ayrshire herd, but I am passing over to the Jerseys.

EVENING.

A. O. INGERSOLL, Esq., member for the county, presided and announced that Prof. Balentine, who was expected to speak, was unable to be present, and that the Secretary would open the discussion.

ECONOMICAL STOCK FEEDING.

Sec. GILBERT. Prof. Balentine was placed upon the programme to present the subject of economical feeding in its scientific aspects. While I feel obliged to bridge over the chasm occasioned by his absence, I do not in any sense attempt to fill the place, but will introduce the subject and let others participate in the discussion.

Following the exercises of the day, the subject of economical feeding is an important one, for the profits which we have claimed to be possible in feeding the farm products to stock are only possible through economical methods in feeding. And these economical methods are based, as is every other department of agriculture, upon scientific facts.

Some one has defined science as refined common sense. Whether that be a correct definition or not, it is a fact that the greatest profits and the best results are secured where the individual practices conform most closely to the well-known facts which have become accepted and established scientific truths. So there is a science of feeding; and as we adhere closely to its teachings, so shall we find our profits enhanced. In presenting the subject it does not become necessary to use any scientific terms; still it is in a measure necessary to introduce something, by way of illustration, which perhaps is not so familiar to us as some other terms and some other facts. I know of no way to present the subject intelligently except by the use of such technical terms as represent the idea we wish to convey.

The idea of economical feeding would, of course, carry with it that system and those methods out of which and by which you can secure the best possible results at the least cost. This is what we, in farming, should always search for, as much as a manufacturer of any product; and the more of this kind of business we put into our work the better it will be for us.

In the opening exercises this morning we talked something about building up plants. In this connection we are going to take these plants and make milk, if you say so, or make growth or any other product which you desire. It comes from the plant used for food; the animal simply takes the nutritive material from the food given, masticates it, puts it into a form in which the organs of assimilation deposit it, either in the form of growth, fat, milk, wool or any other product which you are after. Now, you see at once that if that nutritive material does not exist in the plant or fodder, the animal cannot assimilate it, cannot deposit it in the milk pail, cannot lay it on its form as fat, cannot clothe its back with it in the form of wool. Your material must exist in the food given or else the animal cannot secure it. There are other offices to fill, the animal has to maintain its existence, it has to keep up the animal heat, and it has to supply itself with the force by which it moves about, works, masticates its fodder, and performs the work of respiration. All of that heat and muscular force come from the food eaten; and these nutritive materials which are found there adapted to these different kinds of work are the ones which you want to supply to your animal to do that work with; and, if you want to do it in the most economical manner possible, you want to give to your animal the right proportion of these different materials, so that they will have enough to do the work which you require of them, and at the same time will not waste any part of it. That would be economical feeding. You will see, at once, as the foddors vary in the different quantities of the nutritive materials, and the animals which you feed require different proportions for different purposes, that economical feeding, scientific feeding, becomes a complex problem, one requiring very close study, very wide research. A great deal of this research is now being carried on and has been for years past, yet there is comparatively little that has been accomplished. Still, some things have been established which we can base our practice upon as reliable.

The different classes of material which go to work the different purposes in the animal economy are classified under different names. We will refer to two or three of those names, because it is impossible to present this intelligently in any other way. Besides, they are terms which you are running across every day, and if you are not, as many of you I know are, familiar with them now, the sooner you make yourself so the more intelligently you can read, and the better farmer you will become.

We have, first, the nitrogenous materials. This class of nutritive elements is denominated albuminoids. They contain more or less nitrogen. They are found in all plants, but in varying quantities; some plants contain but little of this nitrogenous material, while other plants contain large percentages of it. An animal at work for a certain purpose would require a certain amount of nitrogenous material; kept for a different purpose it would require a less or a greater proportion of the nitrogenous material corresponding with the purpose for which it was kept. Knowing the requirements of the animal, and knowing the material of the fodder, you can conform to the requirements of the animal, and thus render your feeding operations economical in the highest degree.

The office of these albuminoid compounds is to supply animal growth; it supplies the animal with the material out of which is constructed the muscular system, that is, what we term the lean meat of the animal. The solids of milk—the cream, largely, and the caseine wholly—are formed from these albuminoid compounds. Here is this fact connected with the matter so far as any experimental work has been able to discover, and much of it has been carried on at the different experimental feeding stations, it has shown that an animal cannot supply itself with the material to build up its muscular system out of non-nitrogenous food; that is, it cannot take a non-nitrogenous material and transform it into muscle, or into cream or caseine in milk; it is impossible to do it. Consequently, if you are growing a young animal, a steer, a heifer or a colt, you see what becomes necessary at once; you must supply to that young animal a food rich in nitrogenous material, rich in albuminoids, because from the albuminoids alone can it build up its muscular system. And the same with milk; if you would make a rich milk you must feed to the cow a food rich in albuminoids. It is impossible for the cow to make rich milk out of material lacking in albuminoids.

We have another class of materials known as carbohydrates. This class of materials goes to maintain the heat of the animal, supply force and maintain respiration.

The fats in the food go to maintain heat chiefly. There is some evidence that with some animals the fat in the food is transmitted into resulting fat, either laid on the body or found in the milk in the form of cream; but not to any great extent, and experimenters have not yet fully settled this point. But it is not necessary to an intelligent understanding of this question to deal at length with that point. It is not important that we dwell here, from the further fact that in all of our ordinary cattle foods there is a sufficient quantity of fats without extra pains to supply them.

Having these different materials in mind, let us inquire what is the injury that comes from feeding an excess of any one. For instance, a young animal requires a food rich in albuminoids to make a rapid growth. Economy would require that you give just enough of the albuminoids and just enough of the carbohydrates to supply the wants of the system. Suppose, now, you feed an excess of carbohydrates, where is the loss? It is this: the animal economy will lay up only what is needed to go with, or balance, so to speak, the amount of albuminoids which the animal system requires, and if you feed more than the proper amount to hold that balance with the albuminoids, you are requiring the animal to masticate and digest a portion of food which it cannot assimilate; it is spending its muscular force, using its digestive organs to handle a food which can do no good. This excess is thrown off from the animal as waste material and you get nothing from it except the fertilizing value. So there is not only an actual loss of material, but you see it is detrimental to the most rapid growth of the animal, to require it to grind and digest that which it cannot assimilate.

We have had some talk about the values of different kinds of material, and also the best methods of feeding cows for milk, reserving to this evening the question of the ration of cows and other animals. Let us look for a moment to this chart, and we will see the comparative values of straw and hay. Wheat straw contains 3.1 per cent. of (chart) albuminoid compounds, and 37.5 of carbohydrates. Barley straw, you will see, is a little richer in nitrogenous material and not so much of the carbohydrates.

Percentage of Albuminoids, Carbohydrates and Fat in

	Alb.	Carb.	Fats.
Wheat straw.....	3.1	37.5	1.2
Barley “	3.4	34.7	1.4
Oat “	4.0	35.6	2.0
Hay, mixed grass.....	7.3	44.9	1.8
“ Clover.....	11.0	41.4	1.8
Cotton seed meal.....	43.7	21.5	14.0
Corn meal.....	8.3	69.7	3.5
Oat meal.....	14.7	67.5	7.0
Barley meal.....	11.8	70.9	1.7
Wheat bran.....	14.2	55.6	3.7
Wheat middlings.....	12.2	65.6	3.0
Rutabaga turnips.....	1.3	9.5	0.1
Mangolds.....	1.8	4.4	0.4
	Alb.	Carb.	Fat.
Standard ration for a cow			
in milk.....	2.5 lbs...	12.5 lbs.....	0.4
Mixed hay, 25 lbs. furnish	1.8 “	11.2 “	

Oat straw is a little better than barley straw, as you see. These facts are well known to farmers who have fed these materials; the figures correspond with their experience in the matter, and you will find it so all through the list of our fodder crops. Hay from mixed grass is our standard fodder as we call it. We do not, though, call it a perfect fodder, because it can be improved upon to secure the best possible result. But still that is a fodder which we are all familiar with and know that it is the best of any one single forage plant that we have been accustomed to feed to our animals. It contains 7.3 per cent. of albuminoids, 44.9 per cent. of carbohydrates and 1.8 per cent. of fat. We spoke of clover hay to-day, now let us see how it compares. It has 11 per cent. of albuminoids. You see it is exceeding rich in albuminoids. It has 41.4 per cent. of carbohydrates and 1.8 per cent. of fat. Cotton seed meal has 43.7 per cent. of albuminoids, 21.5 per cent. of carbohydrates and 14 per cent. of fat. You see it is extremely rich in albuminoids and in fat.

Now, from this chart you see that the clover and the mixed grasses do not agree, and the oat straw is below each. We know from practice that oat straw is not worth so much to feed as hay

from mixed grass, and why is it? Simply because it does not contain as much of the albuminoids and as much of the carbohydrates as the hay from the mixed grass, and they are in different proportions from what they are in the mixed grass. These are the guides which indicate their feeding value, and indicate it not only in the materials named, but in every other material that we use in feeding stock.

Now, as to the feeding of clover hay intelligently, so as to make it more valuable than hay from mixed grass. If you should take equal quantities of clover hay and oat straw and mix them together the result would be a food almost identical with hay from mixed grass; and experimental feeders have found that they can mix clover hay and oat straw together and secure as good results as from hay from mixed grass fed alone—a complete verification, you will see, of the correctness of these figures. I believe there are those present who have tested that very question. Another course, which has been practiced by a great many and has proved profitable in innumerable instances, is, taking this cotton seed meal, rich in albuminoid compounds, and combining it with this class of fodders that are low in albuminoid compounds, and securing excellent results from the combination. Ordinary corn fodder is another that is weak in albuminoids. The same is true of your low ground hay, and hay that is injured in storms. A combination of cotton seed meal with these coarser fodders will correct the deficiency, and the result from the combination is as good as you could secure from the best of hay or in any other way.

I have put down upon the chart a standard ration for a cow giving milk. Many experiments have been conducted to show the proper ration for a cow giving milk, that she may digest and assimilate all of these different compounds and at the same time waste none of them.

It has been found that a cow in milk, weighing one thousand pounds, live weight, requires of digestible material, 2.5 lbs. albuminoids, 12.5 lbs. carbohydrates, and 0.4 lbs. fat, and that this nutritious material should be obtained from about 24 lbs. of fodder. If the cow is heavier than a thousand pounds, a proportionate addition should be made to the ration, and if lighter, a reduction. On such a ration a cow is found to do good work, maintain a good condition, and utilize to the greatest possible extent the ration given. All of our dairymen will find on examination that these conclusions hold good, and have been borne out in their own experience.

You see that the ratio of the albuminoids to the carbohydrates is one to five, for a cow giving milk. You will see from this the defect in hay from mixed grass, which we said was not the best possible ration. Every milkman knows—and I speak of milk in particular, because we have experimented more with milk than with any other product—every milkman knows, I say, that it is not possible for him to make a cow, for any considerable length of time, do her level best on hay alone; that she will give you only medium results—only that and nothing more. You will find that these figures prove that that result would follow. An average cow will consume twenty-five pounds of mixed hay with a good relish; a good appetite; but if you feed her very much more than that, she will leave a portion of it and the appetite will become delicate. Experiments without number have proved that. This twenty-five pounds of mixed hay will average 1.8 pounds of albuminoids and 11.2 pounds of carbohydrates. Compare that with the standard ration for a cow, and you see at once why she does not give the best results in milk. You are feeding only 1.8 pounds of albuminoids, whereas, to secure the best results, you should feed 2.5 pounds. That is a defect that must show itself in the results, for you cannot obtain a large flow of good milk unless in the ration the cow has a full supply of albuminoids.

We will suppose, for the moment, that that cow could masticate and digest enough hay to secure 2.5 pounds of albuminoids; you will see she would then have to consume nearly double the amount of carbohydrates which is necessary to maintain the proper proportions. This excess of carbohydrates would not only be a waste, but its mastication and digestion would be an over-tax upon the organs for no good purpose.

This gives you something of a key to a correct understanding of the philosophy involved in economical methods of feeding. Now, I would like for this question to be further discussed, in the light of practice alone, if you see fit, that we may find out if, in this practice, there is not a corroboration of the principles which I have attempted to illustrate here.

W. W. HARRIS, member of the Board from Cumberland:

Mr. Chairman and Gentlemen—Our Secretary has pretty plainly explained to you the relative-feeding values of these different kinds of fodders. I presume that, so far as any of you have practiced feeding these fodders, your practice coincides with the principles

which he has laid down. That has certainly been my experience, so there is no need of my repeating anything that he has said. He has given you the relative feeding values, and he has given you the standard ration for a milch cow. He has not told you, and no man can tell you just how much to feed any particular cow, because some cows want more than others. Now this is a matter where good sense and good judgment is required. If a man looks personally after his stock, watches them, every farmer knows that there are ways enough for him to see whether the machine is running along in order, or whether there is any friction about it; and he is the man to judge. We can give general rules for everything, but there is no arbitrary rule that I know of that should govern in all cases. If you should ask me how I would feed, my answer would be, according to these tables, as to the proportions; and as to the amount, feed till I had fed enough; and here is where the judgment comes in, as I said before. Joseph Harris of New York, a well known scientific farmer and writer, illustrated this thing at one time somewhat in this way: that he was about starting a horse power machine for chopping feed; while they were getting ready, one horse was put in first and he could just turn the machine, but on putting in three horses the machine ran easily and did its work without friction. So in this matter of feeding, up to a certain point you feed just enough to keep the animal in the condition in which you start with it; what you feed above that, up to the proper amount, is what gives you your product. When you feed only enough to keep the machine in running order, you quit just where you commenced, and gain nothing,—your animal is the same as you started with and you have lost your fodder. On the other hand, from feeding this additional amount is where you get your product. The most profitable results come from what is ordinarily understood as high feeding. And I take it this is true in feeding for beef as in feeding for milk, but I never fed enough for beef to instruct you about that. When I say high feeding I mean clear up; there is where a man wants to know his business. I mean that it is best to feed up as high as you find that the feed is increasing the product in relative proportion to the expenditure. For instance, a man is feeding hay with cotton seed meal and shorts; he feeds one quart and finds an improvement in the flow of milk; he feeds two quarts and he enlarges the proportion, finds that he is gaining on this last

quart more than he did on the first. That is what should govern the man.

I believe a good sized cow, seven or eight years old, or more, giving a full flow of milk, may be fed to advantage four quarts of cotton seed meal per day, being worked up to it by easy stages. I have done that and found no difficulty, and have improved the flow of milk by it in large proportion.

Sec. GILBERT: What do you term a good ration for a cow giving a full flow of milk, of course varying it with different animals to a certain extent.

Mr. HARRIS: I have not practiced feeding what we call the coarse fodders much. I raise a good deal of Hungarian grass and make hay of it. Last winter, almost for the entire season, I fed one feed of Hungarian, one of second crop clover, and one of Timothy and Red Top. With these my average feed for my cows was about two quarts of cotton seed and four quarts of shorts to each cow, some a little more and some a little less.

QUESTION: What time do you cut your Hungarian grass?

Mr. HARRIS: Cut it before the seed forms, for the reason that if you let it go to seed it becomes hard and woody, and the cattle don't like it as well as when it is cut green. I believe I cut no hay upon my farm which is worth so much to me as Hungarian, cut thus early and properly cured.

Sec. GILBERT. I would like to inquire if, in your milk business, or later, in your butter business, you have been able to secure the market value of your hay fed out?

Mr. HARRIS. That question was considered last winter, and I stated then, that I had weighed my feeds and tested the matter and according to the best calculation I could make, I found that my hay fed to my stock, together with cotton seed meal, shorts and some corn meal, paid me over \$15 per ton, and paid for my concentrated food.

QUESTION. I would inquire of the Secretary what he would feed turnips with to get the best results, whether it would be coarse hay and straw, or good hay?

Sec. GILBERT. I stated, you will recollect, that turnips are low in albuminoid compounds, containing a larger proportion of the carbohydrates. Rutabagas 1.3 per cent., albuminoids, 9.5 per cent. carbohydrates, 0.1 per cent. fat. They should be fed in combination with some material which is rich in that which the turnips lack,

such as clover hay or good hay. It is a more economical method to feed your turnips with good hay than with oat straw if the object is to secure the benefit of all the nutritive material. Better yet would be a combination of your turnips with clover hay or with cotton seed meal or oat meal or wheat bran, all of which are rich in albuminoid compounds. You would be surprised, if you have not had experience in the matter, to see how the stock will relish the coarser and less palatable foods when fed in combination with these concentrated foods rich in the albuminoid compounds. The animal's appetite is simply a craving for what its nature demands, and its nature calls for a well balanced ration. If you are feeding a ration that is short of albuminoids you will find your animals voracious for something rich in albuminoids; they will grasp at clover hay, but you undertake to feed clover hay alone and after a few days they begin to grow dainty. The philosophy of it is that they have got an excess of albuminoids and they want something that is an off-set to go with it, consequently you feed them a ration of straw and they will eat it with as voracious an appetite as they ate the clover hay with at first. Nothing surprised me more, when I first began to feed cows with the concentrated foods for winter butter making, than to see the result that I could secure from these cheaper kinds of fodder, such as corn fodder, hay of a low grade, and also with straw mixed with it. It seems, when you are feeding these concentrated foods, that you can secure nearly as good results from these cheaper fodders as from good hay.

The practice has been to feed turnips with straw, and better results have been secured than from feeding straw alone. Now, why is this? It comes not from your having corrected the defects of the straw; you have not, you have intensified the defects, but you have made a more palatable food; and the animal, through its greater palatability, has been induced to eat more of it.

QUESTION. I have quite a lot of turnips, and considerable straw and coarse fodder; I have been feeding my cows with them and cotton seed meal, and oat and barley meal. I would like to know about how to get the best results?

Sec. GILBERT. A ration made up of half of each of straw and turnips would furnish digestible material in each hundred pounds as follows: Albuminoids 2.6 lbs., carbohydrates 22.5 lbs., fat 1.5 lbs. The defect of this ration is readily seen, there being much too large a proportion of the carbohydrates. If you feed largely on

oat straw and turnips you should feed liberally with cotton seed meal and oat meal. We sometimes refer to the English practice of feeding turnips; if you will observe carefully you will find that when the English are feeding turnips they almost invariably feed linseed meal or cotton seed meal in large amount with them, thus correcting the defects of the turnips.

QUESTION. How about turnips for colts? I feed some to mine and they relish them very much.

Sec. GILBERT. The result of the defect in a ration of turnips for colts would be about the same as it would be for young cattle. The palatability of a food is no measure of the nutritive value of it. There is nothing we can place before stock that they will eat with a better relish than apples, yet they are one of the poorest feeding materials that we have as regards nutritive contents. So I say palatability is no measure of nutritive value.

QUESTION. What is the effect of feeding apples on the production of milk?

Sec. GILBERT. Fed in small amount they will not have any appreciable effect, because they are low in nutritive value. The result further than that would be about the same as with root food, you increase the water of the milk, but not the cream or caseine to any appreciable extent. You may increase the water of milk by adding turnips or beets or apples to your ration, but this will not increase the amount of butter to any extent.

QUESTION. How is it with sugar beets?

Sec. GILBERT. The result is about the same. The sugar goes for another purpose than to make the solids of the milk.

QUESTION. Suppose you feed an average cow half a bushel of turnips per day, how much cotton seed meal would the cow require to correct it?

Sec. GILBERT. I would not pretend to be very accurate in any statement in this direction without taking time to work it out. In the first place I will say that if I was feeding cows for milk I would not give them half a bushel of turnips, for I should not consider it economical feeding; however, with ten pounds cotton seed meal fed with the thirty pounds of turnips and twelve pounds of good hay the ration would be rich enough in albuminoids to give a good rich milk. But there comes in a question, in this connection, of flavors, which sometimes has to be looked out for in feeding tur-

nips to cows for milk, which, of course, is not under discussion now. It never can be lost sight of in practice, however.

QUESTION. If you were obliged to take cows from the pasture and feed them on dry feed wouldn't turnips and beets then be more valuable?

Sec. GILBERT. That question, of course, comes from the supposition that under those circumstances these watery foods are more valuable from the nutrition being diluted with water. I find myself somewhat in opposition to the prevailing sentiment upon this point. If I am wrong I am open to conviction at any time; but I claim that the water existing in a food and forming part of it, is of no more value to an animal than so many pounds of water, at the same temperature, taken from the pump. I know you don't all agree with me, but you can take it for what it is worth, and I only ask that you examine it with your practice critically, study it from every standpoint, theoretical, scientific and practical, and see if you do not arrive at the same conclusion. Roots have a feeding value, but only for the nutrition that is in them. We need not give value to the water that is in them. You can't get nutrition to any great extent out of water.

QUESTION. What is the difference between hay and grass then?

Sec. GILBERT. One has parted with part of its water, and no other earthly difference.

QUESTION. But a cow will give more milk on grass than hay, will she not?

Sec. GILBERT. She will give more in measure; but are you at all sure that eating the same quantity of nutritive material she will give more butter or cheese?

There we are shaping our own opinions from public opinion round about us, and in it are some errors. It is our duty to get at all the facts, and when we do that we shall lay by some of our opinions. From a practical standpoint, from actual experience, if I were feeding cows to make butter or cheese, and had my second crop grass to feed from, I should dry out half of its water, and I feel sure I should get better results than I could with the water all in.

QUESTION. Were we not told this forenoon by one of the speakers that he got milk from grass at one cent per quart, but from dry hay it cost him three cents?

Sec. GILBERT. That was doubtless a correct statement, and it is due to two causes. One is, that grass pasturage among us here

is a cheaper source of stock food than hay at market prices, or any other substitute we have at hand. The other is that a watery food, like fresh grass, increases the water contents of the milk without increasing the valuable parts in the same ratio. In other words it is an honest way of watering the milk, and while the speaker, whom you refer to, has a clear conscience in taking water from the grass he would not do it from the well.

C. H. COBB, member of the board from Androscoggin county :

I think this question of feeding has been thoroughly and well discussed by the speakers this evening ; and these questions through the day have been so closely connected that the field has been pretty well covered.

The question under discussion at this time is one which any one may guess upon, but it is one on which we want to know that we are right. When I commenced feeding quite a large amount of stock, and feeding these cheaper foods that are raised upon the farm, I had no chart for a guide, but commenced to feed by guess. I fed my clover hay clear and my herd's-grass hay clear. It was all sorted as it was put into the mow and it was fed so ; the straw I would feed clear, and the corn fodder I would feed as soon as it was cut up, and feed it till it was all gone. I found that manner of feeding was not giving very satisfactory results ; and before I knew of any such tables as are represented here, I found that my cows would do better with oat straw or barley straw mixed with clover hay and fed right along on it. This will give very fair results, but by adding cotton seed meal to this feed you get a very much better result. Cotton seed meal is a good and, you may say, a profitable food. How much of it to feed, is a question you should give your very best and keenest judgment. I have seven cows at the present time that I am feeding four quarts per day each, two in the morning and two at night.

QUESTION. How are you going to know that a cow is being injured by cotton seed meal?

Mr. COBB. Just the same as you would if feeding corn meal : they will commence to run to fat, and shrink in milk, so they are fit for nothing but to butcher. And sometimes, as in feeding corn meal, they will become gargety.

QUESTION. Are those healthy cows?

Mr. COBB. A healthy cow is one that will stand a feed of clover hay mixed with straw, to the amount of twenty to twenty-two

pounds a day, and two quarts of cotton seed meal and two quarts of corn meal mixed with four quarts of bran, in two feeds per day. That is a good cow, and will pay you \$96.00 a year, gross income.

QUESTION. It will cost how much to feed her?

MR. COBB. Fifty-four dollars and thirty-six cents, as feed was last year. That is what it cost to feed mine last year. That has been done by actual weight, upon the scales in the barn floor, by lots of two and two and four and four, right along, week in and week out. The amount of cotton seed meal weighs just three pounds to two level quarts, and the bran is a pound and a half. There is but a bit of difference between the weight of two quarts of corn meal and two quarts of cotton seed meal. Corn meal is of too fatty a nature, too heating, and causes garget in cows very much more than any other kind of feed. Cotton seed meal is considered by myself, and by neighbors of mine who have fed it for twenty-five years, to be a perfectly healthy food and a good provender the year round.

The only way of ascertaining how much cotton seed meal can be fed, is by testing it upon your cows, commencing with a little and increasing the amount gradually till you see what the cow will stand. When you find they are shrinking in milk and going to flesh it is time to stop. But if they keep giving a good amount of milk I should not stop even if they gain in flesh. It is cheaper keeping a fleshy animal than a lean one. It is a saying, and a true one, that when a creature comes to the barn in good order, it is half wintered. This can only be ascertained correctly by weighing, and this has been done time and time again, even the milk that comes from each cow being weighed every day. You can guess that it costs a barn full of hay to feed a barn full of cows through the winter, but if you want to know about these things you must use the scales. My experience for a number of years has proved to me that it takes twenty-one pounds of hay, three pounds of corn meal, three pounds of cotton seed meal and three pounds of bran per day to keep a cow, giving good quantities of milk.

QUESTION. Suppose you leave out the corn meal, what amount would you add to the cotton seed meal and bran?

MR. COBB. I would add two quarts to the cotton seed meal, and I do so to those cows that are fresh in milk. As a rule I add one quart of corn meal to those farrow cows that are going to be passed off in the spring for beef.

I used to believe that all these feeds must be mixed with water, but for the past few years I have fed them dry and have obtained better results, letting the animals drink their water clear. After the cows eat their breakfast, I give each one a pail of water and no more; after they have eaten their dinner, I turn them out in the yard and they all drink all they want, and then I tie them up and they lie right down and lie still till supper time. They have no more water till the next morning. They are full all the time and perfectly contented, and they lie down in their stalls and chew their cuds contentedly.

QUESTION. If you feed your cows cotton seed meal enough you can arrive at what we call "taking them off their feed?"

Mr. COBB. Yes; you can by over-feeding. I feed right through the summer months two quarts per day, skipping, perhaps, the month of June, when feed is good.

Sec. GILBERT. You claim that you can feed cows at a profit—can you feed pigs at a profit?

Mr. COBB. It was told to us by a gentleman from another State a few years ago, that pork could be raised at a profit on purchased feed. We had just gone through the severe experience of raising pork and selling it in the spring at six cents a pound, and we considered that pretty low. I experimented twice with lots of two and two. I experimented last spring, commencing the first of April, with two pigs, for the purpose of finding out what kind of feed was the most profitable. I found out, by actual weight and test, in feeding pigs that were in a thrifty condition, that one hundred pounds of wheat middlings would make twenty-nine pounds of live pork. I tried these for nine weeks, weighing them every week, and weighing the feed as it was given. These wheat middlings cost \$1.60 per one hundred pounds. The pigs showed a greater gain at first than they did as they grew older.

Sec. GILBERT. Is that a law that holds good?

Mr. COBB. It proved so in this case; but this being the first time I had tried it, I was not satisfied. Five weeks ago I bought two shoats. They both weighed one hundred and forty pounds. I set a bag of middlings by the pen, and had them fed in this way. In five weeks they have gained eighty-one pounds, and they have gained a little more in proportion to their feed than the first ones. I give all my hogs cold water and cold feed.

QUESTION. Do you ever feed anything to sharpen their appetites?

MR. COBB. Not very often, except about a week in the fall I give them a few little potatoes, and at sweet corn time I feed them about five weeks with sweet corn cobs. I keep a dozen or fourteen hogs, and keep them the year round, except while raising the pigs, on wheat bran and cold water.

SEC. GILBERT. As the results of your experiments, what do you decide is the most profitable food for growing pigs?

MR. COBB. Wheat middlings is the best. It will produce twenty-nine pounds of pork for each one hundred pounds of middlings, right along, week after week and month after month. I used corn meal on trial, and found that one hundred pounds of corn meal would produce about twenty-four pounds of pork. Wheat bran wouldn't do much of anything for growing pigs in this way; it will keep a hog alive, and that is about all it will do. There is not much gain by feeding them wheat bran and cold water.

QUESTION. What kind of feed is two quarts of shorts and a quart of corn meal?

MR. COBB. That is pretty good, but have any of you ever known of a pig taken at four weeks old and fed on corn meal alone to seven months of age but it was driven off its legs?

Corn meal was never made to be fed to growing pigs unless fed sparingly a quart or so a day. It is the same with the growth of pigs as it is with the growth of steers, which was alluded to in the paper this afternoon; the best results in gain you get on steers that are three years old and under. With pigs you get the best growth up to the time they are nine months old. These experimental pigs were only kept till they were five months old and then dressed two hundred and sixty odd pounds apiece. They were fed on nothing but middlings and cold water from the time I bought them. I don't know exactly how old they were when I bought them.

QUESTION. Do you feed your swine any vegetables?

MR. COBB. Some years I have. The years that sugar beets were sold I raised them two years and fed the pulp to my hogs and cows, and called it an extra food. The hogs got a living upon that food and the cows gave more quarts of milk than on any other food I could give them, but I am not under oath to tell how good the milk was.

QUESTION. Is cotton seed meal a good feed for sheep?

Mr. COBB. It is an excellent feed. I have in mind some sheep which were fed with it from August till housing time. They were in a pasture which afforded them about half feed enough, and they were fed at first with a little cotton seed meal and then more and more till they ate a pint apiece; in the month of November they were sold to the butcher and sent to Boston very fat.

Sec. GILBERT. Before we adjourn I would like to "point a moral." We have demonstrated one or two facts that I would like to call your attention to. The gentleman has spoken of the value of cotton seed meal as milk making material. I stated to you that to make rich milk you want a food rich in the albuminoids. Your cotton seed meal, you see by the chart, excels all other foods in albuminoid compounds. You see that practice is proving what the figures indicate. Corn meal, he says, in his experience, has to be used with extreme care, and we find that corn meal, instead of containing a large amount of albuminoids, contains only a fraction over eight per cent., while it is rich in heat forming compounds.

In regard to feeding for profits, and its relation to fertility, if it is practical to go out into the market and purchase feeds and feed them to your stock, and have them return to you a profit, where is the limit to a profitable business? You have got the world to draw from for feed; your profits then are only limited by the extent to which you go into the business. I think we have demonstrated that, under good management, this can be done and return to the feeder a profit.

In relation to the lessons of this forenoon, if you wish to increase the fertility of your farm, just see your possibilities; go into the market and purchase these feeds to any extent that your means will allow or your credit enable you to do, feed it out with this intelligence which secures such results, and you have a profit from the operation, and you have, too, the amount of fertilizing material left on your farm which has been indicated in the discussion to-day.

Gentlemen, it is not a fancy; it is a demonstrated fact proved from practice. If we wish to make our farming profitable we have only to go and do as others have done, and we can extend the business to any extent we please and find profit in it.

Our programme for the day has been filled, and in closing we wish to thank you for the kindly attention you have given to these exercises, and for the generous hospitality you have extended to us.

We hope that this club and these farmers have many prosperous days in prospect.

A vote of thanks to the members of the board present was passed by the club, after which an adjournment was made.

HANCOCK COUNTY.

Institute at Penobscot.

By invitation of the Penobscot Farmers' Club, an Institute was held at the Town Hall, Penobscot, October 24. There was a good attendance of the farmers of the vicinity in the afternoon and evening, filling the hall to its capacity. The ladies honored the occasion with their attendance. Good music contributed to the enjoyment of all present. Free entertainment was furnished by the citizens of the town to all in attendance.

This was the first Institute ever held in the county. The interest manifested by those in attendance was a credit to the community. In this and in several of the adjoining towns there is a goodly amount of good farming lands, and on them are enterprising and prosperous farmers.

Mr. N. F. Norton, President of the Farmers' Club, presided and introduced an

ADDRESS OF WELCOME,

By MR. JOHN HANEY.

Gentlemen of the Board of Agriculture:

In behalf of the farmers of our section of Hancock county and especially of the town of Penobscot, we bid you a hearty welcome to such hospitalities as farmers can furnish.

Though the name of our town is said to signify "Rocky Land," and, indeed, much of our land seems rocky enough to justify the appellation, still there are among our farmers those whose hearts are much softer than stone; and we hope that during your brief stay with us you will be made comfortable, at least, while you are trying to make us happy.

We have no time to waste in apologies for the appearance of our surroundings; we are almost glad that you have caught us, as the women say, "in the suds"; for you will thus be enabled to discover at a glance our needs as farmers; and we assure you that we shall gratefully receive that advice and information which you will, no doubt, be able and willing to impart.

To men, obliged—as most of the farmers of our county, or at least of this section of it are—to toil industriously for a subsistence, anything that shall tend to lighten the burden of life and make rest healthful and benign, will meet with grateful recognition and be gladly welcomed.

But we are not of those who are disposed to quarrel with Fate for having thrown us upon these rock-ribbed hills, though we are obliged to harrass the earth, as it were, for our subsistence, instead of simply "*dressing and keeping it,*" as originally intended. We scarcely realize that we are enduring the primal curse for "original sin."

We are not of those who regard our State as fit only for the home of the Indian, or even as merely "a good place to emigrate from"; but we have it as our native land, our home, homely though it be.

True, we often feel for a moment like repining at our lot when we compare it with the ease and splendor which surround many of the other walks of life; and however much may be said and sung about the joys of the farmer's life, we cannot overlook the fact that the farmer holds, in the public estimation, a rank far inferior to that of most callings or professions.

Let those who doubt this point us to the man of wealth and refinement who, having a son endowed with a sound mind in a sound body and capable of accumulating and enjoying wealth, would advise him to settle upon a farm in Hancock county and reap only what might be derived therefrom, however productive that farm might be made.

With all the aid to be derived from a course of instruction at our State Agricultural College, how many of its students intend ever to become practical farmers in Maine? And why so? There are several reasons.

In the first place, there seems to be a growing aversion for the labors of the farm. We no longer hear "the swain responsive to the milk maid's song." That old-fashioned picture has disappeared

which represents him as telling the "old, old story" while Jenny "milks the cow with the crumpled horn," for Jenny doesn't milk the cow so much as she used to.

To call one of our boys a cow-boy, or even a corn-husker, would be to him a term of reproach, because the duties of the farmer suggest to his mind that which is menial, and he longs for the time when he can get away from the farm and find an employment in which he can wear broader cloth, a whiter shirt, and blacker boots.

Again, the dollar has come to be regarded as almighty; and though it has often been said that money does not "make the man," still we think the adage quite as true that "money makes the mare go." And this brings us to think of the farmer's wants, which, in common with those of the most of mankind, are legion, and to enumerate them would tire the patience of even such a man as Job of old, and fill with discouragement the heart of almost any farmer in Maine.

Still it may be safely asserted that our wants are more numerous than our needs, some of which may be briefly stated.

We *need* to become better men and women. We *need* to raise still higher the standard of education in our rural districts, so that our places may at length be filled by men and women having greater intelligence than we possess. We *need* to learn the process whereby we may make our farms more productive, thereby affording us the means and opportunity for becoming wiser and better ourselves. In short, we *need* "more light," and still further light as to the best means whereby we may justly and lawfully obtain the aforementioned dollar for the satisfaction of our other needs.

And should you succeed in your effort to enlighten us upon this important point, thrice welcome will have been your visit to our little hamlet, and for your own peace and prosperity we, as in duty bound, will ever pray.

This was followed by the Secretary in an expression of thanks and in explanation of the character of the work of the Institute, after which a paper was read upon the subject

HOW MUCH IS ENOUGH?

By FRANK BUCK, of Orland.

When one of Massachusetts' sons said, in reply to this question, "a little more," he gave a representative answer. Want is the normal condition of the race. This is not dependent upon any geographical boundaries. Any distinction of race or color does not supply it; social position often increases rather than diminishes it. How this want shall be supplied is the question that stares us in the face from the cradle to the grave. That some men have less, are content with less, get along with less, than others, is by no means a mooted question. The nearer the animal man lives, the nearer the animal he is and the more circumscribed his wants. Let him cultivate the intellect, increase the moral perceptions, and he becomes lifted in the scale, gets a wider range, and as the mental faculties are developed, clamorings arise which are potent and must be met. To specify some of the wants of the common farmer and indicate, in passing, some of the ways these can be met will be the object of this paper.

First, he does not want more land; he has acres enough; but he does want to remember that soil under his feet is his, not for six inches only, but for six feet, if he will but improve it. He wants to understand (I use want here in the sense of need, for the less a man feels his want the greater his need), that air and sunlight are as necessary to plant growth as for the growth of boys and girls. The man who would put his children in a cold damp cellar and expect them to grow up robust and healthy, would be branded fool all over. Yet how many cultivate their fields and put in their crops in places colder and wetter than their cellar, where not one ray of sunlight or one particle of warmth ever reaches where the rootlets of his plants ought to be, and then complains bitterly of the sterility of the soil and the continued frown of providence, ignoring the fact that the Almighty helps those only who help themselves.

Secondly, the farmer should remember that farming is his business, and of all things the farmer should mind his own business.

Not farm for pleasure only, nor for recreation merely, neither as drudgery; not because he is adapted to nothing else, for if he is not fit for anything else, he certainly will not succeed here. But let him pursue this as his life work. Let him put his brain, his muscle, his money into it; let his reading, his thinking, his talking be in this direction in the main. No matter how much he reads about other matters; no matter how much he talks and thinks about something else; let him read, think and talk about this more. Let him never forget that it is the men of one idea who have accomplished most in this world, and that the only road to success is by pursuing some definite object; that one of the best maxims for the farmer is, "Think well before you pursue it, and when you begin go through it."

Again, the farmer should be a generous man. In his dealings with mother earth he will do well to keep in mind that she holds him to strict justice. However merciful and gracious she may have been in the past, her bowels of mercy have forever closed against him; that the key to her treasures is no longer at the outer door. If he would have them he must dig for them; he must go down deep into her store house and work as for hidden treasures, not forgetting that he who is not weary in well doing shall, in due season, reap if he faint not, and always keeping in mind, that he who sows sparingly shall also reap sparingly, and that whatsoever a man soweth, that shall he also reap. We have more than intimated that the farmer should have some definite object. We mean by this, that he should have some specialty which should occupy most of his attention. We urge this, because often men are driven, by necessity, to ask themselves if they are doing that which is best adapted to their condition. They often find themselves weighed down with Saul's armor, when a shepherd's sling, and a few small stones from the brook, would promise much better success. But, to follow out our idea, a farmer's garden should contain a variety of the comforts and the luxuries, if they can be afforded; but in cultivating his fields, let him have some special crop that shall claim most of his attention. What this shall be, men must decide for themselves. We can here make only a few suggestions. If he lives upon the sea board, where potatoes can be shipped easily and readily, then we are inclined to think this would be his paying crop. If away from the sea board, the transportation often eats up the profit. If his lot is cast in a dairy district, let him pursue this

with energy, if he would succeed. Let him grow his grains, his grasses, his roots, for this one object; and let every calf in his stalls be a cow in miniature, else not raise it. Let him be thoroughly conversant with the price current, that he may know when to buy as well as when to sell. In fine, let him be a master workman—one who needeth not to be ashamed. If he finds himself in a locality where it is cheaper to go across the continent to mill rather than grow his wheat at home, while he remembers that man cannot live by bread alone, he must be careful in exchanging his produce, that his farm is not weighed in the same scale, and thus, for the sake of a little wheaten meal, he sells his birth-right. If it is desirable to grow his wheat at home, then let him under-drain his land, put in the clover, and follow up with wheat.

Some might go on, but though we are not disposed to set bounds for this or that man to follow, yet we would like to refer to a few general facts. Maine is said to be a stock-growing State—better adapted to stock-growing than grain-growing. Now, are her pastures adapted to the growth of large, or small stock? Do we want cattle for lumbering purposes, or beef, or for the dairy? Where is the lumber in the older settled parts of the State? Would this be named the Pine Tree State, if named to-day? If it takes one bushel of corn and one hundred pounds of hay to make ten pounds of beef, who, in Maine, would pursue this branch of business for a living? And is there a more encouraging look in the direction of the dairy? Are the facilities for making good cheese and butter, as good in Maine as in the dairy regions of New York and Vermont? Is there market for the cheese and the butter? Maine imports large quantities of cheese annually, and there is no end to the butter caterers.

Then the egg business is not an insignificant affair. I know of one hermit upon Mount Desert island, whose only means of support is forty hens. The little town I have the pleasure of representing, sent to market one year \$19,000 worth of eggs, or about 76,400 dozen.

Sheep husbandry should receive more attention than it has yet received by the farmers generally; and in urging this, we are fully aware that we cannot compete with the pampas of South America, or with the wool-growing regions of Australia, in producing either mutton or wool, yet we do believe that we can raise the mutton for home consumption much cheaper than we can buy it, and that as an

article of diet we can not afford to do without it. The wool will always sell for cash at some figure, and early lambs are quick at most any price that we please to ask for them. But I am inclined to think that, leaving wool, mutton—and I had almost said, lambs—out of the account, then is the sheep the animal with the “golden foot.” Many of the old fields of Maine are worn out by a long course of cropping. The farmer keeps them inclosed, pays taxes on them, and they are a part and parcel of his farm. Now, what can he do to improve them? He hasn’t top dressing to bring them too with. It costs too much to plow them up and bring them to a condition of productiveness in this way. What then? Divide them off into small lots, and buy a flock of sheep and turn them on, feed it snug, and the clover, Timothy, and honey suckle will pay one hundred per cent on cost. We believe what is true upon the Island of Great Britain will be true in Maine in a few years—that a farmer’s success will depend upon the number of sheep he keeps.

If asked in regard to the kind of sheep we would keep, our reply would be that the South Downs combine as many good qualities as any that have come under our observation.

Many men there are who occupy the land where the farms ought to be—we will not call them farmers—who talk about Maine being out of the way. Their ideas are that one slight remove brings them to the end of space; that Nature or Providence never designed it for a place to farm in; that our fathers made a grand mistake in settling in these valleys and upon these cold hill-sides; that the State should have been left to the Indians—they might have been content and happy, while we drag out a miserable existence in our struggles with the hardships incident to a life in such a clime. I have read of the man who said, “a little more sleep, a little more slumber, a little more folding of the hands in sleep;” and I would cry: awake, oh sluggard, and remember that you are a man! One generation passeth away, another generation cometh; but the State lives, and it is yours, my fellows, to decide somewhat what its destiny shall be in the future.

While we readily assent to the position that Maine is not all that we might desire, in some respects, yet it is and will continue to be the *Dirigo* State. As much wheat, as many oats and as good crops of hay can be grown here as anywhere; and when the million of spindles will make music to the hundreds of waterfalls now sporting and dancing on their way to the sea unimproved, then will the

consumers call aloud upon the producer for the necessaries of life.

In closing, I would have the farmers remember that, while much is being done to improve their condition, they have a duty to perform in return. They ought to communicate their knowledge to others. "All the rivers run into the sea, yet the sea is not full." If the man who makes two blades of grass grow where only one grew is a benefactor, then has he done more if he tell his neighbor how to do it. I think too much can not be said in favor of meetings like the present, where topics of such vital importance are so fully discussed. The object of exhibitions and fairs, is to focalize the productions of a town, or county, or State, that they may be seen at a glance. So the object of these meetings is to focalize the ideas of a people, that each may have the benefit of the whole.

If Maine is not a paradise for farmers, it is a grand place to raise men and women in. How nobly did her sons respond to the bugle call when the country was in danger, and how nobly did they stand as a wall of fire between us and death! Let us then remember that we are not only farmers but men. Integral parts of the great family of man; and it is ours, or it may be, to do something for the race. Others have labored, and you have entered into these labors, is as true in the natural as moral vineyard. It is a question of no small moment. Shall we lay down this work where we took it, or shall progress be written upon every page of our history? A light under a bushel is safe from wind and weather, but upon whom does it shine; whose path does it illumine? In the language of an English writer, "I had rather stand out upon some head-land and hold up the light that the storm tossed mariner may be guided to the port in safety." I remember one little incident in the life of Robinson Crusoe. One day on going to his beach he found human foot prints in the sand. Not a human form had he seen for years; no human sound had greeted his ear, until he had well-nigh lost the sound. Do we wonder he became excited, and that he was terribly frightened when he found they were made by savages.

In a little while others will be tracing the foot prints we have made on the sands of time; shall they be savage foot prints? Rather let us do what we can that every farm house may be a *lighthouse*, and every farmer a living epistle.

DISCUSSION.

JOSEPH HITCHINS, Penobscot :

I understand the paper to recommend special farming, and I would like the speaker's opinion as to what special feature is best adapted to this locality. One reason that the impression of the menial position of the farm prevails is, that there is no more brain power put into the business. When the farmer puts himself into his business as a professional man does, he will tone up public sentiment in its appreciation of the business.

C. H. COBB. A farmer should have special features in his business to which his attention is specially directed. Almost every feature of our farming can be made profitable when well handled. There is more depending upon the intelligence put upon the handling than on just which branch is selected as a specialty. Adaptation, also, has much to do with the success attained. The special line of work must be adapted to the peculiar conditions prevailing, and especially to the tastes of the individuals prosecuting the business. In mixed farming, the theory prevails sometimes that if a little of everything is attempted, that there will be success met somewhere. But this dividing up a business does not lead to success. More certainly, success will follow the man who takes up a line of work and sticks to it.

AFTERNOON.

The afternoon was devoted to the subject of "The Restoration of Worn Out Lands," by a familiar lecture by the Secretary.

EVENING.

THE FARM AND THE HOME.

By H. L. LELAND, Sangerville.

With the Creator's blessing, man received the command—

“Be fruitful and multiply, and replenish the earth, and subdue it.”

The cultivation of the land is co-existent with civilized man. It is the source of civilization and the basis of National life, growth, and prosperity.

Successful agriculture requires a fertile soil, a fixed location, and permanent homes. With permanent homes come social, moral, educational, civil and political rights and duties; hence society, churches, schools, laws, legislation, governments, the State, the Nation.

Washington said of agriculture, that “it is the most healthful, most useful and most noble employment of man.” We ought and do feel a laudable pride in our profession, in our farms and homes, dotting the sunny hillsides and clustered in the pleasant valleys of our noble State. To make these farms what they now are, to win them from the primeval forest, to subdue the rock-bound, unyielding soil and convert it into productive fields, has been a hard task, demanding labor, hard, persistent labor. It is our boast that this labor has been performed by freemen and women, freeholders of the soil. It is a pleasure to do homage to that noble band of pioneers, whose intelligence and virtue, industry and economy, have achieved such grand results, and have bequeathed to their children and successors this goodly heritage. New England homes and New England common schools, are the ideal homes and the moral schools of the Nation.

In the time long past, Virgil, the Roman poet, wrote: “Praise a large farm, but cultivate a small one.” History and the poet's pastorals inform us that, in the years of Rome's prosperity, the land was held in small farms and owned by freemen. Regulus was called from labor on his little farm, by the Senate, to lead the Roman Legions to victory.

In New England, from its earliest settlements until the present time, the system of medium-sized and small farms has generally

prevailed, tilled by those who owned the land. We think it may be justly claimed, that no other system of land ownership could possibly have so fully developed our agricultural capabilities, and so largely have aided in building up and supporting those varied industries that depend so much upon successful agriculture for prosperity. A large rural population enriches the State in the general intelligence, virtue and patriotism of its citizens. It provides for and maintains good educational advantages. It increases the numbers of those who are freeholders. It brings families near to each other, thus affording the pleasures of social intercourse. It helps to make home life cheerful, doing away with the isolation and monotony—the bane of rural life. It increases the general wealth, through increased production, by aiding other industries. Yet, with all the excellencies of our farm system and farm practices, there are many farms in the older sections of the State that have been abandoned; and there are now many engaged in farming who are not meeting with that success that is desirable. And why? Do they realize that success in life is a duty each person owes to himself, to his family, to those with whom he associates in life? Do they exert themselves, and honestly, to achieve success? Aside from serious accidents and misfortunes, there ought to be *no failures* in farming. But what is a man to do who is poor, and has poor land? If he has good health, is industrious, economical, and has a fair share of good common sense, he need have no doubt as to being able to renovate his farm, and improve his own fortune. Success in farming demands faith in the work and in the soil. It demands intelligent labor; the thinking mind must guide the skilled hand. Ignorance and sloth can never succeed, neither ought they.

The mistaken notion of the past, that strong muscles and ability to labor was the only requisite needed for success, if ever true is not so now. Agriculture is a profession, and to be a successful farmer demands a mind as well disciplined, and an education as thorough, and even more varied, than is called for in other professions and occupations.

Farmers need to be raised from the apathy into which they have fallen. They must awaken to the truth, that the world moves; that advance is being made all along the line; that the application of thought, science, and invention, is being given to the world's industries. In this grand onward movement, agriculture is not being neglected. Science is aiding the farmer, through study and

the research that is now being made into the laws that govern plant life and govern the breeding and growing of domestic animals ; it is disclosing the causes that have led to the exhaustion of fertility, and discovers the means of restoration. These and kindred questions relating to agriculture, are engaging the highest scientific talent of the world in their solution. If the farmer would keep abreast of the advancing tide, he must read, think, attend the meetings of the Farmers' Institutes, join the Grange, and the Farmers' Club, take a part in the State and County Agricultural Societies, and be alert to welcome all improvements that will lighten labor and aid in securing better results.

We just now spoke of abandoned farms. The cheerless desolation of these farms and homes, awoken in the beholder unpleasant feelings and associations. Yonder, upon the hillside, once flourished the fruitful orchard, now marked only by a few decaying, moss-grown trees. Upon the sunny slope "where once a garden smiled" and where, even now, many a garden flower grows wild, weeds and bushes grow in the greatest luxuriance. The house, the family home, the scene of a father's and a mother's love, and the joyousness of childhood, is now in ruins ; affording but partial shelter to the flocks that graze the neglected fields ; while all around nature is presented in her most dreary aspect.

Why have these farms been abandoned? Is it because of misfortune? Has sickness and death entered the home and broken its circle? Sometimes. Is it because the soil is naturally infertile and hard to cultivate? No, not generally, as other farmers, on similar soils, have been successful. In brief, is not the cause explained by this one word—*waste*? Is it not wasted labor, wasted production and, more than all else, wasted fertility? Labor is wasted by imperfect tillage and careless cultivation ; weeds are permitted to rob the soil of its fertility, and choke the growing crops. Production is wasted in heedless harvesting, in the improvident disposal of what is secured, and in many ways that will readily occur to your minds.

We will speak of one source of wasted labor and material common to all farmers. I refer to fences. Some years ago it was publicly announced that the fences of the United States cost more in material and construction than all the dwelling-houses, including those of villages and cities. With a judicious system of farm management, much of this stupendous cost might be avoided.

What useful purpose do these miles on miles of road fences serve? Farmers have appeared to think they had no claim to the land set aside for roads; hence, in fencing themselves in, and the public out, they have not only incurred a large expense in labor and material, but they have lost the use of the land by the roadside, except so far as it has been used as a receptacle for brush, stones, decaying wood and timber, and other rubbish that accumulates about the premises, thus making a congenial soil for bushes and weeds that year after year distribute a generous supply of seed over the adjoining fields. The removal of the fence, and clearing up of the roadside, so that tillage may extend to the travelled way, combines both beauty and utility, and adds to the value of the farm.

We observe with pleasure, that in all sections of the State these unsightly fences are being removed, and the boundaries of the road lined with fruit and shade trees. Interior field fences also occupy valuable land, besides adding to the cost of cultivation. Farmers will do well to consider if the benefit of these fences equal the loss of land they occupy, and the cost of construction and maintenance.

It would seem that the most judicious practice in stock farming requires an outlay for fences only sufficient to enclose the land used for pasturage.

The soil is a storehouse of accumulated plant food, and will honor the drafts of growing vegetation until the deposit is exhausted.

It is an axiom in agriculture, proven by centuries of practical experience, and recently corroborated through scientific research, that the fertilizing materials removed in the harvests must be in some form returned to the soil, or exhaustion will surely follow. In tracing man's existence upon the earth, in the footprints impressed on nature, and in the less remote times, through the recorded facts of written history, we see that the axiom here set down is not only true, but that to violate it inflicts upon human life results most deplorable. We have an example of this in that realm, in the remote east, earliest fitted for the occupancy and home of man—"a land flowing with milk and honey"—which was for centuries the scene of active life and cheerful industry; with flocks and herds grazing the perennial verdure of the hillsides; with fields of waving corn ripening for the harvest; vineyards of delicious fruits blushing and purpling in the genial warmth of the sunshine; and cities excelling in population and splendor those of the present day. The food

supply of those busy millions of living beings, and all of this opulence and splendor, was drawn from the fruitful soil.

But, like the worm hidden in the earth and silently gnawing at the root of the tree, despoiling it of its foliage and beauty, so man, as a destructive agent, in violating the laws of nature and destroying her harmonies, in exhausting the soil of its fertility, changed this fruitful land that for centuries fed and clothed its millions, into a barren waste.

For centuries since this fairest domain of earth has been a land of desolation and ruin, excepting a few monuments of former architectural splendor, that have in past defied the corroding tooth of time, and are still magnificent in ruin; even the location and the name of once popular cities have been buried in oblivion, and forever lost, while primeval silence and solitude prevail where once was bounding life.

Such, to-day, is the condition of Persia, Assyria and Babylon; and, to bring the topic to times less remote, the fairest and most fruitful provinces of the Roman Empire, "that portion of terrestrial surface which at the commencement of the Christian era was endowed with the greatest superiority of soil, climate, and position; which had been carried to the highest pitch of physical improvement, and which thus combined the natural and artificial conditions best fitting it for the habitation of a dense and highly refined and cultured population, is now completely exhausted of its fertility, or so diminished in productiveness as, with the exception of a few favored localities that have escaped the general ruin, to be no longer capable of affording sustenance to civilized man."

Farmers of Maine, shall we heed the warning and escape the doom? While our soils are not the most fertile, nor our skies the most genial, yet nowhere in our country, extending from ocean to ocean and from the frozen North to the sunny South, can be found a more moral, industrious, intelligent and temperate people than are found occupying the farm homes of Maine. Shall we, "pilgrims and sojourners here," despoil this goodly heritage, and leave for our successors exhausted fields and barren wastes? The thronging army of foreigners, that are crowding to our shores, do not find their way to the rural towns of Maine. No; these farms are the birthright of our sons and daughters.

If we would secure the success and happiness of our posterity, and the future advancement and prosperity of agriculture—which

is equivalent to the advancement and upbuilding of civilization and all pertaining thereto—we must seek, earnestly seek, to beget within our children a love for agricultural pursuits. It is not enough that we labor and secure a competency for ourselves. The man who has accumulated the greatest amount of dollars and cents may not be the man who has made the greatest success of life. But the farmer who has so learned to work with nature that his fields are clothed with the evidences of fertility, and who has taught his children to love the God-given pursuit of agriculture, has not lived in vain. We should not encourage our children to become farmers from selfish and mercenary motives, but should inspire them with the true idea—that “agriculture is the grandest, noblest, and most useful employment among men;” that he who makes a success of tilling the soil ministers, in a large degree, to the success of every industry; to the happiness of all mankind; to the growth and permanency of the Republic, and to a higher civilization. Our sons and daughters must be taught, that in order to become successful farmers and farmers’ wives, they must become diligent and life-long students of nature.

I desire now to speak more particularly of our homes, and hope to so treat the subject as to awaken the interest of all, but more especially the interest of the mothers, wives and daughters—the keepers of our homes. The influences of home are vital and potent, extending for good or evil into every department of life; moulding the character of individuals, giving tone and bias to society, and exerting a controlling power over the destinies of State and nation—in a word, home influences are indelibly impressed upon all for life. There are no duties devolving upon parents of equal importance with those of the home circle. This becomes apparent when we consider that the moral and social status of society is but the reflection of the moral and social character of home. The philanthropist and the statesman rely upon the virtue and intelligence of rural homes as the safeguard of national purity and liberty. How vital, then, that home influences be pure in tone! How necessary that there be taught habits of industry, punctuality, truthfulness, kindness, forbearance, respect for others, and all those ennobling traits so essential in forming true and virtuous lives!

Home life, in rural communities, is often monotonous. In it we see too little effort to awaken and train the finer sensibilities of our natures. The entire energy of the household is too often devoted to

the one object of accumulating dollars and cents. There is generally too much hard drudgery connected with the routine of farm labor, and too little time given to needful social recreations. This continual toil bears especially hard upon the young. Their natures demand variety and change; and if no provision is made to satisfy this demand, they either grow listless, lose energy and ambition and become mere farm drudges, or they break away from this unreasonable servitude and plunge into the great outside world, exposed to all its snares and temptations, at an age when they most need the wise and restraining influences of home. Alas, how many sons and daughters have cheerless homes, and constant, dreary toil, driven out into the wide world, to make shipwreck of honor and virtue, to live wasted lives of sin and shame, and swell the fearful list of crime! How earnestly, then, ought we to strive to make the home life of our children pleasant, and all its duties and associations healthful and ennobling!

Children have an inborn love for the beautiful, and the surroundings of rural life are so harmonious and congenial with our nature, and especially with child-nature, that the joyful and healthful impressions and influences imbibed, become a part of self that remains through life.

With what animation children seek, in early springtime, in the warmest and sunniest nooks, for the first tiny flowers that unfold their petals to the genial sunshine! How joyfully they listen to the song of "The ten thousand warblers, that cheer the summer day," and how enthusiastic their admiration of their gay plumage as they flit through the air, or swing on the waving branches of the trees? How gladly and eagerly they pet the young domestic animals and join in their gambols?

Most assuredly the artificial life of city homes is in no way comparable to the healthy, natural employments and pastimes of rural life. In fact, the moral, mental and physical vigor resulting from these natural pursuits, is what constitutes the superiority of the country-bred over those reared amid the enervating influences of cities. Encourage, then, the love of the beautiful in nature. Brighten farm life by the cultivation of fruits and flowers and trailing vines. They are the embodiment of gladness and beauty. They charm the eye, refine the taste, and minister to the highest sensibilities of the soul.

The influences of a home surrounded by tastefully arranged trees, shrubbery and flowers, is not confined to the inmates of that home, but extends through the community, and to every passer-by. Do not say that you cannot afford time for these things, that they will not pay. You certainly cannot afford to have your children alienated from you—from the old homestead and farm. If, by your inattention and neglect, you suffer them to be drawn away from you and from their childhood's home, you will find plenty of time for regret. Parents who will, may interest their children and develop a love of home that will grow and strengthen through all their future years.

There is nothing that will bind a family more closely to each other and to their home, than a united effort in search of knowledge, and in collecting and arranging all the available loveliness of nature and art within and around the home. Children also need recreation and amusement. Let these be, as much as possible, within the refining influences of home. Every consideration, for the well-being and happiness of our children, demands that we do not force them from us in search of pleasure. Frequent family excursions to the surrounding fields and forests, family or neighborhood picnics, in some favorite grove by the brook or lakeside, will be found delightful and entertaining sources of present amusement, and pleasant memories to recall in after-life. The social influences are important aids in moulding youthful character—aids too much neglected in the past; but happily the light of improvement is dawning in this, as in many other matters connected with the advancement of rural life.

The social feature of the Grange, that noble order which embraces much of possible good for the yeomanry of our land, is sowing seeds of social reform in rural life, from which we and our children shall reap a harvest of blessings.

Farmers, as a class, are not familiar with the sciences that teach a true system of agriculture. They fail to work in harmony with nature's forces. They often labor in ignorance and so reap the wages of ignorance. Worn and weary and disheartened by the meager returns of misdirected effort, they become discouraged and lose all hope and ambition beyond supplying immediate wants. In this class of homes children find but little encouragement. They toil on in the monotonous round of drudgery, until life's visible horizon is bounded only by work.

The future prosperity of agriculture demands that farmers provide the best possible educational advantages for their children. It is

true that but a small portion of our education, and that not the most important, is learned from books; but, aside from home training, we look for the further preparation of our children for the responsibilities of life to our common schools and agricultural colleges.

We would not detract from our common schools—it is impossible to overestimate their importance; and yet we can but think the course of study and the methods of teaching have been too desultory to be largely effective, either intellectually or practically.

We believe the industrial classes, and especially farmers, need not merely more skill in handicraft, but a broader, nobler development of manhood, an expansion and vigor of intellect, that will enable them to measure the capabilities and possibilities of agriculture, to rightly understand its inevitable connection with all other callings, and that they may so exalt the character of their labor as to secure the greatest amount of human happiness.

If farmers would have their children occupy this advanced plane of industrial life, they must insist upon a course of study that is broad, and at the same time adapted to the wants of agriculture. The elements of chemistry, botany, entomology and geology—those sciences so intimately connected with the farmer's daily life, should receive attention in our district schools. In addition to these the principles of commerce and civil government should be taught, as they bear more or less directly upon the financial results of farm labor.

The Agricultural College is an outgrowth of the pressing need for liberally educated farmers, and that it is, to a certain extent, meeting that need, we are assured; but we are equally assured that it cannot cover the field, that it is impossible for it to meet the demand for educated labor.

But, farmers of Maine, hold fast what you have; and if you would be honored instruments in the material and intellectual prosperity of mankind, if you would lighten and brighten the laborer's lot, do all in your power to assist, advance and elevate our common schools, our State College, the order of Patrons of Husbandry, and all kindred institutions.

To the intelligent and thoughtful, all nature has a voice of wisdom, a song of gladness. In no pursuit is there so favorable an opportunity to study nature's laws and appreciate its wonders and beauties, as in farm life. The book of nature is here opened to

view ; and he who has eyes that can see, may read the grand and sublime record of our globe.

A gifted poet says, the study of nature's works

" Can so inform

The mind that is within us, so impress
With quietness and beauty, and so feed
With lofty thoughts, that neither evil tongues,
Rash judgments, nor the sneers of selfish men,
Nor greetings where no kindness is, nor all
The dreary intercourse of common life,
Can e'er prevail against us, or disturb
Our cheerful faith, that all which we behold
Is full of blessings."

If I have dwelt more fully upon the home training of sons than of daughters, it is not because of its greater importance, but because my best thoughts would be entirely inadequate to teach a mother's duty to her girl, for the relation between mother and daughter is hallowed ground. Angels might shrink here to tread. Mothers, I appeal to you to make the home life of your families pleasant. In your household arrangements unite the useful with the beautiful. Adorn the rooms with tasty conveniences, and works of art. Let there be books, papers and periodicals. All these exert an elevating and refining influence upon the tastes and disposition of children, and add largely to the attractiveness of farm life. Learn a lesson from nature when left to herself, and interweave nature's poetry with the prose. Open the pleasantest room for family use. These fun-loving, wide-awake boys may soil the carpets and disturb that orderly neatness so dear to woman's heart ; but is not the boy of more value than carpets and furniture ? These, if you wish, money will replace ; but if the minds and souls of children be polluted with sin, nought that money will buy can wash the stains away.

The author of " My Farm at Edgewood," says :

" The farmer invites his best friends to his habitual living-room ; let him see to it, then, that this be the sunniest and most cheerful of his house. So his friends will come to love it, and he and his children to love and cherish it ; so that it shall be the rallying point of the household affections through all time. No sea so distant but the memory of a cheery, sunlit home-room, with its pictures on the wall, and its flame upon the hearth, shall haunt the voyager's thought ; and the flame upon the hearth, and the sunlit windows

will pave a white path over the intervening waters, where tenderest fancies, like angels, shall come and go. No soldier, wounded on the battle-field, but will call back with gushing fondness such glimpse of a cheery and cherished hearthstone, and feel heart and hope lightened by the vision."

In these words there is encouragement for you who are parents to endeavor to

"Make your own world, one that never has sorrowed,
Of music, and sunshine, and gold summer air;
A home world, whose brow care never has furrowed,
And whose cheek of bright beauty shall ever be fair.

If you can do so, oh, make it an Eden
Of gladness and beauty—remember 'tis wise;
'Twill teach you to long for that home you are needing—
That Heaven of beauty beyond the blue skies."

Parents, bind the cords of union between yourselves and your children by surrounding your homes with nature's loveliness and beauty, by leading their youthful minds to the fountains of true knowledge. So shall they prove to you a blessing in age, an ornament to society, and the strength and safeguard of the nation. Thus may the blessed influences of home go on in widening, ever widening circles, till they meet and mingle with those holy influences which radiate with unchanging glory from that brighter home,

"Fast by the throne of God."

Institute at Dedham.

A second Institute for Hancock county was held at the Town Hall in Dedham, October 25th, at which the papers and lectures were essentially the same as those given at Penobscot.

Mr. J. B. Burrill took the chair, and introduced

P. P. GILMORE, Esq. :

In behalf of the citizens of Dedham and vicinity, I wish to express the pleasure felt at having the Board of Agriculture favor us with their attentions. It is the first meeting of the kind that has ever been held here, and it is believed it will give to our farming interests a marked and lasting impulse.

That agriculture is an honorable, an indispensable pursuit, none will deny, for upon it all others must depend. We, as farmers, feel that ours is a noble calling; that the culture of the soil is an interesting and useful vocation, and, when pursued with intelligence and perseverance, profitable.

How we can best maintain the fertility of the soil, and at the same time gain a livelihood from it, is the problem which we are anxious to solve, and upon which we hope to get new light before the sessions of this Institute are brought to a close. Whether our farms bring as good returns as they should for the time, labor and money invested, and whether our methods are those which will bear criticism and win approval, are also questions which demand our careful and serious attention. While we have made quite an advance during the past decade—a greater advance than we have ever made in the same time before—we are aware that we have only just begun the work of improvement.

Ours is a mixed husbandry, and is not carried on as extensively as in some portions of the State. We have fair markets, good natural soil, though somewhat broken, but not easily affected by drouth or heavy rainfalls.

In regard to our wants, I may say, briefly, that we need better stock, a higher cultivation, more system, and a greater faith in farming.

Although we do not claim for this section that it is remarkable, that it has striking advantages, or that it has furnished great names in history, yet we do claim that here among us may be found ideal New England homes; that all who will may obtain a good education

and a comfortable living; and that our people are honest, earnest, and thoughtful.

Looking forward, gentlemen, with pleasure, to the benefit we expect to acquire from association and interchange of views, I welcome you again to the hospitality of our community, and to such attentions as we are able to bestow.

H. L. LELAND, Sangerville, followed with discussion, in which he said that, in the welcome given, one of the needs of the locality referred to was, that more system was called for. Mr. Buck, in his paper read, said that "farmers need to mind their own business more," or to give closer, deeper attention to the business in hand. Connected with this, and first of all, it becomes necessary to *have a purpose* in our work. This purpose should be well defined, that we may have a mark to aim at. Unless we realize that we have a well defined object in view, towards which we, are all the time striving, the work will be in a measure weak and ineffectual. To the young farmer especially is this of the greatest importance. It is absolutely necessary to his success in life. The young, too, need encouragement in the special direction in which we would have them interested. If we would have the young interested in the business of farming, it lays with us to instil into their minds a faith in the possibilities of the business which shall promise a successful issue. If there is no purpose in our efforts, no objects either arrived at or achieved, no faith prompting us to efforts, and no success following our efforts, those who may be brought in contact will find little to attract or to encourage them.

EZEKIEL MADDOX. In regard to this faith in the business, I wish to emphasize its importance. It is an alarming fact, that in too many cases, even when the business has been in a high degree successful, faith is waning. The social atmosphere seems to be impregnated with this lack of faith, and it is being educated into the rising generation. When faith and purpose are found with the father and mother, you will find it in the son and daughter.

The attendance throughout the day and evening was all the house could accommodate, and the interest manifested was a credit to the community. A generous hospitality was extended to all in attendance. Good orchestral music gave pleasure to the occasion.

PISCATAQUIS COUNTY.

Institute at Foxcroft.

Piscataquis County Farmers' Institute was held at the Grange Hall, Foxcroft, October 27. The wide-awake, intelligent farmers of this county, with their wives, turned out in large numbers. Dinner and supper, for all in attendance, was furnished by the members of Central Grange, whose hall was tendered for the use of the meeting. A good choir, with Mrs. D. C. Royal as organist, furnished music for the occasion.

O. T. Goodridge, member for the county, called to order, and invited Obed Towne, President of the Piscataquis Central Agricultural Society, to the chair. H. L. Leland briefly and appropriately welcomed the Institute and the visiting friends, and expressed the appreciation of the farmers of the county in the work of the Board, as now carried on.

SUCCESS IN FARMING.

BY O. T. GOODRIDGE.

Another year has rolled away since we met on an occasion like this, with all its hopes and fears, its joys and sorrows, its great anxiety with regard to seed-time and harvest; and although the seed-time did indeed seem unpropitious, and to all human appearance foreboding, yet the promise of the harvest has been abundantly fulfilled. In some instances our most sanguine expectations have been more than realized.

Again we are assembled in a Farmers' Institute to discuss subjects of great interest to the farmer. By the programme I am appointed to open the exercises, and in doing so have chosen the subject of "Success in Farming," on which I will venture to ask some questions, and leave it for others of more experience or better success to answer them.

I will first venture the statement that the average farmer does not receive that measure of success that ought to reward his labors. With the amount of capital invested in his farm and stock, and the amount of labor he performs, he should be able to lay by quite a sum each year, which in time would become quite a fortune. But whoever saw a rich farmer among us, that made it from his farm,

alone? He invariably has some outside show to get his capital from. A rich farmer is an exception. This being the case, why is it so? Why is the farmer so short of means? Why so many farms mortgaged? Why so many changes in the farming population? selling, perhaps, the old homestead, around which cluster so many recollections of childhood. What but the hope of bettering his condition, the hope of better success, would induce him to part with the old farm? Is it a lack of calculation or judgment, of diligence and proper attention to his business, or is he poorly paid for his labors and for the products of his farm?

It seems to me we might be able to find the cause of this poor success, and knowing the cause or causes, apply a remedy. And what more fitting occasion than this Farmers' Institute to talk over this subject. Here we have assembled men of large experience, of varied success in life, men of energy and enterprise, ready to grasp every new fact in agricultural science, as well as those more cautious.

There is a large class of farmers who hardly make the two ends of the year meet, get ahead a little this year and fall behind next, consoling themselves with "Just my luck! farming is an uncertain business any way." When any particular product is high, he has raised some other crop, or only enough for his own use. If he could tell that potatoes would be worth a dollar a bushel next fall, that beans would bring three dollars, or pork be so very high, he could farm it with profit.

He buys stock, horses, or cattle, and something will befall them; horses will get lame, have the heaves, or something happen to them. The pasture was short, so the cattle did not gain as he expected, and he has to sell them for less than he paid. Stock is high this year—has he any to sell? No; it was low last fall, and he thought it was so much more work to take care of cattle than sheep—the cattle you have to water and clean out every day, and sheep you do not, so he would try sheep. Now he has more sheep than he wants to winter, and it seems as if no one wanted to buy sheep; all the call is for cattle. He concludes sheep raising a poor business, gets rid of his sheep at a ruinous price and goes to raising cattle. In a few years he has got well stocked with cattle. There are one or two short crops of hay, beef is very low and there is very little call for cattle. Meantime the price of wool has advanced. All the call is for sheep. But I need not follow this further. You all know how it has been in the past—ups and downs—and I suppose will be thus

until this peculiar Yankee trait can be overcome and we can learn wisdom from sad lessons of experience.

Is this business of farming a matter of uncertainty, a luck and chance operation? or are there certain rules or laws in nature which, if complied with, will invariably produce certain results, and therefore there need not be any such thing as failure in a farmer's crops? Is he sure of a crop after he has done all he can?

One of my neighbors reported he had raised three hundred and fifty-three bushels of oats this year on five acres of land, or a trifle over seventy bushels to the acre. Shall we call this luck? Almost every farmer who sowed oats last spring on good land, raised a large crop.

What about wheat—how is that this year? Nearly every farmer tries to raise some wheat. He devotes the best land he has to this crop, usually land on which he raised a crop of corn the year before, and is in the best state of cultivation of any he has. He ought reasonably to expect a good crop—twenty to thirty bushels to the acre,—instead of which, this year it will average not over ten, worth fifteen dollars to the acre, besides the straw.

Are there sufficient reasons for this low average? Can we assist nature in any way, and thus increase our crops? Would not a more thorough cultivation do much to help us in this direction? And should we not take more pains with our seed, to get the best varieties, and then use all means to improve them?

There are other things besides poor crops which seem to operate against the success of the farmer. Labor is one. Many of us are short of help on the farm. We cannot enlarge our operations as we would like. Many times we could employ help to a great advantage, but are unable to do so, on account of means to do it with. We could clear more land, put in larger crops, make more fertilizers, and, in various ways, employ more help; but the invariable reason is given: "Haven't the means to do it with."

Every little saw-mill, where they can get white birch to work up into spool timber, will hire help and pay one dollar and a half a day. Their profits are large enough so they can afford it. It is so with other manufactures; and they are all dependent on the products of the farm. They must live on what is raised on the farm. Yet the profits from the farm are so small the farmer has a hard time. Why is it?

I have said enough on this subject, at least, to open the door; and there are others to follow, who I doubt not will give us a remedy.

DISCUSSION.

C. C. LEE of Foxcroft, followed the above in consideration of the question whether we are genuine farmers. If we are farmers, and propose to remain farmers, we should confine our attention to the business, and, like business men, keep our accounts, that we may know what is paying a profit and what is not; and, after learning this, then stick to that line of work which brings an income. The lack of capital was referred to, and the idea has occurred to me that in farming, as in other business, copartnerships may be formed with other farmers. Especially might this be done with our sons, and thus enlarge the business and reduce the cost of production.

C. H. COBB. It is well known that we have farmers who are in the practice of keeping accounts, and who know where the profits are found and where the losses occur. With them it is not a matter of guess-work. After determining where the profits are secured, farmers should bend their chief efforts in that direction. Business men are continually searching for lines of profit, and, when found, they are not lost sight of.

H. L. LELAND believes that if we examined ourselves critically, we shall find we are not putting so much of business into our farming as we might. Farming at the present time means a great deal. There is much of business in it, or must be, if it is made successful. The suggestions of copartnership strikes me favorably. Through it there can be a massing of capital, and what is of fully equal importance, a massing of labor, and through the arrangement better net profits ought to be secured.

Mr. KEENE of Atkinson. A serious difficulty is met in the fact that we have not the needed help among us. A large part of the young men are taking the advice of Horace Greeley to "Go West." If this tide could be stayed we should have their labor to assist in developing and extending our business.

Sec. GILBERT. I would raise the question, seriously, whether it is not asking too much of a small investment in a farm, that it furnish a dwelling place for the family, feed and clothe its members well, educate the children, meet the demands of society, meet the taxes,

insurance, and all the various outlays incident to the home and to farm life, and, above all this, be expected to contribute annually to a bank account. An investment of \$1,500, or \$2,000, will purchase a farm on which are comfortable buildings for the shelter of the family, together with an abundance of fuel for home use, and will contain land enough, the income of which will feed and clothe a family and meet running expenses. Is it not too much, out of so small an investment, to look for more than this—and should a farmer be dissatisfied if from it he is unable to secure a surplus? No; the wonder is that it can be made to afford so much. In the city, or large town, that investment would hardly afford a roof under which to shelter the family; while the farm not only does that, but supports the family also. I believe it to be a fact which cannot be controverted, that farm property brings a larger income on the investment, in proportion to the labor expended, than any other kind of property, or any other kind of business.

AFTERNOON.

FEEDING HAY.

By J. E. SHAW, Sec'y Penobscot County Farmers' Club.

Mr. President, Ladies and Gentlemen: We do not come before you at this time to present any new theory, or to present a subject that you are not as well posted in as we are, but we propose to talk on one that is familiar to every farmer present. If it is one that all are familiar with, it is well, many times, to have it talked over in farmers' meetings like this.

We think it is the opinion of a large majority of the farmers of the State of Maine, that mixed husbandry gives larger profits on the labor required than can be realized by making a specialty of any particular crop. When we look over the agriculture of the State, past and present, we find the hay crop has always been made a specialty; and the farmers who have made that, and stock husbandry in its various branches, the special feature of their farms, have prospered. We find the hay crop raised by the farmers of Maine is the most valuable of any crop produced in the State, and is of more importance and of greater money value than all the other field crops raised in the State put together.

Taking the statistics, as published in the annual report of the Department of Agriculture, for the year 1880, we find that 1,284,451 acres in grass produced 1,297,296 tons of hay, worth \$16,436,700, while all the other field crops were worth only \$5,535,654, viz: Corn, \$853,175; wheat, \$780,870; rye, \$37,807; oats, \$966,156; barley, \$188,635; buckwheat, \$240,000, and the potato crop \$2,474,011, showing that the hay crop exceeds all other field crops in value some \$10,000,000; and that the hay crop of the year 1880 was worth about three times as much as all the other field crops produced in the State that year.

Thus the hay crop occupies a more important place than all the other crops produced in the State, and the prosperity of the farmer depends largely on this crop. If a good hay crop is housed in good condition, the farmer must be regarded as prosperous, though his other crops may not be very productive; and if the hay crop proves to be a short one, we all feel it severely, though all other crops may be very good. The soil and climate of Maine is naturally adapted

to the production of grass, and, from the present outlook, the grass crop of Maine in the future will become of greater importance than in the past.

There are thousands of acres of the very best grass lands of the State, that only need to be cleared of their present growth of wood and brush, to make fine grass farms. The large amount of hay that is sold in this State yearly into the markets of other States, puts into the hands of the farmers large sums of money. In many cases it is sold at the expense of the fertility of their farms, and they are producing less tons of hay every year. The question of great importance with the farmers at the present time, who are selling their hay, is how to maintain the fertility of their farms and continue to sell their hay crop from year to year. We think that nearly every farmer will admit that he cannot make the production of hay a specialty for the market, for a series of years, without reducing the fertility of his farm.

The average price of hay in the Bangor market, for the last ten years, has been \$13.00 per ton. The hay that commands this price must be of the very best quality. We think the average price of the best quality, at the barn, cannot be reckoned at over \$10.00 per ton, for it will cost from two to three dollars per ton to press it and haul to market.

We have asked many farmers, who practice selling their hay, this question: "What is the cost of producing a ton of hay?" and we generally receive for an answer—"We don't know, but we think selling hay pays, for we get quite large sums of money for it every year, and more than in any other way that we can dispose of it."

Last winter R. W. Murch, President of the Penobscot Farmers' Club, read a paper on the production of hay, giving the cost per ton. Mr. Murch, is a farmer of experience, owns a large farm, and sells about a hundred tons of hay yearly. He figures, in reckoning the cost of hay per ton, the rent on land, taxes, value of dressing necessary to maintain the fertility of the soil, and cost of labor required for harvesting and delivering at market, all at the value of a cash transaction. According to his figures the total cost of producing a ton of hay amounts to \$13, the average price per ton in Bangor for the last ten years. He claimed that the profits derived by the farmers in selling hay is in their not putting but little if any cash into the crop, having the help necessary to do the work themselves.

Mr. Hall of Brewer, another member of the club, says his fields that cost him \$36.00 per acre when new, will produce an average of one ton of hay per acre for fifteen years, without any dressing except the application of three bushels of plaster once in five years, but says they will require dressing hereafter to keep them up to that point of fertility that will produce on an average one ton of hay per acre. He usually sells some hay at the barn for \$12.00 per ton, and considers he gets \$6.00 from the buyer, and robs his farm of \$6.00 for every ton of hay he sells. We think if we should take the hay crop of the State for the last ten years the price will not average over \$8.00 per ton at the barn. This being the fact it gives us the actual market value of the crop, or what it should be reckoned at if fed to stock on the farm.

According to different analyses it is ascertained that a ton of hay contains thirty-one pounds of nitrogen, 8.2 pounds of phosphoric acid, and 26.4 pounds of potash. In feeding our hay to stock, if we could save all the dressing made from a ton of hay it would give an amount of plant food to put back on the farm that is worth in the market \$5.86. Now we can really know to what extent we are reducing the fertility of our farms by the amount of hay sold, for every farmer that sells twenty-five tons of hay has taken from his farm \$146.50 worth of nitrogen, phosphoric acid and potash, and if there is not a large proportion of these put back on the land again, we shall soon have run out farms on our hands.

It is a serious fact, but one that must be admitted and met by many farmers, that on most of the farms where the selling of hay is practised, they are becoming more or less run out, though the owners apply liberal quantities of stable manures, ashes and commercial fertilizers. Now the question that must be met and answered by the farmers of the State who are in the practice of selling hay, is how they can continue this practice in as reckless a manner as they for a few years past, and keep up the fertility of their farms.

We find many farmers that are becoming convinced that to make farming a profitable business they must adopt some other system of farming than selling hay; and many have come to the conclusion that the most profitable way of selling hay is to feed it to good stock.

In the vicinity of our cities and large villages, there are many farms, where large numbers of cows are kept, and the daily product of milk is sold to regular customers; and judging from the improve-

ments that are made upon their premises yearly, is a paying business. But this branch of dairying can be engaged in by only a few of the farmers compared with the whole number in the State. The butter dairy in many sections can be made a specialty, and from the present outlook of the dairy business, co-operative butter making presents certain conditions which call for a most thorough examination. A large part of our State is adapted to dairying, and we think one cannot find a farmer, or a community, that has adopted dairying as a regular business, and pursued it with energy, but has made it pay large profits. It is with the dairy, as with all branches of business, we must be ready for all the new departures that arise. It is only a few years since our June butter was wanted in September, and the September in January, but at the present time the market demands a new butter that has a sweet, creamy, delicious flavor. This cannot be found in that which has been kept any length of time, and no other butter at the present time will command the highest market price.

There are many farmers that say their cows don't pay their keeping, and the only reason why they keep them is for the sake of having some milk and butter to use in their families. If the farmers would look after their dairy with that interest, and give it the care the manufacturers and merchants do who are successful in their business, we should not hear so many of the farmers saying the dairy can't be made to pay. The most skeptical would be surprised at the income they would receive from their cows. To illustrate why so many complain that their dairies are not paying, can be done by comparing the income of two small dairies in my neighborhood. During the summer of 1881, both put their milk into the same cheese factory four months. One sells all of his best hay, and pretends to keep ten cows. He says he keeps them to eat his poor hay and straw, and he never feeds any grain to them, because "it won't pay;" and he claims it has not cost him over ten dollars apiece to winter them. If we were to judge by their looks in the spring, we should not dare to contradict him. The returns from his ten cows for the year were: for milk delivered at the factory four months, \$185; calves sold, and butter made the rest of the year, \$115; making the total income \$300, or thirty dollars per cow. The other keeps four cows, does not sell any hay, says it costs him \$30 to winter each cow, and the meal and pasture amounts to \$20 more, making the cost of keeping each cow through the year \$50;

milk delivered at cheese factory four months, \$180; calves sold, and butter made the rest of the year, \$120; making the total income for the year \$300, and giving an income of \$75 per cow, and a profit on each of \$25. We believe this sum, and, in fact, a much larger one, can be realized yearly by every farmer, on any good dairy cow, if he will give it the proper care and feed it requires. To the doubting ones we would say, try the experiment and be convinced that there is money in the dairy cow. If properly handled she will give an income of from \$25 to \$50 a year, above the cost of keeping. We presume many will say we have made our estimate too high; but we claim to be very modest, for by consulting several dairymen that make the butter dairy a specialty, we find that some get an income of from \$90 to \$100 per cow.

Some dairymen claim that a cow that will not make three hundred pounds of butter a year it will not pay to keep; they say the butter should sell for thirty cents a pound, which is almost an average price for good butter.

Mr. Hall, a dairyman of twenty-five years' experience, in giving his figures, says it is a good cow that will make three hundred pounds of butter in one year; that his average price has been thirty cents per pound. He figures—

300 pounds of butter, at 30 cents a pound	\$90 00
Skimmed milk	15 00
Total	<u>105 00</u>
Cost of keeping for the year	50 00
Net profit per cow	<u>\$55 00</u>

Many call a cow that will make one hundred and fifty pounds a year, a good cow; so we will see what the profits are from her:

150 pounds butter, at 30 cents a pound	\$45 00
Skimmed milk	10 00
Total	<u>55 00</u>
Cost of keeping	50 00
Net profit per cow	<u>\$5 00</u>

Mr. Edson Jones of Turner, made 672½ pounds of butter from two cows in 1881. Mr. J. T. Floyd, Winthrop, has for several years averaged upwards of 300 pounds to each cow, the present

year reaching an average of 358 pounds. Mr. H. M. Smith of Orrington, gets an average of \$95 per cow for his herd.

The cow that will make 300 pounds of butter in a year, if sold for 25 cents a pound, it amounts to \$75, which gives a fair profit; while the cow that makes only 150 pounds of butter will hardly pay for her keeping.

We think that any farmer who sells 100 tons of hay yearly, can keep 40 good dairy cows, that would give a larger profit on the hay consumed and labor performed than is received from the selling of the hay. To reckon it at the price paid at shipping points, it amounts to only \$1,300; and we can with safety reckon the income for a good dairy cow at \$80, which, for 40 cows, would amount to \$3,200. Now suppose we call the pasturing, grain and extra labor \$1,000—\$25 per cow—which leaves \$2,200 for the hay fed out, or \$900 in excess of what it would have been worth on the market, and with no credit given for either skimmed milk or dressing. We think it makes no difference how many cows are kept in a herd, if each receives as good care as would be given a single cow.

Associated cheese dairying is one of the specialties of farming peculiarly adapted to Maine. There can be no question, that in good grazing sections, the cheese factories will realize to the farmers and patrons, larger returns for the food consumed by their stock than is now obtained by the course of mixed farming that is pursued by many farmers. Our cheese factories ought to make cheese that will command the highest price in any market in the world, and we ought to make better cheese in Maine, with our pure air, pure spring water and fine pastures, than is made in the West.

If the dairymen of Maine would give their business the attention and care that the manufacturer and merchant give to their business to make it a success, we cannot conceive of any earthly reason why dairying in Maine may not become the leading industry of the State, and our dairy products be made to compete successfully in all the markets of the world, with the products of any State in the Union. According to statistics received by the Secretary of the Board of Agriculture, from some thirty cheese factories, we have a total for the State of 732,803 pounds, representing a cash value of nearly one hundred thousand dollars. There may be some advantage gained in the cheese factory system over the butter dairy, in the cost of keeping the cows, as most of the profits come in the summer, when they do not require the amount of grain through the winter season

that they require in butter dairying. From reports we get from the patrons of different factories, it is found that the returns from the milk of a good cow, delivered at the factory, will average from forty to fifty dollars per cow for the season. With the additional sum received from the sale of calves and butter, the net profits are found nearly up to the butter dairy.

Then another branch of stock husbandry is the raising of stock for the dairy and for beef, which we claim can be made a source of profit, though we may fail to prove it. We are ready to admit that a portion of the stock that is raised throughout the State pays only a very small profit, if any, for we raise too much of the scrub stock, and then feed it too poorly to make the business profitable.

Let us take into consideration the course that is pursued by some in raising their stock. In the first place the calf receives a small amount of skimmed milk daily for a few weeks and then they are turned off to shirk for themselves until snow comes, when they are taken to the barn and fed on coarse fodder that is not worth anything to sell. At a year old they are not any heavier than they ought to have been when a few weeks of age. If given a good pasture the second summer they make some growth, and come to the barn in fair flesh, only to pass another winter fed on poor hay and straw. They are sold the next fall at $2\frac{1}{2}$ years old at such prices as their owners can get, which will be from \$15 to \$25, or say an average of \$20. This, we admit cannot give but a very small profit for the three tons of fodder they have consumed in two winters, and pasturage two summers will amount to from \$15 to \$20, so the profits must come from the plant food left on the farm. The dressed weight of this class of beef will average about 400 pounds, and sells at the present time at about \$4.00 per hundred pounds. The daily growth of these animals from their birth has been less than eight ounces a day. If these same animals had received a daily ration of concentrated food with their coarse fodder, which would have made a standard feed, or had been fed the good hay their owners were selling for \$13 per ton, they would have weighed on an average eight hundred pounds each instead of four hundred, and would have been worth eight dollars per hundred in the market and would sell on the foot at an average of \$60 each. Allowing they have consumed three tons of good hay or its equivalent, which is worth at the barn \$10 per ton—\$30, and cost of pasturing \$10, then the animal has cost \$40; thus giving a profit of

\$20 over all expenses. We think that good grade Shorthorns or Herefords will do better than the figures given, with good care and feed, which must be given if we expect any profits from them.

We expect some will differ with us on these figures, and say they can be made by only a favored few. These few are every farmer who will get good stock, take good care of them, and feed them liberally. We will here refer to some farmers who have done better than these figures show. A Mr. Clements of Kenduskeag, Penobscot county, a few years since raised a yoke of grade Hereford steers, that at the age of two and a half years were sold for \$275, the dressed weight of the pair being twenty-eight hundred pounds. If we allow \$175 for their keeping (which we think is too high) on hay and grain, they gave a net profit of \$100.

At the Cattle Show and Fair held at Monroe, Waldo county, in October last, Mr. J. R. Littlefield sold four grade Hereford calves for \$140, or \$70 a pair. We mention these to show what can be done by any one who is disposed to give their stock the proper care and feed they require to make profitable returns. It is claimed by all breeders of stock, that from their birth they should be kept in a thrifty and growing condition, and the calf should never be allowed to lose flesh; and that meat can be made cheaper on animals under three years of age than it can on older animals.

From the present outlook, there is reason to believe that the raising of stock for beef will be a profitable branch of farming in this State, for the demand for good beef will be larger in the future than it has been in years past. We think there should be more attention given to the production of it in our State. According to statistics, the yearly increase of the population in this country is some twenty per cent. more than the increase of the neat stock. This being the fact, there is no prospect of cheap beef in the near future, with larger demands for it every year from foreign countries, and with a million of emigrants landing on our shores every year. The plains, the great pasture of the West, where hundreds of thousands of cattle are fattened every year, are being taken up and occupied by the emigrant, and put to other agricultural purposes beside pasturage, thus reducing rather than increasing the yearly production of beef. At the present time, in several of the European countries, the question is being agitated as to where the beef that will be required to feed their people is to come from. Will it not be with their meat, to a great extent, as it is with their bread—they will

come to this country for a large proportion of what they require. We think, at the present time, few farmers of the State realize the large numbers of cattle and sheep, besides the great amount of dressed beef, mutton and pork, that is shipped from this country to Europe every week, and the trade is yet only its infancy. With more experience and better facilities for transportation, it will increase to meet the full demands. The question may be asked why the farmers of Maine cannot raise beef for shipping as well as the farmers of the West.

It can be done at a profit if we will be as particular in regard to the stock we breed as many of our farmers now are, for all know that a grade Shorthorn or Hereford is worth as many dollars at two years of age as a scrub is at three or four years, thus saving the farmers one or two years feed. We believe it is admitted by all shippers that Maine cattle will stand the sea voyage better than Western cattle.

Sheep husbandry is another branch of stock husbandry that is giving to those who are engaged in it, and ought to many more, profits in return for the feed and care. We think we may with safety place the income from a flock of good sheep at \$5.00 each, and the cost of keeping at \$3.00 each, thus giving a net profit of \$2.00 per head. The distance from market may have something to do with the profits, but in a great measure that may be overcome by the amount that is offered for sale. Capital is always looking for a profitable investment, and he that can afford to go into the country one day for one car load of sheep, can make it more profitable if he can buy two loads. The price in different localities may differ to a certain extent, but not enough to materially affect business.

In the future, if it is not the case at the present time, the agricultural prosperity of the State will depend on its stock husbandry.

DISCUSSION.

L. L. LUCAS, St. Albans. Twenty tons of hay will winter one hundred sheep, and fifty cents per head will pasture them. The cost of keeping, with hay at ten dollars, would be \$250. The average income from a flock should be four dollars per head, or \$400 for a flock which is costing \$250 to keep. If a man is not doing as well as this, either he has sheep not fit to keep, or he is not giving suitable care.

In feeding hay to other kinds of stock the profits of the business will depend on conditions; but these conditions are entirely under the control of every intelligent farmer. It is a lamentable fact, however, that many of our farmers do not meet the conditions. Success depends on increased attention to these matters.

Mr. PERKINS, Foxcroft, said he could not sell a ton of hay from his barn for less than \$14, as he found no difficulty in securing that for it from feeding.

Mr. G. F. DUNHAM, Foxcroft, said that in his practice he had no difficulty in securing more than the market value for the hay fed out. He can do a little better with cows than with sheep.

The evening was devoted to a lecture by the Secretary; subject, "How to Make Good Butter," no report of which is given.

LINCOLN COUNTY.

Institute at Bristol.

In the town of Bristol there is an active and efficient Farmers' Club, which has, for several years, held successful cattle shows and fairs. They own exhibition grounds, on which is an exhibition building, which are substantially enclosed. In addition to holding an annual fair, the Club has been instrumental in introducing improved stock among its members, and as a result the town has become celebrated for the superior quality of its stock, chiefly in the line of its oxen and steers and animals kept for breeding purposes.

This Club invited the Board to hold an Institute with them at the Town Hall, Bristol Mills, November 7. Both the attendance and the interest were a credit to the Club and to the community. There were present of the Board Messrs. Stetson, Holbrook, Lermond, and Hammond, all of whom were entertained by the Club.

The meeting was called to order by Mr. D. R. Hanley, and David Chamberlain, Esq., was called to preside.

E. W. Stetson, member for the county, spoke at length of the "Condition and Wants of the Agriculture of Lincoln county."

The first requisite of a successful agriculture, of course, is a fertile soil, without which no real success can be secured. In this respect, Lincoln county compares favorably with most of the other counties of the State. There is waste land, but there is also a great variety of soil in the county suited to every condition of agricultural life. The locality is especially favorable to the securing of marine manures. There are three rivers running nearly parallel through the county, and on these rivers and on the coast line are one hundred and fifty miles of farm which border on tide waters, affording unmeasured supplies of rock weed and muscle mud which can never be exhausted. These supplies are in easy reach of farm lands that will compare favorably in natural productiveness with the farm lands of the interior. In facilities for obtaining material with which to replenish the soil with fertilizing material used up in production, this locality has an advantage nowhere surpassed. These are natural resources which few localities are favored with.

But with these special advantages, the agriculture of the locality is not what it might be supposed to be. There are other industries

in the county, and especially in this town of Bristol, which diverts the attention from the soil. Especially has this been the case in the past. Now, however, ship-building has, to a great extent, dropped away, and the shore fisheries have failed. Where, then, are we now to look for profitable employment, and for that income which is not only desirable but absolutely necessary, if not to these farms? On them there is room and business for all. The possibilities of profitable business in this direction are realized by few. Bristol, through attention to the matter, and the work of its Farmers' Club, has accomplished wonders in the improvement of the stock. When a man wants a choice pair of cattle he goes to Bristol to find them. So, too, wheat has been grown here yielding to the acre as large a crop as in any other locality. Corn, also, is made a profitable crop. These facts prove that here are resources in the soil which only need intelligent attention to be secured. We are here to-day to consider the means and the methods through which the business may be improved, extended, and made more successful.

WM. CLARK, Bristol. We all know the want of Bristol is to get these marine fertilizers transported to the farms. The soil is good enough, so that with the application of these manures, which are in abundant supply, it is bountifully productive. Capital and labor are needed to make the business successful.

MR. HUNTER had always supposed that Lincoln county had a thinner soil than those sections of the State where agriculture had assumed the position of the chief business. Still, there is no doubt that if the natural resources within our reach were drawn upon, they may be made profitably productive. Rock weed has proved a valuable fertilizer, and wherever used has largely increased the hay crop. So, too, has it been used with success for corn and potatoes. Formerly it was applied in a green state, and with fair success, but now the practice prevails of composting it either with muck or with barn manure, and with better results. Large quantities of grain, especially of wheat, are grown, and chiefly from the application of muscle mud. These products can be increased almost indefinitely with the application of more labor.

Capt. THOMAS NICHOLS. I have used the "lime ashes" from the Rockland lime kilns, at the rate of fifty bushels to the acre, and have secured bountiful crops of hay for five years after. Following this, an application of "porgie chum," at the rate of one ton to the acre, had produced similar results. The lime ashes were

cheaper, and for grass one application seemed all that was needed. Rock weed invariably produces good crops of all kinds.

Mr. WEEKS. The great lack in Bristol is not so much a supply of fertilizers as it is a faith in the business, and pluck to take hold and push it to an extent amounting to something. Stock has been more improved in this town than in any other section of the county. This improvement is still going on, and one of our citizens has recently been into another part of the State and purchased breeding animals for the further improvement of the stock in town.

I have used rock weed and muscle mud with very good advantage, both on clay loam and on highland soil.

The afternoon was devoted to a discussion of the "Profits of Stock Breeding," participated in by the members of the Board and by farmers present.

In the evening a paper on the "Profits of Dairying" was read by J. K. Hammond, the member from Oxford, which will be found in another place in this report.

HOME SURROUNDINGS.

By ERASTUS LERMOND.

To improve the appearance of the grounds around our dwellings, in our fields, and along the roadsides, is a topic that may be a little out of the line of farming proper, and, at first thought, appear to be of but little importance; yet, if the subject could be impressed upon the minds of farmers generally, with a force sufficient to awaken a general interest in that direction, it would produce a greater change in the appearance of the farming districts than anything within the scope of a practical imagination.

When a farmer lives for the purpose of gain only, with no regard for the appearance of his out-door home—with no desire to comply with, or anticipate the wishes of his family in beautifying his grounds—he will be unfit to enjoy riches after he has gained them.

It is a duty, and ought to be a pleasure, that we owe our families, ourselves, and the community, to improve the appearance of our home surroundings. We are expected to make a decent appearance in dress and deportment; then why not try to have all look well about the home, and thus make it attractive, instead of repulsive. Attractive homes enlarge and educate the mind, and tend to

stay the departing footstep, and return the wanderer. An improved appearance around farm dwellings indicates thrift, and is thrift in itself, for the farm is worth more and will sell for more, on the same principle that farm produce, cattle, and horses, will sell for more when put in a marketable condition. And we are pleased and made better by the approbation of others, although affectation may seek to negative this view of it.

After living on a farm for a long time, we do not recognize the presence of unsightly objects that have remained, collected, or grown about us gradually, while a person in passing would take them in at a glance.

We will look at some of the objects that appear as we pass along the highway, such as ungraded grounds around the buildings—so uneven that pools of water stand in the hollows after a rain; large boulders appear just above the surface, and loose rocks are scattered in all directions; wood, boards, new and old posts and rails, wagons and carts, broken wheels, a demoralized hay rack—and tin dishes that look like old friends kicked out of doors by the boots lying there, which in turn have been kicked out too. These are some of the most notable objects in sight, but there are patches of rank weeds which hide many things from view—and perhaps there is a tumble down stone wall close to the house, that was built a century ago. But wait! here is a flower-bed that the females of the household have struggled with, under difficulties and discouragements, till it presents one bright spot in striking contrast with the chaotic confusion which prevails; and it reveals the aspiration of woman for the beautiful. There is a form quite prevalent—a square plot about the size of the house, and generally in front of it, fenced, and called a front yard, with flower-beds inside which are nearly invisible to the outside world, but intended chiefly for company. The children are excluded, for fear they may tramp on or otherwise injure something.

We walk down the road, and here are piles of stone, stove-pipe, broken ware, an old harness saddle, with bushes and weeds on both sides the fence. We go back past the house, along the road by the orchard, which has been well cared for, but the trees are so close together that they shoot upward and lose their lower limbs, which have been cut off and thrown out year by year over an old stone wall, till it requires a close examination to determine whether it is a stone wall or a brush fence. This is partially hidden by thistles and

burdock, which, under the circumstances, become ornamental. On the opposite side of the road from the house, it looks quite commonplace—a few sticks of wood and timber, some old bed pieces, where wood and timber have been landed, a few rocks and weeds, with smooth grass patches here and there, which show us how the whole may be made to look with but little trouble.

We walk out into the field, which is under a fair state of cultivation, and here are piles of rocks with scraggy bushes growing about them, and one tall, ill-shaped tree, near the middle of the field. But the worst of all is the division fence between this field and the next. It has been down and useless for years, except where clumps of bushes held it up. These bunches of bushes in the fences and fields mar the beauty of them, and make a lodging place for weeds, which scatter their seeds in all directions, to plague us in after years. Clean division fences look very well, but a clean, open stretch of field, looks much better. All these need changing. Exterminate the bushes and weeds by the fences and around the rocks in the field. Clear up the roadsides, so they may be mowed and become a source of profit, instead of an "eyesore." Remove all fences that encumber the ground which you need around the buildings; for if farmers cannot have ample room around their buildings, who can? People in cities pay fabulous prices for little pieces of land to enlarge their lawns, while farmers who have an abundance of land allow themselves to be cramped for room.

Farmers should not entertain the idea that neat looking grounds around farm buildings are not appropriate, that they are only for the city or village home, when, in fact, they are better appreciated in the country, and they improve the looks of the farm home much more than they do the city or village home. All farms are supposed to have a market value, and if the owners desire to increase their value, it cannot be accomplished in any other way so cheaply as is herein advocated.

We know all people try to make a good appearance in some things. How trades-people display their wares in the most attractive form—contrive various devices to bring the brightest side of their business to the front—and it has even been intimated that some enterprising farmers put a few of their best apples next the head of the barrel, which, if true, shows that they appreciate the desire of their customers to have things appear well. Now, why not carry

this idea further, and presume that they wish to see the place where they are grown look well also.

The good appearance of the home is not affected so much by the quality of the house as by the grounds around it, for an expensive house surrounded by rubbish looks worse than an old one in the same situation. Of course the good house looks better with nice surroundings, still the old one, even if unpainted, with a well-kept lawn, has a peculiar home-like charm that is very attractive.

Youthful minds are impressed with these things, and would be pleased to have their out-door homes in such a condition that they could receive their young friends with a glow of pride, instead of a blush of shame. Why wonder that they leave the farms for the city and the village, when the contrast is so great? Let each one of us do something, then, to lessen this contrast; let us beautify the rural districts, so that our children may be proud of their nativity.

After the completion of the programme, the Rev. M. G. Prescott, in a fitting manner, and in behalf of the Bristol Farmers' Club and the citizens of the town, moved a vote of thanks to the Board for responding to the invitation of the Club.

WASHINGTON COUNTY.

Institute at Robbinston.

An Institute was held in the town of Robbinston, in the village school house, November 15th, at which a good audience of the farmers of that and the surrounding towns was present. A cordial reception and a liberal hospitality were extended to all in attendance.

The meeting was called to order by A. R. Lincoln, President of the Board, who invited Cyrus Balkam to the chair. After a brief explanation of the proposed work of the day, the subject of the morning was introduced.

EXPERIMENTAL WORK IN AGRICULTURE.

BY WALTER BALENTINE, Professor of Agriculture at the State College of Agriculture and Mechanic Arts.

Experimental work as applied to agriculture, has, in times past, been the derision of a large class of so-called practical farmers. But when we take a glance at the advancement made in practical agriculture within the last thirty or forty years, which is largely due to scientific investigation, I think no candid man will fail to admit that the contempt with which many of our practical farmers have looked upon this work, during its progress, has not been wholly deserved.

We must, on the other hand, admit that more has often been claimed for the results of this work, by the advocates of scientific research, than has actually been sustained in practice. This was, however, rather a fault in the interpretation of the results than with the results themselves or the methods of obtaining them.

Let us go over briefly, some of the facts that experimental work has established, which have proved of inestimable value to practical agriculture, and which have become, to a greater or less extent, incorporated with the ordinary practices of farm management, and which, sooner or later, are destined to become the guiding principles of successful farming in all civilized lands.

How to maintain the fertility of our soils, is a topic in which farmers are always interested, and one of which they never tire of

discussing in their agricultural meetings. It is, in fact, the most important question with which we have to deal in agriculture, for it is on the fertility of the soil that all successful farm operations depend.

Through the investigations that have been made in plant nutrition, we have learned what constitutes a fertile soil. We have learned what elements must be contained in a soil to make it capable of producing plants. We know that besides other substances which are essential to the health and life of plants, but which are seldom wanting in any soil, phosphoric acid, potash and nitrogen must be present in the soil in an available form, in quantities sufficient to supply the wants of a crop, to make that soil fertile.

The fact thus briefly stated is the foundation on which the principles of manuring are based. And the practical result of this knowledge is, that when farmers come to understand these principles, they can go into the markets and purchase commercial fertilizers with as much confidence of obtaining profitable crops from their application to the soil, as when stable manures are used.

The facts that have been brought to light by investigations in animal nutrition have been scarcely less beneficial to agriculture, for they have given us the laws that will eventually lead us to a rational system of cattle feeding. But it is a mistaken idea that the bare statement of the facts, which have been discovered in plant and animal nutrition, is going to be of any material advantage to the farmer without study on his part. There is experimental work required to learn how the discoveries can be applied to the special conditions under which each farmer is laboring.

The chief cause of the failures which many of our farmers have experienced in the use of artificial and commercial fertilizers, is, without doubt, due to the neglect of the farmer to study the special needs of his soil. Farmers in general appear to ignore the fact, that if manures are to be used with economy, it is quite as essential to know what their soil can furnish for the growth of a crop as it is to know what the crop requires for its growth. Nitrogenous manures, phosphatic manures, and those furnishing potash, are applied haphazard, without regard to what the soil needs. Naturally many failures must result from such use of manures.

Before engaging extensively in the use of commercial fertilizers, as thorough and systematic a study of the needs of the soil should be made as has been made of the needs of the crop, and this can

only be done by the farmer himself, through farm experiments with the different fertilizers. Science is, in its present condition, unable to give us any further information than that a worn out soil probably needs one or more of these three substances, phosphoric acid, potash and nitrogen. A chemical analysis of such a soil furnishes no indication of what is necessary to be supplied to restore its fertility. But, by adopting a system of soil testing, the farmer can compel the soil to tell its own story.

If we examine a little into the conditions under which a soil may become barren as regards the three plant foods, which are liable to become exhausted by continuous cropping, viz: phosphoric acid, potash and nitrogen, we shall readily see that there are seven:

1st. There may be a lack of phosphoric acid, potash and nitrogen being present.

2d. There may be a lack of potash, phosphoric acid and nitrogen being present.

3d. There may be a lack of nitrogen, phosphoric acid and potash being present.

4th. There may be a lack of phosphoric acid and potash, nitrogen being present.

5th. There may be a lack of phosphoric acid and nitrogen, potash being present.

6th. There may be a lack of potash and nitrogen, phosphoric acid being present.

7th. There may be a lack of all three of these, phosphoric acid, potash and nitrogen.

In commencing experimental work of any kind, it is always best to know exactly what questions we desire to have answered by the experiments; and then the more definite we can put the questions, the more satisfactory the reply.

In the view given above, of the possible conditions causing infertility in a soil, we have the key to putting definite questions regarding its fertility, with a probability of receiving an answer which will furnish us a valuable guide in the future manuring of the soil experimented upon.

Now suppose we take a plot of ground, say 32 rods by $2\frac{1}{2}$ rods, which fairly represents one of our fields in fertility and general texture of the soil, and lay the plot off in ten equal strips, running lengthwise of the plot, as shown in the diagram. Leave the first plot without manure; apply to the second plot a fertilizer furnishing phosphoric

acid alone ; to the third plot, a fertilizer furnishing potash alone ; to the fourth plot, a fertilizer furnishing nitrogen alone ; to the fifth plot, a fertilizer furnishing phosphoric acid and potash ; to the sixth plot, one furnishing phosphoric acid and nitrogen ; to the seventh plot, one furnishing potash and nitrogen ; to the eighth, one furnishing phosphoric acid, potash and nitrogen ; to the ninth plot, stable manure ; the tenth plot being left without manure. Then plant all the plots to the same crop, and when the crop has come to maturity, harvest each plot separate and measure the produce.

1	No manure.
2	Phosphoric acid.
3	Potash.
4	Nitrogen.
5	Phosphoric acid and potash.
6	Phosphoric acid and nitrogen.
7	Potash and nitrogen.
8	Phosphoric acid, potash and nitrogen.
9	Stable manure.
10	No manure.

By carrying such an experiment through, we have asked all the questions possible, of the soil, in so far as its infertility depends on the deficiency of one or more of the three plant foods mentioned. In the crops produced on these plots, we have the answer. The plots left without manure are for comparison, by which to determine the effect of each fertilizer.

The season is sometimes such that the crop does not get the full effect of the manure, and in order that the failure of a crop in such a season may not be ascribed to anything but its true cause, one plot should be fertilized with stable manure with which to compare results.

In 1877, Professor W. O. Atwater of Wesleyan University, conceived of the idea of carrying out a series of experiments of this character among the farmers of the country at large. Prof. Atwater says, in one of his reports of farm experiments, that "the ostensible object of these experiments was to work on farmers' soils. Underneath this lay, in my own thought, a deeper purpose, to work upon their owners' minds." Through the coöperation of some New York fertilizer dealers, he was enabled to place before the farmers a set of experimental fertilizers for soil testing, at a price barely

covering the cost of the fertilizers; and through the aid of the agricultural press, quite a large number of farmers through the Eastern States and Canada were induced to take part in the experiments, and entered into them with considerable enthusiasm. Many of them failed to get reliable results, from one cause or another, yet quite a large number were carried through with success and gave results which are worth studying by the farmers of the country. One of the most striking of these experiments I copy from the Connecticut Report of the Board of Agriculture for 1877, which illustrates some of the possibilities to be attained in the way of farm experiments:

Experiments with Corn by Mr. D. H. BIRDSEY, Middlefield, Conn.

Soil: Upland, gravelly loam, with gravelly subsoil. Previous treatment: Had been in grass for three previous years; yield of hay estimated at one-half to three-fourth tons per acre. Last manuring was (with oats) leached ashes; previous to this, barn manure and bone. Size of plots, 10 square rods. Amount of fertilizers, plots 1 5, 20 pounds each; plot 6, yard manure, with hen manure and ashes in hill. Amount of seed, 5 quarts per acre. Distance between hills, 4 feet each way. Planted, May 15th. Harvested, October 26th. Yield, (corn in the ear measured in bushel basket) as below:

Number of plot...	1	2	3	4	5	6
Kind of Fertilizer.	Dried blood. I.	Superphosphates. II.	Potash salts. III.	I, II.	I, II, III.	Yard, hen manure and ashes.
Important Fertilizing Ingredients.	Nitrogen.	Phosphoric acid.	Potash.	Nitrogen and phosphoric acid.	Nitrogen, phosphoric acid and potash.	Complete fertilizer.
Yield of Corn	2½ bush.	2½ bush.	6 bush.	2½ bush.	6 bush.	5½ bush.

It is seen from this table that nitrogen alone produced less than one-half as much corn as the yard manure, and the same is true of the phosphoric acid alone. The plot to which potash was applied produced a larger crop than the yard manure, as is also the case where phosphoric acid, potash and nitrogen were applied; while phosphoric acid and nitrogen combined produced no larger crop than when each was used separately. Every plot that received potash produced more than double the quantity of corn produced by the

plots that did not receive potash. In this case it is evident that the soil needed potash, and that the application of phosphoric acid and nitrogen was useless. In other cases the results were equally conclusive in favor of phosphoric acid, while still others showed that phosphoric acid and nitrogen combined were essential for the production of a good crop.

These experiments have been carried on through several years now, and in the majority of cases have resulted in knowledge of practical value to those making them. The reports of the experiments can be found in the Reports of the Connecticut Board of Agriculture, from 1877 onward, under the title, "Farm Experiments."

The practical results of experiments of this kind are well illustrated by the successful farming of Prof. Sanborn of the New Hampshire Agricultural College, who, by a system of soil testing similar to the one I have described, found that one of his fields needed only potash to make it produce a good crop of corn. During the past season he planted nine or ten acres of this field to corn, using only \$4.00 worth of potash salts to the acre, and, with this manure alone, produced a satisfactory crop of corn.

On another field, with a soil of different character, the system of soil testing showed that phosphoric acid alone was the thing needed to make the field productive, and he is treating it accordingly. On these soils money invested in other fertilizers was capital thrown away. This instance of the successful uses of special manures for a special purpose was reported to me by one of the most successful practical farmers in the State, who visited the farm of Prof. Sanborn, saw the crop growing, and from his own lips learned how the land had been treated. Surely this is a case in which experimental farming has paid the one undertaking it.

It must be remembered, however, in connection with experiments of this kind, that different crops have different capacities of obtaining their food from the soil, and that a fertilizer which might supply the deficiencies in the soil for one crop might not do it for another. For instance, beans and all leguminous plants require larger quantities of nitrogen for their growth than do the cereals, but they have so much greater power to gather their nitrogen from the soil that good crops can often be produced on soils that are too poor in nitrogen to grow wheat. The reason for this we can no more explain

than we can explain why cattle thrive on foods that are innutritious for man.

Here, then, is another opportunity for experimental work, in which the capacities of different crops to obtain their food from the material in the soil are to be studied. The method of procedure would be much the same in this case as in the preceding, except that the different fertilizers should be applied in different proportions. That is, the nitrogen for a corn crop, for instance, should be supplied in quantities varying from nothing to the full amount assimilated by the desired crop during its growth, the object being to find how little nitrogen the crop can get along with aside from that which the soil can supply.

I mention the corn crop in this connection, because some very interesting results have already been obtained from experiments on the capacity of this crop to get its nitrogen supply from other sources than from the manures applied to the soil. These experiments were investigated by Prof. W. O. Atwater, who is the pioneer in systematic field experimenting in this country. The investigations were commenced in 1877, and the results of four years' experimenting have already been reported.

Prof. Atwater's plan was to supply the mineral fertilizers to the soil in quantities sufficient to furnish these materials in a crop of fifty-five or sixty bushels of corn to the acre. The nitrogen applications were varied, giving to one plot none, to another one-third ration for a full crop, or 24 pounds; to another two-thirds ration, or 48 pounds; and to another a full ration, or 72 pounds.

In the report of the Connecticut Board of Agriculture for 1880, are the results of four years' experimental work on the "Sources of nitrogen supply" for corn, from which I copy the following tables in which these results are summed up, as an example of experimental work that farmers can do, and as showing the practical benefits of such work.

Average results of experiments with corn in 1878-79-80:

Eleven Special Experiments gave with—

	Bushels of Shelled Corn per acre.
Mixed minerals alone	45.2
Same + 24 pounds nitrogen.	54.5
Same + 48 pounds nitrogen.	55.4
Same + 72 pounds nitrogen.	56.7

The mineral fertilizer alone, produced on an average 45 bushels of shelled corn per acre, at a cost of about \$8.25 per acre for fertilizers. The mineral fertilizers, with the addition of 24 pounds of nitrogen, produced nine bushels more corn, at an additional cost of about 6.00, or at a cost of about 66 cents per bushel for the corn, with the cobs and stalks, for the increase above what was produced by the mineral fertilizers alone. With the mineral fertilizers and 48 pounds of nitrogen, there were produced 10 bushels more corn than with the mineral fertilizers alone, but at an extra cost of about \$12.00. The cost of corn per bushel, with cobs and stalks, above what was produced by the mineral fertilizers, in this case amounts to \$1.20. With mineral fertilizers and 72 pounds of nitrogen, there were produced $11\frac{1}{2}$ bushels of corn more than the mineral fertilizers produced, at an increased cost of \$18.00, or at a cost of \$1.56 per bushel for the extra corn produced. The nitrogen application paid for itself in the increased crop only in the case where 24 pounds per acre was used. In the other cases there was a decided loss.

If we take the mixed minerals with 24 pounds of nitrogen to the acre as a basis from which to reckon the profits or losses of the experiment, we see that an application of an extra 24 pounds produced an increase of only one bushel, and that the extra cost was \$6.00; and that 48 pounds extra increased the crop only two bushels, at an extra cost of \$12.00.

The average of 75 general experiments, gave with mixed minerals alone, 43.4 bushels shelled corn per acre; mixed minerals with 24 pounds nitrogen, 47.8 bushels shelled corn per acre. The increase in crop in these experiments, produced by an application of 24 pounds of nitrogen per acre, was only 4.4 bushels, and at a cost of \$6.00, or \$1.36 per bushel for the increase.

In calculating the cost of the increase in the crop produced by the nitrogen application, I have taken 25 cents per pound as the value of the nitrogen, which is about its average cost in nitrates and ammonia salts.

It may be worth while to give these results a little more in detail, in order to show that they are really quite as important as I have made them appear. I therefore copy two more tables from the same report.

	In number of trials.	WITH NITROGEN.		The average increase of corn was—	The increase of nitrogen in crop was—
		Amount per acre.	Contained in crop of		
1877-8.	29	24 pounds.	18 bushels.	5.9 bushels.	7.9 pounds.
	15	48 "	36 "	7.6 "	9.1 "
	6	72 "	54 "	9.3 "	12.4 "
1879.	26	24 pounds.	18 bushels.	5.9 bushels.	7.9 pounds.
	14	48 "	36 "	1.9 "	2.5 "
	6	72 "	54 "	0.3 "	0.4 "
1880.	20	24 pounds.	18 bushels.	0.6 bushels.	0.8 pounds.
	24	48 "	36 "	9.0 "	12.0 "
	10	72 "	54 "	14.3 "	19.0 "
1877-8-9-80.	75	24 pounds.	18 bushels.	4.1 bushels.	5.5 pounds.
	53	48 "	36 "	6.2 "	7.9 "
	22	72 "	54 "	8.0 "	10.6 "

	In number of trials.	With nitrogen, amounts	Costing	Nitrogen paid for itself in trials.	The nitrogen failed to pay for itself in trials.	Average loss in the several trials was—
1877-8.	29	24 pounds.	\$5 62½	8	21	\$0 90
	15	48 "	11 00	1	14	4 45
	6	72 "	16 50	None.	6	8 51
1879.	26	24 pounds.	\$5 62½	5	21	\$0 90
	14	48 "	11 00	1	13	8 48
	6	72 "	16 50	None.	6	16 26
1880.	20	24 pounds.	\$5 62½	4	16	\$2 34
	24	48 "	11 00	9	15	6 04
	10	72 "	16 50	2	8	10 10
1877-78 79-80.	75	24 pounds.	\$5 62½	17	58	\$1 38
	52	48 "	11 00	11	42	6 66
	22	72 "	16 50	2	20	11 62

These tables show, I think, quite conclusively, that it does not, as a rule, pay to apply nitrogenous fertilizers to a corn crop.

This knowledge has been gained by a large number of practical farmers acting in concert. It is knowledge that is well worth what it cost them in time and money; and, besides, it has added valuable information to the public stock of knowledge on agricultural topics.

The knowledge we are gaining in the direction of the economical feeding of farm animals from experimental sources, also points out to us the value of experimental work in agriculture. Fodders that have hitherto been considered almost worthless, have been shown to be valuable, when properly managed or fed with a due regard to the

requirements of the animal; while other fodders, whose value has been greatly over-estimated by many practical farmers, are finding their true place in the list of feeding materials.

Though everything has not been learned in regard to the economical feeding of animals, much has been discovered which, if taken advantage of, would save thousands of dollars annually to the farmers of the State. As an example of what may be done in this direction, I give the results of some feeding experiments carried on at the New Jersey Agricultural Experiment Station in 1880. But, to enable the reader to fully comprehend them, I will state the reasons for the combinations in the fodders fed in the experiment: The nutritive portions of fodders consist of three classes of compounds known to chemists under the names of Albuminoid or Protein compounds, Carbohydrates, and Fats. The albuminoids are what are popularly called flesh formers. They are compounds that resemble very closely in composition the white of an egg, lean meat and what is known to farmers' boys as wheat gum. Fats are what are ordinarily understood by that term. Their chief source as food for domestic animals are the vegetable oils that exist in the principal fodders. Carbohydrates are such compounds as sugar, starch, etc.

Now, feeding experiments have shown that according to the animal fed and according to the object for which it is fed, the best results are obtained when approximately definite amounts of the above named substances are furnished to the animal in a digestible form for 1,000 pounds live weight, and that when otherwise fed there is a waste of feeding material. It thus happens that many of the coarse fodders which contain small quantities of albuminoids, but no inconsiderable amounts of carbohydrates, are, when fed alone, comparatively valueless, but if they be fed in connection with some substance rich in albuminoids, they can be turned to good account. It is never the case that any one fodder contains the albuminoids, fats and carbohydrates in the proportion to form a complete ration for any animal; and there is therefore usually a waste of feeding material when our fodders are fed alone. For instance, German investigators have shown by experiment that milk cows require, to hold them in the same condition as to flesh and at the same time keep up a good flow of milk, 2.5 pounds of digestible albuminoids, 12.5 pounds of digestible carbohydrates, 0.4 pounds of digestible fats, daily in a ration of 24 pounds of dry matter for 1,000 pounds live weight. I may say also that the practice of the German

farmers has confirmed the results obtained from the experiments, and thus they are guided largely by them in their feeding operations.

The ratio between the albuminoids and carbohydrates of a fodder is called the nutritive ratio. In the ration indicated above, the nutritive ratio is 1 to 5, *i. e.*, one part albuminoids to five of carbohydrates. In good timothy hay, the nutritive ratio is about 1 to 13. Hence, to produce the best results in feeding for milk some substance rich in albuminoids, such as cotton seed meal, should be fed with timothy hay. Other animals fed for other objects require a different nutritive ratio and still others a more concentrated fodder. The low value put upon straw and chaff as a fodder is not that it contains little that can be utilized by the animals to which it is fed, but because the digestible material it contains is almost entirely carbohydrates.

The director of the New Jersey Agricultural Experiment Station found that in practice it took about 35 pounds of good clover hay to keep up a good flow of milk in a cow of 1,000 pounds live weight and at the same time prevent a loss of flesh. Clover hay was worth in the market then \$15.00 per ton, and the question was with him, if a cheaper fodder could not be found, by applying to practice the knowledge that has been gained in animal nutrition by the German investigators, that would produce equally good results. By applying the principles set forth above in making up a ration for the stock on the New Jersey Agricultural College farm, the question has been answered in the affirmative. In looking over the foddere in the market he found that—

ONE HUNDRED POUNDS OF	Cost.	CONTAINS OF DIGESTIBLE		
		Albuminoids.	Fats.	Carbohydrates.
Timothy hay.....	\$1 00	3.02	1.37	48.58
Clover hay.....	75	7.83	1.48	39.71
Corn meal.....	1 12	6.23	2.89	66.90
Cotton seed meal.....	1 30	33.00	10.89	12.62
Brewers' grains.....	25	4.73	1.50	14.29

and that 100 pounds of digestible albuminoids, fats and carbohydrates cost in—

	Albuminoids.	Fats.	Carbohydrates.
Timothy hay.....	\$6 70	\$6 70	\$1 40
Clover hay ..	4 30	4 30	90
Corn meal	4 90	4 90	1 00
Brewers' grains	2 80	2 80	60
Cotton seed meal	2 80	2 80	60

From this table it is seen that the nutritive matter varies considerably in price in the different fodder materials; and it is of course for the interest of every farmer to feed as much as possible of those materials which furnish the nutritive matter at the least cost, with a due regard to the health of the animals and to the utilization of all the nutritive matter in the fodder.

The director of the experiment station made up a ration as given in the following table and fed it to a herd of six grade cows, and in his report of the experiment states that this ration gave perfect satisfaction. The ration was reckoned for 1,000 pounds live weight per day and agrees substantially with the theoretical ration in nutritive matter:

	CONTAINING LBS. OF DIGESTIBLE		
	Albuminoids.	Fats.	Carbohydrates.
Six pounds clover hay.....	0.47	0.09	2.27
Thirteen pounds wheat straw	0.11	0.04	4.88
Twenty pounds brewers' grains	0.99	0.33	2.86
Twenty pounds turnips.....	0.26	-	2.06
Two pounds cotton seed meal	0.66	0.22	0.24
Total.....	2.45	0.65	12.31
Total dry matter in ration.....	25.6 pounds.		

The total weight of the six cows to which this ration was fed was 5,800 pounds. The daily ration for the herd was calculated by multiplying the ration for 1,000 pounds live weight by 5.8, thus making the daily ration for the six cows as follows:

Clover hay	35 lbs.
Wheat straw	75
Brewers' grains	116
Turnips	116
Cotton seed meal	11½

The daily cost of this ration was as follows:

35 lbs. clover hay	\$0 26
75 lbs. wheat straw	0 26
116 lbs. brewers' grains, at \$5 per ton	0 29
116 lbs. turnips, at 10 cents per bushel	0 19
11½ lbs. cotton seed meal	0 15
Total cost for six cows per day	\$1 15
Daily cost for each cow	0 19
Daily cost when fed on clover hay alone	0 26

The length of time through which this ration was fed was thirty days. The cows were milked twice daily and the yield of milk from each cow weighed and recorded. Below are given tables containing descriptions of cows and their milk record during the experiment:

NAME OF COWS.	Age of Cows.	Weight of Cows.	Date of Calving.	Next Calf Expected.
Strawberry	6 years.	965 pounds.	October 23, 1880	August 29, 1881.
Star Face	6 "	1000 "	October 10, 1880	- -
Daly	4 "	825 "	June 12, 1880	July 13, 1881.
Dominie	7 "	917 "	July 15, 1880	August 1, 1881.
Sutphen	9 "	880 "	October 8, 1880	- -
Camel	7 "	1220 "	April 15, 1880	April 1, 1881.

Yield of Milk.

NAME OF COWS.	From Nov. 16 to Nov. 26— 11 days.	From Nov. 27 to Dec. 7— 11 days.	From Dec. 8 to Dec. 16— 8 days.	Total yield for 30 days.
Strawberry	273 lbs. 8 oz.	292 lbs. 8 oz.	199 lbs. 8 oz.	765 lbs. 8 oz.
Star Face	274 lbs.	261 lbs.	185 lbs. 8 oz.	720 lbs. 8 oz.
Daly	165 lbs.	185 lbs.	147 lbs. 12 oz.	498 lbs. 12 oz.
Dominie	256 lbs.	259 lbs.	190 lbs.	705 lbs.
Sutphen	279 lbs. 12 oz.	272 lbs.	199 lbs. 8 oz.	751 lbs. 4 oz.
Camel	223 lbs. 8 oz.	218 lbs.	160 lbs. 4 oz.	601 lbs. 12 oz.

Total yield of the herd for 30 days, 4,042 pounds, 12 ounces ; total yield in quarts, reckoning two pounds to the quart, 2,021—an average of 11 quarts daily per cow.

In running up the results of this experiment, I can not do better than to use the exact language in the Report of the Station :

“ 1. From the experiments it appears, then, that the cows have gained a little in flesh by being fed on this ration, and that their flow of milk has not diminished.

2. It is fairly proved that the ration saved directly thirty per cent. on the cost of a full ration of clover hay, and still more than this on one of clover and Indian meal.

3. The ration also saved indirectly, by turning to profitable account the straw and coarse products which are ordinarily only used for manure.

4. The whole experiment shows that the live stock on a farm can be kept in good condition, and a much larger amount of its high priced products sold than it is now the practice to sell, or else that a greatly increased amount of live stock can be profitably kept while consuming all the food products.”

* This is but a single example of what may be saved in the way of feeding our domestic animals. Other rations could be calculated that would serve the same purpose. And equally good results could be attained in feeding other animals in a rational manner.

The farmers of Maine can not be urged too strongly to undertake experiments of so simple a nature as the illustrations given in this paper ; for, while they are inexpensive, the probabilities are all in favor of great pecuniary advantage being gained by them. The preparation necessary for taking hold of them in a manner to insure success is not great, neither is the information required difficult or costly to obtain.

In the Report of the Board of Agriculture of this State for 1880, the principles of manuring and cattle feeding are well and ably set forth, and copies of this Report can be had for the mere asking. The information given in the articles referred to, is about all the help the farmer can expect from science in its present condition on these topics. It remains for the farmer to determine by experiment to what extent they can be applied to the special conditions under which he is working.

The farmers of the Eastern States have farmed it with muscle about as long as they can make it profitable ; but let them not say that farming in these States can not be made to pay, until they have farmed it for a time with brains.

I have indicated the kind of experimental work that is required of farmers in order to turn to good account the information already gained in agriculture from scientific sources. Agricultural science

is yet in its infancy, and the largest portion of the work that has been done in this direction has been carried out in Europe. Much of it may not, and some of it we know does not apply to the conditions of America. We know that climate and soil make a great difference in the composition of the same plants. The digestibility of fodders grown under different conditions is also different. For reliable tables of composition and digestibility of American fodders, then, the work must be repeated here. The fodder analyses are comparatively inexpensive; but the determination of the digestibility of fodders is a long, laborious and costly undertaking, involving patient and pains-taking work of many experienced men with a considerable outlay in apparatus. Repeated trials must be made with feeding stated quantities of fodders of known composition to different animals through a considerable length of time, and the daily excrement collected, weighed, and submitted to chemical analysis. Besides this, the field for investigation in the interest of agriculture is constantly widening, and the need for it is becoming more and more felt, on account of the competition of the agricultural products of the Western States in our markets.

The farmers of the Eastern States are beginning to realize the fact that their soils will no longer produce profitable crops without the use of large quantities of manure, and to feel that every effort must be made to decrease the cost of production. They are coming to rely more and more on the results of scientific investigation to assist them in their farm operations, and are demanding that the agricultural colleges established by an act of the general government, shall, in addition to their legitimate work of giving instruction in agriculture, do that of an agricultural experiment station. By what authority they are demanding this work of the colleges, we know not; for the act by which they were established makes no provision for it, and but few colleges have the funds with which to engage extensively in experimenting, or the instructors the time to attend to it. It is therefore rapidly becoming a question of no little importance, as to how and by whom this work is to be done. In Europe, such work has been carried on partly at the expense of the government, partly at the expense of the agricultural societies and partly at the expense of private individuals. There are but few private individuals in this country interested in agriculture who have sufficient wealth to warrant them in undertaking anything of this kind, so that trusting to the public spirit of private parties is

out of the question. Neither are the agricultural societies, as they are at present organized, in condition to carry on such work.

I have already alluded to the fact that it is out of the province of the agricultural colleges to engage in experimental work, and though much has been accomplished in this direction by those colleges, it must be looked upon as having been done gratuitously.

It seems to me proper that the expense of this work should be borne by the State. This has been objected to, on the ground that it necessarily involves taxing the whole for the benefit of a class. This, however, is not the fact. Though it involves the taxation of the whole, it is not simply for the benefit of the farmer, but for the benefit of the whole people. Whatever helps the farmer helps every class, rich and poor, alike. One might as well argue that the general government ought not to clear out our harbors and erect light-houses along our coast, because it is taxing the whole people for the benefit of ship-owners and merchants. No one reasons in this way in regard to the shipping interests, for they know how dependent the prosperity of the country is upon those interests. Is not the prosperity of the country dependent in a still greater degree on the prosperity of its agricultural interests?

Four of the Atlantic States have already established agricultural experiment stations, which are now doing good and efficient work. These stations are needed not only for conducting original investigation, but to assist the farmer in various ways in the application of science to agriculture. At the stations thus far established, the first work undertaken has been the control of the sale of commercial fertilizers. In those States they have driven bogus fertilizers from the markets, by publishing from time to time analyses of all the brands of fertilizers that could be found for sale, which enables the farmers to determine for themselves what fertilizers to buy and what to reject. From the control of commercial fertilizers the work has been extended to the control of fodders and seeds, and to scientific research, with results that have gained the confidence of the farmers in the respective States.

It is to be hoped that the farmers of Maine will soon take steps to protect themselves from frauds, and at the same time aid in the advancement of agriculture in general by establishing an agricultural experiment station.

AFTERNOON.

At the opening, the Secretary explained the relations of feeding the farm crops to stock on the farm to the fertility of the soil from which they are taken. The claim is made that the crops of the farm may be fed to good stock and return to the feeder their market value in cash from the income of the stock fed. At the same time a large part of the elements of fertility contained in the products fed out is retained in the form of the voidings of the stock kept.

Mr. Shaw, of the Penobscot County Farmers' Club, then read the paper on "Profits of Feeding Hay," which was presented at the Piscataquis Institute. After the reading of the paper, a gentleman present asked the following question :

How can witch grass (*Triticum repens*) be eradicated?

BENJ. LINCOLN, of Dennysville, replied that in 1881 he plowed witch grass sod immediately after haying, and between that time and winter plowed twice more, harrowing thoroughly each time. This gave the grass no time to recover and establish itself again after being disturbed by the plowing and working of the soil. This year, 1882, it was in root crops and without any appearance of the grass. The past autumn the experiment has been repeated on another field, and at the present time the grass appears to be all destroyed.

EVENING

Was given to a lecture by Francis Barnes of Houlton, subject, "Having a Purpose," no report of which is given.

An interchange of courtesies and an expression of thanks for attentions received closed a successful institute.

KNOX COUNTY.

Institute at Warren.

A very successful Institute was held at the Town Hall, Warren, November 23. Mr. Erastus Lermond, member for the county, called to order and invited E. W. Stetson, of Lincoln county, to preside.

PRINCIPLES OF FERTILITY.

By Z. A. GILBERT, Secretary of the Board.

We come here for work, and farmer like we may as well go at the business in hand without formalities or further preliminaries.

I don't know but I ought to make an apology for introducing the subject of fertility at this time. It is an old subject, one that has been talked over much before agricultural meetings of every description, yet it is one which the farmers in every quarter of the state have to encounter every succeeding year in their farming operations. At this time I wish to present it in a somewhat different form from that in which we ordinarily handle it; I wish to present it in its scientific aspect somewhat, endeavoring to analyze it into its parts, that we may see the reasons for this and that result, and, therefore, the better understand our way out of its difficulties. We want to let the light into the deeper recesses. We are all the time inclined to take superficial views of all agricultural topics; but we ought in our studies to ever be trying to dig down somewhat deeper than we have before done and see if we cannot unearth some things which heretofore have been beyond our reach, something new, something not before understood.

The relations of science to agriculture have been somewhat repulsive to the common farmer. But that is gradually wearing away, from the better understanding of its relations to agriculture. There is nothing about it that we ought to shun at any time, or that should cause us to set up our minds in defiance to its teachings; because science as applied to agriculture is simply the laws of nature applied to production. When we come to consider, as we well may, and as we should, that all plant growth is produced by certain fixed laws of nature, we at once understand the importance of the scientific principles of agricultural production, because nature's laws are not

to be broken—nature fulfils her mission in strict compliance with her laws. If we, in attempting to produce crops from the soil, violate a law of nature, we defeat our object just to the extent that we have violated that law, because no man has yet been able to produce a single plant from the soil in violation of nature's laws; it must be done in strict compliance with those laws.

Let us, then, search out, from every source of information possible, the nature, extent and bearing of those laws, that we may be able to conduct our farming operations more profitably and the better secure the results we are after. The more closely we confine ourselves to a strict compliance to those laws, the more profitable will our business be. It is true, we sometimes violate those laws, but we pay for that violation. It is not through the violation that we produce crops; it is in spite of that violation.

We have two fields, for instance; one is productive and the other refuses to furnish us profitable crops. Now, what is the difference between those two soils? We say one is fertile and the other is infertile. What is the difference between a fertile soil and an infertile one? If we understand well the difference between those soils, and then as fully understand the means and methods by which we can change the one and make it conform to the other—that is, change the infertile and make it conform in character, in productive capacity, to the fertile soil, to that extent we carry on our business intelligently. It becomes necessary, then, to know and to fully understand the difference between these two characters of soil. It will be necessary for us, first of all, to examine the plant which we wish to produce from the soil, for the benefit to us of a fertile soil comes from its capacity to produce a plant.

Nature, by the aid of sunshine and rain, and out of the fertility of the soil, is able to build up a structure which we call a plant. Now, nature cannot do this unless the soil be fertile. What then is this fertility in the soil? I say we must look at the plant to discover that; for I say nature builds up a plant out of its surroundings, out of the soil in which it stands. A chemist will take a plant and examine its contents and find that it is made up of certain elementary materials, to each of which they have given a name. Those materials come from somewhere. A portion of them come from the atmosphere and a portion from the soil. Nature combines them together and erects a plant.

The chemist finds that a plant is made up of thirteen elementary substances, distinct and definite. The difference between the different agricultural plants is this, that these substances exist in these plants in different proportions. The same elementary materials are found in a corn plant that are found in a stalk of wheat, but in the two plants they are found in different proportions. These thirteen elements are divided into two classes, one of which is called organic or atmospheric. There are four of these atmospheric elements in a plant, and three of these are obtained by the plant from the atmosphere alone. You will see at once that the farmer has nothing to do with them. If the plant obtains a material from the atmosphere, the farmer has not to supply it, and he need not trouble himself about it, only that he wants to fully understand the nature and composition of a plant. The fourth element of this class, nitrogen, is found in the atmosphere, but is obtained chiefly from the soil; consequently, as you will see further on, the farmer has something to do with nitrogen; he has got to make himself familiar with it. We will bear in mind that nitrogen is an element found in all plants.

The other class of elementary substances composing a plant are called mineral, inorganic or earthy elements. There are nine of these mineral elements found in every plant. Some are found in only extremely small quantities, and others in larger, but only an extremely small percentage of mineral matter is found in any plant. To determine the exact amount, all you have to do is to take the plant, dry it and burn it, and the organic or atmospheric elements will ascend from the burning into the air from whence they came; the mineral portions are undestroyed by the fire and are left in the form of ashes. You know that if you take a large plant, like corn, and burn it, you have only a very small amount of ashes left; and yet every particle of these nine elementary mineral substances existing in the corn plant is left in the ashes.

Of all these nine mineral elements found in a plant, there are seven of them which are found in sufficient supply in all of our agricultural soils, so that practice has proved that the farmer never need look out for them. That is, in changing an infertile soil to a fertile one, practice has proved that the farmer has to look out for only two of these mineral substances; the others are always found in the soil in sufficient quantities for an indefinite succession of crops. These two, which the farmer from time to time may be called upon to supply, from the fact that they are not found in

plentiful amount in the soil, are phosphoric acid and potash. So that of the thirteen elements of which a plant is made up, the farmer has to do with the supplying of only three. Hence the problem of changing an infertile soil to a fertile one is very much simplified from what we formerly supposed it was, when we acted under the belief that we had to supply every one of these elementary materials in order to render a soil fertile. We now have to look out for nitrogen, phosphoric acid and potash. A soil may be lacking in one of these; a soil may be lacking in all of them. In passing, I will say that no plant will grow unless it has within its reach every one of these thirteen elementary materials. This is not theory at all—it is a scientific fact, which has been proved from practical tests. By actual tests it has been found that our common agricultural soils are frequently defective either in their supply of nitrogen, of phosphoric acid, or in their supply of potash. Sometimes it is one of them only; but if only one of them, the soil utterly refuses to produce crops, just the same as if all three were lacking. So it is one, two or three of these substances which must be looked after by the farmer and supplied, in order to change an infertile soil into a fertile one.

You will probably have in your minds here that what we term an infertile soil still is producing plant growth to a limited extent, although not in profitable quantities. This comes from the fact that all of our soils contain these materials, nitrogen, phosphoric acid and potash; but the trouble is that they are principally in such a form that the plants cannot get hold of them and appropriate them to their use. If they are unable to reach out and take hold of them and appropriate them to their use, the plants will then refuse to grow. But almost all of our soils do contain a small portion, at least, of these elements, which is available, and thus crops still grow, sufficient to cover the barrenness, it may be, but not sufficient to make it profitable. These materials as found in the soil are in an insoluble form. The materials which make up a plant must be in a soluble condition or the plant cannot get hold of them. A plant has to go into the soil and take these different materials and transfer them into the different parts of the plant and assimilate them, so to speak, into its structure. You see at once that that can only be done when they are in a liquid form; these materials must be soluble in water, or else they are locked up beyond the reach of the organs of the plant. This plant nutrition is obtained through and by*

the little hair rootlets which are everywhere attached to the roots of the plant, running out into the soil. If you take any plant and carefully wash the earth away from the roots, instead of tearing it away, you will find that they are covered in every direction with minute hairs; and it is through those hairs that the nourishment, so to speak, is taken up by the plant. You at once see the philosophy of having your material in a liquid form. There is a supply of every one of these elementary materials in all of our agricultural soils, even in our run out soils, sufficient to give paying crops for an indefinite period of years; but they are in a form that is not soluble in water, and the plants cannot avail themselves of them, and hence do not grow.

There are methods by which we can aid in rendering these materials that now exist in the soil soluble, so that the plants may appropriate them. Atmospheric influences acting upon them tend to make them soluble. We stir up the soil by plowing, upturning material which before lay out of reach, in a measure, of the influences which tend to render the material soluble. We expose these particles of soil containing this plant food to these atmospheric influences—to the action of the sunshine, the rain, the frost—thereby rendering a portion of the plant food soluble. We continue a limited amount of crop production by that method alone, and certainly aid in getting a profitable crop. But that operation is not rapid enough, or sufficient for our wants; so we are called upon, as intelligent farmers, to add to the store in the soil, in order to give the additional amounts which are needed to return to us the bountiful crops which we find are necessary to a profitable cultivation.

Manuring the soil, then, resolves itself down to this simple proposition: supplying nitrogen, phosphoric acid and potash, one or the other, or all three, to the soil: this, and nothing more. The value, then, of a manure, you will see at once, is determined by the amount of nitrogen, phosphoric acid and potash there is in it. The barn manures we recognize as our standard. Those manures are valuable for the number of pounds of nitrogen, phosphoric acid and potash there is in them. We go into the market and buy a commercial fertilizer. That commercial fertilizer is valuable for just the number of pounds of nitrogen, phosphoric acid and potash there is in it, and for nothing further. So you see the commercial fertilizers marked (and the law requires it) three or four per cent. nitrogen, ten per cent. soluble phosphoric acid, three or four per cent. potash.

That is all the value there is in them. That is all we want of them. It is the same with barn manures. What we want of barn manures is to furnish nitrogen, phosphoric acid and potash to the soil.

Perhaps this conflicts with the ideas of some men, that it makes a difference what you manure with. It doesn't make any difference to the plant where it gets its nitrogen; the plant is entirely indifferent as to the source from which it comes, it only wants it within its reach; it cares not whether it obtains it from barn manure or from a commercial fertilizer; it cares not whether it gets it from the food you give your animals or from porgie chum from the shore; it only wants its nitrogen. Just so with its phosphoric acid. It makes no difference to the plant whether it obtains it from the voidings of the stock, or from the dissolved bone which we obtain from the commercial manure manufactory. It must be supplied from some source, and that is all that the plant cares about it. It is for our benefit to determine which is the more economical source to obtain it from.

Our common course in supplying ourselves with manure, is to feed our farm crops upon the farm and take the resulting manures to supply the defects of the soil. In one sense we may say we feed for the manure.

If you watch carefully the introduction of husbandry into any section, you will see that on new lands the first system of farming introduced everywhere is the system of crop production, for the purpose of changing those crops into food for the family, or for selling them off in their natural form for their market price. That is the system—crop production for crop selling—always and everywhere, in the first settlement of a new country. That is usually carried on till the native store of plant food is somewhat exhausted, and the gradual lessening of the crops begins to remind the owner of the land that he must give some attention to supplying the soil with those materials which his crops have been drawing from it, and which he has been transferring to the market without returning a like amount of any kind back to the soil from whence it came. When he begins to discover this condition of things, he begins at once to look around and introduce stock husbandry in some form. Stock husbandry has now come, here among the farmers of the State of Maine, to be considered as the basis of successful farming. This is true in every community outside of Aroostook county, and even there the same law is becoming accepted. Out of it comes

what of profit there is in farming. Out of it, as we with intelligence, knowledge and skill handle it, comes the highest profit which is within our reach.

Mr. E. W. STETSON. Is there any method by which a farmer, who has not the means of analyzing his soil, may determine the absence of any of these elements of fertility?

Sec. GILBERT. That seems a very appropriate question to come up here. You will see that economical fertilization may depend upon that knowledge. If, by any means or method, you can ascertain that nitrogen only, for instance, is wanting in our soil, you will see at once that all you have got to do to make that soil productive, is to apply nitrogen. It is cheaper for you to apply nitrogen alone, than it is for you to apply all three of the materials, where only one is wanting. "A farmer who has not the means of analyzing his soil," he says. That might as well have been left out of the question; for, while we formerly hoped for something from an analysis of the soil, we now have arrived at the fact that chemical analysis is no help for us in this dilemma. The methods of analysis are not sufficiently exact to determine the quantities of these fertilizing elements in the soil with sufficient accuracy to fully determine the productive capacity of the soil.

We may have two soils otherwise precisely alike in every respect; one of them is lacking in nitrogen and will not produce a crop, the other one has a supply of nitrogen and will produce a bountiful crop. No chemist in the world can detect the difference between those two soils; his processes are not accurate enough to determine the small amount which makes the difference between a fertile and an infertile soil, or between a paying crop and a losing one.

It was stated a year ago, at a meeting of the Connecticut Board of Agriculture, by Professor Brewer, one of our authorities on these matters, that you might cover the soil over with one inch of guano, a commercial fertilizer which is especially rich in nitrogen and has been used ever since it was discovered for the purpose of supplying nitrogen to the soil, and mingle it with a foot in depth of the soil, and then put a sample of that soil in the hands of a chemist, and he cannot discover that any nitrogen has been applied to the soil. Yet there are thousands of cases where five hundred pounds of guano applied to the acre has been the means of producing a bountiful crop; but a chemist can not discover that an inch of it has been applied to the soil.

So an analysis may be set aside as a source of no information as to the productive condition of our soils. How can it be done? It can be done by the plant, and in no other way; and that question can be determined by you just as well as by the president of an agricultural college. You set a plant in the soil and that plant will tell you whether it can get any food there or not, and there is no other way known to man. This is being done by many individuals. Experiments are being repeated all over the country.

QUESTION. May not all the properties necessary to the production of a plant be present in a soil and still the soil be infertile?

Sec. GILBERT. If they are not in this soluble condition that I spoke of, the soil will be just as infertile as though the material was not existing in the soil. Also a soil may be full of water, when plants will not grow. A plant cannot grow without a proper degree of heat, and heat will not penetrate into a soil when it is saturated with water. That water must be either drained off or evaporated before a sufficient amount of heat can penetrate into and be retained by the soil to produce agricultural plants. Hence the necessity of taking all excess of water out of the soil.

QUESTION. Are not some of our soils so sandy and porous that they will not retain these ingredients when they are applied?

Sec. GILBERT. There is but little danger of leaching; yet there is a possible loss in that direction. With a sandy soil of coarse texture and a gravelly sub-soil, admitting of complete and quick drainage, the percolation down through may possibly carry with it a certain amount of plant food. Hence it becomes necessary to handle different soils in a different manner. The manuring and cropping of one of these sandy soils with a light sub-soil is just as different a piece of farming from the handling of a clayey soil as the profession of politics is different from that of an agricultural talker. You manure, for instance, a coarse, sandy soil with a heavy application of green barn manure, the fertilizing elements of which, you know, are in an insoluble state: you work it deeply into the soil; the plant food in the manure becomes soluble slowly. You have no crop on that soil excepting a few months in the year, and when the crop isn't there to take up this material as it is rendered soluble, the rains falling upon the surface and working down rapidly through it will just as certainly carry some of the plant food with it as the water goes through. With a clayey soil it is different. In a clayey soil the water is mostly evaporated from the surface, the

particles of soil are firm and more retentive, and consequently there would not be the danger from leaching, as with the sandy soil. What is the lesson? If you are going to fertilize a sandy soil, use thoroughly decomposed manure in small quantities, so that the plants will take it from the soil the same season it is applied and make plant growth of it; the next year you do the same and get another crop. Make your applications frequently; stir your soil frequently, and rotate your crops frequently on a sandy soil. This is not so necessary or so advantageous with a clayey soil. We should adapt our methods to the soil we are handling.

S. L. HOLBROOK, member from Sagadahoc: It is very evident to the casual observer that the farm is passing through a sort of transition state. The farm of to-day is not what it was fifty years ago. The enterprising farmer is not satisfied with the way that farming has been managed, and is seeking a better way. He is not satisfied with the production of one acre of corn, a piece of potatoes, one cow and a few hens; that will not meet the wants of society; he has got to farm it on different principles and adopt new methods.

We have under discussion the very important question of the fertility of the soil, a question which lies at the foundation of our business, and in fact of all industries. I will throw out a few suggestions and then leave the matter in the hands of the farmers present. Professor Chadbourne once asked his college class to tell him, at the next recitation, the difference between a plant and an animal. They thought it over and when they came together not one of them could answer the question; they could not tell that there was any difference between a plant and an animal. He told them that all the difference he could give was that one possessed the power of voluntary motion and the other did not; and that one feeds on organic and the other on inorganic matter. He said, "the plant eats as we do, breathes the air as we do; it has veins and arteries as we have, and I don't know but it possesses sensation."

This point should be thoroughly understood, that all plants must be fed; they must have nourishment; and in proportion to the nourishment which they receive they will flourish. There are different ways in which we may improve the fertility of our soil. The first and principal way is by manuring. This is an important question, and on this we shall succeed or fail. We have been told

that stock husbandry lies at the foundation of all successful farming. Well, gentlemen, there is such a thing as the judicious application of manures, and there is such a thing as applying them in an injudicious manner. That is a question of importance which we haven't time to discuss fully here. I will say that the most judicious way that I can apply barn manure to my land is to thoroughly incorporate it with the surface soil. I don't exactly agree with some of the propositions. So far as my experience goes, I prefer bulky manure to that in a concentrated form. We are told that in a cord of barn manure there is so much plant food; but with me I find a benefit beyond that, in the mechanical effect of it. Perhaps on light soil it would not be so; but when I apply barn manure to my heavy soil I think I get great benefit from its mechanical effect. It lightens up the soil and brings out the properties of the soil.

Another way in which we can improve our soil is by drainage. The amount of water in our soil may make the difference between success or failure: and happily we have this within our control to a great extent.

Then we have tillage. The old definition of that was manuring. It was imperfectly understood once. An old Indian once, being asked how he manured his land, said, "I plow and plow and plow seven times;" and the secret was, he said, that he plowed when the dew was on, supposing there was great richness in the dew. He did not understand that by cultivating the soil he rendered certain plant food which was in the soil available to the plant.

I have canvassed the town of Brunswick, containing 28,000 square acres of land and some very good farmers, yet not one fifth of the farmers protect their manures. The fertility of their farms is running to waste, carried down our streams to the ocean.

AFTERNOON.

Sec. GILBERT. In opening this afternoon, I simply wish to call attention to the relation of the subject assigned for the afternoon to the lesson which I attempted to draw this forenoon. You will bear in mind that dairying is a branch of stock husbandry. In prosecuting dairying we do it for the purpose of realizing our profits through dairy products. We would urge it upon the attention of the farmers from two stand-points; the one was indicated by the character of the exercises this forenoon, and that is its relation to the fertility of the soil. No branch of stock husbandry among us so fully maintains the fertility of the soil as this one of dairying. That, of course, is an important feature, and one worthy of being held in mind at all times; but while we are guarding the fertility of the soil there is another matter that we have to guard, and that is the profits. We cannot deposit all the products of our efforts in the soil; we must look out for the money returns also. Here again we hope the investigations of the afternoon will commend this subject of dairying to you from the stand-point of profitable returns in money, and that the two features taken together will give the subject a very favorable appearance.

PROFITS OF PRIVATE DAIRYING.

By J. K. HAMMOND, Member from Oxford County.

I feel some hesitation in presenting to you the statements, which I hold in my hand, from our Oxford county dairymen, when I consider how much more favorably located for that business you are than we. What we lack in Oxford county you have here, a home market for all the products you have to dispose of. Our Oxford county dairymen are obliged to send most of their products to Boston to some commission house, paying commissions and freight; while those in this section find a market in the cities and large towns which lie near at hand. However, I will give a few statements which I have received from our dairymen in Oxford county, in the towns of Hebron, Norway and Paris.

Statement of Albert Andrews, Paris, from April 1st to November 1st, 1882—Six Cows.

CR.	
793 lbs. butter	\$205 47
Calves sold	15 00
92 lbs. cheese	11 00
Skimmed milk	25 00
	256 47

DR.	
To grain fed from April 1st to November 1st	\$31 71
pasturing 6 cows, at \$5	30 00
3½ tons hay fed, at \$12 per ton	42 00
	103 71

Leaving a balance of \$152.76 for profit and care of cows.
Average price of butter sold, 26¾ cents.

Statement of Philip C. Mason, Superintendent of Paris Town Farm—Ten Cows.

CR.	
Cheese sold	\$200 00
Butter sold	131 00
Calves sold and raised	40 00
Estimated value of skimmed milk	20 00
	391 00

DR.	
20 tons hay, at \$12 per ton	\$240 00
Pasturing 10 cows, at \$5	50 00
	290 00

Leaving a balance of \$101.00 for the care of cows.
These cows have not been fed grain at any time.

Mr. Mason informs me that the statement is about an average for the past six years he has had charge of the farm.

Statement of Oliver G. Curtis, Paris.

Milked 5 cows to the first of April, and 8 cows from April 1st to November 1st, 1882.

		Cr.	
January	121 lbs. butter, at 30c.....		\$36 30
February,	87 " " 30c.....		26 10
March,	108 " " 32c.....		34 56
April,	111 " " 30c.....		33 30
May,	161 " " 27c.....		43 47
June,	212 " " 24c.....		50 88
July,	174 " " 25c.....		43 50
August,	173 " " 32c.....		55 36
September,	172 " " 32c.....		55 04
October,	181 " " 34c.....		61 54
<hr/>			
	1,500 lbs. butter.....		440 05
	3 calves sold		12 50
	2 calves on hand		12 00
	Estimated value of skimmed milk		50 00
			<hr/>
			514 55

Mr. Curtis claims there should be added to the credit of his cows the amount which he has received in exchange of cows, \$49.00.

Dr.

Meal for 8 cows from January to June.....	\$104 10
" " October 1st to November 1st.	12 64
14 $\frac{3}{4}$ tons hay, at \$12.....	177 00
Pasturing 8 cows, at \$5.....	40 00
	<hr/>
	333 74

Leaving a balance in favor of cows of \$180.81, or \$22.60 per cow.

Mr. Curtis makes the following statement in regard to the value of skimmed milk for making pork :

Dr.

Bought 5 pigs November, 1881 ; cost as follows :

5 pigs, at \$2	\$10 00
Cost of shorts, corn and corn meal fed	51 98
	<hr/>
	61 98

Cr.	
One shote sold.....	\$5 50
Pork sold, October 10, 1882	96 81
	<hr/>
	102 31
	<hr/>
	61 98
	<hr/>
Balance.....	40 33

All the food fed in addition to the above was skimmed milk from the dairy, and Mr. Curtis estimates they ate about two-thirds of the product from the cows.

Statement of S. R. Ellis, Paris, made November 1, 1882.

This statement commences January 1st and ends November 1st. Whole number of cows, 14; average number milked, 11. Monthly statement of butter sent to Boston.

Cr.	
Amount received for butter sold	\$99 53
" " January.....	80 63
" " February	78 24
" " March	89 36
" " April	54 54
" " May	54 26
" " June	71 22
" " July	103 17
" " August.....	112 56
" " September..	97 67
" " October.....	104 00
Cheese sold for four months.....	124 00
10 calves raised.....	<hr/>
	1,069 18

Dr.	
21 tons hay, at \$12.....	\$252 00
Pasturing 14 cows, at \$5.....	70 00
Meal from January 1st to June 1st	100 80
Meal for 15 days in October	11 34
	<hr/>
	434 14

Leaving a profit of \$635.04. Average, \$45.36 per cow.

The cheese sold was made from the skimmed milk, and, of course, introduces an extra labor item into the cost. So let us credit the cows with what Mr. Ellis received for his butter alone, and see how the account will balance.

Amount received for butter, as above	\$845 18
Expense account, as above	434 14
	411 04
Balance	411 04

Or, per cow, \$29.36.

Statement of Mr. Ezekiel Merrill of Hebron.

Average number of cows 14.

Mr. Merrill uses a Cooley creamery, oscillating churn, and butter worker.

	Cr.	
Butter made in the month of	January,	90 lbs.
“ “ “	February,	106 lbs.
“ “ “	March,	113 lbs.
“ “ “	April,	161 lbs.
“ “ “	May,	217 lbs.
“ “ “	June,	236 lbs.
“ “ “	July,	260 lbs.
	1,183 lbs.,	25c. av., \$295 75
August, ten day's milk carried to cheese factory; received		
108 lbs. cheese, at 13c.		14 04
For the remainder of August, milk sent to Portland.....		56 00
September, milk sent to Portland (rec'd 32c. per can)....		89 95
October, milk sent to Portland		96 95
Butter made from Saturday night and Sunday mornings'		
milk, 140 lbs., at 25c.		35 00
Value of milk given to calves.....		120 00
Value of skimmed milk given to hogs		20 00
		727 69

Dr.

To corn meal, cotton seed meal and shorts, from
 January 1st to November 1st, 1882..... \$200 00

Nineteen tons of hay, eaten from January 1st to

May 15, at \$12 a ton.....	\$228 00
Pasturing fourteen cows, at \$5 per cow.....	70 00
	498 00

Leaving a balance of \$229.69.

Now let us compare the making of butter with making cheese. I will take the months of June and July in which Mr. Merrill made butter.

June.....	236 lbs.
July	260 lbs.
	496 lbs., at 25c., \$124.00.

During those months the milk required for one pound of butter will make two and one-half of cheese. The cheese at the South Paris factory sold for thirteen and a half cents per pound. Had the milk of June and July been made into cheese it would have made

1,240 lbs. cheese, at 13½c.	\$167 40
Less 1¼ cents per pound for making	15 50
	151 90

This is more, after deducting the making, than was received for the butter by \$27.90.

Statement of W. C. Hobbs, Norway.

This statement commenced March 1st and ended November 1st. Four cows. Number pounds of butter made, 508; sold at an average price of 34 cents.

CR.	
508 lbs., at 34c.....	\$172 72
75 lbs. cheese made, at 20c.....	15 00
Calves raised and sold	27 50
Estimated value of skimmed milk	10 00
	225 22

DR.	
Grain fed from March to November.....	\$68 00
Hay from March to June, at \$12	43 20
Pasturing 4 cows, at \$5.....	20 00
	131 20

Leaving a balance of \$94.02, or \$23.50 per cow.

Statement of E. A. Cox, Norway, from January 1st to November 1st, 1882—Six Cows.

CR.	
Butter sold	\$255 00
Calves sold.....	25 00
Calves on hand.....	8 00
Skimmed milk, at $\frac{1}{2}$ c per quart.....	39 24
	327 24
DR.	
9 tons hay at \$12 per ton	\$108 00
Grain from January 1st to June 1st, 10c per day..	90 60
Pasturing 6 cows, at \$5	30 00
Feed from September 1st to November 1st, at \$4 per week.....	34 00
	262 60

This leaves a balance of \$64.64 for profit of 6 cows. Average price received for butter, 26 cents. This does not include butter and milk used in family.

Statement of H. C. Oxnard, Norway.

Dairy consisted of 5 cows. Account commenced January 1, 1882, and ended November 1.

CR.	
Amount of butter made, 867 lbs., at 26c	\$225 42
Pork made from skimmed milk, 400 lbs	36 00
Two calves raised	20 00
	281 42
DR.	
Grain fed from January 1 to June 1	\$75 50
Hay, $7\frac{1}{2}$ tons, at \$10	75 00
Pasturing 5 cows, at \$5.....	25 00
	175 50

A profit of \$105.92.

Statement of Thomas Witt, Norway, Made November 15, 1882.

The dairy consisted of 5 cows (one being a two year old heifer) 8½ months and 6 for the last two months. This statement is for 10½ months.

Total amount of butter, 1,086 lbs.....	\$306 80
Value of 5 calves....	22 00
Value of skimmed milk.....	50 00
	<hr/>
	378 80
Cost of keeping for the 10½ months....	187 85
	<hr/>
Balance.....	190 95

A profit of \$118.95, exclusive of calves and skimmed milk.

Statement of Charles Ryerson, Norway, from January 1st to November 1st, 1882.—Seven cows.

CR.

973 lbs. butter, at 25½c.....	\$248 11
Calves raised and sold	47 00
Skimmed milk.....	10 00
	<hr/>
	305 11

DR.

Grain from January 1st to June 1st.....	\$67 06
10½ tons hay, at \$12.....	126 00
Pasturing 7 cows, at \$5.....	35 00
	<hr/>
	228 06

This leaves a balance of \$77.05 for profit of 7 cows and does not include butter and milk used in the family.

This cheese that Mr. Ellis made was skim-milk cheese. He uses a Cooley creamery, and takes the sweet milk from the creamery and makes skim-milk cheese. In the four months he sold \$104 worth of that skim-milk cheese.

I have given you a few of the statements which I obtained from Oxford county dairymen. You will see by them that those who are making a specialty of the business, are making it more profitable than those who keep but a few cows, and are following that system of husbandry which was pursued by our fathers.

If the farmers in our county, and of the State at large, who are not already doing so, will make a specialty of dairying, I am well satisfied that they will receive much more profit than they are now making under the system of husbandry which now prevails.

QUESTION. If we all make a specialty of dairying, where shall we find a market?

Mr. HAMMOND. There is no difficulty about that; and the same statement would apply to the cheese business. I had the handling of our South Paris cheese factory for two years, and the only difficulty I found was that we could not make cheese enough to go around. There is no sort of difficulty in selling all the first quality of cheese and butter you can make. You needn't be afraid of overstocking the market.

Mr. W. W. HARRIS said: I have certainly been very much interested in listening to the figures presented by the member from Oxford. It is a better showing than I supposed he could make. For some years I was accustomed to sell milk, thinking it more profitable for me than the making of butter would be. Becoming a little tired of the style of the milk business, I experimented somewhat in butter making. I found we could make good butter, and that I could get about the same amount of money from the milk in the form of butter that I could by selling it by the quart. I got the appliances for making butter, and am satisfied with the result. I do not think any one who has listened to the statements given by Mr. Hammond, will require me to endorse the idea that dairying in Maine will pay. Any of you farmers here in this locality who have been making butter, can see there is a profit in it. I have tried it and I know there is. One great objection that arises, and I have heard it urged since I came here, is the trouble to the help in the house. That objection is not so serious as it might be. With a creamery, a butter-worker and some ice, and the attention of the man of the house, there is but very little that need be done by the women.

The Secretary has asked me to speak on the outlook of dairying. I told him I could conscientiously speak encouragingly of it, and I can. At a previous meeting, where we were discussing the raising of sheep, I asked the question, "Who ever knew of an intelligent man that kept a flock of sheep of any size, and properly cared for them for a series of years, that didn't make money by it?" and the answer was that it never was known to fail. At another meeting,

finding a man who handled a dairy business with twelve cows and kept a flock of a hundred choice sheep, we drew out from him that he made more money from his cows than from his sheep.

I imagine that before a great many years we shall arrive at coöperative dairying, not only in cheese, but in butter, taking the whole labor from the women in the house.

The great advantage of the dairying business is, that so large a portion of the product of your feed is left on the farm. It is the best industry for the fertility of the farm that is open to the farmer.

The choice butter handled in Portland comes largely from out the State. It has been some years since I was engaged in the wholesale trade there, and I am not fully posted on the subject; but the proportion of the butter handled there which comes from out the State, is larger than any gentleman here, who is unacquainted with the matter, would suspect.

The danger of over-production of choice butter is in the far distant future. The only trouble, as Mr. Hammond says about the cheese, is that you cannot make enough of it. If I was prepared to furnish one party two hundred pounds of butter per week, I could add largely to the price I am getting to-day. The highest priced butter made for the Boston market comes from the State of Iowa, made by the creamery system, where a few years ago they didn't know anything about making butter. Now they make it and send it by car loads to the Boston market, and it oversells our fresh dairy butter all the time.

QUESTION. Isn't there as good butter made in Maine as in any other New England State?

Mr. HARRIS. I think there is. I know of butter made in Maine that sells for sixty-five cents a pound.

QUESTION. Will not the feed change the uniformity of the butter?

Mr. HARRIS. I think feed has a good deal to do with making butter. It has a good deal to do with producing good milk. When you have the first quality of milk properly handled, you make the first quality of butter, and the feed has a good deal to do with the milk.

QUESTION. Why is it that Maine butter does not bring so high a price in the Boston market as dairy butter from some other States?

Mr. HARRIS. Some Maine butter does. The difficulty, I apprehend, arises somewhat from the fact that there are no large quantities of butter of any one make shipped to the commission

houses in Boston. Consequently Maine butter, as quoted, is not brought up to the level which is reached by butter which is shipped in large quantities of a uniform brand. And I think the most of our choice butter made in Maine goes directly to the consumer.

QUESTION. Is not Maine butter salted too high for the Boston market?

Mr. HARRIS. Very much of the miscellaneous make is. That is a very important thing. In producing an article, no matter what, one wants to know the requirements of the market where it is going. If they want salt butter, salt it; if they don't want salt, keep it out. You have got the taste of the people to satisfy. People are now demanding butter fresh from the churn. When they used to be satisfied to have butter made in June, we could get butter properly packed to keep sweet, yet there was a loss of aroma and sweetness about it; and the people now require butter direct from the churn, and they will pay the price for it. I sell my butter in Portland to a grocer; that grocer has his customers for it, and as soon as my butter is in the store it is divided and sent to their houses at once.

QUESTION. In the making of gilt edged butter, is not coloring matter used to a considerable extent?

Mr. HARRIS. Very often. If the people require the color of June butter in the winter, coloring matter must be used. It don't change the flavor in the least.

QUESTION. Will butter keep as well when made with a creamery as in the common way?

Mr. HARRIS. If I should answer that, it would only be an opinion, for I am not able to keep mine long enough to tell.

QUESTIONER. I heard a man say, who had a Cooley creamery, that he had lost two hundred pounds of butter that was made in the first part of the season. It would not keep.

Mr. HARRIS. I don't think he can surely charge the loss to the creamery.

Sec. GILBERT. Would you recommend a man to keep his butter?

Mr. HARRIS. No; I would not. People demand fresh butter, and the time to sell it is when it is fresh. Then there is no fear of loss. I don't know but my butter would spoil in two or three weeks; I never keep it long enough to tell. If you can get a high price for a thing fresh and new, don't keep it on your hands but sell it.

PRIVATE DAIRYING.

By L. S. ROBINSON, Warren.

The requisites for success in private dairying I put down as follows :

- 1st, Good cows.
- 2d, Good keeping.
- 3d, Good care.
- 4th, Regularity in feeding and milking.
- 5th, Gentleness.

It is useless to think of making dairying profitable with poor cows, such as will not make two hundred pounds of butter in a year. Probably three-fourths of the cows in the State will not come up to this standard. Every dairyman ought to test each individual cow for the amount of milk and of butter and the quality of butter. It is but little trouble to do this, and it will give you a knowledge of the merits of each cow. My cows are pure Jersey (and every dairyman ought to have some Jersey blood), but I would not have any one conclude that because he has a Jersey cow that she is a good one, for there are many poor cows among them, especially among the grades. A bull calf should never be raised whose dam could not make fourteen pounds of butter in a week ; and his sire should be from cows of equal capacity.

It pays to keep cows well. By this I do not mean forcing to their utmost capacity, but keeping them in a good thriving condition at all times. If a cow is fresh in milk, keep her so she will neither gain nor fall away.

Cows will give more milk if treated kindly. No loud or harsh language should ever be used with them. Neither should any harsh treatment be allowed when milking, or when they are being driven to and from the pasture.

After the cow has done her part, the next thing is the care of the milk. For the care of this, a dairy room should be provided, and it should be devoted exclusively to this purpose, and for the keeping of the apparatus in use. The practice of setting milk in the cook room cannot be recommended. Every dairyman, even if he keeps but few cows, should provide a creamery in which to set his milk. The cost is no more, at least, than the fitting of a room, while in all respects the creamery will give the best results.

For a churn, I use the Davis swing churn, and call it "the best churn in the market," much better than those with inside paddles. A good butter worker of some kind should be provided, and also a thermometer, if one expects to make a uniform article. I also use Kinnerson's butter stamp and mould. Butter that is nicely stamped and neatly put up, will look attractive and will sell more readily and at higher prices.

I am aware that many will say that they can make just as good butter with their milk set in earthen pans and butter worked by hand, but there are customers who are not satisfied if the butter-milk is not worked out, and they want their butter printed with some other design than the finger prints of the maker. I am much in favor of deep setting. I can make more butter in a year from the same milk, and the butter is uniform without regard to weather. It is always known what kind of butter you will have, while by the old methods it is about as changeable as the weather. I made enough more butter the first year I had a creamery, from the same number of cows, to pay its cost.

Cows will pay a better profit to come in fresh in the autumn or early winter. Then give them warm quarters, where it will not freeze, well lighted and well ventilated. Keep the cows in these warm quarters all the time in cold weather, save while they are drinking. Keep them clean, as it is impossible to have good milk or butter where filth abounds.

It is a saving of food to feed regularly. When poor quality of hay is to be fed, it should be fed in connection with good hay, giving a feed of each every day with regularity.

Regular hours for milking should be observed. Cows will give more milk, if milked at the same hour each day. I weighed the milk from my cows for the years 1879 and 1880; also the butter and cheese made.

1880.

Milk Maid, 7 years, gave	8,372	pounds.
Nellie, 4 years, gave	6,083 $\frac{1}{2}$	"
Minnie, 4 years, gave	5,913 $\frac{3}{4}$	"
Lady Maitland, 4 years, gave	5,880	"
Princess Alba, 2 years, gave	4,189	"

Number pounds of butter made, 1,437 pounds, and 100 pounds cheese, besides milk and cream used in family, and 75 quarts milk sold. It took less than 19 pounds milk for a pound of butter.

In 1881, I made from four cows and one two years' heifer, 1,491 pounds 10 ounces butter, and 100 pounds cheese, besides the milk and cream used in family.

The present year, 1882, I have had four cows, one three years' heifer, which came in July 1st and suckled calf till August 1st, and one heifer which dropped her calf June 15th, at fourteen and one-half months old. Estimating the amount for the fifteen days of the year yet remaining, I have made the following pounds of butter :

January	104	pounds,	11	ounces.
February	92	"	1	"
March	145	"	15	"
April	121	"	14	"
May	130	"	5	"
June	153	"	3	"
July ..	117	"	14	"
August	126	"	0	"
September	106	"	3	"
October	126	"	8	"
November	110	"	13	"
December	123	"	12	"

Total, 1,459 pounds, 3 ounces; and have sold sweet and sour milk to the amount of \$30.14.

I kept an accurate account for two weeks of the cost of keeping. It cost fifteen cents a day to keep a dry cow on hay; on poor hay and turnips, twelve cents; on poor hay and cotton seed meal, eleven cents. The cost of keeping a new milch cow was as follows :

20 pounds hay.....	12	cents,
3 pounds shorts	$3\frac{3}{4}$	cents,
$2\frac{3}{4}$ pounds cotton seed meal...	5	cents— $20\frac{3}{4}$ cents.

Milk Maid gave in one year 8,432 pounds of milk. In the month of June, when she was giving an average of 37 pounds a day, she made 14 pounds butter in seven days, taking $18\frac{1}{2}$ pounds milk for one of butter. If her milk averaged as rich in cream the year through—and I see no reason why it should not—it would give 453 pounds butter for the year.

Mrs. Robinson gives the following method of making butter: The milk is strained through a tin strainer and through a double cloth, the cloth being placed at the bottom of the strainer and secured by a tin band, and is set in a Cooley creamery. It is allowed to stand

twenty-four hours, at a temperature of 45°. Twelve hours is sufficient time for the cream to rise, but by setting longer the cream becomes more compact, and a given bulk of it will make more butter. The cream is drawn into tin cream cans and set in the dairy room at about the temperature that the cream is desired to be for churning, 58° in summer and 64° in winter. It is allowed to set till "ripe," or until it begins to sour, stirring carefully each night and morning when new cream is added. The Davis swing churn is used, and usually about forty minutes are required in which to complete the work. The butter comes in small granules, which is the best form for washing; and at this stage the buttermilk is drawn off and the butter is washed in two waters. It is then transferred to the butter worker, the water pressed out and absorbed with a cloth, and salted at the rate of one ounce of Ashton salt to a pound of butter. After adding the salt it is worked no more than is necessary, care being used not to injure the grain of the butter. It is then placed in a Kinnerson tray and printed, after which it is cut in pound squares, each square containing four quarter pound prints. The butter then is ready for customers, and is carried to them in a carrier containing slide drawers.

DISCUSSION.

QUESTION. Would not the feeding of cotton seed meal in summer improve the quality of the milk?

MR. ROBINSON. June grass ought to make it good enough. I reckon 18½ pounds of milk to make a pound of butter. When the cow is not giving more than 10 or 15 pounds of milk a day, I don't imagine it would take 18½ pounds of it to make a pound of butter. I notice in my whole dairy now it is not taking that amount.

QUESTION. In your experience, what is the comparative value of cotton seed and Indian meals?

MR. ROBINSON. One cow didn't increase any in her milk on Indian meal, but she increased over two pounds on cotton seed meal. I tried my old cow last year on Indian meal, and then on cotton seed. She gave enough more milk on cotton seed meal than on Indian meal to pay for the cotton seed meal. I always find cotton seed meal a good deal better than Indian meal.

MR. STARRETT. I never tried cotton seed meal till last spring; but from my experience thus far I would as lief have one quart of cotton seed meal as two of Indian, either for milk or flesh.

Mr. ROBINSON. This year I feed my cotton seed meal dry, and find just as good results. I put in a little salt. At one time I asked a gentleman from Augusta what he did for cows when they had the garget. He said: "I don't have any cows that have the garget; I feed them salt and they are not troubled with garget." And I find it so myself, if you give them plenty of salt.

QUESTION. You don't find any difficulty in making a uniform quality of butter?

Mr. ROBINSON. No, sir; I think most people buy too small creameries. You want it large enough to put in a good sized piece of ice.

QUESTION. Do you find any difference in the cream rising in the summer and winter?

Mr. ROBINSON. There is no winter and summer with my creamery; it is just so cold the year round.

QUESTION. At what temperature do you have your cream?

Mr. ROBINSON. The cream is about 64 now, I think. I think you must have your temperature a little higher where a creamery is used than where it is set in pans.

QUESTION. Do you have any fear of your market being injured by several of your neighbors going into the business?

Mr. ROBINSON. No; I think the more good butter you sell the better the demand.

Sec. GILBERT. What butter worker can you recommend?

Mr. ROBINSON. We use the Eureka butter worker. I don't know as that is the best. The greatest objection I have to it is that it takes up too much room.

ERASTUS LERMOND, member of the board from Knox county:

I think well of the dairy business. I think it should be the leading business of farming. I can see no better way to bring up the fertility of our farms than by keeping cows; and keeping larger quantities than we do now is what we need to do.

I was asked to speak of the local adaptation of this county for dairying. I think this county is as much favored in this respect as any in the State. I don't know of any favorable condition that they have in any part of the State that we have not. We have excellent feed here, and a great variety of it. There is no better land for raising hay that I know of than there is in this county, especially along the sea board; and we have ponds and lakes for storing ice handily. We have an abundance of good water, and that is essen-

tial in dairying. We have a great number of markets here, and as good ones as there are anywhere, easy of access. And we have fine opportunities for shipping, if it should come to that, but it has not yet.

My idea of the dairying business here is that it is too diminutive altogether. A man may keep three or four cows and do pretty well out of it, but still it will not support him. My idea is that ten cows ought to be the standard number on these farms here. There is hardly a farm in this county of any size but what could carry that number. I would not limit it to that either.

QUESTION. What would you do for pasture?

Mr. LERMOND. I ride around considerably hunting for cows, and I notice that all through Warren and Union and down through here the first growth of grass in the pastures has gone to seed along the first part of the summer. That is of no benefit to the cattle. The cattle cannot eat it, and it prevents after growth. I judge the pastures are not more than half stocked generally. Some are, of course. It is poor policy to let pastures run without being sufficiently stocked through June and July.

We have as good conditions for dairying in this county as they have in other sections where they make it a profitable business; and if our farmers do not do it here, there must be fault somewhere with them. It is not because they are not intelligent enough; it is not because they are not smart enough; it is because they haven't got their ideas up to it; they have allowed themselves to plod along in the old style somewhat. I think there will be a time when dairying will be a flourishing business here, and that it will be carried on in the form of associated dairying. I think we should go into private dairying first, and get started, get the farms stocked, and be ready for associated dairying. You could not do much of anything now by associated dairying, because there are not cows enough. You cannot run a cheese factory here successfully, just because there are not enough cows. You do not see the profit there is in a herd of cows by keeping two or three; it don't amount to enough; there is too large a portion of it taken out for home consumption to show the profit.

QUESTION. Wouldn't it pay to provender the cows the year round?

Mr. LERMOND. Yes; I think it would. I fed meal to mine all summer, two quarts, except perhaps a short time, and I thought it paid me.

Mr. STARRETT. I have fed mine for two years past a small amount through the summer, and I am satisfied it has paid me. Another gentleman here says he has tried it and thinks it has paid him.

Mr. HARRIS. In regard to pasturing, I wish to say a word. A man may be situated so that he don't have to rely much on pasturing. If a man has an acre of land worth fifty dollars, he can do better than to use it for pasture. In the fall of the year he can sow that acre of land, well fertilized, to winter rye. When it is large enough in the spring he can cut it green for feed, until about the middle of June, then what there is left he can cut and cure for hay. Then let him, upon this same land, sow Hungarian grass, five pecks to the acre, and by and by he is going to have some green fodder there. In the fall he may cut at the rate of three tons to the acre of as good hay as he puts in his barn. Probably you are all acquainted with this kind of thing, but if you are not, I assure you it can be done. There is no fiction about it.

There is only one way to make cows pay, and that is by paying them, in advance, plenty of feed, kind treatment and warm shelter, and keeping them cleanly. A man should experiment, as Mr. Robinson has done, and see what results he gets by this and that feed. Feed as high as you find it will pay you, and when you arrive at the point where it does not pay to increase the feed, it is time to stop. Cows should be fed and milked at regular hours.

QUESTION. Would you recommend a man with one or two cows to use a creamery?

Mr. HARRIS. I think he had better get a small creamery, adapted to the size of his dairy. I use a Mosely creamery.

Mr. STARRETT. The question has been raised as to whether there was danger of over-production of butter in Knox county. I was very much surprised last summer when a gentleman in Rockland told me of the amount of oleomargarine that his firm handled. I didn't suppose any of the stuff was sold here. A man will not use that when he can get good butter. I think as long as that stuff is sold here there is no danger of overdoing the business.

Mr. DUNTON. I have a great deal of faith in the dairy business. I have twelve good cows, and I think I can make a living out of them when I get them up to the standard where I want them.

Mr. LERMOND. There is a great objection raised to increasing the dairy, on account of the labor for the women. I think the more

cows you keep the less work there will be for the women, because the men will do more of it.

Mr. HARRIS. That is so. I have a neighbor who does the whole of the business—takes care of all the milk and butter. The women don't touch it.

Mr. SILAS HAWES of Union. We have used a creamery four years. This summer we have milked six cows. My boy has done all the milking, and I have taken care of all the milk, with the exception of an occasional day when I have been away. All the women have done towards making the butter is that about once in four days they scald the cans, and work over the butter after it is churned. I think, with the creamery and butter worker, there is less work for the women with ten cows than with two where the butter is made in the old way. I am satisfied of that, by the use of the system for four years. And I am satisfied that a creamery will pay for itself in one season. Mine cost me twenty-five dollars. There is very little labor about it. I know I have spent but little time with it.

Mr. STARRETT. It seems to me, if we are going to calculate the profits in any branch of business, we must reckon the labor. If I am going to raise a crop of corn, to find the profit I have got to calculate the amount of labor I put into it; and I think it is the same with the dairy business. I have reduced the amount of work for the women, in taking care of the milk the past summer, so that about all they have done has been to wash the milk pails, strainer and churn. Heretofore, when we have used pans, the women have had a great deal of work to do to keep the pans in proper condition. I have used a creamery the past season, and they find their work very much reduced. My creamery is a Mosely.

Mr. HARRIS. In corroboration of what has just been said, I will say that the labor on my farm is hired labor. The woman in the house, when I was selling milk, of course, had the cans to take care of. When I commenced talking of making butter she investigated the matter, and told me she would rather make butter than take care of the milk cans. She has never taken that back.

Mr. HOLBROOK. If the gentlemen who complain that the item of labor is never reckoned in, in these statements, will look in the last Report of the Board of Agriculture, they will see a statement there by Mr. C. H. Cobb, in which he gives due credit to labor. Mr. Cobb is one of the most careful dairymen in the State—a man who weighs, and measures, and gives due credit for everything.

He finds, after following the business for sixteen or seventeen years, that there is a large margin left for profit, giving to labor a proper compensation. I am not a dairyman, but I have given the matter a pretty thorough investigation, with a view to embarking in the business. I only keep five or six cows; but I am satisfied that successful dairying depends upon a certain condition, and that condition is good cows. Your whole success probably hinges upon that. It will not do to keep a cow that will make but 150 pounds of butter; you want a cow that will make 300 pounds. Then the feed and water have very much to do with it. Then comes skill. These are the three conditions: good cows, good feed, and skill. With these three conditions, success is sure.

. A question has been raised in regard to over-production. You need not be afraid of over-stocking the market with good butter any more than you are of the bottom dropping out of the business of the farmer.

I told you I was looking in this direction. About a year ago I tried to investigate the matter. I bought a few cows and kept careful account of what I fed them, weighing the hay and keeping debt and credit for everything. I wanted to find out how much my hay brought me. I had been in the practice of selling it. I found that my hay brought me twenty-one dollars and some cents per ton by feeding it, although I had but average cows and sold my butter for the average price.

Mr. ROBINSON. I find by watering my cows night and morning I get more milk than by watering but once a day.

Mr. HAMMOND. I wish to say a little more in regard to Mr. Ellis' manner of dairying. He is one of the most successful dairymen in Paris. At a dairymen's meeting that was held at South Paris some ten years ago, he conceived the idea of buying a creamery and starting in a little heavier than he had been. He bought a creamery that was on exhibition there and used it till he exchanged it for a larger one. The farm that he was then living on, and which he occupied till this past season, consisted of only about sixty acres of land, or possibly seventy-five. He kept fourteen cows on that place summer and winter. He managed in the way that Mr. Harris has suggested, by sowing those different fodders which come in at different times of the year. He has great faith in sowing oats. He sowed, a year ago last summer, five acres of oats at different times. He fed them to his cows green till the oats got ripe, when he cut a

number of tons of them and put them into his barn. He fed those oats in the winter with meal. When the oats were gone, he fed them good, early cut hay, increasing the meal a little; and yet his fourteen cows fell off two pails of milk within a week after he left off feeding these cured oats. Mr. Ellis doesn't like cotton seed meal. He told me that if he got a bag of cotton seed meal and fed it to his cows, unknown to his wife, she, in handling the cream and butter, would want to know what the matter was with it, and would say that it didn't work right; and when the butter was sent to Boston to the commission house, he would get word that it wasn't up to the standard. He laid it to cotton seed meal. He feeds Indian meal now wholly. He uses a Cooley creamery.

In regard to feeding cows grain in the summer, I will say that I had occasion to step into the cheese factory and looked over the accounts of the daily receipts of milk. I found that Daniel True of South Paris, who has been keeping dairy cows this summer for the first time, was sending about as much again milk as any other customer. I inquired into the cause of it, and found that Mr. True had fed his cows two quarts of shorts and one of cotton seed meal all summer. At that time he was sending twice the number of pounds of milk of any other man with the same number of cows, and I don't know as his cows are any better than those owned by his neighbors.

WALDO COUNTY.

Institute at Brooks.

A Farmers' Institute was held at Brooks, December 5th. Members present: George E. Brackett, Waldo county; W. H. Pearson, Kennebec; C. H. Cobb, Androscoggin; assisted by Francis Barnes, Houlton, and Wesley Webb, B. S., Unity. George E. Brackett presided.

Secretary GILBERT, in opening the exercises, stated that the central thought on which the papers and discussions of the day were designed to bear, is that "Successful Farming in the State of Maine is based on Stock Husbandry."

The forenoon was devoted to the subject of "Winter Feeding of Stock," no report of which is here given.

AFTERNOON.

CONDITIONS AND WANTS OF THE DAIRY INTERESTS OF
WALDO COUNTY.

By J. W. LANG, Brooks.

The subject assigned me at this time is regarded as second to none in importance to the farmers of the locality, and we are glad it is to come before this gathering at the present time for consideration. It is of importance to every farmer, for dairying, in some of its forms, is a part of the operations of every farmer. The capital invested in cows and dairy appliances, in feed and care and keep, is very considerable.

That this branch of farm production does not receive the attention it should, is evident. That it may be increased to a large per cent., and at a profit, is also, we believe, true. The price of good butter and cheese in our markets, affords a good average margin of profit. All our stores are retailing at a handsome price, cheese no better than we can make, and often not as good, which is

bought in other States. The waste of the dairy, whether sour milk or whey, can be profitably utilized in the piggery or calf pen. The well stocked dairy barn returns a large amount of excellent manure, and stable manure builds up the farm.

BUTTER.

In the production of butter, perhaps there has not been a great gain in amount in the past ten years; but there certainly has been a great improvement in quality. The general average in this direction has been encouraging. The improvement has been accomplished by a combination of forces acting upon butter makers. *First*—the demand for better butter, backed by a better price. *Second*—the spread of better dairy knowledge and its effect upon our butter makers. *Third*—better care, feed, and cleanliness in the business. *Fourth*—better dairy blood that has been diffused in the various parts of the county, and the selection from good milking and butter strains.

Travelling over the county to-day one will be forcibly struck, in comparison with ten years ago, at the rapid and wide-spread prevalence of Jersey blood, either in its purity or its still oftener recurrence in fine grade cows and heifers. This shows we are recognizing the merits of the breed by practical endorsement, and that we are availing ourselves of the advantages of this best of all breeds for butter dairying. Not only this, but improved dairy fixtures, rooms and methods of manufacture and handling are seen everywhere—not perfection by any means, but improvements over those used before. More attention is given to feeding for milk and butter. The farmers generally in our county are discussing, enquiring, experimenting. There is awakened interest and there is thought in the matter and on the subject. More and better heifer calves are being raised. Dairy stock is beginning to be sold and bought on its dairy merits rather than on a beef basis. We are getting a better understanding and placing a higher estimate upon our cow-power. If a good Jersey cow can make two pounds of butter a day in Winthrop, Lewiston, Cumberland, Baldwin, or anywhere else in the State, why not here in Waldo county? If a Jersey cow can do it, every other breed has the same right to do it, if they can. As yet we have no associated attempts at butter making. The creamery is unknown with us. We are only aware of its existence elsewhere by reading of it in agricultural papers and reports. It may in the future loom

up and become an actuality and a fixture among us. If its introduction is attempted, we hope it will be better supported than has been most of our cheese factories. We believe much good is yet to result to our dairy interests through the medium and encouragement of the Grange in the county.

Cheese.—In the production of cheese, our county ranks low in amount but high in quality. During the season of 1873, or nine years ago, twelve cheese factories were in operation in the county. The past season only two have been in operation so far as we know. Instead of this decrease there ought to have been an increase. If the cheese factories had been properly supported, they would have all been successful and among the best paying farming enterprises. They were built with a rush and with too great expectations. They were poorly supplied with milk and soon were given over, and remain to-day monuments of folly to the unbusiness-like ventures. The wants of the communities to-day are that they be reopened and run on business principles. The farmers in their reach should stock up their farms with cows and supply these factories liberally with milk, even up to their utmost capacity. The season should be extended from the first of May to the first of December. Make it a business and it becomes a business that will pay. Every factory that has stuck to it has paid. Every one that will go into business common sense like will succeed. We believe the time will come when not only cheese factories will be rebuilt in this county and operated, but creameries or butter factories and factories making both cheese and butter. Much has been learned by the experience of the past. Much is yet to be learned. One thing we have learned to a certainty, and that is, we laid out too much for buildings at the outset.

Milk—The production of milk, whether for sale or manufacture into butter or cheese, is a point in our dairy interests of greatest importance. Near Belfast and the larger villages there are large herds of cows devoted to the supply of the demand for milk. The business is popularly supposed to be a very remunerative one; but it has its outs and its exactions. It is a laborious and pains demanding part of our dairy interests; and if, after years of close attention from 3 o'clock A. M. to 9 P. M., the milkman secures a handsome competence, he certainly deserves it. To produce good milk demands many conditions: healthy cows having good milk-

making capacity, and good feed and good care. It is not enough that a cow be a large milker, if the milk is poor in quality. Quality is more than quantity every time and every where. It is the cow that combines large quantity with good quality that brings in the profit or the price.

Suggestive Thoughts.—Waldo county farming has no specialty. Hay and potatoes are the leading crops. Corn growing is somewhat on the increase. Grain growing has declined. Considerable hay is sold off from the farms, and less potatoes are raised than formerly. More grain and roots are fed from year to year to stock. In many instances hay sold off is compensated or partly compensated for by feed purchased or superphosphates bought. The use of shorts and cotton seed meal is quite rapidly increasing. All our country stores have large trade in corn and feed. The subject of feeding is one of live interest.

Some changes are seen, looking over the field. A score of years ago the market called for solid packed June or September butter. This brought the best price. Now the market calls for butter fresh from the churn. Then the butter was wanted carrying at least an ounce of salt to the pound; now it calls for butter just flavored with salt, and in attractive print and neat package. Solid butter in jar or firkin is hard to sell and brings low prices. Old butter is not wanted. Demand has necessitated improvement. It pays to make good butter. It doesn't pay to make poor butter. There have been radical changes in the past ten years. Good feed, good care, good cows, clean milk, neatness in handling, and in the manufacture, and in the package for market; the observance of the best rules of dairy success is required. Dairying, then, in Waldo county, in common with other counties of the State, is progressing and is taking its rank and place among the fine arts of the farm. It is becoming one of the exact sciences of our agriculture. Its tendency is onward toward better things.

Wants.—Better markets and better market facilities. More faith in cheese making. More faith in good feed and good cows. More faith in the profits of dairying, and this faith carried out in works.

A lively discussion followed the reading of this paper, participated in by a large number of the farmers of the county, in which causes of the decline of associated dairying in the county were carefully considered. The sentiment seemed to be that the chief cause of

failure came from a lack of faith in the business of dairying, and from a reluctance to coöperate and work together for the good of the community. In some cases the expense of factory was too great, which brought the expense of manufacture high.

F. W. SHEPPARD, Belfast, lamented the decline of the business, and said a factory could be sustained in almost any town in the county, if the farmers had a mind to do it. All that was wanted was for them to go to work and put some effort into the business.

In the evening Francis Barnes of Houlton gave a lecture on the subject: "Shall the Dairy Business of Waldo be continued?" which is not here given. Also W. H. Pearson read a paper: "Oxen on the farm."

The attendance throughout was good and the interest manifested was an indication that the farmers of the county are studying attentively the conditions and the necessities of their agriculture.

With compliments exchanged an adjournment was declared.

OXFORD COUNTY.

Institute at Bethel.

An Institute was held at Bethel Town Hall, December 7, when a large gathering of farmers assembled to aid and share in the exercises. Mr. A. W. Valentine of Bethel was called to preside. Only one paper of the programme is here given.

CATTLE FOR GENERAL PURPOSES.

By G. F. HAMMOND, Paris.

Mr. Chairman: When I first read upon the programme for the day, the subject now to be considered, it at once occurred to me that it was one of much importance, and one that would be very difficult to present in a satisfactory manner. And some further consideration of it does not make it appear of less importance, nor make it any the less difficult to present. This is owing to the fact of there being so many different breeds of cattle, all possessing many qualities to recommend them, and each one having its advocates who claim that it has in a larger degree than any other breed, those distinguishing characteristics which make it desirable for general farm purposes. Another fact, (and one of perhaps even greater force) is that the surroundings, the conditions and the circumstances of farmers differ so widely that it becomes not only difficult, but impossible to tell what breed or kind of cattle is best under all conditions for general purposes on every farm.

These facts, taken in connection with the prejudices that men have formed in favor of this, that or the other breed, and the various uses and purposes for which stock is kept, make the question certainly a hard one to answer, if not almost a dangerous one to meddle with.

We may assume that the primary object in keeping stock upon the farm is profit on the money there is to be made by the raising and feeding of cattle. If the consumption of the various forage products of the farm and the converting them into material for keeping up its fertility is the main object, then the money to be made from it is but a secondary matter. And this holds true whatever may be the purpose for which cattle are kept, or the use to which they may be put. Now it is not my purpose to go into a

discussion in relation to the best methods of feeding or care of cattle, nor of the comparative values of the different kinds of food they consume, neither of the relative profits that will be gained by making the dairy a specialty, or by the growing and fattening of cattle. Yet the condition and situation of one's farm, his own taste, with the attendant circumstances, must have very much to do with the purpose for which stock is kept. That is, these things in connection with his facilities for best conducting and managing his stock, will have much to do in the farmer's deciding whether he will give a large share of his attention (consequently the bigger part of his stock) to the dairy, or whether he will keep cattle mainly for growth. Upon the greater number of our Oxford county farms neither one of the above branches of stock husbandry is at present a leading feature; nor is it in the near future likely to become so. Stock is kept for several purposes, or, as is generally understood, for *general purposes*. That is to say, a few cows to furnish milk and butter for family use and more or less to sell; oxen are kept to do the farm work; young cattle are raised to become oxen or cows, or to sell as steers or heifers. It was a knowledge of this condition of things, I suppose, that caused the question to be presented as a topic to-day. It is with this understanding of it (rather than what breeds are best for all or for some special purpose), that I shall venture an opinion; and while only an opinion, it is based upon experience, observation and information gained from other sources.

For these general purposes, or uses, in my judgment, no breed of cattle so nearly meets all the requirements as the Durhams, or their grades. In saying this, it is with no thought of detracting one iota from the merits or good qualities of any other breed; for, perhaps, I should be inclined to say that, in some respects, I regard the Herefords unsurpassed for oxen, and the same of the Jerseys for cows. The farmer who keeps his forty or fifty cattle can keep all of these kinds if he chooses. Not so with the one who can only keep his ten; certainly not so well, yet I would say, in every dairy of six cows I would keep not less than two Jerseys, or their grades, and certainly one in every dairy of four, if my object was the making of butter, as the quality will be much improved thereby. Of the Polled breeds of cattle I know nothing, only what I have read. If they prove to be superior to those with which we are familiar, we will surely welcome their coming and bless those who brought them.

Now, in answering the question as I have, I must not be understood as saying that all will, or can have the same success by keeping the Durham, or any other breed of cattle. As I have already intimated, there is such a variety to our Oxford county farms in productive capacity and quality of products, as regards cattle food, that equally good results cannot be expected in every instance. So has the farmer's situation, his circumstances, and the aptness or faculty which he has in stock management, much to do with his success in this branch of farm industry.

To illustrate, we will suppose we come to farmer A's and find upon his farm a herd of fine cattle, large, sleek and handsome. In seeking for the reason we see that his pastures produce an abundance of the most nutritious grasses, while his fields yield a large quantity of first quality hay and his barns show that his cattle are not only well fed but well housed. At his neighbor B's we find a very different class of cattle. In looking for a cause for such disparity in cattle of perhaps the same breed in the same neighborhood, we find B's pastures produce only a scant supply of poor, innutritious herbage, and his fields, if giving a fair quantity of hay, the quality is so inferior that it fails to meet the requirements of animal growth, while an examination of his barn convinces us that he does not consider warmth and comfort an essential element in animal growth. Or, if under these conditions B's cattle are equally as good as A's, B must use a large amount of purchased food, so that his profit (if profit there be) is very much less than his more fortunately situated neighbor.

So all the way along between these two extremes are the conditions under which Oxford county farmers are placed. Some are satisfied with stock keeping, being favorably situated and having good facilities for its care and management, and are reaping a profit from it; others are doing fairly well, and some are doing well even under unfavorable circumstances, and all honor be to them. There are a few whose scant pastures and infertile fields make stock keeping up hill work. Such are constantly changing from one breed (if breed they have) to another, or are desirous for change. Now, the best change they can possibly make is to change such a farm for a better one; or if not that, to turn out the poorer parts of their fields into pasture and strive with might and main to increase the fertility of the remainder.

In giving an opinion in favor of the Durhams, or their grades, in answer to the question, What is the best breed of cattle for general purposes? I wish to go a step further by saying, as a rule it is not wise, or best, for the average farmer to raise or to keep pure blooded animals, for the reason that unless they are well cared for and well fed they more rapidly deteriorate their grade, and large losses are the result. While good grades are cheaper, they at the same time are equally good for general purposes, and I think better, for, as a rule, the cows are better for milk and of hardier constitution. The same is true so far as constitution, work and growth go, in oxen and young animals. At the late fat stock show held in Chicago, many of the prizes were awarded to the grades for size and maturity. The sweepstakes or champion four-year-old steer, was a grade Durham, and weighed 2,565 pounds. The same kind of cows weighed from 1,880 to 1,815—all certainly large animals, and, of course, had received feed to make them such.

If we wish to do our best in a matter so essential in good farming as is stock keeping, it becomes important that we make as good a selection as our means and ability will allow us to do. Then by a course of judicious breeding, all the time giving our cattle the best care and feed at our command, we may expect our stock to improve in quality and increase in value, thus giving us not only a profit but also the satisfaction of having good cattle; and let us never lose sight of the fact that one good animal well cared for will give a much better profit than will two which receive poor care and poor feed. In fact, with such treatment the two will be kept at an actual loss. Now, what we all desire, as farmers, is a breed or kind or class of cattle that will in a series of years give the best returns for care and keep under all the varied circumstances in which we in Oxford county are placed. It is with all this in view that I have given my opinion in favor of the Durham grades, yet with no prejudices against any other breed in doing so. Neither do I wish to be understood as meaning that all farmers should at once change their stock into Durham blood of a high grade. A wiser course would be (if deciding to keep stock of that blood) to pursue a system of careful breeding and come into it gradually. Certainly this is the most advisable course with those of us whose means are rather limited.

Brother farmers, in conclusion let me say that this is a day of inquiry and a day of progress with farmers. There was never a

time when they felt a greater pride or took a deeper interest in their calling; never a time when the best methods of conducting every branch of farming were so eagerly sought after and inquired for, and we are so fortunate as to have a Board of Agriculture, composed of gentlemen who are not only interested and full of zeal in their work but who are also capable of imparting the information we so much desire. They will tell us how to restore and how to keep up the fertility of our farms, thereby increasing both the quantity and quality of food for our cattle. They are also able to tell us what kinds of cattle food will give the best results when fed for the different purposes of milk, growth or fat. And they can tell us, too, of specialties in stock keeping, and the results that have been attained in dairying, both in butter and cheese making, and how to obtain still better results. All this and more are they able to tell us. Now, if we are wise and give heed to the information, we shall be the better able to judge what, under our circumstances, is the best breed of stock for us to keep, whether we keep it for special or for general purposes.

The discussion following the reading of this paper indicated that farmers are gradually drifting away from the keeping of animals for "general purposes," and are introducing special stock for special purposes, and special breeds adapted to the kind of purpose in hand. No report of this discussion is here given.

The full programme arranged for the day was carried out, yet no further entry is here made.

ANDROSCOGGIN COUNTY.

Institute at Poland.

By invitation of Lake Grange, an Institute was held at West Poland December 8. This was one of the most enthusiastic gatherings met with for the year. Hon. Luther Perkins welcomed the Board in a fitting manner. Free entertainment to the members and to all in attendance from a distance was furnished. No report of the exercises is given.

A second Institute for the county was held at Turner Center, Grange Hall, December 28th. The attendance was all that could be accommodated in the hall. Free entertainment to all from a distance was furnished. A good choir added pleasure to the exercises.

FINE POINTS IN CHEESE MAKING.

By FRANCIS BARNES. Houlton.

The renewal of interest in associated dairying among our farmers is a gratifying indication of agricultural advancement in our State; for, despite all the failures of a score of years ago, the fact grows more and more patent that through stock husbandry and the making of butter and cheese, as specialties, lies the road to thrift and competency.

Our country has now entered upon that period in its growth in which, with the gradual subsidence of the merely adventurous spirit continually seeking new conquests beyond, the regular industrial pursuits of a great people are crystallizing around their appropriate centres, or are found stretching across the continent in wide, and well defined longitudinal belts.

The manufacturing, mining and commercial industries have grouped themselves in their peculiar and fitting localities, while through and around all, lies the great agricultural interest, which is in truth fundamental as to all the others. It needs, however, indisputably, the greatest diversification of employments among the people to furnish scope for its widest possibilities. Without a ready class of consumers right among the farmers, agricultural progress is slow, and the margin of profit precarious. Across the

country from east to west run these belts of productive and profitable limits for the different branches of husbandry. The sugar belt lies low and narrow, far down to the south. Then comes the cotton, and so with others. Stock husbandry, too, finds limits, or rather graduations in the present method, from the great breeding plains of Texas and the southwest, to the ripening and fattening ranges of a more northern section. Superincumbent upon this last, lies the tract where dairying stands eminent and unrivalled.

Foremost of topics, as a theme of vital consequence, is the question of the food supply for these millions who fill the land and whose numbers are constantly increasing. For its solution men are giving their best thought and most untiring energy, and each section will find its profit and reward of endeavor as it shall most wisely and economically devote its agricultural efforts to the production of those staple articles which are peculiarly its own.

The climate, varying with the increasing latitude, governs the possible choice. To one section is given a lavishness of opportunity wholly denied to another. Nature has given to Maine, in common with three or four other northeastern States, the unrivalled facilities for high grade dairying. Most searching and critical tests have proved that, after passing New York, no other State westward can produce the best of cheese or butter. At the same time it is found that the demand for these best and peculiar grades is constantly increasing, most notably that for cheese.

With the increase of wealth among the people arises a greater demand for the choice articles of food. The home trade can now pay more for choice cheese, and the best lines of canned goods, than the exporters.

That this conclusion of peculiar fitness of the northeast for cheese making is not mere assumption, and destined as a fashion again to pass away is the fact that it is all based upon immutability.

Scientific theorizing long since concluded that the coagulation and ripening of caseine and curd should take place under comparatively even conditions, and at moderately low degrees of temperature. Extremes of either heat or cold would be equally undesirable, and sharp alternations would result in loss of high merit. On these grounds, New York for many years rested her claims for supremacy, until the Western States entered the lists, one after another, and, with loud advocacy of their own merits, seemed about to upset all that had been previously regarded as established upon such

points: but, out of the millions of attempts at cheese making all over the country, the fact has been slowly evolved, and is at last conclusively settled, that in New York, and eastward on the same parallels, the possibilities of cheese making are found. Here we find such averages of climate, that the cows graze upon the best of feed and secrete their milk, for the most part, in quiet and comparative coolness. This fact is of much more moment than generally supposed. The milk can readily be cared for, until its delivery at the factory; and the curds can be suitably ripened, at the minimum of expense and risk. These favorable surroundings are not transferable, and the man who moves out of the belt as much parts with the possibilities as the miser leaves his gold, when he lies down to enter the "narrow house."

Such being a true statement of our situation as related to the rest of the country, it cannot in fairness be considered an exaggerating of trifles to call attention to the fine points in cheese making, for by thorough comprehension of the necessary details, and a careful carrying of them into daily practice, only can proportionately worthy results be attained. There is hardly any inducement for the expansion of the cheese business among us, except in the line of this strictly fine product which we can make if we choose. Buyers have all the poor cheese they wish to handle. The market also is filled up with those grades which have the quality of early maturity. Inasmuch as these sorts have no standing with the trade after the fall months are gone, more of them would be simply a drug on all interested in them. The opportunities before us lie in connection with smooth, firm, close-textured, whole milk cheese. No buyer ever yet had too many of that grade. A noticeable feature at the present time is the cessation in the use of skims. It is an unmistakable evidence of thrift, for just as soon as the people can afford the better article of food they drop the inferior. Scientists, oftentimes, tell of the value of skim cheese, and in the laboratory, no doubt, they find a satisfactory per cent. of ingredients for a proper feeding ration, but practically, the people let it alone. Skim cheese, now, is worth no more money than the original milk was worth in the economy of the farm and household. The labor and trouble of making and marketing is thrown away.

A classification of the fine points which groups them under three headings will cover the whole ground, and in legitimate order:

First, the points involved in the phrase, good milk ; second, proper manipulation ; third, suitable curing.

The three groups are each, "First among equals," as to the relative superiority of importance ; but, together, are the three links of the chain of connection between the farmer and the profit on his cows. If either one be broken disaster ensues, though the other two shall still remain intact.

The good ship will be driven by the storm on to the rocks when one link of the cable snaps, even though a hundred others still hang as strong and uninjured as on the day when they were forged.

A close analysis of the composition of these links in the chain of good cheese making will reveal the difficulties which proved fatal to so many hasty attempts at cöoperative dairying in the State. The milkman is the artisan of the first link, the cheese maker of the second, and the factory building is the embodiment of the third.

The milk owner is competent to know all about the milk, and to a great degree, control its condition. He can also judge intelligently with reference to the curing facilities, for there is no occult mystery or special skill connected with it. On the points of manipulation he must inevitably defer to the special skill and acquirements of the man who has mastered the situation, and is competent to make his link equal the requirements.

The maker, however, of necessity occupies the superior position, in that he must inspect all the work of the milkmen with the thoroughness and minutiae of the army regulations ; and, sufficient in himself to the needs of the daily round of work, he will bring about such combinations of the various ingredients of his curds, that his curing room shall reveal to all comers the unmistakable evidences of choice results.

The phrase "good milk" is of itself ambiguous, for milk is often deemed good which is utterly unfit to be made into cheese. Such is the milk for the most part which is peddled on the city streets. Too much has been added to make up for too much subtraction ; or there has been too great a lack of intelligent care between the time of milking and the delivery to the customer.

Again, it is said that good milk can be had wherever Indian corn will grow and ice be made, but not milk good for prime cheese, as experience shows. In order to fully understand what is good milk for cheese, we will first get an accurate statement of what milk is. For the purposes of this discussion, it is the liquid which is drawn

from the cows' bags, and is handled in its normal condition. Nothing is taken from it, and no addition of any sort is made to it. A thorough setting forth of the nature of milk is comprised in the following extract, taken from an address of Prof. J. P. Sheldon, the eminent English authority on modern dairy topics :

“As a liquid containing a good deal of the element nitrogen, it is liable to early decay, or, in other words, to changes in its chemical and mechanical condition. The temperature it has when milked from the cow is favorable to its decomposition. Above or below blood heat its decay is more or less retarded; and by passing a pure volume of oxygen through it it is made to keep the longer. Left alone it is a suicidal sort of thing, constantly inviting its own destruction, so to speak. It drinks in greedily foul odors from the atmosphere, as one may say, and provides just the food that bacteria delight in. It is determined not to remain in its original form, for it begins to throw off its cream at once on coming to rest. To the chemist it is known as a “transition compound,” seeking fresh conditions and combinations. It is congenial food to the fermentive germs that float in the air, and contains within itself a principle that is an aid to digestion, which is only another word for decomposition. Such being the case, milk requires intelligent treatment if we want it to remain as it is when we get it.”

For cheese making it must remain as it is when we get it, with the single variation that the animal heat is at once taken out. The full proportion of cream, with its exquisite volatile oils, must be retained, and all possible pains taken to keep it from the foul odors it drinks in so greedily. Intelligent treatment is the exact expression to properly characterize the needs around milk from first to last. That kind of treatment which recognizes the transition nature of milk, comprehends the needed methods of handling, and then constantly practices them.

So much has been written about cleanliness that its constant iteration is almost tiresome. Still there is no other resource, but “precept upon precept; line upon line, line upon line,” to meet the exigencies of the case. If we hope to realize good flavors in the products, we must absolutely cut off the sources of bad flavors. Intelligent judgment, which clearly grasps the end from the beginning, must be exercised at all points. The fact that milk will not absorb odors before it cools to the temperature of the surrounding air, deludes too many into the practice of uncleanly ways. If the cows are milked in a close tie-up, which reeks with the fumes of their exhalations and excrements, how can the milk be found pure and fine flavored? The owner and attendants go in to milk and place the pails and strainers, perhaps, on the ledge behind the cows. These dishes immediately condense upon themselves the foul vapors,

and the perfume saturates all the clothing before the work is over. In pouring from pail to pail, and through strainers, an efficient rinsing goes on; and as the pails are carried off, they go, filled more or less with milk, plus the added moisture of the condensations which have all the while taken place. At the time and place of straining, with the milk somewhat cooled, the clothes give out their charge of odor, and further rinsings combine with that to stamp an indelible taste on that dairy. The blind man test of a tie-up is no "fancy" idea, but based upon the soundest reason, and the most practical comprehension of the merits of the case. The rejection of all the deep-setting, submerged creamers by the best of butter makers strongly emphasizes the idea of cleanliness. These contrivances, as made, advertised and sold, too easily induce uncleanly habits; and whatever of slipshod ways pertains to the butter making, by easy passage, goes over to the care of milk for cheese. If, during the summer months, a careful observer be on the lookout among factory patrons he will notice that by their actions very many men say the main object is to get all the milk they may be able, and run it off to the factory as soon as possible. It is too often, seemingly, at least, asserted that the maker can take helter-skelter milk, and by some magic operation eliminating the hurtful properties and tendencies, return to each owner only the best of cheese. This is radically false, in whatever degree it is entertained. As the milk is at the window, such will be the cheese of that day. Not that an unskilful maker may not spoil the best of milk, but that the ablest maker in the world cannot make prime keeping cheese out of inferior milk.

A concluding thought upon this topic can well be the indispensableness of cooling the morning's milk. Some farmers take all needed pains that the cans shall be washed twice and scalded, that the night's milk is stirred, cooled, and left out of doors, uncovered, all night; but in the morning are possessed with a kind of frenzy which drives them out at unreasonable hours, hustles up the cows, gets through milking at railroad speed, and drives off to the factory before five o'clock, at a John Gilpin pace, as though a premium were offered for the warmest and worst mess of milk which could be found.

Confront such a man, after the hullabaloo is all over, with the simple question, "Why all this?" and he can no more give a sufficient answer than could the famous horseman. If milkmen would,

but remember that no cheese maker who understands his business wants to see a drop of milk before half-past six, and also the scientific fact that it is not best to coagulate milk too soon after the time of milking, they would readily find that interval for cooling which so many profess to be baffled in their search after.

The second class of points is included in proper manipulation. They constantly arise before the maker in the daily round of work. In reference to them the farmer must depend altogether upon his knowledge and judgment. Not till the cheese is tested by the buyers can it be known whether they have been rightly attended to.

On passing from the milk to the maker, the propriety of the figure of the links appears very forcibly. As the links of the chain are forged, one within the other, so the maker's first point of vital consequence stretches right back on to, and through, the milkmen, for he becomes the inspector of all their work. The acute discernment of differences in the milk must be in his possession, or he is altogether afloat. When a maker commonly speaks of his "luck" from time to time, or is very much "surprised" by the working of his curds, he is at guess work; and his patrons will have a chance at the same before they are through. The proper standard of requirement is that milk, at the window, shall be cool, clean, right flavored, and with no perceptible approach of the acid state.

A particular word here is timely for makers. If you are striving for excellence on these points, and are charged with too much particularity and fussiness; if the corporation or employer does not fully sustain every effort to maintain the standard, just take off your hat, bid them all good morning, and leave. You can get no fair treatment nor build up your reputation with such. They who scout your requirements will be the first to cudgel you in the fall if they, in particular, cannot have the best cheese.

The test for coolness is the hand on the can; if it feels blood heat or nearly that reject at once. There is no occasion even to open it. The test of cleanliness comes through the nostrils. Whether the difficulty may have arisen from yesterday's whey in the can, or the dirty dish cloth, or the rinsing of the cow's foot or tail in the milk, the delicate sense of smell will reveal the true source of the evil with unerring exactness. With some persons there is a deficiency in the acuteness of this sense, and if so they are not competent to take charge of a factory. This same sense detects the presence or absence of the right flavors, and will snuff up the approach of the

acid state before the palate shows the least susceptibility to its coming. A scrupulous and exacting maker who has developed his sense of smell to this degree will have a curious experience with Brown, Jones and Robinson, in the course of the season. Their milk is rejected from time to time, when to their obtuse faculties it is the embodiment of perfection; yea, even they take it home, and avow that, for three or four days, it is still in all its virgin purity and sweetness. A fine sense of smell is the maker's sheet anchor. If he has it not, all hope of success is fallacious. Only guess work and jumping from one point to another are the available resources. Probably a deficiency in this respect has caused the most of the loss in cheese making in the State of Maine, for, not only with the milk, to detect that first whiff of the acid which is the *avant courier* of all the train of sourness, but, as well in testing the vat subsequently, the nostrils must be on the alert to make certain. The hot iron and numerous expedients are only guesses.

It is admitted that milk may seem quite good after the cheese maker has turned it away; but the difficulty with such a mess, for him, is that it will not stand the application of those two most powerful agents known to the chemists, heat and acid, whose aid he must daily invoke. Put Jones' milk under the influence of heat and the seeds of trouble planted there through his carelessness or incompetency soon put forth vigorous life and growth. By the law of the milk's nature all the rest of the mass in contact soon assimilates to it in condition. Even so large a mess of good milk will not suffice to cover up or redeem the quality of a small bad mess; but, one small addition of spoiled milk will ruin the whole, even in the proportion of one gallon in six hundred.

So if Robinson's milk gives off the sure token of the developing of lactic acid already begun, the rennet principle, a powerful acid of itself, swiftly accelerates the souring tendency, and the two together overleap all bounds, as they hurry the curd on to dryness and insipidity.

Heat and acid, both good servants but bad masters, must be used under the firm control of a maker who knows their strength, and knows what milk is fit to be put under their influence. The nose is the only appliance needed for the handling of tainted milk. Apparatus men advertise machinery with which to make up such milk, and authorities are widely quoted this winter in favor of a combination said to furnish peculiar facilities for such business. Such

advertising suggests the remark of the landlady as she showed a little seven by nine apartment, up under the roof, to a captious lodger. To his comment that it was not big enough "to swing a cat in," "Why on earth should you swing a cat in it?" was her rejoinder. Why handle tainted milk at all?

If a great meat-packing house should advertise superior facilities for handling tainted meat, and first-class opportunities to care for the carcasses of cattle, sheep, and hogs, that have perished through exposure or disease, would such a course be likely to enhance their reputation, or be evidence of wise business methods?

What is the difference between packing tainted meat and tainted milk?

The incisive test of a maker's fitness might be applied in three questions: How long did you work as second hand? What are your tests for milk? How do you decide when to take out the curd?

Three of the senses are called into play in testing the vat, but chiefly the sense of smell. The feeling will give indication of the approaching change by the roughing of the surface of the fingers as the whey becomes sour, and second in the toughening of the curd. The taste is an aid of much value, but more easily led astray by accidental circumstances. The hot iron will show an acid state of the curd, but with no relative exactness as to the condition of the vat in all respects. The curd may string out, either too soon or too late, as the case may be. If the maker has absolute knowledge of each mess of milk that entered the vat, and an accurate idea of the strength of his rennet, his sense of smell, aided by feeling and taste will lead him aright, till the time for dipping is fully at hand. The interval between the moment when the curds and whey are brought to 98°, and this time to dip, though by no means a fine point, yet by its duration, furnishes proof whether fine work is going on or not. The same principle applies here, as in all cookery—not to get through the work in the briefest space of time possible, but to take all the time needed to ensure the best results. Changes must be brought about in the curd before separation from the whey is completed, but slowly, and in five cases out of six they cannot come too slowly. Haste over this critical period ruins flavor and texture for keeping cheese. The time-table for a well ordered factory in New England, for the month of July might be: First vat set at half-past seven; 90° reached at half-past ten; dipping to

begin soon after one. For the other months this last operation would vary from one to four o'clock for its commencement.

The third section of the subject involves the whole question of curing. The curd from the press is simply an aggregation of different elements which shall eventually unite to form one simple substance, a marketable cheese. To accomplish the desired end, the curd must be placed under a suitable degree of temperature and moisture also, to allow a breaking down or mellowing of the constituent parts. Experience has shown that 75° is the needed temperature, and it should be maintained as uniformly as possible.

This place, or curing room, is no drying room in any sense. The comparison between the baking and burning of bricks, and the making and curing of cheese, which is so commonly instituted, is completely wrong. Good cheese curds have not a drop of water to spare, and the air surrounding them should be saturated with moisture.

A great barn like room, or second or third story floors of unenclosed buildings, are all alike to be condemned. The fullest and latest conclusions arrived at for the curing place are complete exclusion of the external conditions of weather, and immediate contact with the ground. The enclosed room, if put up on top of posts, and thus exposed to both heat and cold through the floor, is not sufficient for fine work. The August heats will drive the thermometer above 80° , and the October cold will send it too far in the opposite direction. The curing room of a new factory, or the reconstruction of the old one, should be made after the following method:

Stone wall and underpinning are to be laid to the height decided upon for the sills, and the earth of the excavation can be thrown to the inside, for the purpose of levelling off the surface, smooth, and up to the level of the sills. These can be laid in the usual manner, with some additional device to hold the spread of the walls. A shoulder on the wall, or iron pins set in the walls, at regular intervals, to penetrate the sills, will serve the purpose. Then the superstructure can be put on in the usual manner. Ten feet in height of posts and studding is sufficient. If the beams lock on to the plates, and extend a foot beyond them, it will be easier to close up the building tight, than by nailing the beams to the posts below. Lay a double floor overhead with sheathing paper between the boards. The windows should have a northern exposure, and be double in each case. It is better to board up the inner walls, and

stuff the spaces between the studs with saw dust than to lath and plaster.

In this room the points sought are fully gained—entire exclusion of the outer air and sun's heat, with the coolness and moisture of the earth floor. Such a room will mellow down and subdue the June and July curds in a surprising manner. Our factories which have a promise of life before them would do well to make this kind of room without delay. The shelving can be supported by posts upon longitudinal sills.

A final thought is connected with the development and care of the rind. A good rind depends upon a good curd in the vat, as a good curd hinges upon prime milk at the window. The work in the curing room is not to make the rinds good and sufficient, for that is impossible, but, upon that curd which has a right start, to put such manipulations with needed oilings that the rind shall become smooth, elastic, yet tough and impervious to all insect foes. It is not a paint that is to be put on, or a rough slashing of grease about the cheese, but the careful rubbing in of a warm oil until the rind becomes tanned, as it were, to endure the changes of temperature and the rough handling to which it is to be subject. Here, again, is seen the link stretching back for its completeness into the preceding stage of the work. Given good milk, a good maker, and the proper curing room, the chain is complete, and satisfaction is inevitable.

The afternoon was given to a lecture on "Butter Factories and Factory Butter," and the evening to one on "Jersey Stock and Fancy Butter," both of which will be found in another place.

KENNEBEC COUNTY.

Institute at Winthrop.

By invitation of the West Winthrop Farmers' Club, a Farmers' Institute was held at the Town Hall, in Winthrop, December 27th. Dairying was the leading subject of the day. In the forenoon Francis Barnes of Houlton, spoke on "Fine points in the care of Milk and the making of Cheese," which will be found in another place. In the afternoon a lecture was given on

JERSEY CATTLE AND THEIR BUTTER.

By RICHARD GOODMAN, Jun., Lenox, Massachusetts.

Fellow Farmers: I have been invited to read a paper before you upon the subject of Jersey cattle and their butter. As I believe the discussion which usually follows a paper at these Institutes is quite as valuable as the paper, it has been my object to condense my statements as much as possible, with the hope not only of obtaining a more willing hearing, but, also, of arousing discussion, consequently I shall try to make my remarks *suggestive* rather than *exhaustive* in more senses than one.

In regions like those about Winthrop and Turner where the farmers are farmers, and not shop-keepers or factory superintendents who play at farming (and often do much good to the farming interest), farmers who depend upon farming for their livelihood; where the cattle have had a strong infusion of the best Jersey blood added to a fine quality of "native" stock, and where the pastures are sweet and the springs plenty and the water pure—in a region like this I trust that you will feel that the subject of the best butter and the cattle from which it is made is appropriate.

I understand that the butter from this region seldom brings over 35 cents a pound. I am surprised at these low figures and regret them, but they give me my excuse for speaking to you. There is a demand to-day in the markets of Boston for three thousand pounds a week of butter at 80 cents a pound, and there is a demand in the markets of New York for double that amount and at even higher

prices. Just so long as your best butter makers are getting less than 75 cents a pound for their butter, there will be room here for experiments and the reporters of experiments, and for the comparing of notes one butter maker with another.

We will begin with the producers of "the best butter," and then consider their product. The Jersey cow is a more profitable butter producer than is the cow of any other breed. The Jersey cow averages more butter for a day, for a week, for a month, for a year and for a life time, than do the cows of any other breed. We have reliable records of nearly three pounds and a half a day; of 21, 22, 23, 24 and 25 pounds a week; of 183 pounds in 61 days; of 400, 500, 600, 700, 705 and 778 pounds in a year. Major Brown's "Butter Tables," published in the *Country Gentleman* last year, give us tests between 22 and 26 pounds a week for three cows; between 20 and 22 pounds a week for four cows; between 18 and 20 pounds per week for seven cows; between 16 and 18 pounds per week for forty-one cows, and between 14 and 16 pounds per week for ninety-two cows. Since these tables were published, numerous additions have been made to them, and in all of the classes.

It may be said that a couple of hundred butter tests are a small number, when compared with the thousands of Jersey cows in this country; but it must be borne in mind that these tests are all for a period of a week or more, and are confined to A. J. C. C. H. R. cows, and no one will appreciate the labor of testing a single cow carefully for her butter yield for a week more fully than he, or she, who has made such tests. When one cow is kept, or even two or three, it is very hard to find the time when all the milk and cream of the best cow can be spared for a week; and in large dairies there is so much work to be done that it is by no means an easy thing to have a particular cow milked fourteen times by the same person, and this milk brought to the milk-room separately and set and skimmed, and the cream ripened and churned and the butter worked and weighed separately! And to continue this testing week after week for several months or for a year is a work of very considerable labor and expense. Nevertheless this, in whole or in part, is what every breeder and every butter-maker ought to do for each one of his cows and at various periods of their lives. It is the foundation of breeding for butter, and it is the only way by which butter-making can be made to pay.

It may be affirmed that butter-making cannot be conducted on anything like a business basis unless each cow in the herd is separately tested for her butter yield for at least three days at a time every three or four months; and surely no *breeder* can expect to do less than this and look for success.

But to return to Major Brown's tables. Few and imperfect as these tests are, and interested as were those by whom these tests were made, I nevertheless believe that as compared with the published yields of cows of other herds these tests are true indications of the superiority of the Jerseys as butter producers. Nor is it unreasonable to expect these results, when we consider the history of this breed of cattle. Let us look at it for a moment.

It is no record that more than a century and a half ago visitors to the Island of Jersey found there a breed of cattle distinctive in their race characteristics, and, at that time, surpassing all known breeds in the quantity and the quality of their butter; and among other indications that this race had at an early date a peculiar and valuable character, are the passage of laws by the States of Jersey as long ago as 1789, prohibiting under special and severe penalties the importation of cattle from France. And if we consider some of the circumstances connected with this race it will not, it seems to me, be surprising that this peculiar value was conspicuous a hundred and fifty years or more ago, and guarded by statute a century ago, and fostered and at last thoroughly fixed as a race—characteristic. In the first place the Jersey cow may be said to be the result of the remarkable climate of the channel islands. The climate of the Island of Jersey has, perhaps, not its equal for mildness and uniformity. Mildness, moisture and freedom from sudden changes, give us the conditions necessary for the production of a sweet, tender and nonriching herbage, and also for the production of butter in large quantities and of the highest quality. To favorable climate and food we may add the character of the people and the nature of their farming operations. By race and language French, by conquest and business relations English, the inhabitants of the Island of Jersey may be said, from an agricultural point of view, to possess the merits of both races. They are frugal and careful in detail where the English would be lavish and impatient; they are enterprising where the French would be restrained by expense or tradition; they have held fast to what was their peculiar

source of profit with Gallie tenacity, yet they have shown an interest in the real improvement of their crops and their cattle truly British.

But to these favorable conditions there is another important item to add, namely: the markets in which the Jersey cow and Jersey butter were sold, markets in which close competition from all parts of the world kept up a high standard, but markets in which the wealth of the world stood ready to reward the highest skill. Such markets were found in London, near at hand, and regular in their demand the year round. Early in this century an intelligent and vigorous agricultural society was formed in Jersey which did much to improve the breeding of these cattle.

Though the change of climate and foods has certainly been great, this race of cattle seems to have adapted itself promptly to the conditions of its new life in Canada, New England and the Middle States, the Western and the Pacific States, and latterly to the Southern States. As proof of this, it will be observed that among the great producers among American Jerseys one is found in Vermont, one in Eastern Massachusetts, another in New York, a fourth in Illinois, and a fifth in the South; and of all those whose yields are reported in Major Brown's tables, it may be said that they are almost evenly distributed throughout the New England, Middle and Southern States.

2. But that cow which produces the largest *quantity* of butter per year, will not entirely satisfy the wants of the dairyman nor the ambition of the breeder of to-day. Butter of the highest *quality* is in demand, and in demand in very considerable quantities and at very large prices. And when we consider that, as far as the cost of production, making and marketing goes, the best butter exceeds but little the cost of producing medium butter, the great profit in owning those cows who produce butter of the highest quality will be evident. There was a time, in this country when there was but a limited amount of butter consumed, and the demand for butter of a very fancy grade and at a fancy price was even more limited. But during the past twenty years the change in the butter market has kept pace with the other great changes in our community. The demand for butter of medium grades for home consumption and for exportation has increased with enormous strides; but the demand for butter of a luxurious quality and at a luxurious price has kept abreast with it. And then these high prices have no insecure

foundation. In a busy and prosperous community money is apparently paid quite as readily for the luxuries as for the so-called necessities of life. For example: while the amount of travel by ordinary passenger cars has grown with wonderful rapidity, the amount of travel by the higher priced, drawing-room and palace and hotel cars has kept on growing also. The consumption of beer at five cents a glass grows day by day, but is there any falling off in the sales of champagne which costs, say, forty cents a glass?

We must produce not only the most but the best butter, and statistics from New York and Boston markets show conclusively that the best butter is made from the milk of Jersey cows. Much butter is sold daily in New York, at one dollar a pound, and all, with the exception of one old brand, from Jersey cows, and much is sold in Boston and New York and the other leading cities of the United States at 80, and 70, and 60, and 50 cents, and this is made from Jersey cows. The butter of this breed has a higher flavor and a firmer texture and a deeper color than any other known. There are some good butter makers and some good liverers who still maintain that in their opinion Jersey butter is "rank;" as there is no arguing about tastes, as the proverb says, we may simply remark here that in spite of the assertion of some of our worthy but old-fashioned friends that "good, hard cider is the best drink in the world," nevertheless, a great deal of the frothy and effervescent liquid called champagne is sold at three and four dollars a bottle, and I fancy that more money is made from the manufacture and the sale of the latter, than of the former liquid.

3. But even if the greater quantity and the superior quality of the butter of the Jersey be admitted, the question may be asked, and appropriately, is this butter produced profitably? A good Jersey is a good eater, but also a good "digester," and compared with what she produces, she does not consume more than other cows. I have made two pounds of butter a day from many a cow of this breed, whose feed has either been in summer pasture only, or in winter one quart of corn meal, and three quarts of bran, and fifteen pounds of hay, all fed dry. And the cow Bomba, just semi-officially tested, gave over three pounds of butter a day, some days running on moderate pasture and an average of two quarts middlings, a pint of corn meal and a pint of linseed meal a day.

Having smaller bodies than any of the other leading breeds, they require less food to sustain these bodies while growing, and they require less food to sustain these bodies when they have reached maturity. They come into profit at least a year earlier than other breeds, and thus make a saving to their owners of a twelve month's food, handling and housing. This is no small item considering the labor, expense and risk attending the younger years of valuable stock: and they live as long as the cattle of any other breed. They are as gentle and prolific as any other breed. They are as hardy as any other breed.

A herd of twenty H. R. Jersey milking cows with which I am intimately acquainted were obliged, during a very cold, snowy and windy winter in western Massachusetts, to go half a mile and back daily for their drink of water, and the track they had to make for themselves was through snow drifts up to their bellies, and across a bleak hill-pasture exposed to the coldest northwest winds, and the brook from which they drank was often covered with solid ice, two or three inches thick through which holes had to be chopped for them daily, and the stable these cows lay in was so cold that their dung frequently froze solid. Yet these cows during this whole year did not shrink from their average of 285 pounds of butter for old and young, and calves born every month of this winter developed into full-sized and handsome animals.

The Jerseys are the most persistent milkers of any breed. They do not go dry for more than six or eight weeks, and there are many instances of cows giving half a dozen large, healthy calves in as many years without ever ceasing to give a good yield of milk.

Another important consideration, from the profitable point of view, is the fact of the great richness of the milk of this breed. This gives us just so much less "skim milk," or water, to be drawn from the udder, to be carried to the dairy, to be provided with pan room; these three making no small saving of time, labor and expense in the course of a year. The young cow Bomba, though having grass as well as grain, made her 21 pounds 11½ ounces of butter from 205 pounds 6 ounces of milk.

From the larger size of the butter globule the cream rises quicker and churns quicker than in the case of other breeds, and, in consequence, the cream is exposed for a shorter time to risks of injury from odors and ferments; and in the churn the quicker the butter comes, the better, as a rule, will the grain be; undoubtedly upon

this larger size of the Jersey butter globule not only does the superior flavor but the superior grain also largely depend. It can be demonstrated that in the milk of Jerseys these globules are not only larger but more uniform in size.

4. This breed is thoroughly responsive to in-and-in breeding, when intelligently carried on for the purpose of intensifying and perpetuating their peculiar powers as butter producers. The leading Jersey cows in America to-day show in their pedigrees much close-breeding among their ancestors, and they are better than their ancestors. Eurotas' dam is the offspring of full brother and sister. And Eurotas' son, Duke of Darlington, the sire of Bomba, was sired by Sarpedon, offspring of the same brother and sister who got the dam of Eurotas. Marius, the sire of Signal, who has sired more butter cows than any known bull, was out of Lady Mary by her own son.

This inbreeding not only develops and fixes the desirable characteristics of a race, whether for beef, butter or milk, but it gives us just the quality needed for crossing upon the native mixed breeds of a country. The thorough-bred and inbred race possesses an impetus, so to speak, which, when brought in contact with mixed breeds, carries it a long way in its own direction from the first impulse. Consequently we find that the offspring of a Jersey bull and a native cow possesses not only half but three-quarters, and sometimes seven-eighths of the characteristics of the sire. Moreover, it is a well established fact in cross-breeding that the most favorable results are obtained where the bull belongs to a race whose bodies are smaller than those of the race to which the cow belongs.

So much for a general and brief statement of the claims which we "Jersey men" think our favorite breed has upon the community of farmers at large. With respect to the farmers of Maine in particular it would appear that this breed is especially well adapted, either in their purity or as grades, to this region. The broad, level pastures and the great grain fields of the West, would seem to be the home of the Shorthorn and Hereford; they are certainly not adapted to do their best in Maine, or in any part of New England. The Holstein and Ayrshire, here and everywhere, are the milk and cheese producer's cow.

But for the pastures of Maine—too hilly for the beef producers, and too far away from large cities for profitable milk production—it would seem that they were particularly well adapted for the pro-

duction of mutton and butter, and mutton and butter of the highest grades. Our only chance in New England of successfully competing with the broad, fertile fields of the West, is in making a specialty of a few things of the highest quality. With sweet and well-watered pastures, and invigorating air during the summer, and a steady, dry, bracing air through the winter, Maine is well situated to compete favorably with the world in the production of the highest grades of mutton and lamb and butter.

The life of the Maine farmer who raises lambs for the early spring markets, and who makes butter every month of the year, and more in the winter than in the summer—the life of this farmer and his family is free from many of the hardships which assail the western raiser of corn and wheat. The New England flock master and butter maker has his labor very nearly distributed throughout the year, and he is far less exposed to extremes of heat and cold and storms than is his western brother. The eastern farmer's profit may be somewhat less, but his income is more steady and more certain and, to my way of thinking, the New England farmer has always within reach many of those advantages, social and intellectual, which after all, are what go toward making life worth living.

Nor is it an expensive change in farm operations which I am recommending. As good Jersey butter bulls for grading native cows as there are in the world, are now within reach of every farmer in Maine at from \$25 upward, and the cost of a valuable butter bull may be reduced to a song by a dozen farmers joining forces, and purses, and buying and owning the bull in common. A bull will be the better, and his calves better, for his becoming the sire of at least fifty and from that up to a hundred calves a year; and the bull and his get, would be better if he were worked every day; it is a pity to throw away all of this muscular power, and moreover make it dangerous to the community, as we do by keeping strong bulls stalled the year round. There are to-day, at least half a dozen fine herds of cows within two miles of our farm which in their butter product are as good as pure Jerseys, and these herds have all grown in less than ten years from crossing the native cows of which they were formerly composed with registered Jersey bulls. Now these grade Jerseys do not produce as large veal calves, nor will the cows themselves fat as profitably, but I doubt whether their owners regret these facts very much when they are getting \$75 and \$100 each for their cows which, if native, would bring \$40 to \$60;

nor do they regret the change when they are selling every pound of their larger butter yield at 5, 10, 20 and 25 cents a pound more than the butter of native cows sells for. Their herds, at present, partaking largely of the characteristics of their Jersey sire, are making more butter and better butter, and butter which costs less and sells for much more than that of any native herds.

The rations most favorable in this country for the health of the cow, the development of the calf *in utero*, and for the most profitable production of the best butter, are pasture supplemented by fodder, rye, peas and oats, millet, corn and barley, in the spring, fall and summer; and in the winter, fifteen to twenty pounds of hay, four to six quarts of corn and wheat mixed half and half, and half a peck of carrots or beets. Linseed and cotton seed meal should be avoided or fed very sparingly for fear of injury to the cow or the butter or both.

An amount of grain larger than the Jersey cow can at once direct toward warmth of the body and the supply of butter fats in the udder will cause a tendency toward putting fat on the carcass, and the encouragement of this tendency will prove fatal to the greatest butter yield. From the start care must be taken to give the Jersey enough to keep it growing while young and to supply in the mature animal the demands of the udder and the support of the body generally; but all food beyond that required for these purposes will be worse than wasted, for it will be sure to divert the Jersey from a butter producer, in which character she is a success, to a beef producer, in which rôle she must always and should always be a failure.

Great care should be exercised with regard to high feeding before the cow calves; with cows of this breed it is well to withdraw all grain and to limit the amount of rich pasture for at least six weeks before the calf is born. While it is important to give the cow food sufficient to supply all of her needs, as well as those of the almost fully developed fetus, yet it should be remembered that at this time the cow is taking comparatively little exercise, she is giving little or no milk, and the calf until it comes into the world requires less than an ounce of nourishment a day; all of these needs good hay, and perhaps a few roots, will supply; more food will unduly rouse the system. Our object should be to prepare the cow as well as possible for the great change her system will undergo, when all of the energies of her organism are turned suddenly from the moderate needs

of her own and her unborn calf's support, to her great milk and butter product. The strain, great in any case, is vastly increased, it should be remembered, in our artificially high-bred cows, who, in their civilized condition, pour into their udders nourishment enough for a dozen calves each, instead of the small supply really needed by her one calf. It cannot be too strongly urged that in order to save our best cows from death or injury from milk fever and garget, all grain should be removed for a month or two before the period of parturition; nor should the cow during this month or two receive all of the grass or hay even that she would be willing to consume.

Let the calf be removed from its dam at the end of forty-eight hours and fed carefully by hand three or more times a day, about a quart at a time, with milk warmed and diluted with skim-milk or hot water; at the end of two or three weeks, skimmed milk alone warmed may be given up to six or eight quarts a day. The calf should be encouraged to eat hay and whole oats, or grass and oats as early as possible.

Hand-fed calves should be compelled to take their milk slowly. I know of no remedy except this for the disorders called in England "curd in the stomach," and in this country "acute indigestion." Sometimes a leather teat is fastened into the feeding trough; the calf by sucking and pulling at this bit of leather strap not only takes his milk more slowly, but gets it more thoroughly mixed with saliva.

The dairy supply companies in England have on sale well made metal pails in the bottom of which are rubber teats. One form of these pails is called "Tucker's Patent Calf Feeder," and is sold, I understand, by the Aylesbury Dairy Company of London. The wooden trough and leather strap soon sour and cause looseness of the bowels, troubles which are arrested by the tin and rubber of the Tucker pail, which brings the feeding calf nearest to the natural method of taking its nourishment of any device I am acquainted with.

EIGHTY CENT BUTTER.

In order to make the best butter and the most of it, and in the most profitable manner, everything about the stable and milk house must be *clean*, and *fresh* and *pure*, and to accomplish this the cows and their milk must be kept *above ground*. In no other way can we obtain all of the fresh air, all of the light and all of the freedom from dampness which both the cows and

their milk require. There *may* be *good cellar* cow stalls and *cellar* milk rooms, but I have never come across either one or the other. In the case of cellar or basement cow stables, dampness is unavoidable, if not in mid-winter in the spring and fall; foul, sickly odors are almost certain to be present; and it is very difficult to obtain all the light desirable. Don't let your cows live in a cellar nor over one either. Let the cow stable, if possible, be a foot or two above the natural surface of the ground. Let the light come into this stable if not on all four sides on two at least, including the south. Let the windows be large and many. Let the stable have large ventilators *which can never be closed*. Let the manure be thrown or wheeled out of the cow stable two or three times a day. Let the cows feed out of boxes which can be taken out and cleansed and sunned and sweetened. Let the floor be whitened daily with plaster. In other words let the stable be so made and so cared for that the air inside it shall be as fresh and pure as the air outside of it.

In the same way it is necessary that the milk room should be above ground to escape dampness, bad odors and darkness. It is not an easy thing, it is true, to get a uniform temperature in an above ground milk room, and without a temperature which is equable we lose in amount of butter; but our first object is quality rather than quantity—and the best butter can only be produced in an abundance of fresh, odorless air. Yet how many stables and how many milk rooms are *absolutely odorless*? Not many. How much perfectly good butter is there? Not much. These things go hand-in-hand. The prime conditions of the best butter are clean cows, clean food and drink and air for them, and clean utensils and clean air for their milk. These conditions obtained, there is yet much work to be done, but without these conditions for the foundation our after work is thrown away. The best form of cow stable—the best for the farmer making over his old buildings and the best for those who are building a new steading—is that which gives the cows a moderate sized separate building; a building, however simple, above ground, with no manure under it, no hay above it and nothing but cows (and fresh air) in it. Let the hay barn be next to the cow barn, on the north or west side if possible, but not covering the whole of that side of the cow barn. Let the manure shed or manure cellar be at the other end of the cow barn. In such an arrangement as this, the hay and grain can easily be hauled

through a door to the cows and the manure wheeled through another door from the cows; by some such an arrangement as this the hay and grain will not be contaminated by the manure or by the cow's breath and other odors, nor, in turn, will the cows be covered with the dust of the hay and grain barn, nor will they have the fumes of tons of rotting and heating manure forever rising up under their nostrils and constantly contaminating their food and their milk.

The cow's flank and udders should be as clean or cleaner than a horse's flank—why not? If the cow is tied by a stanchion or by a properly adjusted chain, and is placed upon a platform which drops six or eight inches behind her heels, she will keep herself clean in ninety-nine cases out of each hundred. As it is, the reverse is almost literally true, ninety-nine cows are very dirty for one that is clean, and yet it is not much more difficult to keep a cow clean than it is to keep a horse clean, and how vastly more important it is! When I see people riding out with sleek, well-groomed horses and reflect upon the nasty condition of the cows whence comes the milk they and their children drink, I am tempted to compare them with people who wear lace collars and velvet coats but who seldom take a bath! We all know people of this kind and are careful to avoid them.

I find the Robbins' Cattle Tie, of chain, or chain and leather, and the Barnard Stanchion, of wood or iron (combined with the above mentioned short platform), the only methods by which cows can be economically and thoroughly kept clean and comfortable. These methods of fastening are much easier for the cow than the old-fashioned rigid stanchion; they permit her to get up and down without injury to the shoulders or knees, or strain upon any part of the body; they permit her to lick or scratch herself and to lie with the head naturally by the side as in the yard or open pasture, yet they keep her absolutely from going forward into the manger, from dunging on the platform where her flank or udder will rest, and they prevent her from standing with her hind feet in the gutter or on the lower level. They are well made, strong, safe and not expensive, and the most desirable in the market. At least these are the conclusions which I have arrived at after watching the workings of, and trying a dozen or twenty different methods, and after more than a year's trial of the two kinds commended above. Try one of them with the platform dropping eight inches, half an inch behind the cow's heels.

Now let the housewife or dairy maid insist that the milk shall be brought promptly to the milk room, which room is also above ground and protected from all cellar and kitchen and bed and sitting-room odors, and exposed to all the airs that blow, and in this room let the milk be set in shallow open pans and at a temperature of 60° the year round. There are many very "convenient" methods of setting milk in deep open, and deep covered, and deep submerged cans, and a very *uniform* quality of butter can be made in most of them but it is "uniformly" bad, or at least very negative in its quality. I am speaking of Jersey butter only, now, and that of the highest quality. Shallow, open settings, at a temperature of 60° and with plenty of fresh air moving about it, are the only conditions by which Jersey milk will yield that cream which will make "the best butter."

Oxygen! the cows want it to produce the best milk and the milk wants it to produce the best cream, and the cream wants it to produce the best butter. The heavy tallow-like fats in butter can be secured in good condition in most any form of pans and at most any temperature, but to get the valuable oils liberated, those oils which make butter (butter, not tallow or suet), those oils which give the best Jersey butter its fragrant, nutty, appetizing, healthful flavor, *to develop these oils in their perfection, I know of but one process, viz: small, shallow, open pans with plenty of fresh air at 60°.*

As to the churning of sweet or sour cream the taste of the majority of one's customers must decide; and so with regard to salting; and so with regard to coloring. Most of the purchasers of high priced butter to-day prefer that which is made from cream churned just as it begins to develop a bright, fresh acid taste, and they do not want over one-third of an ounce of salt to each pound of butter, and they like their butter deeply colored; and why not give it to them dark brown, or white, or black if they want it, so long as the coloring matter used is, like annatto, perfectly harmless? My own customers like their butter made from sour cream, nor do they care to have all of the butter-milk or water worked out, none like over one-third ounce of salt, and some prefer no salt at all, and at 60 to 70 cents a pound the year round, I am very much inclined to humor them in all of their preferences! So much for those general rules which apply to all butter makers. As to the particular methods and machines which I am about to name or have already named, I can say that not one is commended which I have

not used, and used until I have become well acquainted with it, and with it as compared with the other leading machines or implements of its class.

In regard to milk pans, I prefer, first, the small, shallow, open pan, in a carefully made milk room, so arranged that it can be maintained at a temperature of 60°, with plenty of fresh air each day in the year. But such a milk room is very expensive to make and more expensive to manage, and to keep cool in summer and warm in winter. Such milk rooms, in wings of houses or in separate buildings, do exist, but in first cost and in after management they are out of the reach of the great majority of even the most ambitious butter makers. The nearest approach to this ideal milk room, known to me, is that provided by the Ferguson Manufacturing Co., in their Bureau Creamery; by its use an extremely high and uniform quality of butter can be produced, and much labor, expense and anxiety saved. The first cost is not great, the workmanship is very satisfactory, and the firm putting them before the public are business men and gentlemen.

My experience inclines me to say that to produce the best butter, milk should be skimmed promptly after standing at 60° thirty to thirty-six hours.

As to butter working and butter workers. Butter working cannot be taught by verbal instruction, nor am I sure that it can be taught by example either; the good butter worker, like a poet, is born, not made. Moreover, the amount of working and the intervals must depend a good deal upon the kind of churn used and the quality and condition of the salt. As to butter workers (the machine, not the person), I know nothing as satisfactory as the lever and inclined table—unless Mr. Blanchard has discovered this long sought tool in his hand worker; this I have not yet had an opportunity of trying, but it certainly has an inviting appearance.

No churn produces a grain equal to the Blanchard, and none do their work with more ease or promptness. Oscillating churns of most all patterns cause the butter to come at the end of the mass of cream before the bulk in the centre has broken, which inequality ruins the grain of that which comes first and of course destroys the value of the entire churning. These objections apply also to revolving barrel and box churns, and they, like the oscillating, occupy, some when at rest and all when in motion, far more room than the Blanchard, and most all are patterns difficult to cleanse. The

Blanchard occupies but little space at any time, its cost is very moderate, its workmanship is worthy of all praise and it not only churns the butter most satisfactorily, but in it you do half of the working of the butter. Beginning with a good churn nearly a century ago, the makers of this one have kept actively observing and experimenting, and feeling the pulse, so to speak, of the best dairymen, until in their latest *round top, fixed float* pattern, they offer the dairyman a churn which not only produces butter remarkable for its grain and uniformity but one which occupies little space when at rest or in operation, is very durable, is easily worked, easily cleansed and easily paid for.

EVENING.

BUTTER FACTORIES AND FACTORY BUTTER.

By MAJOR HENRY E. ALVORD, of Houghton Farm, Orange Co., N. Y.

Ten years ago, Chicago and the States west of that city depended upon the East for more or less of the butter there consumed. Last year besides supplying its own rapidly increasing population, that region shipped eastward from Chicago a round 100,000,000 pounds of butter, and an almost equal weight of cheese.

When butter began to come from the west it was not an article that eastern dairies were afraid of. Look back only a few years and you will find "Western Grease" quoted in all the New York market reports. That meant the butter from Illinois and Iowa. But when in the autumn of 1876 the prizes were awarded in the Dairy Department of the Centennial Exposition, much to the disgust of eastern dairymen and to the astonishment of all, the Gold Medal for the best June butter went to Iowa, and the Gold Medal for the best October butter to Illinois. The judges marked on the scale of 100 points for perfection. The best eastern lot of butter shown was marked 84; three western lots were 85, 94 and 94.

The next large dairy show was held at Chicago, December, 1877. There the first premium for factory butter went to Illinois, second to Wisconsin, and third to Wisconsin; and for dairy butter, first to Illinois and second to Wisconsin.

Two International Dairy Fairs have been held in New York city, the first in December, 1878, the second, December, 1879. Analysis of the premiums awarded on butter :

Sweepstakes :	1st.	2d.	3d.	4th.	5th.	6th.
1878.	Iowa.	N. Y.	Ills.	Iowa.	N. Y.	Wis.
1879.	Wis.	Ills.	Iowa.	Iowa.	N. Y.	Me.

Of the 32 highest premiums on butter, open to all the States :

1878—New York, 22; Iowa, 7; Illinois, 2; Wisconsin, 1. East, 22; West, 10.

1879—Iowa, 15; New York, 10; Maine, 3; Illinois, 2; Wisconsin, 1; Vermont, 1. East, 14; West, 18.

In confirmation of the change thus shown, I take the following extract from a letter from a friend in Boston who is particularly well informed on this subject :

“Eastern dealers are now looking to Illinois and Iowa and the west generally for their best butter. The best butter that now comes to the Boston market at least, is from that quarter and it is rapidly taking the place of the fancy butter made nearer home. The most experienced Boston merchants give it as their opinion that in a very short time nearly all the fine butter will come from the West.”

Now turn to the market reports : It is useless to consider either retail prices in general or the special rates obtained for the butter product of certain dairies having a local reputation. The butter sold in Boston above the general quotations, does not amount to 1 per cent. of the whole quantity handled weekly. To study the market we must deal with the wholesale rate of butter sold in quantity. The Boston market is the one of most interest here. One time is as good as another, for illustration, let us look at quotations : Saturday, Dec. 23, retail, creamery, 33-42c; prime tub, 30-35c. Wholesale, fresh creamery, 40-42c; fall creamery, 37-38c; choice New York and Vermont dairies, 29-33c. On an average during the present year, creamery butter has commanded 4 to 6 cents per pound more than the same grade of dairy. General average, western creamery in New York, 1882, 35 cents. Dairy, less than 30 cents.

Now the New York market : We quote from the *American Dairyman*, Dec. 21, creamery, fancy, 44-45c; good to choice, 38-42c; State dairy, choice, 28-32c.

Even when eastern dairy butter is at its very best in the market, almost everything labeled “Creamery” stands higher. As a general

rule for several years, the second grade of creamery or factory made butter, has sold quicker and at higher prices in our eastern markets, than our own New England farm butter. Day after day butter made more than 1,000 miles away comes rolling into Boston by the car-load, and sells in your own market at the highest prices, crowding out or down the butter of your own farms. This is not a pleasing condition of affairs for New England farmers, and it is full time the matter received careful attention. To a close observer and student of the subject, just two things can be found as causing this successful, onward march of Western made butter :

1st. The activity and enterprise of the butter makers out there ; their organizations and the good resulting from numberless meetings.

2d. Their wise abandonment of the old way of private farm dairying, and the substitution of the factory or " Creamery " system of coöperative dairying.

Please notice that it is not simply western butter, but *creamery* butter that has stood at the head of the market quotations for the last four or five years. During this period creamery butter has made for itself a great reputation, based upon uniform high quality. Here is a combination of two very important points : high quality and uniformity. We all know the unevenness that exists in a thousand pounds of butter made on fifty different farms, and even in the butter of a single farm in successive weeks. This unevenness makes such a lot of butter hard to sell in the large markets, every package has to be inspected and classified. But under the factory system the cream from the fifty farms being brought together into one mass every day and made up, day after day, on exactly the same plan, by a person who is an expert and who does nothing but make butter the year round, a product of a thousand pounds results of perfect uniformity, and in this way it is possible to maintain this uniformity throughout the year. It is plain that this uniformity gives a great advantage in the market to the factory or creamery butter. A single package only from a car load of tons has to be examined to classify the lot. Dealers are better satisfied and so are consumers. And a factory which makes a thousand pounds a day (there are many such), may soon establish such a reputation as to sell its whole product in advance and without any inspection, just as the best single dairies do. So this one point of uniformity of product gives the factory butter a very great advantage. But

added to this is the fine quality. It is easy to understand how, with proper management, the butter made at a factory from the milk or cream from a hundred different farms, will be much better than the average quality of the butter from any hundred farms in a neighborhood when separately made. It is a fact that in many cases the factory product equals in quality the very best previously produced in any private dairy in the same locality.

The high position of creamery butter is, therefore, not a mere fashion, or temporary matter, but being based upon sound reasons, we cannot hope for a change. It behooves us to consider whether it is not expedient to adopt the creamery system, in some form, in New England. To one who has given the subject a little attention it seems hardly necessary to argue it. Manifestly something must be done to overcome the disadvantages under which we now labor in the sale of our dairy products. So radical a change, however, as removing all the care of milk, or at least all the butter-making from the farm, changing this home production to a regular branch of manufactures, deserves to be fully and carefully considered.

Objections exist to the factory system of dairying, as well as to everything else, especially new things. First, there is the daily labor of transportation of the milk or cream from farm to factory,—certainly a serious matter, whether done by the farmers or the factory agents. Second, there is risk of loss and damage attending this transportation. Third, there is the cost of the labor at the creamery. A good many will say at once that here is labor, of a skilled character, which must be well paid for, when the work could be done on the farm for nothing. But as these objectors must be people who don't think the labor of wives and daughters costs anything, and that the more they can be made to do the greater the gain, it will hardly pay to dwell on this matter; discussions with such people are useless. Fourth, the farmers who unite in any scheme of coöperation must be prepared to surrender their individual ideas and preferences for the good of the many. This forfeiture of independence is one of the hardest things for a farmer to do, and the necessity for it operates as a serious obstacle to coöperative dairying. Yet at the foundation of our institutions lies the execution of the will of the majority, not the individual, and the submission of the minority, and it can do no harm to apply the same principle to the regulation of neighborhood butter making, as to the management of the affairs of state.

Opposed to these objections numerous advantages can be presented. A partial list only is given and these so plain as to need no explanation. The advantages of the factory system are :

1. Economy of manufacture in great quantities, in labor and tools.
2. Tendency of system to raise the average quality. In many cases the butter and cheese produced by this method equal the best ever made before in the same section from the same cows, and at times surpasses it.

3. Economy of marketing large quantities.

4. Last, but not least, is the great relief of having the milk or cream taken off the farm, saving all further labor and care. And this relief comes, as a rule, to that part of the working force of the farm which needs it most, the farmer's wife and daughters. Often this dairy duty is just so much in addition to the ordinary domestic cares which are, of themselves, a sufficient burden.

Let me not be understood, however, as believing in an entire substitution of the new system for the old. Associated dairying originated in cheese making districts, and in its earlier forms is better adapted to that branch of the industry than to butter making. The butter factory, pure and simple, followed the cheese factory, and derived from both—at first a combination of the two—we have the establishments known by the general name of creameries.

Creameries, or butter factories, differ much in their systems and management, and in viewing the question of introducing coöperative dairying in any given locality, the kind of creamery adapted to its wants will depend upon various conditions. The main point will be, whether the whole milk or only the cream shall be taken to the factory. Taking the whole milk off the farm is in the long run, selling the farm itself by the gallon or by the pound, and can only be afforded when the receipts for the milk are so good as to enable a return to the land by the purchase of food for the stock, or of fertilizers. As a rule, selling the whole milk should not be advocated, and the butter factory in its original form is objectionable on that account. Butter alone, however, or pure cream contains no nitrogen and no mineral matter of consequence, and may be perpetually produced and sold without perceptibly affecting the fertility of the farm, provided the skimmed milk be used at home and in the best way. It seems to me quite evident that the factory system best adapted to a specially butter making section, where there is very little sale for milk at remunerative rates, is that which

has recently come into such favor in Wisconsin, Iowa and the other Western States under the name of "The Cream-Gathering Plan;" also called "The Fairlamb System," for its originator.

The chief feature of this system is indicated by its name—the cream from many farms is gathered and carried to the factory for churning. Besides having most of the desirable features of the general factory system, this plan has the following special advantages:

1. The milk is set at home on the farm where produced, being the place and time best suited for getting all the cream.

2. The cream alone is taken away, leaving all the skim milk upon the farm, and sweet.

3. Instead of all milk being considered equally valuable as in the case of the cheese factory, the best butter stock has the advantage under this plan, by producing the most cream, and it is the quantity of cream that determines the factory payments.

4. The milk, within certain limits, may be treated according to the judgment of the owner, as to the best method of cream separating.

5. The factory itself under this plan may be a very cheap and simple affair. Instead of the necessity for large storage rooms and facilities for handling great quantities of milk and disposing of the skim milk, all that is needed is a suitable room and moderate tanks for storing and ripening the cream, a churn and worker and a working-room.

We do not argue that this plan is perfection. Cream from different cows and different farms, pound for pound or gallon for gallon, differs in its butter making value as well as milk, but not so widely. There is very great and very manifest injustice in paying the owner of a herd of choice Jerseys the same price for his milk as is given for that from a herd of ordinary natives or even fine Ayrshires or Holsteins, provided the purpose is butter-making. But if the milk while creaming, is treated on the same general plan on several farms, the value of a given quantity of cream for butter making will be nearly the same, although there is a great difference in the breeding and feeding of the cattle. The difference is so small that it is found in practice in thousands of trials, to be insignificant. So while theoretically and in fact, this plan is not absolutely just, it more nearly approaches equity among cow owners coöperating than any other yet devised.

It is manifest that an essential feature of the cream gathering plan is uniformity in the treatment of the milk on all the farms contributing to any factory. All must set shallow, or set deep, open or closed. Differences in these respects would make great variation in the value of the cream produced. It is found that the true way is for all the patrons to have exactly the same milk vessels. Mr. Fairlamb discovered this early, and invented the Fairlamb Can (here exhibited), to accompany the Fairlamb system. This can is by no means essential to the system,—if all patrons of a factory used any one of the modern creamers or cans, it would do,—and Fairlamb factories are, in fact, using different cans. But this being the original, specially designed for the purpose, as efficient as any and the cheapest of all, it is more generally used than any other can in connection with the cream gathering plan.

Whatever the milk vessel used, it must be arranged so as to easily measure the quantity of cream before removing it from the milk. It makes no difference what the measure is, it may be pounds, or quarts, or inches of depth upon vessels of equal size. The latter has been found the best in practice and hence you read of the inches of cream, in connection with these factories. This Fairlamb can is, as good an example as any. It has a glass panel in the side, on which divisions are marked, so that the can being filled with milk, and the cream separation fully effected, one may read at a glance the depth of cream on the milk in the can. This is read in inches and eighths of an inch. There are a good many things about this scale on the can that need more detailed explanation than it is possible to give here. The cans are not all made of the same capacity, there being three sizes, which hold respectively 30, 45 and 60 pounds of milk. But they differ only in depth, are all of the same size at the top, so that this scale applies to all, and a given depth of cream as shown on the scale, means a fixed bulk of cream without regard to the capacity of the can. For convenience the scale is arranged, after long experience, so that one inch depth of cream, read upon it, represents one pound of packed butter. The quantity of cream in this one inch depth on the Fairlamb can, is 113 cubic inches, or not quite two quarts ($115\frac{1}{2}$ cubic inches.) You see this can is upon the deep setting principle, and the cover excludes the air, although it is not submerged, so the cream is thin and bulky. Two quarts of such cream is not excessive for a

pound of butter, but in the Northwest the Fairlamb factories, as stated, average rather less than two quarts, and the experience of the Massachusetts factories is that it requires still less, or only about 110 cubic inches of cream to make a pound of butter.

The chief peculiarity of the Fairlamb can is the centre-tube for centre-cooling. An examination of the can will show its construction and operation. It does best set in water, and home-made tanks are generally used. In the operation of a cream-gathering factory the patrons, or farmers contributing the cream, need cans enough for three milkings, and every dairy should have some of the small size. The cans and tank for cooling are all that the patrons have to provide at home, and where the Fairlamb cans have been adopted, the cost of the "outfit" has been from \$2.00 to \$2.50 per cow.

The operation of this system of coöperative butter-making is as follows: The factory being ready and the patrons provided with cans, the milk on every farm is strained into the cans; they are set in the cooling tanks, the cover is left off till the temperature of the milk falls to about 60° F., and then the covers are put on and the owners have nothing more to do with the milk until after the cream has been removed. Every day one or more agents of the factory, called gatherers, start out on fixed rounds; each has his horse and wagon, large cream cans, cream pails and skimmer. Passing from farm to farm the gatherer stops at each one, measures the depth of cream on the cans of milk as they stand undisturbed, doing this in the presence of the owner if desired, credits the latter with so many inches of cream, then skims and takes away the cream, leaving the milk standing in the cans. The gatherer then passes to the next farm and so on through his circuit back to the factory. This round is made but once daily, or perhaps two shorter routes, each occupying but a half day. Thus at each farm the gatherer skims two milkings. In summer he would generally skim both settings of the day previous, and in winter he might do this on his afternoon route, but on that of the forenoon, if on Wednesday, for example, he would skim the milk of milkings of Monday night and Tuesday morning. (In this case the farmer would have to provide cans for four milkings.) One man can drive from 15 to 20 miles per day, and gather the cream from 125 to 200 cows; the more compact his route, the more economical the service. The usual pay for a gatherer furnishing his own horse and wagon, is \$2.50 per day,

and this is one of the largest items of expense in conducting a factory. After the cream reaches the factory the ripening, churning, working and packing are conducted exactly as in a private dairy, except being on a larger scale and usually better systematized. One good butter-maker, paid from \$15 to \$20 per week, will do all the work at a factory for 200 to 250 cows. If cream from more than this number is received an assistant to the butter maker will be necessary.

No factory on this plan can be profitable to its owners and patrons which does not receive from its start, the cream from at least 200 cows, and the most economical size is a factory with 400 to 500 cows contributing, and having two gatherers and two workers at the factory.

The plan for managing such a butter factory may vary with circumstances. It may be jointly owned by the cow owners, and managed by a committee of their number, or by a paid treasurer or superintendent; it may be a joint stock concern, making the butter for the cream owners at so much per pound, or a proprietary concern, like any other factory, owned by one or more persons, who buy the cream outright from its producers, as their raw material, and turn out butter as their manufactured product. The purely coöperative plan is usually found the best for introducing the system, but it often drifts into the proprietary form in the course of time.

The cost of erecting and equipping a building for a Fairlamb Butter Factory, or of fitting up a rented building for the purpose will vary according to circumstances, from \$1,500 to \$3,500. The latter sum will build and equip new throughout, in a substantial manner, a factory with capacity for handling the cream of 500 cows. An approximate rule is \$8 or \$10 per head for the cows included in the project, as the cost of starting the factory. The details of the equipment and the management will necessarily vary with the place and the people concerned.

It is necessary in all cases to keep the total cost of the butter-making as low as possible. The main items of expense are these: the interest on investment in factory, compensation of manager and selling agent, wages of butter-maker and assistants, and of cream gatherers, cost of power, whatever it may be (steam is the best the year round), wear and tear of fittings and utensils, and cost of fuel, salt and packages. The aggregate of these items, plus

“sundries,” must be assessed upon the pounds of butter made during any given time. Monthly settlements are usual and the total expenses should not exceed five cents per pound on the butter sent to market. This cost of manufacture may be reduced to three cents per pound, in a factory of economical size, well managed. The cost of making is generally greater during the first six months operation than afterward. At Hatfield, Mass., after an experience of one year on the purely coöperative plan, the superintendent, butter-maker and gatherer, formed a partnership and contracted with the farmers to do all the work from skimming to marketing, and including interest on the factory investment at $3\frac{1}{2}$ cents per pound on the butter made for a year.

There is evidence enough of the household relief and pecuniary profit afforded by this Cream Gathering System of butter making, not only by its rapid extension in Wisconsin and Iowa, in Pennsylvania and northern New Jersey, but in the success already accomplished in New England.

At Hatfield, in western Massachusetts, on the Connecticut river, as the result of a meeting held in March, 1880, the first Fairlamb Factory east of the Hudson, commenced operations in October of that year. They rented a building and the whole expense of fitting it and starting on a basis of 300 cows was \$1,200. They had a capital of \$1,500 in shares of \$10. The cost of making butter the first two months was 6 cents, the next two $4\frac{1}{2}$ cents, then 4 cents and during the second year $3\frac{1}{2}$ cents. The first year this factory made, in round numbers 50,000 pounds of butter from 49,000 “inches” of cream, (measured on the scale of the Fairlamb can which was there adopted.) The second year a rival establishment drew off part of their cream and they made 42,000 pounds; the largest product in one month being 5,983 pounds. This factory is now making about 1,100 pounds a week. The first year the patrons of the factory received, net, 28 cents per pound for the butter made from their cream, and during the second year they have averaged $30\frac{1}{4}$ cents per pound. During these same years, when the average to patrons has been over 29 cents, the average receipts for the best private dairies in the town has been 28 cents and less. Thus, by this factory system, the patrons have actually received more money for the same quantity of butter than under the old way, while they have been saved all the trouble and expense of making and marketing.

The next factory established was at Easthampton, Mass. That started in October, 1881. Its average has since been 5,150 inches of cream and over 5,000 pounds of butter per month. Its selling price during 1882 has averaged 35 cents, or the same as the very highest quotations of the New York market for the best western creamery. This factory has labored under the disadvantage of getting too little cream for its running capacity, and the cost of making has reached nearly six cents per pound. Nevertheless, the patrons have, on the average, had larger incomes from the same number of cows than ever before, and feel such a relief at home that nothing would induce them to return to the old way of private dairying.

At Granby, Conn., a Fairlamb factory was started last June, and it has proved very successful. Its capital is \$4,000, and it has received the cream from nearly 400 cows. In six months it made 44,228 pounds of butter at a total cost of only four cents a pound, and sold it at 28 to 42 cents a pound. Last October the factory dividend to the cow owners was at the rate of 37 cents net per pound for their butter—or, rather, 19 cents per quart for their cream, as it stood on the milk at their own farms.

Other examples of a like nature might be given of what has actually resulted here in New England from the adoption of the Fairlamb system in butter-making neighborhoods. I have selected these three because personally instrumental in starting them and familiar with their operations. In every case the butter made at these factories was from the first graded in the market as equal to western creamery, and sold accordingly. The result was an increased price averaging at least five cents per pound during the year more than the butter from the same farms would have sold for as dairy butter in home-made lots. This gain of five cents a pound was enough during the starting year, and more than enough afterwards, to pay all the expenses of the business, including interest on the investment at the factory, and the necessary outlay at the farms for cans and tanks. The gain, therefore, if it be only the relief at home, is enough to justify change.

In many cases, however, the actual results, after the system has become well established, show still greater gains. I have authority, which cannot be disputed, for these statements:

1. The quality of the whole butter product of a community, made on the cream-gathering plan, at a factory, has averaged as high for

a year as that of any ever attained for a like period by any private dairy contributing.

2. The net income from a given number of cows has been greater by this system than ever before obtained; more money from the same cows, and all labor and expense saved.

3. Some farmers claim that they get through this system, more money per inch for their cream than they used to get per pound for their butter, and also that more butter is made for them at the factory in a given time, than they ever succeeded in making at home from the same cows.

These advantages, thoroughly vouched for, are more than ever was claimed for the system, in advance, by its warmest friends. As an example of what a general adoption of this factory plan would do for a whole section, I have made some figures on the county of Franklin, Mass., a county whose butter, exclusively made by farm dairying, has long had an exceptionally good reputation in the Boston market. Its product there commands the very highest price for dairy grades. During the year 1881 that county sent 421 tons of butter to the Boston market. This was all shipped and sold in small packages as dairy butter, and averaged 27 cents a pound for the year, or a total of \$227,330 returned to the farmers of that county for butter. The butter from the factory at Hatfield, a town adjoining Franklin county, with same class of stock and pasturage and care, sold during the same year at an average of 32 cents—five cents per pound more. Now, if the whole product of Franklin county had been made on the factory plan and sold like the Hatfield creamery butter—as it might have been—the total sum realized would have been \$269,440, or a gain to the county of \$42,100 in the year, on their butter crop,—or rather on that part of it sold in Boston. This would have been a right snug little sum to add to the yearly revenues of a small agricultural county. Even if this added sum had gone to factory men instead of to farmers, it would have been a direct gain to the county, but in fact, the cow owners are partly, if not wholly, the factory owners, so that they would have been more or less benefitted by the added revenue.

This co-operative system of butter making, and particularly on the Fairlamb plan, may be advocated on two strong grounds: First, as a great lightening of household labor on the farm; second, as a business improvement, a *paying* thing to do as far as dollars and cents are concerned.

It will be found, however, that the adoption of this new plan will be of greater benefit to the owners of a few cows, and those who are not very good butter-makers, than to the owners of fine dairies of special reputation. The premium butter-makers of the town can't be expected to be the first to go into the new movement. But only one farm in a hundred produces premium butter, and so, seeking the good of the greatest number, it is to the ninety and nine that we may first appeal. Still, when these factories have been introduced, it is found that the very best dairies of the community have soon joined in contributing their cream.

It is to-day true of new England, as it is of old England and, indeed, of all old farming districts, that the broad and fertile acres of new lands, by competition in grain growing and somewhat in grazing, force upon us some readjustment of our system of agriculture. We need a higher state of cultivation upon fewer acres, more land in grass and more live stock. Increase in the live stock, if it can be profitably carried, brings all other needed changes.

This plan of associated butter-making seems to me to be specially adapted to those parts of New England where butter is made in the greatest quantity, and where the money returns are the least satisfactory. I cannot advise any to join in such an enterprise, who make butter at home which is sure to command, the year round, a price above the highest market quotations. There are a great many such, but all cannot become "gilt-edged" butter-makers, and compete in this very limited and uncertain "fancy" market. The great majority of country butter-makers, therefore, should welcome any system which tends to save care and labor, raise the quality of the products, and increase the profits.

Institute at Waterville.

A second Institute was held at Waterville Town Hall, January 30, 1883, in connection with the winter meeting of the State Pomological Society, at which was given the following lecture :

NATURAL HISTORY OF THE POTATO-ROT FUNGUS.

(*Peronospora infestans*, Mont.)

By C. H. FERNALD, Professor of Natural History at the State College.

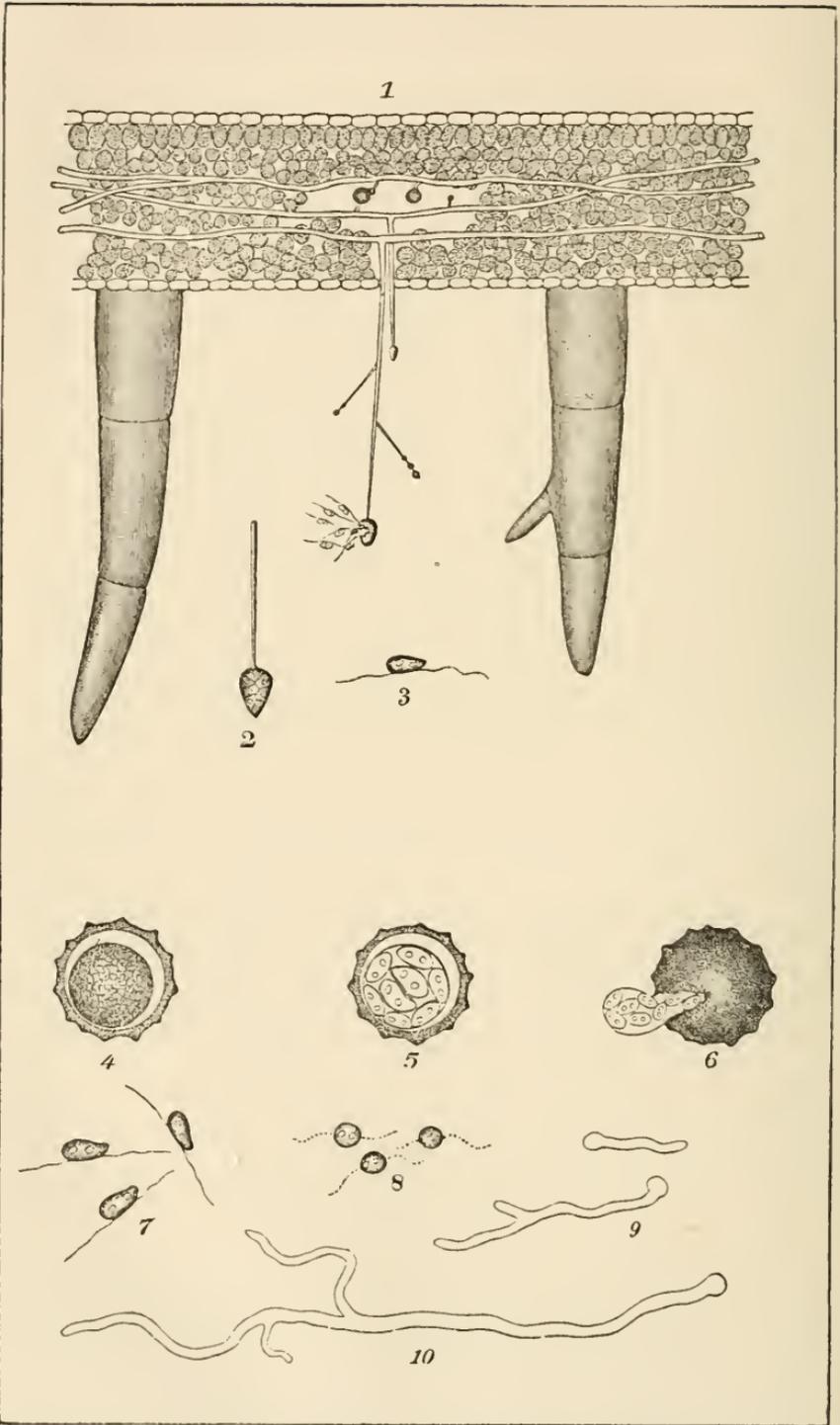
The potato-rot has probably been the cause of greater destruction to the potato crops of the world than all other agencies combined. Even the injury caused by the Colorado potato beetle is but slight, when compared with that caused by the rot in years past.

The potato itself is a native of South America, found wild in abundance in the mountainous regions of Chili and Peru, and the rot occurred there even before its appearance in other parts of the world; in fact, South America, the home of the potato, is also, without doubt, the home and center from which has been distributed the minute fungus which has caused such destruction to the potato crops in all quarters of the globe wherever it has been cultivated.

The disease first made its appearance with certainty in Belgium in 1842, and in Canada in 1844, and also on the island of St. Helena in the same year. In 1845 it spread with alarming rapidity through Europe and the United States, at least the northern parts. During the following four or five years it was distributed over the world, wherever potatoes were cultivated, causing most distressing results among those people who depended largely upon their potato crops for support. During these years the destruction of the potato crop by the rot, caused in Ireland one of the most dreadful famines known in the annals of history, and it has been estimated that more than a million persons died from starvation in that country.

SUPPOSED CAUSE.

Many theories were advanced to account for and explain the remarkable phenomenon, as it was regarded. Some claimed that the cause of the rot was a peculiar fungus, but what its nature was they did not seem to have the slightest conception. Others supposed it to be caused by insects, but by what kind and in what manner, it



Explanation of Plate.

1. Section of a potato leaf magnified and showing the cells of the epidermis on the upper and under sides, with two large hairs beneath, three threads of the mycelium of the potato-rot fungus extending through the middle of the leaf, in the central portion of which the cells have been purposely omitted to show the two resting spores and the two smaller fertilizing bodies. From two of the mycelium threads, stems extend down through a breathing pore on the underside of the leaf, one of which has two lateral branches with conidia at the ends of them, while the main stem has an avoid body at the end, from which the swarmspores are escaping.

2. An avoid body much enlarged, the swarmspore showing within.
3. A swarmspore much enlarged.
4. A resting spore with its contents separating from the outside walls.
5. A resting spore with its contents organized into swarmspores.
6. A resting spore burst and the swarmspores escaping.
7. Three swarmspores swimming through the water.
8. Three swarmspores having come to rest and their thread-like organs disintegrated.
- 9 and 10. Three swarmspores after having come to rest, developing mycelium threads.

was not made clear. Still others declared that it went in the air, but without the slightest knowledge of the manner by which the air becomes the vehicle for the transportation of contagion of any kind; and finally there were those who believed that it was a dispensation of Divine Providence, sent upon the people as a punishment for their sins.

THE TRUE CAUSE.

Immediately upon the outbreak of the potato-rot in Europe investigations were made by careful scientific men, who discovered that the diseased plants were more or less infected by an unmistakable fungus, the minute thread-like mycelium of which penetrated in all directions through the tissues of the leaves, stems, roots and tubers; that through the stomata or breathing pores on the underside of the leaves, the fruiting portions of the fungus extended out into the air, and that through the corroding influence of the mycelium the tissues were changed into the well-known condition of the potatoes when attacked by the malady.

Dr. Montagne first described the fungus under the name of *Botrytis infestans*. About the same time it was described by Madame Libert under the name of *Botrytis devastatrix*, and by M. Desmazieres under the name of *Botrytis fallax*; but Dr. Montagne's name being the oldest in point of time is the one now adopted, but in a revision of the genera this species has been placed in a new genus and the fungus is now known by the name of *Peronospora infestans*, Mont.

For a long time it was hotly disputed that the fungus was the cause of the potato rot. Some contended that it only lived in and fed upon the fermenting and decomposing tissues of the potato, but experiments conducted by DeBary of Strasburg, and others, have fully established the fact that this fungus is the real and true cause of the potato-rot. Before we can hope to subdue an enemy it is necessary to know its structure and habits, and then we may possibly find some vulnerable point where it may be attacked with some degree of success.

NATURAL HISTORY OF THE FUNGUS.

Like other fungi this species has a vegetating and a fruiting portion which includes several kinds of seeds or *spores* as they are called. The vegetating portion is represented by long slim branch-

ing threads, called the *mycelium* which penetrate throughout the tissues of the potato plant, absorbing its nourishment from the cells of which those tissues are composed, causing them to decompose, and the whole substance to become a foul and foetid mass.

To understand the position which the fungus occupies in a potato leaf let us examine the normal structure of the leaf. If we make a vertical section through the leaf of a potato and examine it under a moderately high power of the microscope, (See Fig. 1) we see that the upper and lower surfaces are each covered with a single layer of colorless cells, forming what is called the *epidermis* of the leaf, and from the surface of the under side arise those hair-like bodies which give to it the peculiar hairy appearance readily seen by the naked eye. Besides the hairs on the under side of the leaf there are minute openings through the epidermis, called breathing pores or stomata, which are guarded by peculiarly formed cells which open or close the breathing pore according as the air is moist or dry, thus regulating the evaporation from the leaf. The interior of the leaf, between the epidermis of the upper and lower surfaces, is composed of a mass of cells of a more or less globular form, according as they are more or less crowded and compressed into other than the normal globular form. The first layers of these cells immediately beneath the epidermis of the upper side of the leaf are more compactly placed than those below, and form a denser tissue on the upper than on the lower surface of the leaf, and they do not permit so free a circulation of the air. These cells contain in their protoplasm a mass of granular matter of a bright green color called *chlorophyl*, and here is where the food of the plant is elaborated. There are also bundles of woody tissue scattered here and there through this part of the leaf not shown in the figure, forming the veins and veinlets. Through this portion of the leaf the fungus pushes its mycelium in long fine threads between the green cells of the leaf, and contrasts in color with the green cells in being of a light brown color though of a much smaller diameter than the cells themselves. As the mycelium rests against the side of a cell, it gives off, occasionally, little projections called *haustoria*, which press upon the side of the cell, or even penetrate into it, by means of which the mycelium draws its nourishment from the cell, which becomes more and more exhausted, and at last is completely destroyed.

After the fungus has developed to a certain extent branches are given off which extend out into the air through the breathing pores

and occasionally through the epidermis even of the upper surface. When these branches have reached beyond the surface of the leaf they form several branches, at the ends of which are developed egg-shaped bodies, (Fig. 2) which burst open at maturity, and from them escape from six to fifteen very minute and peculiar bodies, (Fig. 3) of an ovoid form, with two long threadlike organs by means of which they propel themselves through the water, after the manner of certain microscopic animals; in fact so closely do they resemble animals in their movements that they have been called *zoospores*, from a Greek word meaning animal, and spore. After these *zoospores* have moved about in the dew or water which may be held by the hairs on the underside of the potato leaf, and which would form an ocean for these minute bodies, they make their way into the interior of the leaf again through the breathing pores. In about half an hour from the time they are first discharged they come to rest, the thread-like organs of locomotion disappear and the zoospore at once elongates into thread-like mycelium, like that from which it originated. The egg-shaped bodies do not always burst and give rise to zoospores, but sometimes fall off and develop at once into mycelial threads, and if by any chance they fall near, or upon the potato plant, this mycelium corrodes and pushes its way into the interior of the plant to continue the same round of life as before.

It has been calculated that one square inch of the under surface of a potato leaf may yield 3,000,000 zoospores, and that in an incredibly short time these will have grown and developed a new generation, so that it is not at all surprising that after the first appearance of the disease, an entire field of potatoes is so quickly destroyed.

There is still another kind of spore called *conidia*, which are formed on certain of the branches which grow out through the breathing pores into the air. These are of a globular form and much smaller than the others, and they develop into mycelium after they fall off, in precisely the same manner as the zoospores after they come to rest. So small are these conidia that the slightest breath of wind can waft them across the field, and they may be carried from field to field by only a moderate breeze, so that one infested potato field may be the means of infecting those for miles in the direction the wind happens to be blowing. It is a noteworthy fact that this parasite on the potato thrives best in a warm, damp spell of weather, in fact without moisture it does not seem to thrive

at all, so that it has been regarded as a water plant, and so located by the botanists.

This much of the history of the potato-rot fungus has been known since the investigations of DeBary in 1863. As this disease of the potato makes its appearance in midsummer and runs its course on the tops in a field of potatoes in a few days or a week, and as the spores and mycelium thus far described are destroyed by the frosts of winter, the question arises, how does the fungus continue, or what is the natural state of the fungus during all the rest of the year?

There have already been described some eighteen different species of the genus *Peronospora*, six or seven of which have been observed in this country. Now the complete round of life of quite a number of these species has been clearly made out and is well known. They are multiplied not only by spores like those already described, the conidia and zoospores, but there was also found, entirely within the tissues of the host plant another kind of a spore which formed a dense, hard, rough outer coating sufficient to protect it from the frosts of winter, and this was called the *oospore* or resting spore because it was the stage in which the parasite rested from its activity during so great a portion of the year. Analogy led us to suppose that there must be a resting spore formed somewhere, which would preserve the life of the potato-rot fungus during its long period of inactivity, and protect it during the freezing cold of winter. For years botanists had been searching for this resting spore, well-knowing that until it was discovered, all attempts to hold the pest in check were just as likely to favor the continuance of the fungus as to destroy it. It is true that Dr. Montagne in 1844 found some peculiar bodies in rotten potatoes, which Mr. Berkley claimed were the resting spores, but though searched for again and again, no one was able to find anything like them, and it came to be doubted whether the bodies described by Dr. Montagne under the name of *Artotrogus hydnosporus*, Mont., had any connection whatever with the potato-rot fungus. It was also well known that certain species of minute parasitic fungi pass one stage of their existence on one species of plant, and another on a totally different species, as the too common rust of wheat which passes one stage on the Barberry and another on some species of the grass family.

The so called lettuce mold (*Peronospora ganigliiformis*, Berk.) a species closely related to the potato-rot fungus, was known to develop in the tissues of lettuce and form conidia and zoospores on

that plant, but it also infested the common sow-thistle, chicory and some other plants, and in the tissues of these last were formed the resting spores which were able to continue the existence of the parasite through the cold winter months, when it again attacked the lettuce. Other species of *Peronospora* are confined to a single host plant. From all this knowledge of other species, botanists were quite in doubt where or when to look for the resting spores of *Peronospora infestans*, Mont. The leaves and tubers of diseased plants were examined again and again without success, and the suspicion began to prevail that clover might be the plant within which the resting spores were formed, and many farmers were inclined to regard the clover plant with suspicion thinking that it might in some way be favorable to the potato disease, and even the stable manure from animals fed on clover hay was not used under potatoes. It was thought by some, and not without good reason, that the resting spores were not only able to retain their vitality in the tissues of the clover during the cold of winter but also in their passage through the alimentary canal of the animals fed on the clover. Experiments in planting potatoes on newly plowed clover lands, and also on manure from clover fed animals as often gave negative results as anything else, so that the farmers were totally in the dark, not knowing what to do, as often doing the very worst thing as the best, till at last it was impatiently asked "why don't the scientists do something for us?" The problem which they had asked to have solved was one of the most intricate and difficult which had ever been undertaken by the botanists. Not only was the most profound knowledge of the related fungi required, but also the most consummate skill in the use of the microscope and its accessories. The most extreme care is required in any attempt to cultivate these minute objects, a mere trifle too much of moisture may destroy them or the merest breath of air which is too dry may cause the whole colony to collapse, and the labor of weeks be lost. Furthermore, the scientists were expected to do this work gratuitously. I am not aware that a single dollar was ever given by any government, state or society to aid in the investigations on the potato fungus with one single exception. The Royal Agricultural Society of England appropriated \$500 to aid De Bary in his investigations on this plant.

In the early part of June 1875 the editors of the London Journal of Horticulture called the attention of Mr. W. G. Smith, one of the foremost cryptogamic botanists in England, to what was then

called "the new potato disease," which appeared in the form of small black spots over the surface of the leaves, but a microscopical examination proved that it was only the old enemy in a new disguise and appearing much earlier in the season than usual. Nevertheless Mr. Smith called the attention of botanists, both in Europe and in this country, to the fact that the well known parasite had probably under peculiar and unknown conditions presented appearances quite different from what had hitherto been reported.

DESCRIPTION OF THE RESTING SPORE.

In making an examination of the black spots on the potato leaves, Mr. Smith placed them with their edges in the water to macerate them so that the interior of the leaf might be the more readily examined with its contained fungus, but in a few days it was found that the water greatly stimulated the growth of the fungus and before long globular bodies appeared growing from the threads of mycelium within the tissues of the leaf, (Fig. 1.) These globular bodies were not confined to the leaves, but were also found in the stems and in the tubers themselves. They were of two sizes, one about the size of the cells of the leaf, and the other not more than one-fourth as large in diameter. They were developed on small stems here and there from the mycelium, and when they happened to be near each other it was observed that they inclined towards each other until they touched, when a small tubular body called the *pollinodium* was extended out from the smaller body and thrust into the larger, through which more or less of the contents of the smaller was poured into the larger, which thus becoming fertilized developed into the long sought for resting spore of the potato-rot fungus.

The conidia and zoospores are not formed by the union of two elements, but multiply the species by what is called the asexual method of reproduction, while the resting spores—the result of the union of two unlike bodies—represent the sexual method.

When these resting spores have become mature, the stems upon which they were developed vanish and the spores are set free. After the potato plant has been badly attacked and destroyed by the fungus, every part of the plant and its parasite perishes, except the dark brown resting spores just described, and these find their way into the earth and hibernate. When they awake to renewed life in the summer they must germinate in the damp earth, and if no potato plants are near they perish, as the earth cannot support

them ; but if potato plants happen to be near the corrosive mycelium, this penetrates at once into the roots or tubes and stems, and when they have extended into the parts above ground, as the stem and leaves, branches are sent out through the breathing pores into the air, and upon these are formed the conidia and zoospores which re-enter the breathing pores and develop their mycelium within the tissues of the potato leaf, and the whole history of the fungus is repeated again.

It is a well known fact that the potato disease is most abundant in warm damp seasons. The summer of 1844 was unusually cloudy and moist, and so far as I am able to learn, all the great outbursts of the disease occurred in seasons which were unusually moist and warm, especially if this condition prevailed in July and August. A short time only is quite sufficient for the development of the asexual spores and the complete destruction of the potatoes as we well know, and since the parasite is an internal one there seems to be no good and practical method by means of which the malady may be arrested, when once the potatoes are infested. If, however, the tops alone are affected, as would be the case when asexual spores are brought by the wind from some other infested field, we may save the potatoes in the ground to an extent by pulling up the tops before the mycelium has had time to penetrate down through the stems to the tubers. Even in this case great care should be used to prevent, as far as possible, the conidia and zoospores from falling upon the potato hills, since they have been known to be washed down through the ground far enough to reach the tubers and infest them. It is plain, therefore, that we should carefully burn all the infested tops, for should any of them fall into water or into damp places, even, the very conditions would be fulfilled which would cause the development of prodigious numbers of resting spores capable of infesting the crop of the following year.

It is an easy matter for us to conjecture how the resting spores may be so widely distributed as we know they must be. Should infested tops and tubers be allowed to remain in the field in damp places, or in damp weather, we can understand how the resting spores would be formed and matured. Later in the season, in September or October, the weather becoming dry, these tops would have decomposed and the resting spores liberated, and taken up by the winds and scattered over the fields where they would hibernate

ready to attack the potatoes planted the next year in the ground where they had fallen.

From what we have learned of the life, history and habits of the potato-rot fungus, we may safely say that it is better to plant *sound* potatoes only, on dry or well underdrained lands, where the conditions are the most unfavorable to the growth of the fungus, and then if by any means the potatoes become infested, not only all the tops but all diseased tubers should be carefully burned and potatoes planted the next year on a different part of the field. If all the farmers in a given region should pursue this course, it seems to me possible for them to hold the parasite in check.

The course some farmers pursue is to put the potato tops into the compost heap. This is the most dangerous policy that could be adopted, if the manure is to be used under the next year's potato crop, for the dampness of the compost heap would give the most suitable conditions for the production of the resting spores. It is true that the tops put into a compost heap may not be infested with the fungus in question, but the risk is too great and, as I believe, should be carefully avoided.

CUMBERLAND COUNTY.

Institute at New Gloucester.

An Institute was held at New Gloucester, Upper Corner, Centennial Hall, January 12. There was a large gathering of the representative farmers of the county. The members of the Board and all present from a distance were provided free entertainment day and night. At no point has the Board met a more cordial reception or a deeper interest in their work than with the farmers of this town. There were present of the members, Harris of Cumberland, Prest. Fernald and Prof. Balentine of the State College, and Cobb of Androscoggin.

The forenoon was given to the subject of Stock Feeding by the Secretary, and Utilizing Coarse Fodder by Prof. Balentine, followed by a critical discussion of the same. In the afternoon Mr. Cobb read a paper on Milk Farming, which was followed by a full discussion of the subjects of making milk and its care, both for sending to market and setting for butter making. It was a most profitable discussion and occupied the full time of the afternoon.

EVENING.

LABOR AND EDUCATION.

By HON. W. B. FERGUSON, Dixmont.

There is an old Latin maxim whose English is, "Labor conquers all things," and from the earliest time to the present day, employment,—some avocation or business, has been found necessary for all men. That fiat of the Creator, "In the sweat of thy face shalt thou eat bread," was meant for the human race. Nor would I have it otherwise. I do not understand that man is to be raised above the need of labor. I do not expect a series of improvements by which he is to be released from daily work. I have faith in labor, and I see the goodness of God in placing us in a world where labor alone can keep us alive. I would not, if I could, so temper the elements that they

should make vegetation so exuberant as to anticipate every want, and the minerals so ductile as to offer no resistance to our strength and skill. Such a world would make a contemptible race.

Man owes his growth, his energy, chiefly to that striving of the will, that conflict with difficulties, which we call effort. Easy, pleasant work does not make robust minds; does not give men a consciousness of their powers; does not train them to endurance, to perseverance, to steady force of will,—that force without which all other acquisitions avail but little. Manual labor is a school in which men are placed to get energy of purpose and character,—a vastly more important endowment than all the learning of other schools. The material world does much for the mind by its beauty and order, but it does more by the pains it inflicts; by its obstinate resistance, which nothing but patient toil can overcome; by its vast forces, which nothing but unremitting skill and effort can turn to our use. I believe that difficulties are more important to the human mind than what we call assistance. Work we all must, if we mean to bring out and perfect our nature. Even if we do not work with our hands, we must undergo equivalent toil in some other direction. No business or study, which does not present obstacles tasking to the full the intellect and the will, is worthy of a man. In science he who does not grapple with hard questions, who does not concentrate his whole intellect in vigorous attention, who does not aim to penetrate what at first repels him, will never attain to mental force. To me labor, or rather the honest laborer, has great dignity,—the dignity of a man made in the likeness of God, faithfully striving in the battle of life.

Work is not *merely* the grand instrument by which the earth is overspread with fruitfulness and beauty, and the ocean subdued, and matter wrought into innumerable forms for comfort and ornament; it has a far *higher* function, which is to give force to the will, efficiency courage, the capacity of endurance and of persevering devotion to far reaching plans. Alas, for the man who has not learned to work! He is a poor creature and does not know himself. He depends on others with no capacity of making returns for the support they give.

Manual labor is a great good, but in so saying I must be understood to speak of labor in its just proportions. In excess it *does* great harm. It is not a good when made the sole work of life. It must be joined with higher means of improvement or it degrades

instead of exalting. Man has a varied nature, which requires a variety of occupations, and requires discipline for its growth. Study, meditation, society and relaxation should be mixed up with his physical toils. He has intellect, imagination, taste, as well as bone and muscle, and he is grievously wronged when compelled to exclusive drudgery for bodily subsistence. Life should be an alternation of employments so diversified as to call the whole man into action. Variety of action corresponding to the variety of human powers and fitted to develop all is the most important element of human civilization. There is a too general disposition to shun labor, and this ought to be regarded as a bad sign of the times. In the city and elsewhere are throngs of adventurers in the hope of escaping the primeval sentence of living by the sweat of the brow. The body as well as the mind needs vigorous exertion, and even the studious would be happier were they trained to labor as well as to thought. Not a few of the wisest, grandest spirits have toiled at the plow; which toil aided them no doubt, not only in developing their physical powers, but in reaching a higher plane in the moral and intellectual world.

There is but one elevation for farmers and all other men. There are not different kinds of dignity for different orders of men, but one and the same for all. The only true elevation of a human being consists in the exercise, growth and energy of the higher principles and powers of the man. A bird may be shot upwards to the skies by a foreign force, but it rises in the true sense of the word only when it spreads its own wings and soars by its own living power. So man may be thrust upwards into a conspicuous place by outward accidents, but he rises only in so far as he exerts himself and expands his best faculties, and ascends by a free effort to a nobler region of thought and action. This elevation is indeed to be aided by an improvement of his outward condition, and in turn it greatly improves his outward lot; and thus connected outward good is real and great.

We are placed in the material creation not to be its slaves but to master the situation and to make it minister to that highest of powers—the energy and efficiency of mind. The highest force in the universe is mind. This created the heavens and earth. This has changed the wilderness into fruitfulness, and has linked distant countries in a beneficent ministry to one another's wants. It is not to brute force, to physical strength, so much as to art, to skill, to

intellectual and moral energy, that men owe their mastery over the world. It is mind which has conquered matter. I believe that with the growth of intellectual and moral power in the community, that productive power will increase; that industry will become more efficient; that a wiser economy will accumulate wealth; that new resources of art and nature will be discovered. The inward molds the outward. The power of a people lies in its mind, and this mind if fortified and enlarged, will bring external things into harmony with itself. Antiquity exalted into divinities the first cultivators of wheat and other useful plants and the first forgers of metals; and we in these maturer ages of the world have still greater names to boast in the records of useful art and agriculture.

There are many causes which have operated to produce a progressive reduction of our rural population. False teaching, and the generally prevailing false ideas about the relative merits or advantages of the several pursuits of life, and other mischievous influences have induced many to withdraw from agricultural employments and engage in what they suppose to be the more inviting fields of industry. Men possessing the highest type of energy and enterprise have left the farm because higher compensation is assured them for their services and because the labors of the factory, the machine shop, the counting room, the office and other positions were presumed to be less onerous, less confining than the duties imposed upon the farmer. While there are discouragements incident to some phases of the farmers' life, as in all other avocations, and while there are natural controlling reasons why men should not necessarily be compelled to remain at the old homestead, and perpetually a farmer, yet there has been a recklessly wild, unreasoning and fanatical cry, "Go west and get rich." This incessant clamor has generated a feverish, unsettled, adventurous spirit, which has done infinite harm. Time, labor and money have been lost by the premature and too rapid withdrawal of the essential elements of prosperity from the older States where the same labor and capital would have been more economically and profitably employed. I would not restrict men in their judgment as to when and where they should make their abiding place nor intimate that there should be no emigration or change of employment.

Let those who will seek homes in the West. Let them, however, do so considerately so that disaster and privation will not take the place of happiness and prosperity. Through the grossest

exaggeration of advantages to be enjoyed, and the wildest and wickedest assurances of the wealth, the honor, and the happiness in store for those that go to the new States, many young men have abandoned the peaceful pursuits of home and have rushed heedlessly into the strifes and conflicts of an adventurous and unsettled life. While few have been successful, many have realized the disappointments and mental anguish of an unsettled career. As a consequence the industry of the country has not been stimulated to higher and more persistent labors, and our wealth has been seriously repressed thereby. The prosperity of the farmer is dependent on so many influences, and is affected favorably or adversely by the wise or the unwise conduct of so many classes of men, and is subject to so many casualties, including climatic, that he is required to be vigilant and circumspect in the investigation of everything that may interfere with his business. If he shall hope for success in his vocation he must not only intelligently seek after the causes which injuriously affect his interests, but he must use such means, apply such corrections, as may be appropriate and necessary. To do this efficiently and wisely, to perform his duties in all the manifold relations of life, the farmer ought to be thoroughly furnished for every good work. He should have a very liberal as well as practical education, the more liberal, the more full and comprehensive, the better. With farmers as well as with other classes of men, such an education is not attainable by all, because of the want of opportunity, of means, and sometimes of mental capabilities. Then the more urgent the need and the higher the obligation upon others who have opportunities to improve all their advantages, and to acquire a sound, thorough and complete education. I am not unaware of the fact that some men are shocked at the idea of giving to sons of farmers as good educational advantages as are furnished for young men belonging to other pursuits of life; a very meagre, starved, special education, in the opinion of some men, is best suited to the wants and conditions of young farmers and mechanics. These gentlemen repudiate the old aphorism that "knowledge is power"; they have no faith in educated labor when the education shall have passed the bounds of mere rudimental knowledge. Those who prescribe a restricted course of education for young men connected with agriculture and the mechanic arts, assume an odious responsibility. By implication, at least, they deny the necessity and propriety of an advanced education for those engaged in such pursuits and thereby

assign them to a lower position than others are privileged to occupy. They would exclude them from occupying all high positions where educational attainments were indispensable. If such crude, illiberal and contracted ideas of education are intended to have application to the institutions of the country organized under the law of Congress passed July, 1862, I apprehend that it will be found that such a restricted course of education is in open conflict with the express provisions of said law. That which the advocates for a poor course of training for farmers and mechanics would specially desire to have excluded from such colleges, the law says shall not be excluded. It provides that in such colleges it shall be a leading "object to teach such branches of learning as are related to agriculture and the mechanic arts, without excluding other scientific and classical studies." This language is not obscure. It pointedly declares that some scientific and classical studies are related to agriculture and the mechanic arts, and then affirms that other scientific and classical studies not so related to agriculture and the mechanic arts shall be so excluded. And for what wise purpose did Congress make this liberal endowment? Let the language of the act itself answer. To teach the branches related to agriculture and the mechanic arts and other scientific and other classical studies. To what end? So as "to promote the liberal" (not special) "and the practical education of the industrial classes." And who constitute the industrial classes? Let the terms of the act of Congress again make answer. Those who are engaged "in the several pursuits and professions of life." Are not the terms of the law plain, direct and unambiguous? And yet here and there some clamorous, persistent pretender in the fullness of his supposed infallibility of judgment, proclaims that all classical studies, including the German and French languages, shall be utterly excluded, together with many others of the most important branches of an education. They would deny to our sons who might desire or elect to receive instruction in any language or branch of study not approved by them, the privilege of pursuing such study within the walls of any college established under the provisions of said law. By this same class of gentlemen we are admonished that whatever studies will contribute to the cultivation of our tastes, so that we can enjoy the beauties of nature or of art, can be rightfully taught; provided, always, that our enjoyment shall come through some inanimate, unintellectual medium. You may teach architecture or landscape gardening so

that we may derive the most exquisite pleasure from viewing a fine architectural structure or a well designed and appropriately laid out lawn; but you must not educate men so that they can derive enjoyment from an inherent intellectual appreciation of language, of literature, or of mental or moral science, of sound philosophical thoughts, elegant mental conceptions of any kind, or bursts of impassioned eloquence, all inspired by or emanating from the direct culture of the mind through linguistic or other classical studies. If, however, such thoughts are inspired by or come through the contemplation of a dwelling, a barn, a cattle stable, or a pigstye, architecturally constructed, or from viewing with delight a lawn, a drive, or an artificial fish pond, then such emotions are to be gratefully received and cherished. They have come through a proper medium—they have been safely reflected.

As language is not only the medium of thought, but the medium of the communication of our thoughts with others, it is a most indispensable element in every sound practical education. As almost the entire nomenclature of all sciences and of all professions are derived from languages other than our own vernacular, their study becomes almost indispensable to any one seeking a thorough education. Why, therefore, shall not ample provisions be afforded for teaching language in the colleges established and maintained by means derived from the common resources of the whole country? There is another class of wiseacres who favor a very restricted special education for the sons of farmers, because they apprehend that through the baneful influence of a liberal education they will be educated out of the business of farming. This is the same disparaging reflection upon the farmer and a gratuitous, offensive intimation that intelligence and culture in the farmer are comparatively unimportant, and that therefore the standard of collegiate education should be so low that the young men of the country would have no aspirations or qualifications for any other pursuit of life. There is another influence fairly deducible from this; that parents ought to so control the education of their sons as to compel them to remain upon the farm. This would be an odious and unwarrantable assumption of parental authority, which ought everywhere to be resisted. No such right, naturally or otherwise, belongs to either the parent or the State. The obligation upon the parent for a general, a liberal education for his son is clear, and should be afforded so far as the means and the condition of the parent will permit.

Such an education will qualify the son for the wise selection of the pursuit which his taste, his genius, his aptitudes or other considerations will indicate. When such an education has been acquired, and the business of life determined upon, then the special training appropriate to his calling will be sought and speedily obtained. This claim, on behalf of the parent, of a right to prescribe such a course of study as will prevent the son from leaving the farm, while it interferes with the natural right of the child, will never accomplish the end sought. The children of the rural population never have been and never will be deprived of the privilege of seeking new locations or pursuits.

While no man more highly appreciates the dignity, the usefulness, the advantages—physical, mental and moral—of the farmer's life, and none would more urgently commend young men to the business of farming when circumstances do not forbid, still I would regard the exclusion of the country population from towns and cities as a serious calamity to the whole country. The agricultural population would become disproportionately large, and the civic population, while it would be hardly self-sustaining in numbers, would physically, mentally and morally retrograde. The truth is, that our agricultural population is the great source of supply from which the more important elements of soundness of body, vigor of mind, purity of character, and reliable habits of industry and economy must be obtained for maintaining, building up and successfully carrying on the affairs of city population. I would desire to express the strong conviction that in our cities may be found the highest types of commercial integrity, faithfulness, industry and enterprise. But it is still insisted upon that farmers' sons must not be educated out of the business of farming. Is our country less prosperous, less renowned, because some men prefer to spend their lives on the tumultuous ocean wave as explorers, or in carrying on the commerce of the world, rather than in the quiet and the security of a country home?

If farmers are to have their interests duly cared for or promoted by either State or National legislation, they should have more representatives who take a lively interest in their welfare. If they hope to have representatives from their class, they must see to it that they select educated, competent men, who in some degree may be able to comprehend all the questions affecting their interests, as connected with the interests of other classes of men. An individual is not

elevated by figuring in public affairs or even by getting into office. He needs previous elevation to save him from disgrace in his public relations. The lowest men, because most faithless in principle, most servile to opinion, are too often found in office. I am sorry to say it, but the truth should be spoken, that at the present time political action in this country does little to lift up any who are concerned in it. It stands in opposition to a high morality. Politics, indeed, regarded as the study and pursuit of the true, enduring good of the community, as the application of great, unchangeable principle to public affairs, is a noble sphere of thought and action; but in its common acceptation, or considered as the invention of temporary shifts, as the playing of a subtle game, as the tactics of party for gaining power and the spoils of office, and for elevating one set of men above another, is a paltry and debasing concern. All interests of society should be represented in the government and protected by it. I would by no means discourage the attention of farmers to politics in its true sense. They ought to study in earnest the interests of the country, the principles of our institutions, the tendency of public measures. But the difficulty is we do not study; and until we do we cannot rise by political action. A great amount of time, which, if well used, would form an enlightened population, is wasted on newspapers and conversations which inflame the passions, which unscrupulously distort the truth, which denounce moral independence as treachery to one's party; which agitate the country for no higher end than a triumph over opponents and for the emoluments secured by office. To rise we must substitute reflection for passion. Much, however, is to be hoped from the growing selfrespect of farmers and others, which tends to make them shrink indignantly from the disgrace of being used as blinded partizans and unreflecting tools. Much is to be hoped from the discovery which must sooner or later be made, that the importance of party is greatly overrated; that it does not deserve all this stir. Political institutions are to be less and less deified, and are to shrink into a narrower space; and just in proportion as a wiser estimate of government prevails, this frenzy of political excitement will be discovered and put to shame.

The dominant idea of the education of a farmer is that his labor may become more skilled and more profitable; but to know how to make two blades of grass grow where only one grew before is not all of the farmer's life. He has higher interests and higher responsibilities than those for which some men would alone provide an

education. As the mind, the soul, is to the mere physical man, so are these other interests and duties more exalted, more precious and more imperative; and they have infinitely higher claims upon us than those involving only business considerations. What we want, then, is to abandon the old idea that farming has no higher aim than getting a living, and instead of it to adopt the better one *that the grandest result of farming is the culture of the farmer and his family*. We should prosecute the business of farming with a higher aim and purpose, so that whilst it should give support and be remunerative, it may secure to the farmer the same improvement in intellectual and social position that men expect to secure in the learned professions. Let us henceforth strive to make farming successful in the broadest and best sense, regarding it not simply a means to make money, but as a means to culture and improvement. Then we may expect to see the farmer in possession of a full share of influence, and his sons and daughters growing up in health, ability and character.

After the close of Mr. Ferguson's lecture, President Fernald of the State College gave an extempore address upon the subject of Education for Farmers' Boys, which was received with much favor.

An interchange of courtesies closed a most successful Institute.

SAGADAHOC COUNTY.

Institute at Brunswick.

An Institute for Sagadahoc county was held at Brunswick, January 23. Although the town of Brunswick is in Cumberland county, yet it belongs to the Sagadahoc Agricultural Society and is a convenient point for the farmers of the various sections of the county to convene. The day was one of the coldest of the winter, but notwithstanding this a goodly number of farmers assembled, interested in the programme.

The meeting was called to order by the Secretary, and S. L. Holbrook, the member for the county, was called to preside. Beside the chairman there were present of the Board Messrs. Stetson, Harris and Cobb.

In the forenoon the subject of Sweet Corn for Canning was presented by Messrs. Cobb and Harris. The afternoon was given to the subjects of Feeding Hay and Hired Help on the Farm.

EVENING.

At the evening session, Charles E. Townsend, President of the Sagadahoc Agricultural Society, presided. The exercises opened with a paper on

ELEMENTS OF SUCCESS.

By S. L. HOLBROOK, Brunswick.

The true ideal of farming is rarely attained. It lies above and beyond the average farmer. It involves so much and so many rich and varied conditions as to make its complete attainment exceedingly difficult. The young man, as he pushes out in this direction, finds it hard at the very onset to obtain the spot of rich and varied soil on which he would risk his fortunes and plant himself for life; and then being successful in this, money is involved; bone and muscle are laid under contribution; and mind, quick invention and continued hard thinking are called to the front. Both the farm and the

man united for life are required to be of high order, in order to reach the true ideal. Thus, as we travel the country, and make observations, read and enquire, we find that farming as a rule may be regarded at least as a partial failure. All over our country the true and grand conception of farmer and farm is rarely found. But to reach this ideal is the earnest desire, no doubt, of all high minded farmers. Let us, then, briefly notice some conditions of successful farming.

We will suppose the young farmer has already thoughtfully and firmly fixed his purpose of life, has selected his land or farm, understands to some extent the nature of his soil, the demands of the market, and is girding himself for the struggle before him. He should make up his mind to be an honest man. Removed as he is from the centres of traffic, and constantly dealing with our honest mother earth, his calling tends to virtue, and the tendency and influence of his noble business is to lift him above the tricks of trade. The real and true idea of a sovereign farmer—enterprising, persevering, intelligent, virtuous and happy—is fundamental and grand. And to such, when his deportment reaches this true nobility, all others are constrained to award the meed of honor. But farming, grand and noble as it is, may be abused. The tiller of the soil, as well as others, may neglect and abuse his calling. The mere fact that he cultivates the earth will not make him a saint or even a wise and frugal man. In fact, we sometimes find among the farmers of the lower strata some of the most degraded of human beings. They seem to think it smart to cheat the soil of her dues, and then come to market with short measure and weight and inside deception. The basket of potatoes looks well on top; the load of wood looks well outside; the cheese is duplicated with a hard one in the middle. To the taxmaker his stock is of diminished numbers and almost worthless, but on the fair grounds he has more in number and of superior quality. Thus he degrades himself until he is known and shown in the market as a cheat. Such a farmer is sure to fail. But dealing honestly with his farm and fellow men, he may yet as Soloman says, “stand before kings.”

Again, to become eminent as a farmer he should bend all his energies in that direction. These half farmers and half lumbermen and half mechanics will never become distinguished in any calling. I once heard of a man who had such a diversity of talent as to be able to turn his hand at once to any business of life. In the law—

for this was a part of his calling—he might have stood in the front rank. As a carpenter—for this he followed—he might have led all his fellows. As a trainer of horses—to which he turned his attention—he was becoming distinguished. As a musician—which claimed his attention at times—he could mock the very birds, and sing and play to a charm. As an actor upon the stage—to which he devoted a part of his energies—none could excel him; and still his life was a failure, and he could hardly earn his bread.

Another element of success in farming is industry and vigilance. Constant labor is the price of victory. Long and strong pulls in one continuous line of battle are demanded in order to subdue the stubborn soil, scatter the insect legions, and finally garner the golden harvest. Without vigilance everywhere on the farm and around the home enterprise will go backward. The buildings from top to bottom must be looked over with scrutiny and penetration several times every year. A shingle is defective and lets in the rain. The earth is heaped against the boards and sills of the barn, and decay is working at the foundation of the structure. The cellar windows are not opened until late in the spring, or in the early summer, holding in the dampness and disease which ought to be scattered in March. Then in the field noxious weeds are coming from time to time, and making small beginnings. Once a vigilant farmer, who found a certain weed in his cornfield had been overlooked until its seed had been dropped at its base, carefully drove a stake down at that point so as to know where to meet the case another year. The orchard requires constant watching and trimming and grafting every year. Worthless trees are to be made profitable or removed for others. The well must be looked after or the drainage of all its surroundings will finally come into the water-pail, and meet him at the table. The fences must be watched and repaired in season to save the crops and save all trouble with the neighbors.

Another item of success in farmer's work is that of system. And here he shall commence at the bottom of the matter, and lay broad and deep in his own well stored mind the true science and real practical facts which pertain to his calling. The cultivation of the soil with success requires study and research, equal if not surpassing any other profession. The experience of all ages is needed in adapting crops to the soil and then preparing the soil for the crops. Securing the best implements of husbandry and entering fully into all the improvements of the age requires thought and study of no

ordinary character. Thus the farm, the buildings, the implements, the orchard, the garden and all the domain should constantly feel the impulse of a vigorous and commanding mind.

Another element of success is economy—economy in all the business of the farm, and economy of time. Says Franklin, "Time is money." Our mill operatives work eleven hours a day, mechanics work ten hours, grocery men fifteen hours a day. If all the farmers of the State of Maine should work ten hours a day for the next ten years to come the State would blossom like the rose. Economy is called for in the feeding of farm stock, in purchasing of implements and care of the same, and in the buying of fertilizers.

In these days of fashion and show, large demands are made upon the farmer's purse. Store prices are high; the outlays for dress in modern style are enormous; and wants corresponding to the onward push of civilization multiply on every hand. How to pay all demands and make the ends of the year meet is often a serious question.

The poorer classes are constantly struggling to imitate the fashion and style of their more wealthy neighbors. This work of keeping up appearances of an extravagant order is pressing heavily upon those who lack the means. To remedy this the farmer should show his independence and never substitute fashion for comfort, or put show in the place of convenience. Simplicity in living and dress is a virtue for farmers and everybody else. To come squarely up to the golden idea involved in this word would lighten immensely the pecuniary burdens of life, and make its votaries all the more happy and useful. What a blessing would be conferred upon the community if those who lead in the fashions of life would strike out on the score of simplicity, and set an example of economy and neatness to all those who are constantly aping their styles and treading in their steps!

Said a minister of our village, a few years ago: "I married a couple—a showy girl to an honest farmer boy. They lived together several months, when the fellow returned the girl to her mother, and declared he never could support her, and if he continued to sustain her fashion she would run him out of house and home." It is a saying that those who begin life at the top of the ladder generally tumble off, while those who begin at the bottom acquire steadiness, courage and strength of arm and will as they rise.

Another idea important to the farmer is that of contentment. Contented with his country, his locality and his calling. Many farmers are constantly sighing for some better country, better climate, better farm and better employment. We heard of one of this class, not long since, who makes himself miserable all the time with the Western fever. His farm is neglected from his discontent, and he relies upon his wood lot for his support. He is only waiting for the means to take his departure. If he should go West, he would find that the trouble is not in the soil and climate he now occupies, but in the man. All these countries, go where you will, have their advantages and their disadvantages, and with a contented mind this State is as good as any other. Says one in giving his experience of Western life, "I have been there and have seen multitudes returning, and multitudes of others homesick, wishing to return. I had this Western fever, and under its influence I have written many letters describing in glowing terms the great and beautiful prairies; but when face to face with some of the stern and really degrading conditions of Western life, I have come to change my mind. When disappointed I have held my peace, and so it is with others." Thus the whole truth in our public journals fails to be told. The story of failure, attended with shame and humiliation, keeps itself in silence, while all the good fortunes are sounded abroad; so the tendency is to push into view the bright side while the dark side is kept in the back-ground.

Other farmers there are who wish to better their lot by moving into the village and living more at leisure. Restless and dissatisfied they think there must be a better way somehow or somewhere than to attend to the work of the farm. For the benefit of such, Rev. Mr. Bell has drawn a vivid picture, to which I wish to call your attention.

"I knew a man who was a brisk worker in the field. His energy was observed and lauded by all. It was refreshing to walk along the border of his broad acres and look over the great gardens he had made. Few persons knew better than he how to raise corn having wide and grand leaves. Wheat responded to the summer wind, and clover covered the soil like a soft and gorgeous carpet. This man had shining horses in whose friendly eyes he could see his own face as in a mirror. All day long this man was cheerful and happy. Vigor glowed in his honest countenance. He whistled while he worked, and was not the less amiable when he was weary.

But one day he said to his industrious wife, 'let us now move down to the village, and make the residue of our sojourn holidays.' The beautiful farm, which from its excellence was quick in the market, was sold. And the happy family moved to the village. Says the man, 'here our lot is easy, and what years of delight are before us!' But, more time elapsed. The village into which he had moved began to lose its power of animation. The new had worn off. When he walked in the street every man whom he met seemed to have something to do. All were busy but himself. When he entered the stores the merchants in their haste seemed to sweep by him with indifference. It was rarely that a man of business had more than a moment to spend with him. The grocer, the merchant, the mechanic, the lawyer, all seemed to him to be in good spirits, pushing their work. By degrees he became dispirited. He almost envied the lot of the poor men around him whose daily bread was the more sweet because they had paid drops of sweat for it. From morning till night his face showed no pleasant smile. The old brightness went out from his eyes. Health forsook his blood, and disease made its nest in his brain."

And finally in all departments of life we are to seek for higher and higher attainments. The voice of revelation and the voice of nature are calling us up higher. Higher, says the sprouting corn and grain and vegetables, as they burst open the soil and begin to come out in the light. And so let us seek elevation, for we have a high calling. As the poet says :

"Of all pursuits by man invented,
The farmer is the best contented;
His profits good, his calling high,
And on his labors all rely.

By him are all mechanics fed;
Of him the merchant seeks his bread.
His hands give meat to every thing;
Even from the beggar to the king.

Then we by vote may justly state
That farmers rank among the great;
More independent they than all
That dwell upon this earthly ball.

All hail ye farmers, young and old,—
Push on your plough with courage bold!
Your wealth arises from your sod,
Your independence from your God."

After the reading of the above paper the remaining time was devoted to the subject of Village Improvements, opened by E. W. Stetson, member from Lincoln, and followed at length by Rev. H. P. Nichols of Brunswick, A. G. Tenney of the Telegraph, and Mr. Furbush of Brunswick. The subject was ably handled, but no report of it is given.

YORK COUNTY.

Institute at Cornish.

By invitation of the Ossipee Valley Agricultural Society, a Farmers' Institute was held at Cornish, the headquarters of the Society, February 8th. Drifting snows rendered the roads almost impassable, still a large number of the farmers of the vicinity assembled at the meeting.

B. F. Pease, President of the Agricultural Society, presided. The forenoon was given to a paper by J. E. Shaw, Secretary of the Penobscot County Farmers' Club, on "Profits of Feeding Hay," which will be found in another place.

AFTERNOON.

FARM FENCES AND BARB WIRE.

By HENRY M. SMITH, Worcester, Mass.

Any one venturing to treat of the question of fencing, before a gathering like the present, should save himself from the rashness of believing it a topic that is new in your discussions. A pretty careful study of what has been presented in farm reports and by farm authorities in our State has shown for Maine a great array of facts, a wide variety of views and a pretty solid agreement that the matter of fences and fencing is no small one. I do not come here to recapitulate what has been already printed in the volumes of your State Board, for I believe these have been read, and are read by those who are most interested in the subject. Your contributions to the discussions on fencing that have held foremost place in agricultural and land questions for the past twenty-five years, have come from able and earnest writers, and men of practical experience, and cannot be overlooked or undervalued by any one seeking light and help in this direction.

But the subject is not exhausted. Its essential facts and arguments have been growing and not decreasing, and a brief general review of the Fence question in its present aspect may be of interest. It finds a very substantial recognition of its bulk and

importance in the special bulletin of the United States Census for 1880, whose returns are now coming into our hands, setting before us the material features of our industries. According to that report the cost of building and repairing fences in the United States in the year 1879 was not far from eighty millions of dollars (\$78,629,009.) The States leading in this expenditure were

Pennsylvania	\$5,507,456
New York	5,201,660
Illinois	5,925,425
Iowa	4,678,773
Ohio	4,863,063
Missouri.....	4,614,416

In this list, as would be expected, Maine ranks among the least, yet presents a figure not only to be respected but carefully regarded in the best light that can be thrown upon the subject. The expenditure in the period above named, in the New England States, was as follows :

Maine.....	\$633,069
New Hampshire.....	334,410
Vermont	607,962
Massachusetts	618,433
Rhode Island.....	130,555
Connecticut	643,375

Whatever value in accuracy we may be disposed to accord or to withhold from these figures, they are the best we have and upon these we must proceed. But confining our view to this State in the present comparison, there must have been some loose work in making figures or some excellent economy in fencing realized since Secretary Goodale's Report for 1859, which gave the annual cost of erections, changes and repairs in fences in Maine at \$1,250,000.

But either figure is enough to challenge attention to this subject, an attention that manifested itself many years ago in this country. A few facts of fence history may be of interest. Beyond all question the fence as a factor in farm and home life has more close connection with the English speaking people, than with any other race. We are continually being reminded by letter-writers and theorists, taking their facts from the continent of Europe, that other nations have better modes, but for the past five hundred years, since the era of a better husbandry began in Great Britain, the fence and

the careful enclosure of land has been an invariable characteristic of English farm and home life. The careful historian cannot fail to find therein a cherished and open mode of affirmation of rights in land, and its exclusive possession, that have been dear to the English born since English liberties began. Fortescue, in his *De legibus legum Anglia* in 1463, declares that "the importance of having the land enclosed is generally admitted. Even the feeding lands are likewise surrounded with hedges and ditches."

Sir A. Fitzherbert, who wrote and published the first English work on rural affairs, the "Book of Husbandry," in 1532, which it is acknowledged gave great stimulus to early British farming, urges the enclosure of land as the foremost principle of good husbandry. He strenuously advises the division of land into proper enclosures, by which operation he says: "If an acre of land be worth sixpence (rental) before it is enclosed, it will be worth eight pence when it is enclosed."

No stronger declaration of the English fence system need be sought than is furnished in the series of Enclosure Acts which, commencing in the time of Charles II., have continued down to our own time. The total of land enclosed by 2,591 Acts, up to the end of 1805, was 4,187,056 acres. Blackstone (*Commentaries* 3d, p. 188) makes special reference to this system and principle which brought under cultivation immense areas of common and waste fields. "Thus," says a leading writer on British farming matters, in 1816, "the commons and common fields, a disgrace to English agriculture, are being wiped away."

I am tempted to present to you the sturdy British meaning and achievement of these Enclosure Acts, illustrated in the fencing done under them. Each Act named the Commissioners to carry out its provisions, who were required not merely to allot boundaries, but to secure the erection of prescribed fences. The general view of the agriculture of Devon, 1813, gives in detail the modes of fencing pursued, as thus:

"Raising a mound on a nine feet base, with a ditch three feet wide on each side (making the whole site of the fence fifteen feet), facing the mound with stones to the height of four feet, sodding it three feet higher above the stone work, and leaving it four and a half feet broad on the top. Then planting the top with two rows of law-thorne."

This is, safely enough we should think, spoken of as "a fence permanently efficient for the purpose of subdivision and boundary, as well as an excellent protection for stock." The average size of

these enclosures was stated as varying from six to eight and ten acres. I am disposed to give another of these fence descriptions from Devon which, like the first, seems to have largely borrowed from the art of the military engineer :

“The outside and partition of all the new allotments in the Black Down Hills, are laid out on a ten feet base, upon which a mound sodded on both sides is raised five feet high and left six feet wide at the top. These banks are all enclosed with a ditch four feet wide and three feet deep. On each brow of the mound a wattled fence about two feet high, within which is planted a double hedge row. On the top of the mound two rows of withy or sallow cuttings placed about three feet apart. Between these are planted oak, ash, beech, birch, alder, hazel, dog wood, or thorn, and at a distance of every ten feet along the middle of the mound alternate Scotch and spruce firs are planted. The size of these enclosures varies from five to eight acres.”

We have an excellent and painstaking review of English farm fencing forty years ago in the two volumes that are the fruits of Henry Colman's tour in Europe. His reputation as Commissioner of Agriculture in Massachusetts gives authentic value to his statements. He says, writing in the year 1844 :

“The farm inclosures in England are of various extent, from ten to twenty and fifty acres. In some parts of England they resemble the divisions of New England farms, and are of various sizes, but generally small and of all shapes, often not exceeding four or five acres. It is reported of a farmer of Devonshire that he lately cultivated over one hundred acres of wheat in fifty different fields. On a Staffordshire farm a sixty-five acre turnip field was in eight inclosures. It was subsequently divided into three fields, and nearly half a mile of fence saved. Ninety-one acres in the same neighborhood were originally in twenty-seven inclosures. Some of the fences in the latter instance occupied land from three to four yards wide that the plough never touched. In parts of Lincolnshire inclosures average fifty acres each, and in the fens, or redeemed lands, the ditches are the only fences. In Northumberland and the Lothians the inclosures are extensive, and, excepting on the outlines, there are no fences. In Berkshire, it has latterly become the practice to remove inner fences, and leave the fields open.”

The same intelligent writer declares his disappointment at the condition of the hedges throughout England :

“There are exceptions, but, in frequent instances, they are neglected greatly; are broken, straggling, weedy, and full of rubbish, and are often seen with these pernicious accompaniments occupying more than a rod in width.”

Mr. Colman got no better answer why these were left in this condition, than that “they are valuable for the protection of game, and make excellent covers for partridges and foxes.”

In 1862 Hon. Ezra Cornell, President of the New York State Agricultural Society, derived from an extended tour some careful observation on fence practices abroad. He had been favorably impressed with the hedge until he saw it in use in England. He

regarded it an expensive, wasteful and troublesome fence. In way of comparison he says, "In France there is not enough fencing to suit our wants; in England there is too much." (New York State Agricultural Report, 1862.)

In 1879, Richard Grant White contributed to the *Atlantic Monthly* a series of articles on rural affairs in England, in which appears the following:

"The notion that the hedge is the universal fence in England is erroneous. Even in the south, where hedges are most common, post and rail fences are even more common; for the hedge is used chiefly on the road-line, and to mark the more important divisions of property. Elsewhere, post and rail fences and palings are frequently found. The hedges that line the road are generally not more than three and a half feet high, and are not thick, but grow so thin and hungrily that the light shines through them. Near houses, especially in suburban places, brick walls are common; and I observed in these a fact which seemed significant. In most cases I saw that the walls in such places had been raised by an addition of some three feet. The upper courses of bricks were plainly discernible to be of a different make from that of the original wall, and the joint and the newer mortar could easily be detected. This seemed to show, unmistakably, an increase in the feeling of reserve, and perhaps in the necessity for it. The walls that would sufficiently exclude the public a hundred years and more ago, were found insufficient, and some fifty years ago (for even the top courses were old, and well set, and mossy) the barriers were made higher,—high enough to be screens against all passing eyes."

These latter statements are significant as showing that the fence principle is still strong in England, that the system of exclusiveness is still a British land home characteristic, which has honestly enough come to us, English by descent in this country.

It was in the early period of the system of land enclosure, as dear to British born, and emphatic in its development as above described, that English settlements in America began. There was a pride in exclusive possession of soil, and a wilderness for its gratification and employment. The first comers had too much to do with far too slender resources to make a headlong resort to fences. They made a trial of the open field in Plymouth, as told in the preamble of their earliest Fence law:

Whereas, in the beginning and first planting of the colony, it was ordered that all should plant their corn, &c., as neere as might be to the town of Plymouth aforesaid, and for that end, an acre of land was allowed and allotted to each person for their private use, and so to them and their heirs forever, and whereas the said acres lay open without inclosure, divers laws and orders have been made to prevent such damage as might befall the whole by kine, swine, goats, &c., that so by herding or other causes, men's labors might be preserved, and such damage or loss as fell upon any, to be made good by the owners of the same cattle trespassing. But since the said acres are for the most part worn out, and cattle by God's blessing abundantly increasing, and necessity constraining to inclose elsewhere, it was thought meet, at a

court held the 2nd of Jan., 1632, that the former privileges of said acres be laid down, and that, as elsewhere, no man set corn upon them without inclosure, but at his peril. (Laws of the Colony of New Plymouth, 1632.)

The preface to the Massachusetts Province Fence Laws, in 1693, reads as follows :

“For the better preventing of damage in corn fields, and other improved and common lands, by horses, neat cattle, sheep or swine, going at large.”

The whole underlying principle of the good and sufficient fence to fence out, adhered to still in Massachusetts, is well stated in an early law as follows :

The Newbury Town Fence Law.—January 10th, 1644.—Remembering the severall inconveniencies and multiplicity of suits and vexations arising from the insufficiency of fences, which to remedy in the olde town hath been so difficult, yett, in our removal to the place appointed for the new town, may easily be prevented. It is therefore ordered, that all fences, generall and particular, at the first setting up, shall be mayde so sufficient as to keep out all manner of swyno, and other cattle great or small; and at whose fence or part of fence any swyne or other cattle shall break through, the party owning the fence shall not only beare and suffer all the damages, but shall further pay for each rod so insufficient the somme of two shillings. It is likewise ordered, that the owners of all such cattle as the towne shall declare unruly, or excessively different from all other cattle, shall pay all the damages that unruly cattle shall doe in breaking through fences. (Town Records of Newbury, Mass.)

And from this homely but perfect statement has gone out the essential features of the American fence system. Whatever the burdens and costs of fencing, whatever the difficulties in securing the perfect fence, they have been in all our communities counter-balanced always by “several inconveniences and multiplicity of suits and vexations arising from the insufficiency of fences.” Perhaps we are coming to a better way. We are certainly tending toward a better economy in the remedy.

And we have been long about it. Sixty years ago the pioneer farm journals of the country were full, as with a live topic, of the complaints of the cost and burdens of fences. The first settlers, many of them, had logs enough and to spare for fencing, and the log heap took the rest. In many sections the rocky field furnished the material for its enclosing fences, to the relief of the soil thus freed from stones. In these cases it was merely a question of labor. But waste of timber in fencing came to be complained of in Vermont in 1824 as I find in a public print of that period. Three years before that period the *American Farmer* of Baltimore was vigorously urging a similar complaint. In 1833 the farmer of North Bend, Gen. Wm. Henry Harrison, in a public address to farmers, declared the waste-

fulness of wood fences and "the necessity of some other material than wood and more universally available than stone."

In the first quarter of this century numerous efforts and large expenditures were made for the universal adoption of the hedge in American fencing. It was abundantly and widely tried and most emphatically failed. It was probably less largely pressed for consideration in Maine, for the hedge of whatever variety is a crop in whose perfection climate is to be considered. But it has been a success in no section of the country. Both in the United States and England the overgrown hedge has become a pest of the soil. Where scanty and irregular in growth it is worthless. But the fences of wood and stone had other evils that have long been complained of, and these aside from the question of cost already before referred to. Says Secretary Flint, in the Report of the Massachusetts State Board of Agriculture for 1861 :

"A very large item in the waste by old-fashioned fence construction is the land occupied by the fence, and worthless because uncultured on each side. * * * Four feet is a moderate estimate for the land thus rendered worse than useless. This would leave under and on both sides of the fence enclosing ten acres one and one-fourth acres, or for the twenty-three million rods of fencing in Massachusetts, thirty-one thousand, two hundred and fifty acres unoccupied, untilled, a refuge for every kind of vermin that walks, flies or crawls."

Says the Annual Register of Rural Affairs :

"The entire loss to the ten million acres of arable land in the State of New York from the zigzag form of fences cannot be less than three hundred thousand acres of arable land, equal to three thousand good farms."

The same testimony comes from all sections and has been coming for a generation past. Nevertheless, fencing has held its place, and to-day we have in the United States six millions of miles of fencing that cost in original outlay something over two billions of dollars. Why do we fence? It is a case where custom sustains legal enactment. And the legal enactment is not everywhere hoary and mossgrown. If you turn to the most recent enactments of new States and Territories you will find strict fence laws among the first to be enacted among the statutes. (See Statutes of Nebraska, Colorado, California, Oregon, &c.)

It may be declared with safety that the perfect fence is either prescribed in all the States in specific terms, or it is made the farmer's interest to build one, and more universally the well fenced farm is the first item descriptive of the well kept farm, and there is no surer token of the sluggard agriculturist than dilapidated fences. That is farm rule reaffirmed by farmers.

It would not appear to any one familiar with past discussions on this subject that this is because our farmers have been told of no other way. The "no fence" argument, and to a moderate degree the no fence practice in the open field, has been given an ample and ably presented share in your State discussions and individual experiences. The strong and earnest advocacy of the practice of soiling cattle, which stimulated the discussion of the fence question in Maine Reports 1859 and 1860, has still its representatives whose views are to be respected. But the American farmer is not ready, has not been ready for the modes of culture practiced on the continent of Europe, where the home of the American farmer and the aspects of American farm life are unknown.

The systems of agriculture of France and Germany so gloriously praised by theoretical writers, many of whom have no practical connection with the question of fencing, furnish no example Americans or Englishmen at home or in Canadian or Australian Colonies would be willing to see reproduced among them.

Says Dr. Loring, United States Commissioner of Agriculture, in his recent paper on American Landholding :

"It is true that French farmers are citizens of a Republic and are owners of the soil on which they live, but it is a Republic without the traditions of Freedom; a soil divided among them by violence before they had reached the point of citizenship. There the home of the American farmer is not found. The American farmhouse is almost unknown. The peasantry gather for the night into crowded towns away from their lands, and go forth by day to till their few outlying acres." (Problem of American Landholding, 1881.)

We shall never find the peasant farmer at home on American soil. We shall never find a class of cowherds in our villages. We shall never shelter our farm beasts on "the European plan," under the same roof with their owners.

True, all this is not involved in soiling, but it is a part of the same system, enforced by doing away with fenced enclosures. Neither Belgium nor France can give us examples. Belgium has three hundred persons to the square mile. France has two hundred, and by French division of property in descent the farm land is divided into patrimonies from a few acres down to a few rods square. And this is un-American.

Discussing the subject in 1863, in Iowa, with its rapidly filling territory under vast pressure for fencing under conditions that have always made fences costly and troublesome, (fences in Iowa in 1879 cost nearly five millions of dollars) and where the no-fence theory

should have taken root if thoroughly practical, a very exhaustive report on the Fence question appears in the Iowa State Agricultural Report for 1863.

That writer does not conceal the burdensome facts of fencing. He says :

“Even in States where the timber is of the best quality and is abundant, so much so that it is an object to get it off the land, the cost of fencing their land exceeds the cost of the buildings required for the comfort of the inhabitants.”

This would be confessedly a good State for any writer in Maine who should set out to banish fences altogether. It was written not in Maine with its abundant forests, but in Iowa where trees are scarce, and wood the sole material, yet this Iowa report states solidly the American idea, which Iowa farmers have always sustained in practice.

“Whatever the laws may be, Iowa farmers will be led by practical good sense to fence a large part of their lands,” and he adds : “Advocates of the no fence theory refer to Common law and insist that we shall return to it. But England is the home of Common law. It is the pride and boast of her people. With all the protection it is flippantly claimed the Common law gives to open fields, the people of England have more thoroughly and effectually fenced their grain fields, their pasture fields, their orchard paths, their gardens and lawns than any other people on the face of the earth,” and for this he gives the genuine English and Anglo-American reason :

“The love of home is fostered by the quiet enjoyment and exclusive possession of property and the assurance of security when enjoying it.”

Says the United States Agricultural Report for 1869 : “The love of exclusive possession is the mainstay of society.” And almost as much is declared in the plain farmer’s statement in the *Rural New Yorker* in 1856, a comparison that will hardly do for Maine : “Good and secure fences are better than hot toddy to sleep upon.”

Opposing the no fence theory at the period of its strongest presentation nearly thirty years ago, the *Rural New Yorker* in 1856 declared :

“We cannot get along without fences as a necessary evil, if such they are. A scarcity of timber may make the present fence materials too costly, but other materials will be drawn from the great reservoir of nature.”

Says the *Farmers’ Dictionary* about the same time : “Had the systems of soiling and enclosing pastures by portable fences been profitable, they would long ago been adopted by practical farmers.”

But it will be asked what of the movements already inaugurated for doing away with fences in some of our American communities, notably in Kansas and in several of the States of the South? If we examine the conditions of each case we shall find them special and by no means applicable, or at least not found equally pressing in other States. In Kansas it is a conflict between the herder and the cropper, the former generally a large owner with extensive capital and large herds, and in many cases the owner of herds with no land at all. This was destructive to the small farmers, generally poor, in a land where fencing with wood is out of the question, and all fencing costly. In about half the counties of Kansas the Herd law is in force, but I find among the best authorities many opinions as to the transient nature of the law, and the belief that there will be a general return to the old system with the advanced development of the State. It is only popular as an expedient in the newest settled counties.

In the South the conditions are still more anomalous. A great change has come over the agricultural systems of the South under free labor, and this constitutes an essential feature in the fence question. The old plantations have gone, and the subdivision of land came all at once. In Alabama the forty-one thousand farms of 1850 became in 1880 one hundred and forty thousand. In Georgia fifty-two thousand farms have grown in thirty years to one hundred and thirty-eight thousand. (I employ only the round figures of the late U. S. Census Report.) And the change is equally marked in all the Southern States. The owners and tenants in the new holdings are poor and cannot at once build sufficient fences. But the new farmers, once slaves, will have their live stock, and the poorest of them cherish pride in a mule, a shote, and a few cattle of their own. So that the farm neighborhoods of the South found themselves swarming with loose domestic animals, and all seeking in Common law the remedy, making every man responsible for his own beasts. This is not doing away with fences. In the law in Virginia, where the movement began as long ago as 1856, counties and larger or smaller territories were allowed, on vote of their electors, to do away with fences by enclosing the whole circuit of such tracts or territories with a legal fence, gates to be maintained at all roads entering the same, and within such limits the Common law rule prevails. New England will not soon fence her villages and counties in such fashion, but her laws have always

recognized the ring fence and fencing in common, as in broad meadow bottoms liable to be swept by freshets.

Upon such as these in summer time in the valley of the Saco, or from Mount Holyoke overlooking the meadows of Hadley and Northampton, the pleased eye of the traveller rests delightfully while he wonders, if he be a no fence theorist, why the rule is not universal. Because the necessity is not universal.

While I respect the theory I do not for myself favor the universal open park system for our homes. I believe the shelter of the fence will be coveted by American owners of cherished home possessions as long as there are American homes, and if I did not believe in it I should find it less easy to account for the persistency of the practice.

Much has been gained by the fence discussion of the past thirty years, but they have not changed or shaken the essential facts and features of American home and farm fencing.

A word as to the waste of timber, hitherto our chief resort in fence material. No topic of the time excites so universal or more needed interest than the destruction of our forests. Reliable estimates tell us that the vast resources of the upper lake and upper Mississippi pine regions, at present rate of consumption, will disappear in twenty years. In the heart of Vermont the traveller on the road from White River Junction to Montpelier traverses a forest wilderness that seems to the eye exhaustless, but recent careful statistics show that it will last ten years as at present being drawn upon. Your own State makes no better showing for a limited future. Lumbermen are already commencing to count anxiously. But if we must have fences, repeating what has already been quoted from widely apart authorities, there must be "some other material."

And it is impossible not to see that a large and appreciable relief has been brought in the advent of a new fence material. I do not appear in the interest of the manufacturer when I bring into its place in this discussion the facts of Barb Wire. The material as a market staple gives these striking figures rendered in miles of finished three strand fence.

AMOUNT OF BARB WIRE IN USE.

Amounting in 1874 to	10 miles.
“ in 1875 to.....	600 “
“ in 1876 to.....	2,840 “
“ in 1877 to.....	12,863 “
“ in 1878 to.....	26,655 “

Amounting in 1879 to.....	50,337 miles.
“ in 1880 to.....	80,500 “
“ in 1881 to	120,000 “
“ in 1882 to	160,000 “
Total.....	453,805 “

The history of iron wire in fencing must be briefly told. Its use was strongly suggested sixty years ago, though at that time it was a comparatively scarce and costly article, drawn by hand, the workman's daily stint being from fifteen to forty pounds a day, in place of the present daily yield, to each workman, of from 1,800 to 2,500 pounds.

In 1816 the Memoirs of the Philadelphia Agricultural Society contain a paper read January 8th, in which instances are given of Wire Fencing already in use, which had demonstrated a great saving of cost to the farmer.

In 1821 the *American Farmer*, of Baltimore, complaining of the cost and wastefulness of existing fences, urged wire as “an economical and effective resort.”

In 1830 *The Journal of the Franklin Institute* (Philadelphia), referring to a patent for a wire fence, says: “There is no novelty in the invention. Fences of wire were common in England many years ago. They were also used in this country, particularly in the neighborhood of Philadelphia, fifteen or twenty years since. Messrs. White & Hazard, who at that time had a Wire Manufactory at the falls of the Schuylkill, erected many wire fences in the neighborhood of their establishment.”

In 1845 the transactions of the New York State Agricultural Society declare wire fencing successful, and urge its “growing necessity.” In the same volume, Edward Clark, in the reports of the New York State Agricultural Society for 1845, describes wire fencing and praises its efficiency. He says he “saw it check a furious bull.” He declares that for protection it should be galvanized. The same authority declares hedges “under growing disfavor, as they shelter field-mice, and the enemies of the crops.”

In 1847 the New York State Agricultural Society awarded a silver medal for wire fence as “cheaper and more effective for farm use than wood.”

In 1849, among the transactions of the same Society, a wire fence brought out in Niagara County was highly commended as “secure

against all animals; a great saving of land; giving no shelter for briars and nettles; proof against high winds; makes no snow drifts; durable and cheapest among materials."

In 1849 *The Plough, Loom and Anvil*, of Philadelphia, sharing in the discussion of the period, uttered this wise and far-seeing opinion, that "setting aside merits, the demand for wood fences would *increase the price, while the demand for wire fence will diminish the price*, as the greater the demand for wire the cheaper it can be made." This was speedily realized, and has remained true in the history of wire manufacture.

When the settlement of the prairie and treeless States of the West of thirty years ago began, wire was of necessity a principal resort. It is estimated that one hundred and fifty thousand miles of plain wire fences were built in the period between 1850 and 1870 in America and Australia. But plain wire was never a successful fence until the addition of the sharp, prickly Barb, the invention of an Illinois farmer in 1874.

That Barb Wire has met the demand of farmers is attested by its extensive adoption. That its most characteristic and first challenged feature, the sharp, keen barb, has not justified the fears and prejudices with which it was received in an age remarkable in its humane regard for the brute creation, is shown by the fact that it is to-day a legal fence in all parts of the United States.

The reasons for the adoption of Barb Wire are briefly told.

1. *It is cheap.* Even where the landowner owns both the timbered land and the saw mill adjacent, he can build a Barb Wire fence more cheaply than he can get out and build fences with the boards from trees that cost him nothing but the labor.

2. *It is everywhere available.* The material for sixty rods of fencing occupies about the same space and has the weight of a barrel of flour. The farmer's team can carry anywhere in one load the fencing required for his largest field. One car-load will build twenty miles of good fence.

3. *It is a secure fence.* Cattle instantly respect it.

4. *It occupies and shades no soil.* It makes no snow-drifts in field borders or roadways. In this latter respect it is in numerous instances being adopted in New England towns by the local authorities who, in roadways of especial winter exposure, are furnishing to the farmer Barb Wire at town cost to replace his old fences. This cannot be a light consideration in Maine, where, according to the

report of your Board in 1860, it cost \$150,000 to open snow blockades in your winter highways caused by the fences in common use.

5. *It can be used to make old fences effective*, and can be exactly adapted to the farmer's needs. Thus one wire attached to trees is doing good service on thousands of acres of New England hill pastures, and is perfectly effective against larger beasts. By increasing the number of strands complete security can be given to the choicest enclosures. Fruit, poultry, and gardens are safe, and the sheep may be kept in safety from the mutton-loving dog, either in the pasture or the fold.

6. *It is imperishable*. It cannot be burned down, blown over, washed away, or stolen for kindling stuff.

7. *It makes the farmer's fields safe*, and is not a popular fence with summer boarders and cross country strollers. Advertisements of quack medicines cannot be painted upon it.

I find only one closing consideration regarding Barb Wire fencing which may rest in some of your minds. Is it a cruel fence? It cannot part with the feature of sharp barbs. The animal whose sensitiveness of skin is a protection to himself, must be warned, and that instantly. If he derives only a pleasant satisfaction in the scratching he covets, it will be bad for your fence. All attempts at Barb Wire that does not prick are sure to be disappointing failures.

This challenge as to its inhumanity was the first opposed to the use of Barb Wire. The figures that show its steadily increasing adoption are a sufficient answer to the charge. But it has been most formally answered by a thorough trial by newspapers, by several prominent and careful hearings before State legislatures, by meetings of farmers, and by the efforts of some of the officers of Humane Societies, who have sought the fullest light on the question. It is everywhere a legal fence. It could not have become, or remained so, but for its fully demonstrated utility.

But the introduction of Barb Wire as a fence material, with its cheapness and universal availability, has wrought some broad changes which here may be the place to record. A few years ago the great cattle ranges of the Southwest and far West, in regions denuded of trees, from their great area and the roving nature of their occupancy, seemed to be the impregnable home of the no-fence theory. No one thought fencing a practicable question, and those certainly thought it least desirable who, owning only cattle, enjoyed free range for them without wish or care to own the land. All this

is changed. Breeders are becoming landowners, and as landowners are fencing their tracts in vast enclosed pastures. In Neuces County, Texas, 80,000 acres are enclosed in one tract with Barb Wire fence. In the Ozark region in Missouri is a sheep range similarly fenced 30,000 acres in extent. On the famous Maxwell grant in New Mexico seven hundred thousand acres are bounded and subdivided in the same way with over two hundred miles of Barb Wire.

The tendency now throughout the vast interior region is in the same direction of careful fencing, and it has one bearing that is not merely the pleasure or the profit of the land owner. We have seen and read much of infectious herds. By this new system, cattle are cared for as they could not be on a free range. The healthy herd can be kept apart, and the diseased animals or infected herds can be segregated.

The longest line of Barb Wire fence, and probably of any fence, in the world, runs from the Indian Territory across the Texas Panhandle, in length two hundred miles, to shut off the loose drift of cattle. All our cattle growers are interested in this matter of better care and safeguard against infection in the great herds of these vast regions.

But further, the new cheap material for fencing is making thousands of acres of cheap land in the older States valuable, land that could not and would not pay for a more costly fence. It is the statement of many farmers in Vermont that they are to-day getting fair returns for pasturage of land never before fenced, and so never before a source of any revenue at all.

To briefly recapitulate the points I have sought to make :

The fence comes to us by inheritance of the English love of enclosed home and farm life.

It has brought its great burdens of cost, its multiform evils of construction and waste.

It has been for many years discussed, under a pressure, seeking to do away with it.

Nevertheless in all our States it stands sustained both by law and custom and by custom more than by law.

No pictures of the European open field culture have brought the American farmer to fall in love with the open field system.

The demand for a cheaper fence material—a fence material everywhere available—has brought into use in the past eight years over

four hundred and fifty thousand miles of barb wire fencing, representing that amount of three strand perfect fence.

This extensive adoption and its everywhere legalized character attests the merits of the new material.

We shall derive reform from the discussion of the general fence question. We shall do away with many interior fences and roadside fences, where farmers are willing to take the risk, but we shall not do away with fences. The adoption of Common law as practically the rule in most American communities gives no promise of parting with the good and perfect fence.

W. W. Harris of Cumberland followed the reading of this paper with his experience with barb wire fence. His farm borders on the railroad. Six or seven years ago the railroad company built a wire fence along the road, a part of which was against his pasture. At first he had fears that the stock running in the pasture might get injured by the sharp projecting barbs. He has had, since it was built, probably one hundred and fifty different cattle pastured against it, and there has been no injury to the stock whatever. Has built the line fence on one side of the farm of this material, and finds it a cheap and effectual farm fence. It costs but little to put it up and still less to keep it in repair. The posts should be set one rod apart. Fourteen feet of the wire weighs a pound and is sold at nine and one-half cents per pound. Three strands will make an effectual barrier for ordinary animals. Cattle will graze under the wire as far they can reach, but they never disturb it. This makes a good portable fence, as it can be easily taken down and moved when desired.

Secretary Gilbert said a case had been under his observation in Turner for two years where a pasture was fenced with two strands only of wire fastened upon cedar stakes driven into the ground, and it had proved entirely safe and reliable. It is also being used in place of poles upon low stone walls, where a single wire is proving entirely effectual in restraining sheep, colts, and other stock. It is stretched either on stakes set by the wall, or, better still, upon miniature iron posts three-eighths inch in size and about one foot long, set into top stones of the wall about one rod apart. The end of this iron is split and the wire is laid into the opening. This seems to be a cheap and easy solution to the question of restraining sheep in a walled-in pasture.

Mr. Smith, in answer to a question, stated that the wire was galvanized and should last an indefinite time. The only test recalled was for a period of forty years. The twist of the wire obviates all injury from expansion and contraction occasioned by changes of temperature.

EVENING.

WHAT I HAVE LEARNED IN BUTTER-MAKING.

By ARTHUR L. MOORE, Limerick.

In order for a man to succeed in farming there are three requisites to be considered—he must know his business; he must pay strict attention to it; he must be an enthusiast. A man can know his business only by studying the best methods and practices of successful farmers, and by keeping posted in the best agricultural literature of the day.

We must not be retrogressive but progressive. We must strive to improve our methods by every possible means. The times demand that we produce the best of everything, and for the best only can we expect to obtain the highest prices.

What was considered a good practice fifty years ago would not necessarily be considered so now. This fact becomes self-evident when our attention is called to the changed surroundings of the present day. The demands and necessities of the people are constantly changing, and we must adapt ourselves to satisfy their wants. It will not do for the farmer to spend his time in the village store or blacksmith shop—his business is to study the wants of his farm and stock and then find out how to supply them.

Let us be enthusiastic—feel, as we ought, that we are pursuing the best and most honorable employment ever allotted to man. Such enthusiasm will create a zest and zeal for work unknown before. The question naturally arises in the mind of a man first entering upon the business of farming, how can I follow all the branches of mixed husbandry and become proficient in each?

Some men can, but there are many more who cannot. The truth is, we try to spread ourselves over too much ground—we do not attend to each part of our business as well as we ought. Thus a man is naturally led to choose some specialty in farming. Let the young man be governed by his taste and circumstances in selecting some

particular branch, and then devote his whole energies to that branch until he understands it thoroughly.

We have first to consider in the subject of butter-making the natural adaptability of the locality. Where in the whole State of Maine do we find better natural facilities than in the Ossipee Valley? Our hillside pastures furnish the best and sweetest of feed and an abundant supply of pure spring water in all ordinary seasons. This is a natural grass region. Our wet, swampy lands, overgrown with bushes and bulrushes, can easily be made by drainage and improvement to produce from two to three tons of the best timothy per acre. We are too far from the large markets to make the baling and shipping of hay remunerative, even if desirable. No better market can be found for the hay produced upon the farm than by feeding it to good cows. We want higher farming—we want more manure applied to our acres, and a consequent larger yield per acre. Every year our productions are brought more and more into competition with those of the cheap lands of the West; and in order to compete successfully, or even to hold our own, we must increase the fertility of our farms.

I contend that there is no surer or more profitable way of doing this than by the making of fine butter. We need first to consider the cows, as they are the machines which manufacture the rough materials. A good cow need not necessarily be a full-blood Jersey or Guernsey. High-grades of either breed are undoubtedly equally as good for all practical purposes. These grades should be obtained by crossing the thoroughbred bull on our best native cows. Choose a good sire from a family of noted butter producers. Special attention should be paid to the selection of the best cows as foundation stock—they should be tested both when fresh in milk, and after milking six months; and all cows that cannot make seven pounds of unsalted butter a week should be rejected.

The general characteristics of a good butter cow are a fine, intelligent head, small horns, thin, longish neck, short and rather small legs, large barrel indicating food capacity, fine switch well covered at the tip with golden scales, ears yellow on the inside, udder large and well covered with veins. The udder when empty should be small and thin, not fleshy, teats of good size and well set apart, milk veins large and knotty, running well forward on the belly; a broad and high escutcheon, rich mellow skin, and soft, fine hair. Such cows are frequently to be met with amongst our common

stock, and by crossing them with a thoroughbred bull of some known butter breed, one can in a few years obtain a herd of choice cows. Good bulls from choice butter families can be purchased quite reasonably by watching the chances. For instance, I was recently offered a grandson of Jersey Queen of Barnet, who made 800 pounds of butter in one year, for \$25. It is not necessary that the bull be registered, as the mere fact of registration will add nothing to the intrinsic value; only be assured that he is full-blooded.

The heifer calves from the best cows should be raised to supply deficiencies in the herd caused by the removal of old or inferior cows. My practice is to take the calf from the dam as soon as the milk is good, and teach it to drink, which can generally be accomplished by giving the finger a few times. Calves, however, are a good deal like children, some learning a great deal quicker than others. I give the new milk until the calf is a fortnight old, then I begin to add a little sweet skim-milk, and when three or four weeks old, all skim-milk is given. If the milk is always sweet, never scalded or overheated, and the pail in which it is given kept sweet and clean, there will be no trouble from scouring or from indigestion. Under this treatment the calf will continue to grow until he is soon able to eat a few shorts, ground oats, barley, or middlings, and choice early cut hay, which should be constantly before him. I do not recommend hay-tea or puddings. The aim should be to secure a good growth of bone and muscle without a tendency to lay on fat; consequently we should only supply those foods that will bring about these results.

A good machine cannot be worked to its greatest capacity or expected to last long unless it is well oiled, housed, and carefully used. The care that a man gives his farm machinery will in a large measure indicate his prosperity. In order to obtain the best results cows should be provided with warm, light, and well-ventilated quarters. If the tie-up is not already warm enough, line up all around with good square-edged boards, which should receive a coat of whitewash once or twice a year to keep sweet and clean. You will find them much cheaper than hay. The stalls should be partitioned off in order that each cow may have what is fed her, without being robbed by her neighbor. Tie upon short platforms sloping slightly toward a gutter behind. This should be well-

supplied with dry muck, leaves, or some other good absorbent to save all the voidings, and cleaned out twice a day or before each milking.

The question of feed is of prime importance, requiring the constant exercise of both skill and judgment. A good feeder needs to know the appetite and the capacity of each member of the herd. He needs to be governed by the size of the cow, and by the weather. Regularity must always be insisted upon. A cow should always eat up clean what is given her, and she will do it when rightly fed. Good early cut clover, timothy, or second crop hay, and bright, well-cured corn fodder, fed in connection with a well-balanced grain ration, cannot help making good butter, other necessary conditions being observed. I find from experience that the best results are obtained from a combined grain ration, say two quarts cotton-seed meal, two quarts corn meal, and two quarts shorts to cows in full flow of milk. Cob meal or middlings might be substituted for clear corn meal and not materially alter the effect of the ration. Give this ration in two feeds, morning and night. Give the cow more than enough to keep her alive, for profit will only come from additional feed. Scant feed and scant care are the bane of a majority of New England farmers. Plenty of good pure water given twice a day is another important factor. It ought to be given under shelter in very cold or stormy weather.

Let the cows be carefully groomed before each milking, both for health and cleanliness. Why this habit, too common among farmers, of allowing their animals to besmear themselves with their own voidings, when a few minutes' time each day will prevent it? The milking must be done at the same hour each day, the same person always milking the same cows. The intervals between milkings should be divided as nearly equal as possible. Exercise kindness and patience in the tie-up—do not kick or swear at a cow, as you will often be tempted to do, because she happens to kick you or the pail over. Perseverance and gentleness will have far more effect than threats and blows. The milk ought to be drawn into small pails and strained into cans holding three or four gallons each, unless it is immediately taken to the dairy. Cleanliness must be observed in every detail of the work, from beginning to end. The dairy should be a separate room either above or below ground in the farmhouse, or else a building by itself, where the milk can be set, cream ripened, and butter made. It should be well supplied with

good water and drainage. It is important to be able to control the temperature somewhat, both in summer and winter. Keep it as near 52° as possible. The ice house should be convenient, to avoid extra work.

The question of the best method of setting milk is still an open one. There is no doubt, however, but what just as much, and just as good butter can be made by open pan, as by deep-can setting of milk, provided all the outside influences can be controlled. This is the very point upon which the whole matter hinges. There are few cellars or milk-rooms perfectly sweet and free from contaminating odors, where the milk can be kept at a uniform temperature, and it is useless attempting to make fine butter unless we have these matters under control. The creamery or deep-can method possesses the very important advantages of economy and almost absolute control over outside influences. It economizes room, tinware, and labor. To be sure, it is necessary to use ice during a portion of the time, but this is a small item of expense as it can be cut and stored almost anywhere for a dollar a ton. Even this expense can be saved in many instances where running water is convenient.

The right temperature for setting milk is from 45° to 50° , to which point it should be cooled as rapidly as possible after straining. It may set twelve, twenty-four or thirty-six hours, as is most convenient; it is always best, however, to skim while the milk is sweet. The cream should be ripened at an even temperature of 52° in winter, and 60° to 62° in summer. It must be stirred at least twice a day or upon the addition of fresh cream, to insure uniformity throughout the mass. Churn as often as twice a week, or when the cream becomes slightly acid, at a temperature of 60° in summer and 64° in winter. There need be no guess work or finger-trials about this part of the work. The thermometer will always tell us the exact point. The market demands a June-colored butter the year round, and it should be our aim as good and honest dairymen to satisfy the market. All butter from herds of cows, even full-blood Jerseys, is subject to a deterioration in color during the cold season, no matter what the feed is. Do not hesitate to add a quantity of coloring, gauged according to the demand of consumers—it is as honorable and legitimate as it is to add salt. People are inclined to taste more with their eyes than formerly, and no matter how fine the flavor and texture, if the color is not right your butter will not command the top price of the market.

Amongst the many different forms of churns, perhaps none have met with more general favor or are more extensively used than those without inside gear. These churns possess special advantages, as the butter always comes in the granular state—hence it can be more readily freed from the butter-milk. The churn should be turned about 70 revolutions per minute. The length of time required will not vary much from forty to fifty minutes. Stop churning when the butter is about the size of grains of wheat, then draw off the butter-milk through a tin dipper with perforated bottom, then cover the granular mass with clear, cold water, move the churn back and forth a few times, draw off the water, and repeat until the last water runs off clear. Three waters are usually sufficient. The butter is now ready to be removed to the worker, which can best be done by means of a wooden scoop. Tin or anything sharp is liable to cut the granules. The worker should be turned a few times to press out the water, and then salt sprinkled on evenly from one-half to an ounce a pound, according to the taste of customers. Work only enough to thoroughly incorporate the salt. If worked too little the butter will be streaked; if overworked the grain will be broken and texture destroyed. The grain is that quality which good butter possesses, which if broken when at 60° temperature will show a distinct fracture. It is in this state that butter has its highest flavor and best keeping qualities. If the grain is broken the butter will look oily and greasy, the flavor will be injured, and its keeping qualities diminished. It should be the aim, therefore, to so manipulate the butter in all the various processes as to preserve the little fatty sacs entire and unbroken.

I prefer to print or pack the butter at churning time, although I sometimes work a second time. The only object of a second working is to more thoroughly incorporate the salt. In the matter of packages and carriers one has an almost unlimited variety to select from, so a person must either use his own judgment or be governed by the fancy of his customers. Butter put up in neat half-pound prints, stamped with the maker's monogram or farm name and wrapped in muslin, are both tasty and attractive. These are shipped to market on trays in boxes holding fifty pounds or less. Another popular package is a square box made of thin spruce stuff dovetailed together, with a sliding cover, holding five or ten pounds. Enough muslin is put in to lap over the top, and the butter packed solid. This package is quite cheap, costing not over one and one-

quarter cents per pound. The quality alone will not sell butter, it must be put up in a manner to attract the eye of the fastidious purchaser.

Now, as regards the profits of this branch of farming, I have some practical results to present from which you can draw your own conclusions. During the past year I have had charge of a herd of ten common cows. Two were half-blood, one seven-eighths Jersey, and the rest native stock. The year's product was 2,000 pounds butter and 125 pounds cheese, besides milk and cream supplied to a family of twelve persons. The butter sold for an average price of 33 cents per pound the year round; veal and calves were sold to the amount of \$42, in addition to the skim-milk and butter-milk which was fed to swine, except what was required to raise seven calves. The gross annual income amounts to \$71.50 for each cow. Each cow consumed two tons of good hay or its equivalent with the following grain ration for seven months, fed twice a day, two quarts at a time—one-third cotton-seed meal, one-third corn and cob meal, and one-third wheat bran, which will cost at the present prices about eight cents a day per cow. The account will then stand like this:—

Two tons hay at \$15.00	\$30.00
Grain.....	16.80
Pasturage	6.00
	\$52.80

This leaves a net balance in favor of the cow—exclusive of the skim-milk and the manure—of \$18.70. Or to put it in another form, returns \$24.35 per ton for the hay fed out.

But I am not satisfied with this showing. I want to raise the average annual yield of my herd from 200 up to 250 or 300 pounds, and obtain a corresponding increase in the average price of the butter per pound. In order to do this I must wait for my grades to come into profit, when I feel confident that I shall make more butter per cow and of a higher quality.

In conclusion I wish to impress upon you that whatever measure of success I have attained has not been due to any special training, but to good care and attendance, and a strict attention to all the minor details of the business.

The remainder of the evening, after the reading of the above paper, was taken up with a discussion on the "Feeding and Care of Cows," participated in by the members of the Board and by the farmers present.

SOMERSET COUNTY.

Institute at Skowhegan.

An Institute for Somerset County was held at Skowhegan, February 27th. Farmers were in attendance from a wide section. Free entertainment was provided for all present. There were present, of the members, A. L. Smiley of Somerset, W. H. Pearson of Kennebec, Professor Balentine of the State College, S. L. Holbrook, and C. H. Cobb.

David Horn, Esq., President of the Somerset Central Agricultural Society, called to order and invited William D. Hayden, an ex-member of the Board, to preside. On taking the chair, Mr. Hayden in a fitting manner expressed the appreciation the farmers of the county feel in the work of the Institutes, and the pleasure felt at being able to welcome the members of the Board among them. It is believed that it can be claimed that the county ranks well in its agriculture when compared with other sections of the State. It is well known that the county breeds and raises some of the best stock found in the State, and raises it in large numbers.

In the forenoon Secretary Gilbert and Prof. Balentine spoke on the following question, proposed and presented by the farmers of the vicinity:

“Will it pay an average farmer to buy corn, shorts, or cottonseed meal and feed to stock for the production of wool or mutton, pork, beef, butter and cheese, or the growing of young stock?”

Mr. Smiley, in the afternoon, read a valuable paper entitled “The Farmer as he is,” after which the subject of “Growing Sweet Corn for Canning” was discussed by Mr. Cobb.

In the evening the exercises opened with a paper by Mr. Pearson, following which Hon. W. B. Ferguson of Dixmont repeated his lecture, “Labor and Education,” given at New Gloucester.

From want of space a full report of this Institute is omitted. It was well attended, the discussions were of a high character, and the interest manifested throughout proves that the farming of the county is in the hands of those who are studious for its future success. Thanks for courtesies extended and favors rendered closed the exercises.

FRANKLIN COUNTY.

Institute at Phillips.

An Institute was held at Phillips March 28th, in the North Franklin Grange Hall, which was kindly tendered for the occasion. The attendance was good throughout the day and evening. J. W. Butterfield, member for the county, opened the meeting with appropriate remarks. The forenoon was taken up with a discussion of the subject of the "Valuation of Fertilizers," by Secretary Gilbert, no report of which is given.

AFTERNOON.

LESSONS FROM MY EXPERIENCE IN ORCHARDING.

By PHINEAS WHITTIER. Chesterville.

If an orchard is to be grown, the first essential thing is to get an orchardist, one who likes the business, sees its importance, has great perseverance, and will take pains to educate himself for it. Holding these views you must allow me to speak of something more than the mere details in telling how to grow fruit.

In passing through our State one cannot fail to notice a great difference in the appearance of the farming community. In sections favored with rich alluvial soils, and on upland possessing a good soil comparatively free of rocks, the farmer who does not appear to be in comfortable circumstances is an exception. In other sections with an equally fertile soil, but so encumbered with rocks that it costs more to prepare it for cultivation than the land is worth after it is prepared, the farmer who is prosperous is the exception. We can ride many miles over our hills, through the best of orchard lands, and see deserted farms turned out to pasture or left to grow up to bushes, their former owners gone West or into more profitable business. Others there are where a hard struggle is still continued, but all the signs about the farm and buildings point to a failure sooner or later. On such farms, where improved machinery cannot be well used, the high price of labor bears heavily, and this with a decreasing fertility, and the competition of the West growing stronger every year, makes farming in the old way on such soils a very discouraging

business. A young man with health, strength and vigor may feel that his bone and muscle are a match for all these obstacles. I thought so once, but it did not take me long to find out my mistake, and see that there was no profit in trying to farm it in the old way on such land.

I confess I can see but one way that such farms can be made a source of profit and comfort to the owners, and that is by making fruit farms of them in connection with sheep raising, for I consider sheep the best help we can have in cheaply keeping an orchard in the best condition. We can come nearer competing with the West in fruit raising than in any thing else. We can have good thrifty trees and luscious fruit where the rocks lie undisturbed in the soil, and the full blood merinos lie around enriching the soil and waiting to give us their valuable fleeces. If it is desired to free the soil of rocks, it will require only a small area, comparatively, for one acre of orchard well taken care of will be of more profit than many whole farms of one hundred acres now are. I know of no other crop from which so much can be realized on the same amount of land as fruit. A good orchard is very desirable on any farm, but on such as I have referred to, it is an absolute necessity if they are to be continued as farms. If each one of them had a good, large, thifty orchard on it, the benefit to the community and to the State would be beyond computation. Where a hundred dollars are now brought into the State, thousands and tens of thousands would be realized. Farms that are now worth a few hundred dollars would be worth as many thousands. It may be thought that I am too enthusiastic on this point, but (pardon me for referring to my own operations) when I bought the place where I now live it was an old forsaken farm, buildings all gone except a few old timbers which I put into the fence, and the whole turned out to pasture. It is no better orchard land than a thousand of other farms, and I know of some that are much better. I commenced setting trees and sowing nurseries, and have kept on ever since. Good judges of orchards are kind enough to say that I have a valuable orchard; at any rate the assessors seem to think so, and my farm is not for sale. I think if I could make such a place worth living on, others might do the same. All the money I could raise to pay toward my land when I bought was seventy-five dollars, and I had no other property except a sucking colt, so you see it is possible to get up an orchard without monied capital to commence with. Any one who has an acre of land can commence operations,

if he can get the apple seeds. It ought to be the poor man's opportunity. And why is it not? Perhaps you will see the reason when I tell you what an orchardist must expect.

In the first place he must expect to wait about about fifteen years after setting trees before he gets any great income from them, and all this time he must manure, mulch, and be continually looking after them. He must expect continued warfare with the enemies of fruit trees, must expect to have many seasons injurious to them and to the fruit. He must expect that his labors will benefit others after he has passed away. But few persons can expect all this and be willing to take the necessary steps to get up an orchard even if they can find nothing else to do. One quite large class of persons are so fearful that the business will be overdone, yankee like, so as to make it unprofitable, that they dare not undertake it. "So many setting out trees," they say. The young expect to get rich in a quicker way, and older men are scarce who are willing to work with an even chance that others will enjoy the benefit of their labor. Then again not one in ten who do undertake it will be successful—not at least until they have a better knowledge of how to do it, and put that knowledge in practice. All the apples that can be raised in this little corner of the United States will hardly effect the market. If they can be raised at a profit on high priced land, that is well adapted to all cultivated crops in other States, then certainly we can do so on our cheap but good orchard lands that are not so well adapted to anything else. The time was when for want of transportation facilities we had only a local market, that all fruit more than was needed at home was almost worthless. Now we have the whole world for a market, and by canning and evaporating it can be kept a long while, or until there comes a scarcity. Thus we are assured of an even price and a sure market. Maine cannot raise too many apples, for the market is extending much faster than the orchards. A large number of persons have tried fruit raising and failed. That is, they have tried it so far as to set out the trees, and that was about all. It seems to be a common idea with many that if they put the trees into the ground, they have only to wait a few years without any further effort, when they will have a good orchard. They think, and I have heard them say so, that a load of manure put around an apple tree as a top dressing and mulching is wasted; and even if they are planting where there are large apple trees they will put little or no dressing near them because they

cannot raise much of a crop in their shade. It is entirely useless for such persons to be inquiring about the best trees to set, the best location, the best varieties, the best way and time to trim, or anything else about orcharding, so long as they continue to neglect the one thing most necessary. Before orcharding can be generally successful in this part of the State people must be educated to the idea, and act upon it, that fruit trees can no more thrive and bear profitable crops of good fruit, without enriching the soil and keeping it in a suitable state for the roots to grow in, than can corn, potatoes, grain or any other crop. I dwell on this point because I know it is the greatest, and in many cases the only cause why so many have failed in this vicinity.

If you will allow me, I will give you the result of my experience and observation on these most important points of apple raising—what varieties to grow and how to best raise them. I know of some who have been quite successful so far as to get up an orchard of thrifty trees, but they have failed to make it profitable because they have gone into raising fall fruit so largely. In most seasons summer and fall fruit in any considerable amount is almost worthless so far as a profitable market is concerned, and it is worse than useless to make into cider, unless it can be converted into jelly or put to some other use than for drinking. It would be better to have some varieties that would not decay so soon. When one has spent so much of his most valuable time in getting up an orchard only to find that he has not the varieties that are profitable to raise, it is a very serious matter. If one sees that he has made a mistake in his crops that he plants annually, he can remedy it the next season, but it is not so easy a matter with an orchard. Therefore it is very necessary that he should know what varieties he should have.

What we want for a profitable market apple is one that is a good keeper, does not bruise easily, will stand up well in shipping long distances, has a good color, is good for both eating and cooking, is a good bearer and is of uniform size, does not fall easily from the tree, and is adapted to our soil and climate. A variety may grow to perfection and be one of the very best of apples in one part of the country, and yet be one of the poorest in another. I know of no other variety that combines all these qualities to so great an extent as the Baldwin, and I consider it the king of apples for us to raise on all except low, frosty locations. It is adapted to more kinds

of soil than any other late keeping apple I know of. I think we have better apples in quality than this, that are desirable to raise for our home market, but they all have some serious defects for a general market apple. I think the Rhode Island Greening comes next to the Baldwin for a profitable apple to raise. Its faults are that it falls easily by high winds; it has not a fashionable color, and does not keep quite late enough. The Roxbury Russet is a profitable variety to raise on the very few locations and soils adapted to it, because it will keep late enough to bring an extra price; but I think that two barrels of Baldwins or Greenings can be more easily raised than one of Russets, even on soil adapted to it. The Northern Spy is an excellent apple when it grows to perfection, in which it is very apt to fail. It is too soft to stand up well in shipping long distances, and is uneven in size. Exactly the same can be said of the Yellow Bellflower as of the Northern Spy. For a sweet apple the Tolman Sweet is far the best and most profitable of any I know of for us to raise. The King of Tompkins is a large, handsome apple, but the quality when grown here is not first-rate. I might go through a long list of varieties which some few persons might think the best to raise, but which would not stand the test of the market in large quantities. In situations where the Baldwin will not thrive the Yellow Bellflower is one of the most profitable apples to raise. It is one of the best in quality, and with extra care in handling it does well in the market. The tree is very hardy but needs high cultivation. The Northern Spy is hardier than the Baldwin, and is a good apple to raise where the latter is liable to fail. I would not run the risk of setting largely of any new varieties, however highly spoken of, until they had been thoroughly tried in our own soil and climate, and also in the market.

The raising of summer and fall fruit for market should be confined to locations near large markets, so that they can be readily supplied in such quantities only as the market calls for. The market is best and safest for apples that are good for both eating and cooking. The Harvey is one of the best autumn varieties to raise in large quantities for market in locations where it grows to perfection. In some places it is a shy bearer and the fruit is watery. The trees are very sensitive to shade and will not bear to be crowded or set near forest trees. They must have an open, sunny space in order to thrive. Almost all of the summer and fall varieties are hardy enough for our climate and we should select those that have been proved to sell well in market and are adapted to our several locations. As a

general rule the less summer and fall fruit we try to raise for market, the better it will be for us. We should make sure, however, of enough for our own use by having one or two trees each of the different varieties that we or our families have a liking for. Individual tastes should govern the selection more than anything else. The importance of a generous and continuous supply of good fruit the year round in a family cannot be overestimated. It is not only a source of gratification but is also a great promoter of health.

If any one has a portion of an upland pasture, made rich by the droppings of the stock, no matter how rocky it is if there is a chance to set the trees, he has one of the very best prepared chances for getting up a good thrifty orchard in the easiest and cheapest way possible. The way is to fence off such a piece, and allow no neat stock or horses to run in it at any time. Set the trees on the best places about the right distance apart, and do not be too particular about setting them in rows. There will be no need of manure from the barn in such a place, but they should be kept mulched. Almost any thing that will keep the grass down around the trees until they get a good start, will do for this. As soon as they get large enough so that the sheep cannot bend them down nor reach to eat off the tops, the fence should be so arranged as to allow sheep, and no other stock, to go into the orchard to spend their idle time lying around and enriching the soil. The more of them the better. So long as such an orchard is thus managed there will be no trouble, so far at least as the management of the soil is concerned, in having a good thrifty orchard, bearing large crops of the nicest fruit.

Another good place to raise an orchard is on a piece of newly cleared upland with a strong deep soil, if its fertility can be kept in it for that purpose; but if it is to be cropped for grain and grass as it usually is, the trees must receive the same treatment that they need in any other mowing field. The best way in all other localities is to cultivate the land until the trees get a good start, and even then they should be mulched to prevent their drying up in summer and freezing to death in winter. Any one can be quite successful in raising an orchard in a grass field by mulching the trees with good manure as soon as set out in sufficient quantity to kill all the grass for three or four feet around them, then, before the grass gets a start again, mulch with straw, brakes, poor hay, or almost anything to keep the grass down. After a year or two put on more manure and mulching in a larger circle, and keep up such treatment

until the trees come into bearing. After that the whole surface must be top-dressed and kept in a good state of fertility. Don't forget that the amount and quality of the fruit you will get will depend almost wholly on the amount of dressing applied. This method means labor and expense, but I am satisfied that in no other way can a good orchard and its fruit be raised in a mowing field. Trees set in such a place and left to themselves might just as well have been burned up before setting. If any one has engaged trees and intends doing so with them I should advise him, after he gets his trees and pays for them, to chop them up for the stove and save further trouble. I have seen trees set and left in that way so many times that I know it to be a sure failure.

The proper feeding of fruit trees holds exactly the same place of importance that the feeding of stock does to insure profitable animals. Alternate liberal feeding and starvation is as unprofitable in one case as the other. The manuring of the soil is of full as much importance for fruit trees as for a crop of corn or anything else. After securing the right varieties, this matter of manuring is the most important point to be met.

The next in point of importance is eternal vigilance in protecting the trees and fruit from their numerous enemies. This means something besides going around amongst the trees and looking at them. It means work, and continued, persistent work. It means the studying of the habits of these enemies, their methods of doing business, and the best way of destroying them.

There are two ways to increase the size and quality of fruit. One is to take off a portion of the tree top or the fruit in early summer, and enough of it so that the tree will not be over-taxed to perfect what is left. The other way is to increase the fertility of the soil sufficiently to supply a good growth to the whole top and perfect a large crop of fruit. Orchardists can take their choice of the two ways, but if the last method is chosen it will be necessary to begin at least a year or two before hand. I think in many cases both methods might be used with good results.

I would not advise any one to set trees grafted at the root. They will do well enough in favorable seasons, but when there comes a hard year for them they are more liable to be killed than those that are grafted in the limbs; and we are located too near the northernmost limit of some of the most valuable market varieties to neglect to place them under the most favorable circumstances in our power.

On some farms there are many hundreds of volunteer trees that are hardy and thrifty, and if in a good location, I would ask for no better chance to obtain good fruit quickly. Such an opportunity is far too good to be neglected, for one who has such a chance has got a good orchard more than half raised already. When I see a man neglecting such an opportunity, and working hard upon his hard soil for a small income, I think he is like a man trying to get money by raising vegetables on a rich gold mine.

If I have not wearied your patience already, perhaps I ought to say something about old orchards. If a farmer has such, he can by proper management get quite a good profit from it while he is raising a new one. It should be grafted, and if the old limbs have commenced to decay so that new ones and sprouts have started out, enough of such new ones should be grafted to make a top. Some trees are capable of renewing their tops several times and bearing good crops of fruit; others are of no account after the original limbs fail. When a tree shows signs of trying to renew its top, do not fight against it too persistently by cutting off all the new shoots, but graft some of them and assist it all you can. Do not leave any new ones to grow ungrafted. Such an orchard should be plowed shallow and manured and kept so; or if it should be seeded to grass it should remain so only one or two years before it should be again plowed and manured or heavily top dressed and mulched. It is of no use to plow and manure an old orchard for a year or two and then mow it for hay, as is usually done, as long as grass will grow, while the trees starve. I will repeat that where an orchard, old or young, is so situated that it can be done, the best and cheapest way is to give a large flock of sheep the run of it.

Following the reading of this paper, Mr. Bennoch read a paper on "Varieties of Fruit adapted to Franklin County," and the subject was further discussed by the fruit growers present.

In the evening a lecture was given by Hon. James Morrison, Jr., of Phillips. Subject, "Neglected Farms in Franklin County." The lecture was an able presentation of the present condition of the agriculture of north Franklin, with suggestions towards its further advancement, and drew out an earnest discussion, after which an adjournment was made.

Institute at Jay Bridge.

By invitation of the Jay Bridge Grange, a second Institute for the county was held at their Hall, March 28. In the forenoon Secretary Gilbert repeated his lecture on the "Valuation of Fertilizers," which commanded the most earnest attention of the audience.

In the afternoon Dr. A. R. Millett of Livermore Falls gave an address in which he ably reviewed the condition of agriculture, and dwelt at length on the importance of the various mediums now aiding in its progress, and closing with an earnest welcome, in behalf of the Jay Bridge Grange, to the members of the Board.

In the evening the papers on fruit culture, given at Phillips, were repeated, and Mr. Bennoch illustrated, from samples brought for the purpose, his method of "saddle grafting."

The organization under whose auspices the meeting was held embraces the principal farmers of the vicinity. Active in their business they are wide awake to avail themselves of every effort in their behalf. The hall was well filled through the day and evening. A generous hospitality was tendered to all present. A pleasant interchange of courtesies closed the exercises and closed the series of Institutes for the season.

MAINE BOARD OF AGRICULTURE—1883.

OFFICERS.

A. R. LINCOLN, PRESIDENT.

C. H. COBB, VICE PRESIDENT.

Z. A. GILBERT, SECRETARY.

MEMBERS CHOSEN BY COUNTY SOCIETIES.

Term expires Dec. 31.

Androscoggin county,	C. H. Cobb,	East Poland,	1883
Kennebec	“ W. H. Pearson,	Vassalboro’,	1883
Lincoln	“ E. W. Stetson,	Damariscotta,	1883
Waldo	“ George E. Brackett,	Belfast,	1883
Washington	“ A. R. Lincoln,	Dennysville,	1883
Cumberland	“ W. W. Harris,	Cumberland Centre,	1884
Oxford,	“ J. K. Hammond,	Paris,	1884
Sagadahoc	“ S. L. Holbrook,	Brunswick,	1884
Somerset	“ A. R. Smiley,	Skowhegan,	1884
York	“ Horace Bodwell,	Acton,	1884
Aroostook	“ Edwin Wiggin,	Maysville Center,	1885
Franklin	“ J. W. Butterfield,	Phillips,	1885
Penobscot	“ J. E. Bennoch,	Orono,	1885
Piscataquis	“ O. T. Goodridge,	Milo,	1885
Knox	“ M. R. Mathews,	Warren,	1885
Hancock	“ Vacancy.		

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President, M. C. Fernald, Orono.

Professor of Agriculture, Walter Balentine, Orono.

ELECTED BY THE BOARD.

Z. A. Gilbert, East Turner, Secretary.

Officers of Agricultural Societies, 1883.

NAME OF SOCIETY.	President.	Post Office.	Secretary.	Post Office.	Treasurer.	Post Office.
Maine State Agricultural So.	Rufus Prince	South Turner	A. L. Dennison	Portland	H. S. Osgood	Augusta.
State Pomological Society	Robert H. Gardiner	Gardiner	G. B. Sawyer	Wiscasset	G. E. Sawyer	—
Androscoggin	B. F. Briggs	Auburn	William R. Wright	Lewiston	David Farrar	Lewiston.
Aroostook	J. D. Gove	Linneus	J. Frank Holland	Houlton	Wentworth Fall	Houlton.
Aroostook, North	Edward Wiggin	Maysville Center.	H. L. Barto	Presque Isle	Columbus Hayford	Maysville Center.
Cumberland County	W. W. Harris	Cumberland Cr	John J. Frye	Portland	John J. Frye	—
Franklin	G. K. Staples	Temple	V. L. Craig	Farmington	P. P. Tufts	Farmington.
Franklin, North	M. C. Kelley	Phillips	J. W. Butterfield	Phillips	N. W. Hinkley	Phillips.
Franklin Central	E. J. Gilkey	Strong	A. J. Norton	Strong	J. M. Lambert	Strong.
Knox	—	—	H. Y. Vinal	Kookland	—	—
Knox, North	M. R. Mathews	Warren	T. A. Gashee	Appleton	Elden Burkott	North Union.
Kennebec	E. O. Bean	Readfield	H. O. Nickerson	Readfield	C. H. Stevens	Readfield.
Kennebec, North	Martin Blaisdell	Waterville	A. H. Rice	Waterville	J. G. Soule	Waterville.
Lincoln	Henry Ingalls	Wiscasset	E. W. Dunbar	Damariscotta	L. H. Winslow	Nobleboro'.
Oxford	Seth Holbrook	Oxford	A. C. T. King	South Paris	A. C. T. King	—
Oxford, West	George R. Bean	Denmark	D. Lowell Lampson	Fryeburg	John Locke	Fryeburg.
Ossipee Valley	—	Cornish	Roseoe G. Smith	Cornish	Howard Brackett	Cornish.
Penobscot and Aroostook	B. F. Pease	Island Falls	Luther B. Rogers	Patten	E. W. Perry	Patten.
Penobscot	S. C. Sweetser	—	B. A. Burr	Bangor	B. A. Burr	—
Penobscot, West	E. A. Chandler	Exeter Mills	T. P. Batchelder	Kenduskeag	T. P. Batchelder	—
Penobscot, North	W. B. Pinkham	Lincoln	R. W. Bailey	West Charlesle	Joseph Burland	Lincoln.
Penobscot Central	T. J. Peaks	Charleston	G. W. Dunning	West Charleston	James Knowles	East Corinth.
Piscataquis, East	James L. Smart	Mtlo	M. L. Durgin, Jr	Milo	M. L. Durgin, Jr	—
Piscataquis Central	Obad Towne	East Dover	J. F. Hammond	Foxcroft	B. F. Hammond	—
Piscataquis, West	W. F. Towne	Monson	J. F. Thombs	Monson	J. F. Thombs	—
Sagadahoc	C. E. Townsend	Brunswick	I. E. Mallett	Topsham	Lyman E. Smith	Brunswick.

Somerset, East.....	C. M. Jewett.....	Palmyra.....	J. Finson.....	Hartland.....	S. L. Mayo.....	Hartland.
Somerset Central.....	David Horu.....	Skowhegan.....	A. R. Smiley.....	Skowhegan.....	John Weston.....	Skowhegan.
Somerset, West.....	S. W. Tinkhan.....	North Anson.....	N. F. Clapp.....	North Anson.....	N. F. Clapp.....	-
Shapleigh and Acton.....	John F. Ferguson.....	Shapleigh.....	Horace Bodwell.....	Acton.....	H. A. Standley.....	Shapleigh.
Waldo.....	S. A. Payson.....	Belfast.....	D. A. Wadlin.....	Belfast.....	A. S. Redman.....	Belfast.
Waldo and Penobscot.....	Freeman Atwood.....	Monroe.....	E. H. Nealley.....	Monroe.....	F. L. Palmer.....	Monroe.
Waldo, North.....	J. B. Vickery.....	Unity.....	B. B. Stevens.....	Unity.....	H. B. Rice.....	Unity.
Washington.....	M. S. Wilder.....	Pembroke.....	H. F. Porter.....	Pembroke.....	Peter E. Vose.....	Dennysville.
Washington, West.....	George A. Bucknam.....	Columbia Falls.....	A. W. Trickey.....	Jonesboro'.....	Levi Leighton.....	Columbia Falls.
York.....	Jonas K. Taylor.....	Lyman.....	John M. Deering.....	Saco.....	Ivory Lord.....	Saco.

MAINE STATE AGRICULTURAL SOCIETY.

The State Agricultural Society held its twentieth State Fair on the Society's grounds at Lewiston, September 26, 27, 28 and 29, 1882. The State Pomological Society united with the Agricultural Society and held its fruit and flower exhibition in connection with the Fair at City Hall.

The weather throughout was favorable, and the attendance large. The exhibition as a whole excelled any previous one ever held by the Society. Appended is a detailed statement of entries, receipts, and expenditures prepared under the direction of the treasurer.

STATEMENT—*Showing number of Entries, together with amount of Premiums paid at Maine State Fair, 1882.*

PARK.

CLASS.	No of Entries.	Amount of Premiums Paid.
CATTLE.		
Maine Herd Book Jersey Stock.....	46	\$151 00
Devon Stock.....	none.	
Ayrshire Stock.....	none.	
Hereford Stock.....	24	105 00
American Cattle Club Jersey Stock.....	71	182 00
Shorthorn Stock.....	52	176 00
Holstein Stock.....	12	67 00
Polled Angus Stock.....	none.	
Grade or Native Stock.....	48	49 00
Working Oxen and Steers.....	27	116 00
Trained Stoers.....	2	10 00
Fat Cattle.....	20	92 00
Matched Oxen.....	15	83 00
Town Teams.....	5	54 00
Pulling Oxen.....	21	144 00
Pulling Steers.....	10	42 00
	353	\$1,271 00

STATEMENT SHOWING ENTRIES, ETC.—Continued.

CLASS.	No. of Entries.	Amount of Premiums Paid.
HORSES.		
Stallions for general use.....	21	\$85 00
Stallions four years old.....	6	53 00
Stallions three years old.....	8	35 00
Best Draft Stallion.....	none.	
Brood Mares.....	17	53 00
Geldings and Fillies four years old and over.....	53	220 00
Geldings and Fillies three years old.....	9	30 00
Stallions, Geldings and Fillies two years old.....	24	69 00
Stallions, Geldings and Fillies one year old.....	21	30 00
Draft Stallions to be tested.....	7	43 00
Gents' Driving Horses.....	24	100 00
Walking Horses.....	12	30 00
Best Trained Colt.....	none.	
Matched Driving Horses.....	4	60 00
General Tilton's Special.....	7	†
	213	808 00
Trotting Horses.....	113	2,350 00
SHEEP.		
Long Woolled Sheep, (Leicester and Cotswolds).....	19	68 00
Oxford and Hampshire Downs.....	19	100 00
South Downs.....	19	70 00
Merinos.....	38	84 00
Breeding Merino Ewes.....	5	13 00
Shropshires.....	1	8 00
Texels.....	12	60 00
	113	403 00
SWINE.		
Large Breeds.....	36	131 00
Small Breeds.....	none.	
	36	131 00
POULTRY.		
Poultry.....	21	50 00
DAIRY, ROOTS AND VEGETABLES		
Grain, Seeds and Sheaves.....	79	53 00
Roots and Vegetables.....	93	49 00
Aroostook County Special.....	37	75 00
Butter, Cheese and Dairy Implements.....	49	137 00
Honey.....	4	§ 35 00
	262	349 00
Agricultural Implements.....	321	* 160 00
Plowing Match.....	13	‡ 31 00
RECAPITULATION.		
Cattle.....	353	1,271 00
Horses for Exhibition.....	213	808 00
Trotting Horses.....	113	2,350 00
Sheep.....	113	403 00
Swine.....	36	131 00
Poultry.....	21	50 00

* 11 Diplomas and 3 Silver Medals.

† Premiums paid by Gen. Tilton.

‡ 1 Silver Medal.

§ 2 Diplomas.

STATEMENT SHOWING ENTRIES, ETC.—*Continued.*

CLASS.	No. of Entries.	Amount of Premiums Paid.
RECAPITULATION—Concluded.		
Dairy, Roots and Vegetables.....	262	* \$349 00
Agricultural Implements.....	321	† 160 00
Plowing Match.....	13	‡ 31 00
	1,445	5,553 00
ACTUAL NUMBER OF ANIMALS REPRESENTED ABOVE.		
Bulls, 32. Bull Calves, 33	65	} \$745 00
Cows, 81. Heifers, 69. Heifer Calves, 34.....	184	
Oxen (pairs,) 59. Steers (pairs,) 29.....	176	526 00
Horses for Exhibition	220	808 00
Trotting Horses.....	78	2,350 00
Sheep and Lambs.....	274	403 00
Boars and Sows.....	23	} 131 00
Litters of Pigs	13	
Poultry.....	54	50 00
	1,087	5,013 00
* 2 Diplomas. † 11 Diplomas and 3 Silver Medals. ‡ 1 Silver Medal.		

HALL.

CLASS.	Number of Entries.	Premiums Paid.	Diplomas.	Silver Medals.
Household Articles of Maine Manufacture.....	6	\$4 00	1	-
Brass, Tin, Copper, Iron Work, and Stoves	2	-	1	1
Maine Corporation Manufactures.....	20	5 00	6	6
Needle and Fancy Work	208	61 00	2	-
Articles of Leather, Saddlery, etc.....	9	-	4	-
India Rubber Goods.....	none	-	-	-
Carriages and Sleighs	6	33 00	-	-
Hardware, Cutlery, Tools and Machinery.....	3	7 00	-	-
Bread and Table Luxuries.....	34	21 00	-	-
Canned Fruits, Preserves, Pickles, etc.....	96	18 00	1	1
Printing and Binding.....	1	-	1	-
Pictorial and Industrial Arts.....	68	88 00	7	1
Household Furniture and Carpenter's Work.....	3	4 00	-	-
Millinery, Hats, Caps, Furs and Regalias.....	1	-	1	-
Musical, Surgical Instruments, etc.....	6	5 00	1	4
Mineral and Botanical.....	4	5 00	1	-
Miscellaneous and New Inventions.....	54	2 00	11	5
	521	253 00	37	18
Baby Show.....	24	57 00	-	-
	545	310 00	37	18
FINAL RECAPITULATION.				
Number of Entries, Park.....	1,445	-	-	-
“ “ Hall.....	545	-	-	-
Premiums Paid, Park	-	5,553 00	-	-
“ “ Hall.....	-	310 00	-	-
Silver Medals Awarded at Park	-	-	-	4
“ “ “ Hall.....	-	-	-	18
Diplomas Awarded at Park	-	-	13	-
“ “ “ Hall.....	-	-	37	-
	1,990	5,863 00	50	22

STATEMENT — Showing Income and Expenditures of the Maine State Agricultural Society on account of the Fair of 1882, and for other purposes.

INCOME.

	On Park Account.	On Hall Account.	On Gen'l Account.	Total.
From Sale of Tickets, (Single Admission) ..	\$6,886 00	\$1,982 90	-	\$8,868 90
“ “ “ (Rail Road).....	3,329 45	369 90	-	3,699 35
“ “ “ (Grand Stand)	477 35	-	-	477 35
“ “ “ (Exhibitors)	199 00	129 00	-	328 00
“ “ “ (Tent)	288 50	-	-	288 50
	11,180 30	2,481 80	-	13,662 10
“ Entry Fee on Trotting Horses.....	1,617 50	-	-	1,617 50
“ Ground Rents.....	512 50	-	-	512 50
“ 204 Life Members, \$10.....	-	-	\$2,040 00	2,040 00
“ 5 “ “ \$20.....	-	-	100 00	100 00
“ Coat and Parcel Room.....	27 60	-	-	27 60
“ F. B. Prince, Coll'ns on acc't Track Rent	94 66	-	-	94 66
“ G. H. Haven, Candy Stand Hall	-	18 87	-	18 87
“ Sale of Old Lanterns, Locks, &c.....	3 53	-	-	3 53
“ Advertising in Premium List	-	-	35 00	35 00
Income of 1882.....	13,436 09	2,500 67	2,175 00	18,111 76
Balance from Account, 1881	-	-	285 33	
Income for 1882.....	-	-	18,111 76	18,397 09
Gross Receipts, as per C. B	-	-	18,428 22	
Less Entry Fees Refunded	-	30 00	-	
“ Amount from G. H. Haven, credited on cash account.....	-	1 13	31 13	18,397 09
EXPENDITURES.				
For Materials, (Lumber, Hardware, etc.) ..	303 82	21 52	-	325 34
Labor.....	1,606 59	403 20	456 00	2,465 79
Police Labor.....	219 50	29 50	-	249 00
Stationery and Printing.....	90 45	33 35	446 02	569 82
Advertising	16 50	2 50	202 50	221 50
Postage, Telegraph and Express	-	-	322 47	322 47
Hay, Grain and Straw.....	191 00	-	-	191 00
Shavings.....	40 00	-	-	40 00
Stabling Horses.....	14 00	-	-	14 00
Transportation.....	168 50	25 75	2 00	196 25
Tools, Signs and Furniture (pur. & hired)	73 50	16 50	4 15	94 15
Improvements on Buildings and Grounds	2,448 74	-	-	2,448 74
Use of Tents, etc., (Agr'l Imp Dep't) ..	201 25	-	-	201 25
National Trotting Association	56 00	-	-	56 00
Caps, Ribbons, Badges, Paper, Twine, &c.	23 33	8 27	4 96	36 56
Diplomas and Medals.....	28 41	132 49	-	160 90
Water Dep't for Pipe, Freight, Trucking	162 26	-	-	162 26
Ice, and Water for Grounds.....	57 30	-	-	57 30
Music.....	83 00	91 00	-	174 00
Insurance	56 94	-	-	56 94
Pomological Society (as per agreement)	-	-	325 00	325 00
Salaries.....	-	-	1,500 00	1,500 00
Injuries to Mrs. T. B. Frost, at Grounds	35 00	-	-	35 00
Miscellaneous	-	6 00	14 00	20 00
	5,876 09	770 08	3,277 10	9,923 27
Premiums Paid.....	5,508 00	316 00	-	5,824 00
Expenditures for account of Fair, 1882.	11,384 09	1,086 08	3,277 10	15,747 27

Total Expenditures.

Amount of Bills and Premiums for Fair of 1882	-	\$15,747 27	
“ “ “ of former years.....	-	17 36	
			\$15,764 63
Gross Payments as per Vouchers and Approved Bills..	-	15,795 76	
Less Entry Fees Refunded and charged to that account	\$30 00		
Less Amount credited on Account G. H. Haven.....	1 13	31 13	15,764 63

Recapitulation.

Cash Received for the Year.....	-	\$18,111 76	
Balance from Account, 1881.....	-	285 33	
			\$18,397 09
Total Amount Bills and Premiums Settled, 1882	\$15,747 27		
“ “ “ “ of former years	17 36		
		15,764 63	
Balance to new account.....	-	2,632 46	18,397 09

H. S. OSGOOD, *Treasurer.*

TREASURER'S OFFICE, }
 Augusta, Me., January 1, 1883. }

Financial Statement of Agricultural Societies for the Year 1882.

SOCIETIES.	Amount received from State.	Amount raised by Society.	Total receipts for the year.	Total amount of premiums and gratuities awarded.	Incidental expenses for the year.	Whole amount of disbursements for the year.	Value of property belonging to the Society.	Amount of liabilities of the Society.	Awards for plowing at exhibition.	For bulls and bull calves.	For working oxen, 4 years old and over.	For steers under 4 years old.	For milk cows.	For heifers and heifer calves.
Androsoggin.....														
Aroostook County.....		61 75	226 85	154 75	19 00	175 95				4 50	3 00		14 50	3 00
Aroostook, North.....	\$153 00	2,791 28	2,397 28	2,019 00	1,686 86	3,754 36	50 00			55 00	55 00	21 00	84 00	14 00
Cumberland County.....	96 00	1,086 83	1,430 02	401 59	200 00	777 07	2,000 00	700 00		13 50	55 50	59 00	22 00	18 75
Franklin County.....	66 00	417 09	483 09	281 40	100 00	460 18				7 25	24 00	14 75	8 75	4 75
Franklin, North.....	19 00	204 01	223 01	104 45	25 00	104 70	600 00	375 00		2 00	3 00	6 00	4 25	1 00
Franklin Central.....														
Knox County.....	217 00	697 60	914 60	456 50	323 44	779 94	337 86			17 50	41 00	7 00	34 00	12 75
Knox, North.....	110 00	486 12	596 12	241 75	316 85	558 60	75 00			7 00	36 00	21 75	1 50	3 50
Kennebec County.....	286 00	861 44	1,747 44	562 00	384 47	967 38	500 00	126 00		11 00	64 00	37 50	36 00	17 50
Kennebec, North.....	114 00	202 23	316 23	203 75	69 98	337 73	2,500 00			8 00	10 00	17 00	11 00	6 00
Lincoln County.....	241 00	629 11	870 11	335 67	510 11	845 68	75 00			3 75	8 00	5 50	6 00	3 00
Lincoln County.....	210 90	2,471 69	2,681 69	1,251 05	527 62	2,642 93	7,000 00	1,920 54	14 00	66 00	101 00	80 00	58 00	32 00
Oxford, West.....	66 00	844 22	910 22	373 80	339 79	713 59	2,000 00			4 50	48 00	19 00	7 00	12 50
Ossipee Valley.....	200 00	715 81	915 81	333 20	144 97	546 95	3,000 00			15 00	67 00	30 00	17 00	40 00
Penobscot and Aroostook.....	100 00	54 50	154 50	76 00	34 00	110 00				4 50	3 50	3 75	9 00	5 25
Penobscot County.....	51 00	179 52	230 52	150 00	30 00	200 50	250 00			6 00	5 00	5 00	8 00	4 00
Penobscot, West.....	161 00	439 46	603 46	275 75	167 62	443 37	3,000 00	600 00		10 00	17 00	15 50	12 50	44 25
Penobscot, North.....	55 00	77 30	132 30	90 00	31 75	129 75		25 00		4 00	6 00	8 00	6 00	8 00
Penobscot Central.....	100 00	129 62	229 62	192 25	22 50	172 88				27 50	19 50	12 00	20 50	6 50
Piscataquis, East.....	20 00	71 60	91 60	69 60	22 00	91 60				75 00	10 00	5 75	2 50	2 50

FINANCIAL STATEMENT OF AGRICULTURAL SOCIETIES FOR THE YEAR 1882—Continued.

SOCIETIES.	FINANCIAL STATEMENT OF AGRICULTURAL SOCIETIES FOR THE YEAR 1882—Continued.												
	Amount received from State.	Amount raised by Society.	Total receipts for the year.	Total amount of premiums and gratuities awarded.	Incidental expenses for the year.	Whole amount of disbursements for the year.	Value of property belonging to the Society.	Amount of liabilities of the Society.	Awards for plowing at exhibition.	For bulls and bull calves.	For working oxen, 4 years old and over.	For steers under 4 years old.	For milk cows.
Piscataquis Central.....	\$112 00	127 00	434 63	399 93	160 44	560 37	157 74	-	12 00	39 00	9 00	18 00	11 00
Piscataquis, West.....	26 00	66 00	92 00	51 20	38 44	89 64	-	-	1 00	4 50	2 75	2 25	1 50
Pomological, State.....	500 00	421 77	1,021 77	604 00	261 25	950 75	100 00	150 00	-	-	-	-	-
Sagadahoc County.....	264 00	2,285 00	2,549 00	1,399 85	1,225 57	2,625 42	5,000 00	-	19 00	115 00	43 00	49 00	41 00
Somerset, East.....	319 00	991 77	1,310 77	544 35	210 50	1,101 50	2,500 00	419 33	8 50	5 75	12 50	36 75	22 75
Somerset Central.....	-	243 00	255 00	106 00	35 05	141 05	800 00	-	13 50	31 00	12 00	6 00	8 00
Somerset, West.....	23 00	18 00	127 63	216 45	65 04	65 04	1,000 00	-	15 00	19 00	20 00	12 00	17 30
Shapleigh and Aton.....	93 00	737 17	530 17	386 50	24 00	510 50	4,500 00	-	6 50	50 50	8 75	6 00	5 50
Waldo County.....	110 00	637 68	747 68	700 00	124 00	634 00	2,000 00	6 00	54 00	15 00	14 00	30 00	27 00
Waldo, North.....	114 00	336 35	455 55	393 50	89 56	450 06	-	-	22 00	28 00	16 00	12 00	6 75
Waldo and Penobscot.....	130 00	1,567 40	1,697 40	806 55	569 40	1,366 95	2,500 00	-	19 00	28 00	15 00	8 00	11 00
Washington County.....	180 00	937 93	1,117 93	660 85	363 28	1,024 13	1,500 00	-	46 00	14 00	22 00	18 00	34 50
Washington, West.....	215 00	856 00	1,071 00	707 74	400 82	1,168 56	-	-	29 00	-	-	24 00	8 00
York County.....	180 00	731 30	911 30	896 50	246 27	1,132 77	150 00	16 00	18 00	10 00	24 00	39 00	14 00

REPORT OF COMMISSIONERS ON CONTAGIOUS DISEASES OF ANIMALS.

To the Governor and Council:

The Commissioners appointed by the Governor and Council for the investigation of contagious diseases of cattle and other animals in Maine, met at Lewiston, on December 20, 1882, and organized by the election of Hon. Z. A. GILBERT as President, and Dr. GEORGE H. BAILEY as Secretary.

The attention of the Commissioners has been called directly to but three cases since their appointment, thus proving that the State is almost entirely free from disease, and in an eminently healthy condition.

On February 14th our attention was called to a case of suspected Glanders at East Sumner, but upon investigation the animal was discharged, the Commissioners having failed to make out a case.

In March we received a letter from Mr. J. F. Sprague, one of the Selectmen of Monson, Me., notifying us that claims had been made upon the State for the payment of several head of cattle that had been destroyed by order of the town officers, and that others were in a similar condition, afflicted with what was supposed to be "Contagious Murrain," better known as "Foot and Mouth Disease," or Aphthous Fever, and requesting that the veterinary of the Board be sent there to investigate the disease, and if found to be infectious or contagious, to give such directions as should prevent its continuance.

On March 25th Dr. Bailey was sent to Monson, and upon his arrival found that the animal last affected, after having been appraised, had been destroyed and buried by order of the Selectmen. The animal was a milch cow belonging to a Mr. Swift. The cow had been buried under the snow for several days, but was exhumed, and a careful examination and post-mortem made of the cadava to determine the cause of death. After having obtained a correct

history of the disease, from the owner, and also from Mr. S. D. Packard, who lives upon the adjoining farm, and who had previously lost four animals of the same disease, Dr. Bailey was enabled to fully make out a case, not of Murrain, but of Dysentery or "Bloody Flux;" and while the latter has some symptoms in common with Aphthous Fever, there are such distinctive features and points of divergence between them that we are at once enabled to differentiate the two diseases, although some portions of their pathology may be closely allied. Prof. Law gives the causes of Dysentery or Bloody-Flux as those of Diarrhœa acting with greater energy, the emanations from marshy, inundated soils, or from carcasses, putrid or stagnant water, masty or otherwise altered food, or even a *contagium*. It occurs in cattle, horses and swine, and may be enzotic on certain soils, or even epizootic.

Foot and Mouth Disease is one of the most contagious and infectious maladies which affects domestic animals, and is one of the easiest of transmission, while we find the best authorities differ, and some absolutely deny the contagious properties of Bloody Flux. In coming to the conclusions we do in the present case, we wish it to be distinctly understood that we in no wise intend to establish a precedent by which the State may be held liable for any doubtful, non-contagious or curable cases to which our attention may be called, but in recommending as we do the payment of this claim, we give the parties in interest the benefit of the doubt, because we have every reason to believe that the owners of the cattle and the officers of the town acted in good faith, not only to protect themselves against loss, but to prevent the spread of what they believed to be an infectious and contagious disease.

In these cases, however, no precautions were taken to isolate any of the animals from those affected, or to disinfect or to bury their morbid dejections. The latter, being intolerably offensive and loaded with blood and shreds of false membranes or sloughs, were allowed to accumulate in the stables and yards, to be spread broadcast over the farms, and thus contaminate everything within their reach. We have every reason to believe these cases at Monson to have been of spontaneous origin upon adjoining farms, and to have become contagious, if contagious at all, through entire lack of ordinary care, or quarantine of the animals affected; and we do not apprehend the recurrence of the disease upon any other premises,

or even upon the same farms if the recommendations of the Commissioners as to their thorough disinfection is complied with.

Hereafter no such action of the town officers as in these cases will be called for, for if any case of suspected contagious or infectious disease arises, they have only to notify the Commissioners, upon which a prompt investigation will ensue, and if they order the animals destroyed, there would then be no question about the liability of the State to pay the full amount of any fair and honest appraisal.

The Commissioners take great pleasure in being able to announce that since their duties commenced, none of the contagious diseases that have affected other States have made their appearance in Maine, nor do we believe that any cause of anxiety is apparent or probable, especially in view of the precautions being taken, and already in force in this State, by which the United States government has established ample quarantine accommodations at Portland for the detention of all imported cattle during the full period of incubation of any of the diseases to which they might be liable.

The remaining case to which our attention was called was on April 10th, which proved to be a case of contagious Glanders. The horse was owned by Mr. Charles E. Odion of Gorham, and the animal was accordingly appraised and destroyed, as soon as the provisions of the law in these cases could be complied with.

GEORGE H. BAILEY, V. S., *Secretary.*

Z. A. GILBERT.

W. B. FERGUSON.

JUNE 12, 1883.

REPORT OF INSPECTOR OF FERTILIZERS.

The use of commercial fertilizers among the farmers of the State is rapidly on the increase. Dealers in every section report larger sales the past season of the leading brands than ever before.

Commercial fertilizers contain certain fertilizing ingredients which give them value. These ingredients are *Nitrogen*, *Phosphoric Acid* and *Potash*.

Nitrogen is the most expensive fertilizing element. It occurs in various forms or states. *Organic nitrogen* is the nitrogen of animal and vegetable matters generally. The most active forms of Nitrogen are *ammonia* and *nitric acid*, and are the result of the alteration of organic nitrogen in the soil and in the manure heap.

Soluble Phosphoric acid implies phosphoric acid or phosphates that are freely soluble in water. "Insoluble" phosphates are rendered "soluble" by treating them with sulphuric acid. Soluble Phosphoric acid can be readily taken up by plants, and it can be distributed through the soil by rains.

Reverted Phosphoric acid is phosphoric acid that was once soluble in water, but from chemical change has become insoluble in that liquid. It is understood to be readily assimilated by crops but it does not distribute freely through the soil.

Insoluble Phosphoric acid implies phosphate not readily soluble in water. Raw bones are a source of supply, and it is also mined in the form of South Carolina rock phosphate, Navassa phosphate, and Canada apatite.

Potash needs no description. It may be purchased in the form of sulphate of potash, but is cheapest in the form of muriate of potash.

These substances have not an absolutely fixed value in trade, yet the prices are comparatively steady and never take a wide range. The values used in these estimates are intended to be the average price in the markets during the year 1882, and are the same which were used by the Massachusetts State Inspector of Fertilizers, and at the Connecticut and New Jersey Experiment Stations. The

prices prevailing the current year for some of the ingredients in certain forms are somewhat lower than the prices here given, yet it is deemed best to use in this computation of values the prices prevailing at the time the articles were manufactured.

Nitrogen.....	26	cts. per lb.
Phosphoric acid soluble in water	12 $\frac{1}{2}$	“
“Reverted” Phosphoric acid.....	9	“
Insoluble Phosphoric acid	6	“
Potash.....	7 $\frac{1}{2}$	“

List of Fertilizers Sampled.

Inspector's Number.	NAME OF FERTILIZER.	Manufactured by	Sampled by	From Stock of
1	Bowker's Hill and Drill Phosphate....	Bowker Fertilizer Company, Boston.....	Z. A. Gilbert.....	Robinson & Beede, Auburn.
2	Bowker's Dissolved Bone.....	do do	do	do
3	Bowker's Pure Ground Bone.....	do do	do	do
4	Stockbridge Potato Fertilizer.....	do do	do	do
5	Stockbridge Corn Fertilizer.....	do do	do	do
6	Bowker's Phosphate.....	do do	do	do
7	Cumberland Superphosphate.....	Cumberland Bone Company, Portland.....	do	O. S. & E. P. Ham, Lewiston.
8	Soluble Pacific Guano.....	Glidden & Curtis, Boston, General Agents....	do	Dingley & Brewster, Auburn.
11	Bradley's X. L. Superphosphate.....	Bradley Fertilizer Company, Boston.....	do	E. L. Mower, Greene.
12	Pure ground Bone.....	C. W. Belknap & Son, Portland.....	do	O. S. & E. P. Ham, Lewiston.
13	Bay State Superphosphate.....	J. A. Tucker & Co., Boston.....	D. H. Thing.....	Purchased of manufacturers.
15	Bone Fertilizer.....	J. M. Kendall, Bowdoinham.....	S. L. Holbrook.....	Manufacturer, at factory.
16	High Grade Superphosphate.....	do do	do	do
17	Bone Meal.....	do do	do	do
18	Fine Bone Meal for Top Dressing.....	do do	do	do
19	Red Beach Bone Phosphate.....	Manufactured at Red Beach, Calais.....	A. R. Lincoln.....	T. W. Allan & Sons, Dennysville.
20	Dole's Common Sense Fertilizer.....	Dole Common Sense Fertilizer Co., Boston.....	Z. A. Gilbert.....	A. L. & E. F. Goss, Lewiston
21	Bay State Fertilizer.....	Clark's Cove Guano Co., N. Bedford, Mass.....	J. W. Lang.....	C. E. Lane, Brooks.

Samples of several different brands of fertilizers offered for sale in the State have been analyzed, and the analysis, together with their estimated values, are herewith given :

NITROGENOUS SUPERPHOSPHATES.

Inspector's Number.	NAME OF ARTICLE EXAMINED.	Nitrogen, per cent.	Soluble Phosphoric Acid, per cent.	Reverted Phosphoric Acid, per cent.	Insoluble Phosphoric Acid, per cent.	Potash, per cent.	Estimated Value per ton.	Cost per ton.
7	Cumberland Superphosphate.....	2.29	7.80	1.83	3.04	3.25	\$43 29	\$40 00
11	Bradley's X. L. Superphosphate	2.22	8.33	1.57	2.05	2.44	41 30	42 50
8	Soluble Pacific Guano	1.76	6.88	1.63	4.24	2.90	38 72	40 00
6	Bowker's Phosphate.....	2.35	7.00	0.82	2.25	33 89	38 00
1	Bowker's Hill and Drill Phosphate.....	1.84	6.80	1.23	2.40	1.58	34 03	42 00
2	Bowker's Dissolved Bone	1.58	7.24	0.99	0.41	1.80	31 29	38 00
5	Stockbridge Corn Fertilizer.....	3.04	7.10	1.04	0.50	3.28	40 95	*50 00
4	Stockbridge Potato Fertilizer	3.31	7.26	0.50	0.56	3.10	41 58	*50 00
13	Bay State Superphosphate.....	2.62	7.75	0.86	0.66	1.27	37 19	40 00
16	High Grade Superphosphate.....	2.53	8.45	1.61	1.13	1.06	40 13	+35 00
19	Red Beach Bone Phosphate.....	1.63	7.73	0.14	0.45	0.68	29 63	+47 50
20	Dole's Common Sense Fertilizer	2.71	6 60	2.24	1.81	4.75	28 91	35 00
21	Bay State Fertilizer.....	2.59	8.31	1.17	1.87	2.52	42 37	45 00
15	Bone Fertilizer							+25 00

* Single bag.

† At manufactory.

GROUND BONE.

Inspector's Number.	NAME OF MANUFACTURER.	Nitrogen, per cent.	Insoluble Phosphoric Acid, per cent.	Estimated Value.	Cost per ton.
3	Bowker Fertilizer Company, Boston.....	4.34	20.23	\$46 84	\$39 00
12	C. W. Belknap & Son, Portland.....	4.00	20.63	45 55	39 00
18	J. M. Kendall, Bowdoinham	3.74	21.98	45 82	38 00

It is well known that the phosphoric acid of raw ground bone or bone meal as it is called, without further treatment, is in an insoluble form. It is not readily given up to the plant because it is not soluble in the moisture of the soil, and cannot be diffused through the soil by the rains. After application to the soil it slowly is rendered soluble from the action upon it of agents with which it comes in contact. It is evident then that the finer it is ground the more rapidly it will become available to the plants in the soil. In the table of values it is seen that soluble—or readily available—

phosphoric acid is set down at twelve and one-half cents per pound ; reverted—not so readily available—at nine cents ; insoluble—still less readily available—at six cents. So, usually in computations of the value of raw bone meal there is a distinction made between the coarse and the fine ground—a graduation corresponding with the fineness.

With the samples here reported there was no such distinction made. The contents of phosphoric acid was reckoned at six cents a pound in all the samples, a higher valuation than is usually given it. Bowker's, No. 3 in the table, was extremely fine ground and evenly ground, while No. 12, Belknap & Son's, was coarse ground. It cannot be otherwise than that the Bowker bone meal would be a superior article for application to the soil in a raw state. Belknap & Son's, while almost as rich in contents, would act much more slowly.

The sample of bone meal from J. M. Kendall, No. 18, is sold by him as "Bone Meal for Top-dressing," and is not the same grade of article sold by him as "Bone Meal." This No. 18 is very nearly as fine ground as No. 3, and falls below that sample only a trifle in nitrogen and exceeds it in phosphoric acid. Like No. 3, this would be a superior article also to apply to the soil in a raw state.

The high percentage of phosphoric acid in each sample analyzed, leaves no room for a suspicion of adulteration.

The Nitrogenous Superphosphates analyzed take a wide range of contents, and a corresponding range of values. The Cumberland and Bradley's X. L., Nos. 7 and 11, the two brands most largely sold and used in the State, lead in their percentage of valuable contents. That these are used so extensively is proof that the effects from their application through a series of years is measured by the quantity of fertilizing ingredients supplied. Hence, then, as a rule, the fertilizers containing the largest quantities of available nitrogen, phosphoric acid and potash, are not only of the highest commercial value, but it seems in practice with possible exceptions, they prove the most valuable agriculturally.

Z. A. GILBERT,

State Inspector of Fertilizers.

JUNE 18, 1883.

FARM EXPERIMENTS AT STATE COLLEGE,

*Conducted during the year ending June 1, 1883, by G. M. GOWELL,
Farm Superintendent, and WALTER BALENTINE, Professor of
Agriculture.*

EXPERIMENT NO. 1.

Pig Feeding.

In undertaking this test there were several points upon which information was sought. First, the comparative results from the different foods employed. Second, at what age of pigs is the most satisfactory growth obtained. Third, the cost of making pork, at present prices of food. Four pure blood Chester White pigs of similar forms and weights, three months of age, were selected for this trial. Up to this age their food had been skim milk and wheat bran. They were divided into two sets of two pigs each. Set A being fed throughout the trial upon fifteen pounds skimmed milk daily, and all the corn meal wet, uncooked, they would consume. A little bone dust was given frequently. Set B received all they would consume of a mixture of seven parts corn meal and one part fish scrap, wet with water, uncooked. At the commencement set A weighed 170 pounds, and set B 168 pounds :

SET A.

Periods of two weeks each.	Weight of Set at end of each Period.	FOOD CONSUMED.		Gain in pounds.		Amount of meal required for one pound of gain.	
1st period.	217 lbs.	210 lbs. milk and	130.5 lbs. meal,	47 lbs.	2.77 lbs.		
2d "	267 "	" "	152 "	50 "	3.04 "		
3d "	312 "	" "	166.5 "	45 "	3.7 "		
4th "	381.75 "	" "	226.5 "	69.75 "	3.25 "		
5th "	451.5 "	" "	266.5 "	69.25 "	3.85 "		
6th "	498 "	" "	291.5 "	46.5 "	6.27 "		
7th "	548 "	" "	262 "	50 "	5.24 "		

SET B.

Periods of two weeks each.	Weight of Set at end of each Period.		FOOD CONSUMED.				Gain in pounds.	Amount of mixture of meal and scrap for one pound gain.			
			130 lbs.	mixture of meal and scrap.					42 lbs.	3.09 lbs.	
1st period.	210	lbs.	130	lbs.	mixture of meal and scrap.			42	lbs.	3.09	lbs.
2d "	246.5	"	168.5	"	"	"	"	36.5	"	4.61	"
3d "	313	"	188.5	"	"	"	"	66.5	"	2.83	"
4th "	375.5	"	235	"	"	"	"	63	"	3.75	"
5th "	439.5	"	262	"	"	"	"	64	"	4.09	"
6th "	504	"	278.5	"	"	"	"	64.5	"	4.32	"
7th "	556.5	"	253	"	"	"	"	52.5	"	4.82	"

Set A consumed a total of 1495.5 pounds of meal and 1470 pounds skim milk, and gained 378 pounds, thus requiring to produce one pound of growth, 3.95 pounds of meal and 3.89 pounds of milk. Set B consumed 1515.5 pounds of meal and scrap, and gained 388.5 pounds, requiring 3.9 pounds of the mixture for one pound of growth. Probably the reason for the low gain made by set A during the sixth and seventh periods, may be found in the fact that they were heavily loaded with fat, and very ripe, requiring much effort to get about their pens. Throughout the trial the tendency of set A was to fatness, while set B grew vigorously but did not become very fat. This result, must, I think, be ascribed to the different foods employed and not to peculiar tendencies existing in the animals, as they were well bred, and at the commencement of the trial very evenly mated, as the pigs in each set continued to be throughout. From the table it will be observed that as they advanced in age and size it required a greater quantity of food to produce a pound of increase. The showing of set A is not favorable to the feeding value of milk, but the test in this case was not just, for they were fed beyond the point of profit in the sixth and seventh periods. How far the milk in their ration was influential in producing such early maturity and ripeness is a point upon which we shall seek further light. At the expiration of the seventh period the pigs in set A were butchered. Live weight of set was 548 pounds. Dressed weight, 470 pounds. Shrinkage, 78 pounds, or $14\frac{1}{4}$ per cent.

SET A.		Dr.
To 2 pigs 1 month old		\$8 00
To feed until three months old, 200 pounds bran, \$3.00, and 270 quarts skim milk, \$2.70		5 70
To feed after three months, 1495.5 pounds corn meal at \$1.88 per cwt., delivered.		28 12
To 684 quarts skim milk		6 84
To butchering and marketing		2 00
		<hr/>
		\$50 66

SET A.		Cr.
By 470 pounds at 11 cents per pound		\$51 70
Cost of dressed pork per pound, 10.77 cents.		

Set B not being sufficiently fat its feeding was continued thirty-five days upon corn meal and water. The gain during this time was 176 pounds upon 724 pounds meal, 4.11 pounds of meal being required for one pound of gain. During the feeding upon meal alone the gain appeared to be in fat, rather than in growth. At time of slaughtering they were ripe, but not so excessively fat as were the members of set A. The account is as follows:

SET B.		Dr.
To 2 pigs 1 month old		\$8 00
To feed until three months old, 200 pounds bran, \$3.00; 270 quarts skim milk, \$2.70		5 70
To feed after three months, 1515.5 pounds of mixture at \$1.88 per cwt		28 49
To feed after seventh period, 720 pounds corn meal at \$1.80 per cwt		13 02
To butchering and marketing		2 00
		<hr/>
		\$57 21

SET B.		Cr.
By 608 pounds pork at 9 cents per pound		\$54 72
Cost of dressed pork per pound, 9.41 cents.		

There was a decline of two cents per pound in the market price of pork between the sales of set A and set B. No account was made of labor in caring for animals, or for manure resulting from food consumed. It is evident there was no profit in the above feeding. It must not be forgotten that the prime object in this test was not to see how cheaply pork could be made, but rather the comparison of feeds and their produce when fed at different ages of animals.

EXPERIMENT NO. 2.

Field Experiments with Artificial Manures.

Five years ago Prof. W. O. Atwater, then director of the Conn. Agricultural Experiment Station, instituted a variety of field experiments which have been carried out by a large number of parties in the United States and Canada, that have added much valuable information to our knowledge on the economical use of commercial fertilizers.

One set of these experiments was designed to study the feeding capacities of some of our more common agricultural plants with special reference to the nitrogen supply. This set of experiments has brought to light some very interesting facts in connection with the ability of the corn crop to obtain its nitrogen from other sources than that supplied in the manure. It has been shown that the majority of our farmers have supplied to this crop a much larger quantity of costly nitrogen than is necessary for its production.

The college has taken part in these experiments from the beginning, and has done its share of the work, which in the future is to enable us to grow corn at a much reduced cost.

The soil on the college farm is not adapted to successful corn culture, and the nitrogen experiment with that crop was in consequence abandoned this year. It was our intention to continue the nitrogen experiment on potatoes, but owing to the heavy rains in the first part of the season the land devoted to experimental purposes was rendered unfit for planting till the season was so far advanced that we were obliged to make our field experiments on beans.

The ground selected for experimental crops was a level field of uniform clay loam, with heavy clay subsoil. It had been in mowing for several years without manure. For the nitrogen experiment one acre 435.6 feet in length by 100 feet in width, was taken, and divided into twenty equal plots running lengthwise of the field, making the plots five feet wide. The beans were planted in rows $2\frac{1}{2}$ feet apart, giving two rows to each plot. The fertilizers were applied in the drill in the proportion given in the following table.

The questions to be studied under the experiment are: First—To what extent is it necessary to supply nitrogen in manures to produce a crop of beans? Second—What substances furnish nitrogen in forms best adapted to the crop?

The plots marked 0 and 00 were planted without manure to show the natural fertility of the soil. Plots 1-6 were designed to show the effect of the different fertilizers when applied alone and in pairs. In plots 7-9 nitrogen is supplied in Nitrate of Soda, in 10-12 nitrogen is supplied in Sulphate of Ammonia, and in 13-15 nitrogen is supplied in Dried Blood.

No. of Plot.	Kind of Fertilizer.	Amount of Fer-	Yield per plot.	Yield per acre.	Increase per acre
		tilizer per plot.			above unmanured plots.
		lbs.	lbs.	lbs.	lbs.
Preliminary Group.	0 Nothing	-	24	480	
	1 Nitrate of Soda	7.5	21½	430	70
	2 Superphosphate.....	20.0	23	460	40
	3 Muriate of Potash.....	6.7	25	500	
	4 Nitrate of Soda	7.5			
	Superphosphate	20.0	28	560	60
Nitrate of Soda Group.	5 Nitrate of Soda	7.5			
	Muriate of Potash.....	6.7	25	500	
	6 Superphosphate, } Mixed	20.0			
	Muriate of Potash, } Minerals...	6.7	39½	790	290
	7 Mixed Minerals as No. 6.....	26.7			
	Nitrate of Soda, ½ ration.....	7.5	44	880	380
	Mixed Minerals	26.7			
Sulphate of Ammonia Group.	8 Nitrate of Soda, ⅔ rations.....	15.0	35½	710	210
	Mixed Minerals	26.7			
	9 Nitrate of Soda, full ration.....	22.5	35	700	200
	Mixed Minerals as No. 6.....	26.7	35	700	200
	10 Mixed Minerals	26.7			
	Sulph. Ammonia, ½ ration.....	5.6	36	720	220
Dried Blood Group.	11 Mixed Minerals.....	26.7			
	Sulph. Ammonia, ⅔ ration.....	11.3	32½	650	150
	Mixed Minerals.....	26.7			
	12 Sulph. Ammonia, full ration.....	16.8	41	820	320
	6 b Mixed Minerals as No. 6.....	26.7	32	640	140
	Mixed Minerals	26.7			
Dried Blood Group.	13 Dried Blood, ½ ration.....	11.0	59	780	280
	Mixed Minerals.....	26.7			
	14 Dried Blood, ⅔ ration.....	22.0	34	680	180
	Mixed Minerals.....	26.7			
	Dried Blood, full ration.....	33.0	40	800	300
6 c Mixed Minerals as No. 6.....	26.8	37	740	240	
0 No manure.....	-	26	520		

An experiment with fertilizers carried on through one year only, decides nothing, especially in a season like the one just past, in which, owing to the drought, the crops failed to get the full benefit of the fertilizers applied. It may be well, however, to call attention to the fact that applications of nitrogen with the mixed mineral fertilizers did not produce great gains over the mixed minerals alone.

EXPERIMENT NO. 3.

An acre of land adjoining the nitrogen experiment was devoted to an experiment for growing beans with different forms of phosphoric acid, known as soluble, reverted or precipitated and insoluble phosphoric acid. Combined with this experiment is one in regard to the quantity of phosphoric acid that can be applied with profitable results. The land used for the experiment was of the same character as that used for the nitrogen experiment, and had received the same treatment in previous years. It was divided into plots of the same dimensions as the plots for the preceding experiment and in every way treated the same except in the matter of fertilization. Plots from 1-18 received a basal mixture of 10 lbs. sulphate of ammonia and 10 lbs. of muriate of potash. To this mixture was added the fertilizer containing the different forms and quantities of phosphoric acid for the different plots; dissolved bone black furnishing soluble phosphoric acid, dissolved bone black with chalk furnishing precipitated phosphoric acid, and bone black furnishing insoluble phosphoric acid. The precipitated phosphoric acid was obtained by mixing together equal parts of dissolved bone black and chalk, then wetting down the mixture and allowing it to stand two weeks before using. At the end of that time it showed only a slight trace of soluble phosphoric acid. The table below shows the results of the experiment. Groups I *a*, II *a*, and III *a*, are duplicates of Groups I, II and III.

No. of Plot.	Name of Fertilizers.	Yield per plot.		Increase above plots with no manure.
		lbs.	lbs.	
0	No manure.....	25	500	
Soluble phosphoric acid. {	1 Basal mixture, 15 lbs. dissolved bone black.....	30	600	100
Group I. {	2 " 10 " ".....	28	560	60
Group I. {	3 " 5 " ".....	27½	550	50
Precipitated phosphoric acid. {	4 Basal mixt., 15 lbs. dis. bone black, 15 lbs. chalk.	31	620	120
Group II. {	5 " 10 " ".....	28	560	60
Group II. {	6 " 5 " ".....	20½	590	90
Insoluble phosphoric acid. {	7 Basal mixture, 15 lbs. bone black.....	27½	550	50
Group III. {	8 " 10 " ".....	29	580	80
Group III. {	9 " 5 " ".....	28	560	60
Soluble phosphoric acid. {	10 Basal mixture, 15 lbs. dissolved bone black.....	29	580	80
Group I <i>a</i> . {	11 " 10 " ".....	30	600	100
Group I <i>a</i> . {	12 " 5 " ".....	30	600	100
Precipitated phosphoric acid. {	13 Basal mixt., 15 lbs. dis. bone black, 15 lbs. chalk.	30½	610	110
Group II <i>a</i> . {	14 " 10 " ".....	26	520	20
Group II <i>a</i> . {	15 " 5 " ".....	22	440	60
Insoluble phosphoric acid. {	16 Basal mixture, 15 lbs. bone black.....	25	500	
Group III <i>a</i> . {	17 " 10 " ".....	22	440	60
Group III <i>a</i> . {	18 " 5 " ".....	23	460	40
00	No manure.....	27½	550	50

The above experiments are submitted without further comment. They will be continued in the future with variations suggested by the experience we have gained in this work.

EXPERIMENT NO. 4.

Comparison of Feeding Values of early and late cut Hay.

A field of grass of uniform quantity and quality consisting mostly of clean herds-grass, with a very little white-weed intermixed, was selected and divided into plots two and one-half rods in width and twenty rods in length. The grass upon the first, third, and fifth plots was cut when in full bloom—July 11th; and the second, fourth and sixth plots were cut twenty days later—August 3d, when the seed had become hard but not sufficiently ripe to shell in harvesting.

The weight of hay cut early, at time of putting in the barn, was 2,931 lbs. per acre. Weight of same Feb. 14th, 2,675 lbs; shrinkage, $8\frac{3}{4}$ per cent.

The weight of hay cut late, at time of harvesting was 3,150 lbs. per acre. Weight of same Feb. 14th, 2,662 lbs.; shrinkage, $15\frac{1}{2}$ per cent.

The greater shrinkage in the late cut hay is probably owing to its being weighed directly from the bunches that had stood in the field over night. The amount of winter dry hay from each cutting was practically the same.

[In this connection it will be well to bear in mind that the season was extremely dry, and that grass made very little growth after the middle of July.—ED.]

Chemical analysis of the hay showed the following composition :

EARLY HAY.

Moisture.....	10.7	per cent.
Protein.....	6	“
Fat.....	3.3	“
Nitrogen-free extract.....	48.5	“
Crude Fibre.....	27.7	“
Ash.....	3.8	“

LATE HAY.

Moisture.....	7.8 per cent.
Protein.....	4.6 “
Fat.....	2.8 “
Nitrogen-free extract.....	51 “
Crude Fibre.....	30.2 “
Ash.....	3.6 “

To test the comparative feeding value of this hay two cows as evenly mated as possible were selected, each being cross-bred, seven-eighths Jersey and one-eighth Ayrshire. They were comparatively fresh, having been in milk but a few weeks. They each received three lbs. of corn meal, three lbs. of cotton-seed meal, one and one-half lbs. of bran, and twenty lbs. of hay daily throughout the entire period of feeding.

Bess was fed during the first period of twelve days upon late hay, the first six being in preparation and to overcome the influence of previous feeding, and the milk product of the last six days of the period was taken as the result of the late hay. At the close of the first period her feed was changed to early hay, and she was fed upon this during the second period of twelve days, the first six to destroy the influence of previous feeding as before, and the last six the milk produced represented the result of the early hay consumed during that time. The third period her hay was the late cut, fed as in the first. This feeding alternately on late and early hay was continued through six periods of twelve days each, or seventy-two days.

The cream was raised and butter made from it under similar conditions during each period, the butter being made from the milk of one day, and calculated for the period from the number of pounds of milk required for one pound of butter. The total amount of fat contained in each day's milk was ascertained by chemical examination.

This same course of feeding and testing was repeated with Pet, excepting when Bess had late hay Pet had early, and when Bess had early Pet had late. This was for the purpose of equalizing the influence of the variation of temperature that might occur.

BESS.

Periods of six days each.	Feed.	Pounds milk for period.	Per cent. of cream.	Pounds milk required for 1 pound butter.	Pounds butter for period.	Pounds fat in milk for period.	Weight of cows at end of periods.
First.....	Late Hay	160.12	21	14.46	11.07	5.88	860
Second.....	Early Hay	163.87	19	18.54	8.33	6.33	860
Third.....	Late Hay	149.18	19	19.40	7.69	5.97	865
Fourth.....	Early Hay	150.25	22	14.69	10.23	5.99	860
Fifth.....	Late Hay	133.68	20	15.41	8.67	5.51	870
Sixth.....	Early Hay	144.18	19	21.44	6.72	5.63	845

PET.

First.....	Early Hay	187.37	21.5	19.46	9.62	6.33	862
Second.....	Late Hay.....	169.37	19.5	20.5	8.21	6.51	865
Third.....	Early Hay	178.43	20.	21.75	8.20	6.73	862
Fourth.....	Late Hay.....	157.68	22.5	17.04	9.25	5.88	910
Fifth.....	Early Hay	166.06	20.	17.69	9.38	6.35	912
Sixth.....	Late Hay.....	151.12	20.	18.94	7.97	5.55	905

It was found that 270 lbs. of mixed grain and 720 lbs. of early hay produced 990.12 lbs. of milk, which yielded 52.98 lbs. of butter, and the milk contained 37.36 lbs. of fat. The same quantity and quality of grain as above, fed in connection with 720 lbs. of late hay, gave 921.15 lbs. of milk, which yielded 52.85 lbs. butter, the milk containing 35.3 lbs. fat.

In this test the comparative value of the early and late hay for milk production was as 100 to 93.34; or, the daily feeding ration of 20 lbs. of early hay was equal to 21.42 lbs. of late hay for the same purpose. There was practically no difference in the amounts of butter obtained from each fodder. It was feared that the appetites of the animals might not be as good for the late as for the early hay, but such was not the case to any serious extent. In only two of the six changes from early to late was there any dislike exhibited, and this was overcome during the first day of feeding upon it.

In one of the six changes from late to early there was nearly the same dislike manifested. This was somewhat surprising, as the early hay was green and fresh, while the late was evidently nearly ripe.

It must, however, be borne in mind that the weather during the last haying season was unusually favorable to late standing grass, no rain of consequence occurring after July 10th.

These results show much less difference in the nutritive value and palatability of hay harvested when in full bloom, and that harvested at a much later period, than has generally been supposed to exist.

EXPERIMENT NO. 5.

Hungarian and Mixed Hay Compared in Feeding.

The important position which Hungarian grass is destined to occupy among the forage crops of the State, together with the lack of accurate data bearing upon its feeding value, prompted its comparison by careful feeding tests with a good quality of mixed Timothy and Red Clover hay. When it is remembered that Hungarian is an annual, to be sown in June, ready for harvest in August, and yielding from two to four tons of cured hay per acre, succeeding upon light or heavy soils if sufficiently fertile, its value as a means of increasing the stock carrying capacity of farms becomes apparent.

The Hungarian hay fed was grown last season and harvested in fine order, as was also the mixed hay with which it was compared.

Two cows fresh in milk—"Helen Hart" and "Maggie 3d"—were selected and fed upon the same plan that the animals were in the late and early hay test, the cream, butter and fats being obtained by the same processes there employed.

They each received the same quantity and quality of mixed grain throughout, viz: 3 lbs. corn meal, 3 lbs. cotton-seed meal and one and one-half lbs. of bran daily. Each one also consumed twenty-two pounds of Hungarian, or mixed hay, per day. This course extended through five periods or sixty days.

The composition of the Hungarian and mixed hay was as follows:

HUNGARIAN HAY.

Moisture	8.7 per cent.
Protein	6.8 "
Fat	3.5 "
Nitrogen-free extract	48.7 "
Crude Fibre	26.4 "
Ash	5.9 "

MIXED HAY.

Moisture	8.2 per cent.
Protein	5.5 "
Fat	2.7 "
Nitrogen-free extract	48 "
Crude Fibre	30.8 "
Ash	3.9 "

HELEN HART.

Periods of six days each.	Feed.	Pounds milk	Per cent. of cream.	Pounds milk required for 1 pound butter.	Pounds butter.	Pounds fat in milk.	Weight of cows at end of periods.
First	Hungarian	174.62	22.5	19.04	9.176	6.09	985
Second	Timothy and Clover	163.93	25.5	15.43	10.624	6.21	990
Third	Hungarian	173.0	19.0	22.25	7.775	6.13	990
Fourth	Timothy and Clover	155.18	21.5	22.5	6.897	5.76	1005
Fifth	Hungarian	159.0	21.	22.44	7.085	6.04	980

MAGGIE 3d.

First	Timothy and Clover	204.5	22.	23.12	8.845	6.39	1050
Second	Hungarian	213.06	22.	23.16	9.199	7.18	975
Third	Timothy and Clover	187.18	22.	24.59	7.612	6.37	1028
Fourth	Hungarian	206.0	21.5	19.67	10.508	7.27	1026
Fifth	Timothy and Clover	193.43	21.5	23.32	8.295	6.76	1040

Two hundred and twenty-five pounds of mixed grain and 660 lbs. of Hungarian hay furnished 925.68 lbs. of milk, and 43.743 lbs. of butter—the milk containing 32.71 lbs. of fat.

The same quantity of grain and 660 lbs. mixed hay gave 904.22 lbs. of milk, 42.273 lbs. butter, and the milk contained 31.49 lbs. of fat.

The relative value of the Hungarian to the mixed hay was as 100 to 97.68 for milk production, and for butter production as 100 to 96.64.

The twenty-two pounds mixed hay was all the animals would consume per day. The same quantity of Hungarian was eaten with much apparent relish, and evidently more would have been utilized had it been supplied.

EXPERIMENT No. 6.

Practical Comparison of the feeding values of Corn Meal, Cotton-seed Meal, and Wheat Bran.

To learn the comparative practical feeding values of cotton-seed meal, corn meal and bran, as milk and butter producers when used in connection with good hay, was the purpose of this feeding test.

Two cows, Clover and Rockaway, were fed through seven twelve-day periods upon good mixed hay, the quality of which was uniform throughout the whole time of feeding. Rockaway received twenty pounds daily, while nineteen pounds was all Clover would consume.

During the first period Clover received, in addition to the hay, six lbs. per day of cotton-seed meal. During the second period six lbs. of corn meal, and during the third period six lbs. of wheat bran or shorts. In the fourth, fifth and sixth periods, the work of the first three periods was duplicated. In the seventh period, the feed was hay alone.

Rockaway was fed through the several periods upon the same plan pursued with Clover. The resulting butter and fats were obtained by the same processes employed in the early and late hay test.

The cows at the commencement of this experiment had been in milk some seven months, which accounts for their small yields.

The grain used in this experiment, as well as in experiments Nos. 4 and 5, had the following compositions, and may be considered as fair representatives of these feeds, as usually found in the markets:

COTTON-SEED MEAL.

Moisture	9.0 per cent.
Protein	40.2 "
Fat	12.5 "
Nitrogen-free extract	24.7 "
Crude Fibre ...	5.2 "
Ash	8.8 "

CORN MEAL.

Moisture	14.6 per cent.
Protein	9.2 "
Fat	3.6 "
Nitrogen-free extract.....	69.1 "
Crude Fibre	1.9 "
Ash	1.6 "

WHEAT BRAN.

Moisture	11.6 per cent.
Protein	14.0 "
Fat	2.9 "
Nitrogen-free extract....	56.8 "
Crude Fibre	8.4 "
Ash... ..	6.3 "

The hay fed in this test was the same as that used in experiment No. 5 against Hungarian.

CLOVER.

Periods of six days each.	Food.	Pounds milk for period.	Per cent. of cream.	Pounds milk required for 1 pound butter.	Pounds butter for period.	Pounds fat in milk for period.	Weight of cows at end of periods.
First.....	Cotton-seed meal.....	94.25	22.5	25.20	3.74	3.27	847
Second.....	Corn meal.....	87.81	19.5	28.25	3.104	3.22	825
Third.....	Bran.....	73.62	21.	18.9	3.89	2.92	835
Fourth.....	Corn meal.....	87.06	24.	20.4	4.267	3.36	855
Fifth.....	Cotton-seed meal.....	90.06	19.5	20.6	4.372	2.91	865
Sixth.....	Bran.....	76.56	21.5	19.24	3.979	2.98	862
Seventh.....	Nothing.....	45.75	24.5	17.12	2.671		864

ROCKAWAY.

First.....	Corn meal.....	105.62	No separation of cream from milk detectable	21.98	4.85	4.20	1010
Second.....	Cotton-seed meal.....	103.37		19.50	5.301	4.82	1007
Third.....	Bran.....	94.12		18.66	5.04	3.97	1020
Fourth.....	Cotton-seed meal.....	107.5		28.40	3.785	4.52	1012
Fifth.....	Corn meal.....	108.68		23.83	4.561	4.75	1045
Sixth.....	Bran.....	98.5		25.53	3.858	4.20	1013
Seventh.....	Nothing.....	62.		25.	2.481		1021

It was found that 468 lbs. of hay and 144 lbs. of cotton-seed meal gave 395.18 lbs. of milk, 17.198 lbs of butter, and 15.52 lbs. of fat.

That 468 lbs of hay and 144 lbs. of corn meal gave 389.17 lbs. of milk, 16.782 lbs. of butter and 15.53 lbs. of fat.

That 468 lbs. of hay and 144 lbs. of bran gave 342.8 lbs. of milk, 16.767 lbs. of butter and 14.07 lbs. of fat.

The relative values of these foods for milk production are represented as follows: Cotton-seed meal, 100; corn meal, 98.4; bran, 86.7. As butter producers, cotton-seed meal, 100; corn meal, 97.5; bran, 97.4.

Regarding the economy of the foods, the cotton-seed and corn meal each cost one and one-half cents per lb. and the bran cost one and one-fourth cents per lb.

The cotton-seed used in the production of 100 lbs of milk cost 54.6 cents. The corn meal used in the production of 100 lbs. of milk cost 55.5 cents. The bran used in the production of 100 lbs. of milk cost 52.5 cents. The cotton-seed meal used in the production of 1 lb. of butter cost 12.56 cents. The corn meal used in the production of 1 lb. of butter cost 12.87 cents. The bran used in the production of 1 lb. of butter cost 10.73 cents. These costs are in addition to the value of hay employed.

Had these materials been used in connection with a poor quality of hay or straw, the results might have varied more widely in their

relations to each other. Again, had the cows fed been fresh in milk rather than in the latter part of their year's work, the yield from the foods would have been much larger, costing less per pound, yet relatively they might not have been affected.

The several samples of butter made from cotton-seed meal were very good in both texture and color. Those from bran were so much like the cotton-seed samples that no difference could be detected, while those produced from corn meal were superior in firmness and color to all others. The butter from hay with no grain was of decidedly inferior quality in every respect.

It is not claimed that these experiments definitely settle any disputed point or mooted question. Many such are required before a truth can be established, yet, from the length of time over which they have extended, the number of periods employed, and the care devoted to the work throughout, they do furnish data which may not be disregarded.

To the Secretary of the Maine Board of Agriculture :

I have the honor to submit herewith, as required by law, a report of the transactions of the Maine State Pomological Society, for the year 1882. It contains the details of the annual exhibition, the papers read at the winter meeting, with a condensed report of the discussions on the same, and a statement of so much of the "proceedings" of the Society as appear to be of public interest ; together with such notes and observations of my own as seem to be required.

In order to avoid misleading any reader, it is proper to say that the Society assumes no responsibility for the correctness of any theory advanced or of any statement of fact or opinion made in the papers and discussions reported ; but only undertakes to report the same faithfully, omitting in the discussions, as far as practicable, all repetitions, irrelevant and unimportant matters.

GEO. B. SAWYER, *Secretary.*

MAINE STATE POMOLOGICAL SOCIETY.

Transactions for 1882.

The period covered by this report constitutes the tenth year of the Society's existence. The results which have thus far been accomplished have demonstrated the public utility of such an organization. But to establish and develop a comprehensive pomological system, which shall produce tangible results in the bulk and value of our orchard products, is a work which could only be begun in so short a period; it requires ample means and the continuous attention of competent laborers.

At no previous time in the history of the State has there been so much attention given to the planting of new orchards, or to the intelligent care of those previously planted, so earnest and general discussion of the methods of horticultural practice, nor so much sound judgment in the application of principles and practices to the production of definite results as at the present time. Without undervaluing the success of the numerous persons who, years ago, established extensive and profitable orchards in various parts of the State, or the efforts of those who by their writings and public addresses have, during the last half century, earned the distinction of pioneers in the work, it is safe to say that at the time of the formation of this Society the improved art of horticulture, as understood and practiced at the present time, had not taken any considerable hold of the masses of the people. The adaptability of the great central and southern portions of our State to successful fruit culture had been fully demonstrated; with respect to the northern portion it was an open question, (and not yet fully settled.)

The Society found people everywhere buying and planting fruit trees, but in a majority of cases with no conception of the adaptation

of varieties to particular localities or specific purposes. They had no guide but their own fancy or the caprice of the dealer of whom they bought. Where trees of the old standard sorts had failed for the want of proper care, a remedy had been sought in the introduction of some new kind of which marvelous accounts were given. Another evil existing at that time was the confusion in regard to the names of fruits. As the result of all this there were growing in the State an innumerable list of varieties, known and unknown, and many of them worthless or not adapted to the locality or the markets. As a single illustration, there had been planted a great number of trees under the indefinite name of "golden russet," of most of which the fruit was inferior in size and quality. Many farmers had been induced to plant large numbers of crab apple trees, under the belief that there was in them some special source of profit. Men might learn by their own failures, but the process was slow and expensive; and they seldom learned much from the experience of others.

In no department of agricultural labor was there such misapplication of time and money, or such need of an organization to give direction to individual effort and to develop the great possibilities of our situation, as in that of fruit production.

The efforts of the Society have been thus far largely devoted to the elimination of worthless and unprofitable varieties of fruit and the correction of errors in nomenclature, and at no period has more rapid progress been made in this respect than during the last year. At the same time attention has been given to all the varied details of the theory and practice of horticulture, so far as the means at hand would allow. Much has been accomplished, but more remains to be done. While the fundamental principles of fruit culture are the same in all times and places, their adaptation to specific and profitable results is governed mainly by local conditions. All the forces and instrumentalities of nature—the varying conditions of climate, temperature, altitude, atmospheric humidity, rainfall, snow and frost, the influences of animal and insect life, parasitic and fungoid growths, as well as the facilities for transportation and competition in our own and other markets, are to be weighed and considered. Hence every considerable section of the country needs a system of its own, differing in some respects from any other. The extent and diversity of the territory of our own State calls for two distinct pomological systems, neither of which will correspond with that of any other section. To develop these systems and make them a part of the

common intelligence of the people, to banish ignorance, egotism and empiricism, to make ourselves self-reliant and self-supporting in respect to everything in tree or fruit which needs to be purchased, and to open the markets of the world to our productions (which shall be inferior to none), are among the objects of this Society.

Ten annual exhibitions and eight winter meetings have been held by the Society, and the interest has been fully maintained to the present time.

THE SEASON OF 1882

was exceptional in its climatic conditions. The spring was cold and backward, and retarded the blossoming of fruit trees, so that no material damage was done by the spring frosts. A drouth of unusual severity prevailed over nearly the whole State during the months of July and August. A violent gale on the 14th of September, followed by another on the 19th, with high winds from various quarters during the intervening time, blew off fully one-half of the fruit then upon the trees; but the quantity which remained, particularly of apples, was sufficient, with the late growth which resulted from this violent "thinning," and under the influence of favorable autumn weather, to develop an abundant crop, of average quality. The drouth of the summer, while it diminished the size, hastened the development of all the fruits. It gave us the largest and best ripened vintage of out-door grapes ever known in the State; but, with other causes, gave a light crop of pears, which were below the average in quality. Plums were abundant and of good quality, but the heavy and continuous rains from the 21st to 24th of September, destroyed that part of the crop which had not been harvested, and also injured, to a considerable extent, those pears and apples which were about ripening at that time.

THE TENTH ANNUAL EXHIBITION

was held at Lewiston, on the 26th to the 29th days of September, inclusive, and in connection with the annual Fair of the State Agricultural Society. The terms of the arrangement between the two Societies were mutually advantageous, and were carried out in a manner satisfactory to both—the great object being to make the most complete exhibition possible, with the least unnecessary expense.

The saving to our Society of the expense of advertising and all the detailed arrangements of a separate exhibition, and the advantage to the public in being enabled to witness our exhibition in connection with the varied attractions of the State Fair, are matters of great moment. The only considerable disadvantage is the want of space which results from massing at one time the products of so many industries, and this it is hoped will be remedied by more ample accommodations to be provided in the future.

The space assigned to the Pomological Society was the upper hall in the City Building, and it was filled to its utmost capacity; and some packages of fruit designed for exhibition remained unopened. The exhibition by this Society was confined strictly to fruits, flowers and plants. The number of entries was eight hundred and forty, of which 38 were of cut flowers, including collections and single varieties; 37 of bouquets, wreaths, designs, &c., and 32 of greenhouse and pot plants in collections and single specimens; the remainder with the exception of a few miscellaneous articles, being of fruit. Of the latter there were about 1,250 plates, viz :

In collections of apples.....	570	plates.
Single varieties of apples.....	344	“
Collections of pears.....	100	“
Single varieties of pears.....	78	“
Grapes.....	150	“
Plums.....	10	“

It will be seen that the entries were not as numerous, nor the exhibition as extensive, as in some former years; but considering the unfavorable circumstances of the season, and the want of room for more, they were satisfactory. The early ripening fruits as previously remarked, and the flowers, out of doors, had been greatly damaged by the boisterous weather of the preceding ten days; the winter fruit was not fully developed, but was remarkably well colored and free from blemishes. There was a greater preponderance of valuable and standard varieties, and fewer specimens of unknown and inferior sorts, than heretofore. The exhibition of pears was fairly creditable to the State; that of grapes was probably the finest ever made, and the few specimens of plums shown were very good. The flowers were bright and beautiful as ever, and the greenhouse plants were very fine.

The amount of premiums offered was \$975.00, and the amount awarded \$565.50, all of which has been paid.

Further details of the exhibition will appear by the subjoined list of premiums offered and awarded, and of entries made.

THE ANNUAL MEETING OF THE SOCIETY

was held September 28th, pursuant to notice given, but was adjourned to the time and place of the winter meeting, without the transaction of any other than formal business.

The principal officers of the Society for the year 1882, were as follows :

President—HON. R. H. GARDINER, Gardiner.

Vice Presidents—JOSEPH TAYLOR, Belgrade; STILLMAN W. SHAW, Minot.

Secretary and Treasurer—GEORGE B. SAWYER, Wiscasset.

Corresponding Secretary—GRANVILLE FERNALD, Harrison.

Executive Committee—The President and Secretary, *ex-officio*; SAMUEL ROLFE, Portland; HENRY McLAUGHLIN, Bangor; CHARLES S. POPE, Manchester.

SCHEDULE OF PREMIUMS OFFERED, ENTRIES MADE AND PREMIUMS AWARDED.

[NOTE.—The names of persons to whom premiums were awarded are given first under each specification, with the amount awarded, in ordinary type; and afterwards, in smaller type, the names of other competitors for the same. When the name of a person is repeated his place of residence is omitted.]

CLASS 1 — APPLES.

FIRST DIVISION.

Special Regulations. “Entries for all premiums in this division must consist of five specimens of each variety exhibited, and (except Nos. 18 and 19) of at least twenty correctly named varieties. Entries for premiums Nos. 18 and 19 must be separate and distinct collections, not embracing any other collection or specimens, and in awarding the premiums regard will be had both to the quality of the specimens and the value of the varieties exhibited.

Collection entered for premiums Nos. 2 to 17, may also be entered for No. 1, but in any such case only one premium will be awarded for one collection.

Seedlings and “native fruits” *not named*, or standard varieties “unknown” or incorrectly named, will not be admitted in these collections; but all such specimens will go to the Committees on “new fruits” or “nomenclature.”

By “named varieties” is meant such as are named and described in some standard work on Pomology, or have been named and approved by some National or State Horticultural Society.

In adopting 20 as the number of varieties required in these collections, (1 to 17,) the Society does not intend to encourage the multiplication of varieties; and the committee will be instructed, in awarding the premiums, to have regard to *quality and value* rather than to the number of varieties, and will be authorized to recommend gratuities for meritorious collections embracing less than the number of varieties required as above.”

Premium No. 1. For the best general exhibition of apples, grown by the exhibitor, in any part of the State. Miss L. L. Taylor, Lakeside, (Belgrade,) first premium, \$15.00; S. C. Harlow, Bangor, second premium, \$10.00; R. H. Gardiner, Gardiner, third premium, \$5.00.

2. For the best general exhibition of apples, grown by the exhibitor, in Androscoggin county. J. M. Richardson, Greene, \$10; D. J. Briggs, South Turner, \$8; N. W. Harris, Auburn, \$5.

3. For the same in Aroostook county. No entry.
4. For the same in Cumberland county. S. R. Sweetser, Cumberland Centre, \$10.
5. For the same in Franklin county. G. K. Staples, Temple, \$8.
6. For the same in Hancock county. No entry.
7. For the same in Kennebec county. J. Pope & Son, Manchester, \$10; Perley & Perkins, Seward's, (Vassalboro',) \$8.
8. For the same in Knox county. No entry.
9. For the same in Lincoln county. H. J. A. Simmons, Waldoboro', \$10; George B. Sawyer, Wiscasset, \$8.
10. For the same in Oxford county. J. J. Towle, Dixfield, \$10.
11. For the same in Penobscot county. J. E. Bennoch, Orono, \$10.
12. For the same in Piscataquis county. No entry.
13. For the same in Sagadahoc county. H. S. Carey, Topsham, \$10; James M. Fulton, Bowdoinham, \$8.
14. For the same in Somerset county. James S. Hoxie, 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. No entry.
18. For the best five named varieties of Autumn apples. S. R. Sweetser, \$3; H. J. A. Simmons, \$2; J. E. Bennoch, \$1.
Miss L. L. Taylor, R. H. Gardiner, Alfred Smith, Monmouth; S. C. Harlow, D. P. True, Leeds Centre.
19. For the best five named varieties of Winter apples. S. C. Harlow, \$3; Alfred Smith, \$2; D. P. True, \$1.
L. L. Taylor, H. J. A. Simmons, R. H. Gardiner, H. S. Carey, J. E. Bennoch, N. W. Harris, S. R. Sweetser.
20. For the best collection of apples for home use, for the entire year, in the smallest number of varieties. S. R. Sweetser, \$5; D. P. True, \$3; H. J. A. Simmons, \$2.
J. E. Bennoch.
21. For the best collection of Crab Apples, not less than five varieties. J. S. Hoxie, \$2; S. C. Harlow, \$1; J. J. Towle, *gratuity*, 50 c.
Porley & Perkins.

SECOND DIVISION.

“Entries for premiums in this division must consist of from five to ten specimens, according to size, of each variety exhibited, and must be separate specimens from any exhibited in the first division.”

22. For best single variety of autumn apples. S. R. Sweetser, (Gravenstein,) \$2; Miss L. L. Taylor, (Somerset,) \$1.

Simmons, Briggs, Smith, Harlow, Perley & Perkins, True, Bennoch.

23. For the best single variety of winter apples. S. R. Sweetser, (Northern Spy,) \$2; S. C. Harlow, (King of Tompkins County,) \$1.

Miss Taylor, Simmons, Briggs, True, Bennoch.

24. For the best dish of Alexander. J. E. Bennoch, \$1; Miss L. L. Taylor, 50 c.

C. A. Day, Turner; T. M. Merrill, West Gloucester; Harlow, Perley & Perkins; Peter De Roher, Waterville.

25. American Golden Russets. Entries were made in the class of “special exhibition of russets.”

26. Baldwins. S. R. Sweetser, \$1; Miss L. L. Taylor, 50 c.

Simmons, Richardson, Gardiner, Bennoch, Smith, Harlow, Perley & Perkins; John Dunton, Lewiston; Edward Clark, Lewiston; A. B. Chipman & Son, West Gloucester; Mrs. M. L. Robbins, Winthrop; S. W. Shaw, Minot.

27. Benoni. S. R. Sweetser, \$1; Mrs. A. B. Strattard, 50 c.

Bennoch, Gardiner.

28. Black Oxford. L. H. Blossom, Turner, \$1; J. M. Richardson, 50 c.

Mrs. Robbins, Bennoch, Perley & Perkins.

29. Blue Pearmain. J. Pope & Son, \$1; Miss L. L. Taylor, 50 c. Simmons, Richardson, Gardiner, Bennoch, Smith; C. T. Jellerson, Lewiston.

30. Briggs' Auburn. Miss L. L. Taylor, \$1.

31. Cole's Quince. Entry by J. E. Bennoch, but not found by the committee.

32. Danvers Winter Sweet. Perley & Perkins, \$1; S. W. Shaw, 50 c.

Miss Taylor, True.

33. Dean. (*Nine ounce.*) Miss L. L. Taylor, \$1; J. Pope & Son, 50 c.

Bennoch, Towle.

34. Duchess of Oldenburgh. S. R. Sweetser, \$1; S. C. Harlow, 50 c.

Simmons, Dunton, Bennoch, Harris, Hoxie, Towle, True, Mrs. Strattard, Sawyer; Nelson S. Albee, Dennysville; I. T. Waterman, Auburn.

35. Early Harvest. Mrs. A. B. Strattard, \$1; H. J. A. Simmons, 50 c.

Harlow.

36. Early Strawberry. Entries were made by Miss Taylor and Hannah Davis, West Gloucester, but the committee reported that they were not true to name.

37. English Russet. (*Poughkeepsie Russet*.) Entries by Simmons, Smith, Perley & Perkins, and De Rocher, but no premiums awarded.

38. Fall Harvey. Miss L. L. Taylor, \$1; C. A. Day, 50 c.
Richardson, Gardiner, Bennoch, True.

39. Fameuse. Peter De Rocher, \$1; Alfred Smith, 50 c.
Simmons, Clark, Gardiner, Bennoch, Harris, Mrs. Strattard.

40. Franklin Sweet. Perley & Perkins, \$1; Alfred Smith, 50 c.
Richardson, Miss Taylor.

41. Garden Royal. No entry.

42. Golden Russet. (*English Golden Russet*.) Entry by Perley & Perkins, but no premium awarded.

43. Gravenstein. S. R. Sweetser, \$1; N. W. Harris, 50 c.

Miss Taylor, Simmons, Richardson, Clark, Hannah Davis, Chipman & Son, Gardiner, Smith, Truo, Jellerson, Shaw; E. N. Nelson, Minot.

44. Hightop Sweet. Z. A. Gilbert, East Turner, \$1; L. H. Blossom, 50 c.

Simmons, Bennoch, Harlow.

45. Hubbardston Nonsuch. Perley & Perkins, \$1; Miss L. L. Taylor, 50 c.

Richardson, Clark, Mrs. Robbins, Bennoch, Smith.

46. Hunt Russet. (*Golden Russet of Mass.*) Entries by Mrs. Strattard and George H. Pope, West Gardiner, but no premium awarded.

47. Hurlbut. H. J. A. Simmons, \$1.

Entry by H. S. Caroy, "not true to name."

48. Jewett's Fine Red. (*Nodhead*.) Perley & Perkins, \$1; Miss L. L. Taylor, 50 c.

Richardson, Mrs. Robbins, Bennoch, Smith.

49. King of Tompkins County. S. W. Shaw, \$1; S. R. Sweetser, 50 c.

Miss Taylor, Sawyer, Dunton, Clark, Hannah Davis, Chipman & Son, Mrs. Robbins, Bennoch, Smith.

50. King Sweeting. Miss L. L. Taylor, \$1; J. S. Hoxie, 50 c.

Richardson, Smith, Perley & Perkins.

51. Large Yellow Bough. S. W. Shaw, \$1; Perley & Perkins, 50 c.

True, Sweetser, Bennoch, Gardiner, Sawyer.

52. Minister. J. Pope & Son, \$1.

53. Moses Wood. Miss. L. L. Taylor, \$1; Perley & Perkins, 50 c.

Gardiner, Pope & Son.

54. Mother. Miss L. L. Taylor, \$1; J. M. Richardson, 50 c.

Gardiner, Bennoch.

55. Naked-limbed Greening. Mrs. A. B. Strattard, \$1; S. C. Harlow, 50 c.

Smith, True.

56. Northern Spy. Miss L. L. Taylor, \$1; Perley & Perkins, 50 c.

Simmons, Richardson, Clark, Hannah Davis, Gardiner, Chipman & Son, Mrs. Robbins, Bennoch, Fulton, Harris, Smith, Sweetser.

57. Orange Sweet. J. S. Hoxie, \$1; H. J. A. Simmons, 50 c.

58. Peek's Pleasant. J. J. Towle, \$1; J. Pope & Son, 50 c.

59. Pomme Royale. No entry.

60. Porter. Charles H. Blanchard, Cumberland Centre, \$1; S. W. Shaw, 50 c.

Miss Taylor, Simmons, Richardson, Dunton, Clark, Gardiner, Hannah Davis, Mrs. Robbins, Bennoch, Day, Smith, Sweetser, Towle.

61. President. L. H. Blossom, \$1.

62. Primate. No entry.

63. Pumpkin Sweet. S. C. Harlow, \$1.

Gardiner, Bennoch, Smith, Nelson. "Second premium not awarded on account of specimens not being true to name."

64. Red Astrachan. J. J. Towle, \$1; J. S. Hoxie, 50 c.

Simmons, Sawyer, Harris, Harlow, Perley & Perkins, Mrs. Strattard.

65. Red Canada. Alfred Smith, \$1; R. H. Gardiner, 50 c.

Richardson.

66. Rhode Island Greening. S. R. Sweetser, 1; Perley & Perkins, 50 c.

Miss Taylor, Simmons, Richardson, Dunton, Clark, Gardiner, Smith, True, Jellerson.

67. Rolfe. (*Macomber*.) No entry.

68. Roxbury Russet. Alfred Smith, \$1; Edward Clark, 50 c.

Miss Taylor, Richardson, Gardiner, Mrs. Robbins, Bennoch, True, Shaw.

69. Sops of Wine. (*Bell's Early*.) Alfred Smith, 1; S. C. Harlow, 50 c.

Miss Taylor, Simmons, Sawyer, Bennoch, Perley & Perkins.

70. Somerset. Miss L. L. Taylor, \$1; J. E. Bennoch, 50 c.

Simmons, Smith, Sweetser.

71. Starkey. Perley & Perkins, \$1; J. Pope & Son, 50 c.

Sawyer.

72. Talman's Sweet. N. W. Harris, \$1; Edward Clark, 50 c.
Miss Taylor, Richardson, Gardiner, Mrs Robbins, Bennoch, Smith, Sweetser,
Perley & Perkins, True. "All splendid specimens."
73. Tetofsky. Mrs. A. B. Strattard, \$1.
74. Wagener. N. W. Harris, \$1; H. J. A. Simmons, 50 c.
Harlow.
75. Williams' Favorite. J. S. Hoxie, \$1; Miss L. L. Taylor, 50 c.
Simmons, Bennoch, Smith, Mrs. Strattard.
76. Winthrop Greening. J. Pope & Son, 1; Alfred Smith, 50 c.
Miss Taylor, Sawyer, Richardson, Gardiner, True.
77. Yellow Bellflower. R. H. Gardiner, \$1; John Dunton, 50 c.
Miss Taylor, Simmons, Clark, Bennoch, Mrs. Strattard.
78. Crab Apples. J. S. Hoxie, \$1; S. C. Harlow, 50 c.
Simmons, Clark, Waterman, Gardiner, Smith, True, De Rocher.

SUNDRIES. Edward Clark, Beauty of Kent, *gratuity*, 50 c; Hannah Davis, Summer Pearmain, Pound Sweet, New York Stripe; Z. A. Gilbert, Milding, *gra.*, 50 c.; J. M. Richardson, Pound Sweet, Fall Jenneting, Carlton. White Jenneting; G. B. Sawyer, Ontario. *gra.*, 50 c.; R. H. Gardiner, Fairbanks, Sweet Golden Pippin, *gra.*, 50c.; Gloria Mundi, Hubbardton Pippin, Strawberry, Fall Pippin, Ribston Pippin, *gra.*, 50c.; Jersey Sweet, Winter Pearmain, *gra.*, 50c.; Spitzenburg; A. B. Chipman & Son, Golden Ball; John Dunton, Ben Davis, Lady; James M. Fulton, Wealthy, *gra.*, \$1; T. S. McLellan, Brunswick, same, *gra.*, 50c.; J. E. Bennoch, same; C. A. Day, Autumn Strawberry, *gra.*, 50 c.; J. M. Richardson, Gloria Mundi of Maine, *gra.*, 50 c.; D. J. Briggs, Ben Davis, Swaar, White Rambo, *gra.*, 50 c.; Winter Sweet, Smith's Cider, Sweet Nonsuch, Mammoth Pippin; J. J. Towle, Fall Pippin, *gra.*, 50 c.; S. W. Shaw, Fall Jenneting, *gra.*, 50 c.; Beefsteak.

Special Exhibition of Russets.

"With a view to the settlement of numerous doubts and controversies respecting this class of apples, the Society invites contributions of the varieties of russets grown in the State, five specimens of each variety, named as correctly as may be, for comparison. A special committee will be appointed to consider the same, and authorized to recommend reasonable gratuities for any variety or collection deserving such recognition."

Under this class there were, besides the entries of the various kinds of russets before mentioned, entries as follows: J. J. Towle, 8 varieties; G. B. Sawyer, 3 varieties; John Dunton, 2 varieties; I. T. Waterman, R. H. Gardiner, Perley & Perkins, S. W. Shaw

and Henry Ingalls, one variety each. The specimens presented a great diversity in form, size, color and quality, and were examined with much interest; but, with a few exceptions, they were not sufficiently advanced in development to justify an estimate of their merits, and the subject was postponed to the Winter Meeting.

CLASS 2 — PEARS.

“Entries for premiums Nos. 79, 80, and 81, must consist of five specimens of each variety exhibited.”

79. For best general exhibition of pears. Samuel Rolfe, Portland, \$12; A. B. Chipman & Son, \$8; Alfred Smith, \$5; D. P. True, \$3.

80. For best five named varieties of autumn pears.

Alfred Smith, D. P. True. Premiums not awarded.

81. For best five named varieties of winter pears. No entry.

“Entries for premiums Nos. 82 to 110, inclusive, must consist of five to ten specimens, according to size, of each variety exhibited.”

82. For best single variety of fall pears. Alfred Smith, \$2; D. P. True, \$1.

83. For the best single variety of winter pears. No entry.

84. For the best dish of Bartlett. Albion Ricker, Turner, \$1; E. N. Nelson, 50 c.

E. N. Leavitt, Auburn; Smith, Jellerson.

85. Belle Lucrative. S. C. Harlow, \$1; E. N. Nelson, 50 c. Sawyer, Gardiner, Smith.

86. Beurre d'Anjou. Alfred Smith, \$1; G. B. Sawyer, 50 c.

87. Beurre Bosc. No entry.

88. Beurre Hardy. R. H. Gardiner, \$1.

89. Beurre Superfin. D. P. True, \$1.

90. Beurre Clairegeau. G. B. Sawyer, \$1.

91. Beurre Diel. G. B. Sawyer, \$1; D. J. Briggs, 50 c.

92. Buffum. E. N. Nelson, \$1; D. P. True, 50 c.

93. Clapp's Favorite. E. N. Nelson, \$1; G. B. Sawyer, 50 c. Clark, Gardiner.

94. Doyenne Boussock. No entry.

95. Duchess d'Angoulenne. A. B. Chipman & Son, \$1; Alfred Smith, 50 c.

D. P. True.

96. Flemish Beauty. Edward Clark, \$1; S. R. Sweetser, 50 c.
Briggs, Gardiner, Rieker, Smith, Miss Taylor, Nelson, True, Perley & Perkins.
97. Fulton. Perley & Perkins, \$1.
98. Glout Morceau. No entry.
99. Goodale. Perley & Perkins, \$1.
100. Howell. Alfred Smith, \$1; E. N. Nelson, 50 c.
Gardiner, True.
101. Josephine de Malines. No entry.
102. Lawrence. Miss L. L. Taylor, \$1; E. N. Nelson, 50 c.
Jellerson.
103. Louise Bonne de Jersey. E. N. Nelson, \$1; Alfred Smith,
50 c.
Briggs, Leavitt, True.
104. Marie Louise. No entry.
105. Seckel. C. T. Jellerson, \$1; E. N. Nelson, 50 c.
Briggs.
106. Sheldon. Edward Clark, \$1; Miss L. L. Taylor, 50 c.
Briggs, Leavitt, Smith, Nelson.
107. Swan's Orange. Alfred Smith, \$1.
108. Urbaniste. G. B. Sawyer, \$1.
109. Vicar of Wakefield. A. B. Chipman & Son, \$1; E. N. Nel-
son, 50 c.
D. P. True.
110. Winter Nelis. E. N. Leavitt, \$1; R. H. Gardiner, 50 c.
- SUNDRIES. G. B. Sawyer, Ott; R. H. Gardiner, Napoleon, *gra-
tuitly*, 50 c.; Miss L. L. Taylor, Nickerson, *gra*, 50 c.; Perley &
Perkins, Nickerson, *gra.*, 50 c.; seedling; S. C. Harlow, Indian
Queen, *gra.*, 50 c.; Edward Clark, small, yellow pear, unknown.

CLASS 3—GRAPES.

111. For best exhibition of foreign grapes, grown with fire heat.
John C. Baker, Lewiston, \$10; John Vickery, Auburn, \$8.
112. For best exhibition of foreign grapes, grown in cold grapery.
G. B. Sawyer, \$8; John Burr, Freeport, \$5.
113. For best cluster Black Hamburgh. John Vickery, 1; G. B.
Sawer, 50 c.
Baker, Burr.
114. Wilmot's Hamburgh. G. B. Sawyer, \$1; John Burr, 50 c.
115. Victoria Hamburgh. John Burr, \$1; G. B. Sawyer, 50 c.
116. White Frontignan. No entry.

117. Grizzly Frontignan. No entry.
118. White Muscat. No entry.
119. Muscat Hamburgh. G. B. Sawyer, \$1.
120. White Chasselas. G. B. Sawyer, \$1; John Burr, 50 c.
121. Lady Downes. No entry.
122. Buchland Sweet Water. No entry.
123. Trentham Black. G. B. Sawyer, \$1.
124. West's St. Peters. No entry.
125. White Nice. John Burr, \$1.
126. Red Chasselas. John C. Baker, \$1; G. B. Sawyer, 50 c.
127. Chasselas Musque. G. B. Sawyer, \$1.
128. For the best collection of Native grapes (open air.) Wesley Blanchard, Lewiston, \$6; Peter De Rocher, \$4; W. W. Dunham, No. Paris, \$2.
- Sawyer, Smith, True, Harlow.
129. For the best single variety, three bunches. Perley & Perkins, \$2; D. P. True, \$1.
130. For the best three bunches Delaware. Wesley Blanchard, \$1; Peter De Rocher, 50 c.
- Sawyer, Briggs, Perley & Perkins, Dunham.
131. Concord. Wesley Blanchard, \$1; G. B. Sawyer, 50 c.
- Briggs, Smith, True, Dunham.
132. Hartford Prolific. Peter De Rocher, \$1; G. B. Sawyer, 50 c.
- Smith, True, Perley & Perkins, Blanchard, Dunham.
133. Rebecca. W. W. Dunham, \$1.
134. Allen's Hybrid. No entry.
135. Adirondac. Peter De Rocher, \$1; W. W. Dunham, 50 c.
136. Creveling. Peter De Rocher, \$1; W. W. Dunham, 50 c.
- Perley & Perkins.
137. Massasoit, (Rogers' Hybrid No. 3.) S. W. Shaw, \$1; W. W. Dunham, 50 c.
138. Wilder, (Rogers' No. 4.) John Vickery, \$1; G. B. Sawyer, 50 c.
- W. W. Dunham.
139. Lindley, (Rogers' No. 9.) Wesley Blanchard, \$1; W. W. Dunham, 50 c.
140. Agawam, (Rogers' No. 15.) Perley & Perkins, \$1; Alfred Smith, 50 c.
- Vickery, Blanchard, De Rocher.
141. Merrimac, (Rogers' No. 19.) G. B. Sawyer, \$1; Alfred Smith, 50 c.

142. Salem, (Rogers' No. 22.) S. W. Shaw, \$1; S. C. Harlow, 50 c.

Sawyer, Blanchard.

143. Worden. Peter De Rocher, \$1; G. B. Sawyer, 50 c.

Smith, Dunham.

SUNDRIES. G. B. Sawyer, Black Hawk, Adirondac, Rentz, Perkins, Eumelan; Iona, Diana and Allen's Hybrid, grown under glass; D. J. Briggs, Blood's Seedling, Royal Muscadine, Seedling, Early Champion; John C. Baker, Golden Hamburg, Black Sweetwater, White Sweetwater, Black Muscadine, Royal Muscadine; M. J. Rogers, New Gloucester, Blood's Seedling; John Vickery, Concord, Delaware, Salem, Seedling and Sweetwater, grown under glass, *gra.*, \$1; Clinton, Martha; D. P. True, Clinton, Northern Muscadine; Perley & Perkins, Northern Muscadine; Wesley Blanchard, Herbeumont, Early Black, (?) Essex, Champion, Walter; John Burr, Golden Chasselas, Golden Hamburg, White Sweetwater; Peter De Rocher, Essex, Martha, Brighton, Moore's Early, Telegraph, Lady, Belvidere, Early Black, (?) Union Village, Champion; W. W. Dunham, Moore's Early, Lady, Clinton, Isabella, Eumelan, Telegraph, Cottage, Northern Muscadine, Perkins, Blood's Seedling, Florence, Champion, Dracut Amber, Brighton, Janesville, Martha, Stewart's Seedling, *gra.* for numerous kinds on trial, \$2; G. H. Pope, Seedling, (of no apparent merit); Hannah Davis, Shaker Seedling; Alfred Smith, Eumelan, Isabella, *gra.*, 50 c.

There were several entries of well known varieties under names which proved to be synonymes, viz: Black Hamburg as *Red Hamburg*; White Sweetwater as *Dutch Sweetwater*; Telegraph as *Christine*; Hartford Prolific as *Framingham*.

CLASS 4 — PLUMS.

144. For the best general exhibition of plums, not less than ten varieties. No entry.

“Entries for premiums Nos. 145 to 163, inclusive, must consist of not less than twelve specimens each.”

145. For best dish of plums of a single variety. E. W. Leavitt, \$2; D. P. True, \$1.

146. For best dish of Green Gage. No entry.

147. Purple Gage. No entry.

148. Red Gage. No entry.
 149. Yellow Gage. No entry.
 150. Prince's Imperial Gage. D. P. True, \$1.
 151. Coe's Golden Drop. No entry.
 152. General Hand. No entry.
 153. Lawrence. No entry.
 154. Moore's Arctic. No entry.
 155. McLaughlin. No entry.
 156. Reine Claude de Bavay. No entry.
 157. Lombard. D. P. True, \$1; Mrs. J. P. Longley, Auburn,
 50 c.
 E. N. Nelson.
 158. Columbia. No entry.
 159. Magnum Bonum. No entry.
 160. Washington. C. T. Jellerson, \$1; E. N. Nelson, 50 c.
 161. Jefferson. No entry.
 162. Penobscot. No entry.
 163. Smith's Orleans. No entry.

Hon. A. W. Paine of Bangor, exhibited seedling plums grown by him and called Paine's seedling. Resembles Jefferson and Washington, and is probably a seedling of one of those varieties. Mr. Paine regards it as not inferior to either of them; (*gra.*, \$1.)

CLASS 5—MISCELLANEOUS.

164. For best dish of peaches. No entry.
 165. For best dish of apricots. No entry.
 166. For best dish of nectarines. No entry.
 167. For best dish of quinces. No entry.
 168. For best ornamental dish of fruit. Mrs. A. B. Strattard, \$1.
 169. For best peck of cultivated cranberries. Seward Dill,
 Phillips, \$2; Mrs. A. B. Strattard, \$1.
 Alfred Smith.
 170. For best samples of nursery apple trees. No entry.
 171. For best samples of nursery pear trees. D. P. True; not
 seen by the committee.
 172. For best samples of nursery grape vines. No entry.
 173. For best orange tree, in fruit. H. B. Bartlett, Lewiston, \$1;
 John Burr, 50 c.

174. For best lemon tree, in fruit. No entry.
175. For best fig tree, in fruit. John Burr, \$1.
176. For best exhibition of canned fruits, in glass jars, five varieties, of domestic manufacture. Mrs. A. B. Strattard, \$1.
177. For best exhibition of dried fruit, by any process. No entry.
178. For best exhibition of dried fruits, of domestic manufacture, the product of one family or individual. No entry.
179. For best exhibition of evaporated apples. J. J. Towle, Dixfield, \$2.
180. For best cider apple sauce. Lizzie Haskell, West Gloucester, \$2; Hannah Davis, West Gloucester, \$1; A. B. Chipman & Son, *gratuity*, 50 c.
181. For best exhibition of fruit jellies, not less than five varieties, of domestic manufacture. No entry.

CLASS 6 — FLOWERS.

“In this class no article can be entered for more than one premium.”

FIRST DIVISION.

182. For best display of cut flowers, filling not less than 100 phials. W. E. Morton, Portland, \$10; Mrs. A. A. Sawyer, Wiscasset, \$8; Mrs. Charles Stanley, Winthrop, \$5; Mrs. A. B. Strattard, \$3.
183. For best exhibition of roses, not less than five varieties. G. M. Roak, Auburn, \$2; W. E. Morton, \$1.
184. For best exhibition of Dahlias, not less than ten varieties. Mrs. Charles Stanley, \$2.
185. For best exhibition of Chinese Pinks. G. M. Roak, \$1; Mrs. Charles Stanley, 50 c.
186. For best exhibition of Carnations, not less than five varieties. G. M. Roak, \$2; W. E. Morton, \$1.
187. For best exhibition of Japan Lilies. W. E. Morton, \$2; G. M. Roak, \$1.
188. For best exhibition of Asters, not less than ten varieties. Miss L. M. Pope, Manchester, \$1; Mrs. Charles Stanley, 50 c.
Roak, Mrs. Strattard.
189. Pansies. G. M. Roak, \$1; Mrs. A. B. Strattard, 50 c.
Mrs. John C. Baker, Mrs. Charles Stanley.

190. Zinnias. Mrs. Charles Stanley, \$1 ; John Burr, 50 c.
Mrs. A. B. Strattard.
191. Phlox Drummondii. John Burr, \$1 ; Mrs. Charles Stanley,
50 c.
192. Stocks. Mrs. Charles Stanley, 50 c.
193. Balsams. G. M. Roak, \$1 ; Mrs. Charles Stanley, 50 c.
194. Chrysanthemums. No entry.
195. Petunias. John Burr, \$1 ; W. E. Morton, 50 c.
Mrs. A. B. Strattard.
196. Gladiolus. Miss L. M. Pope, \$2 ; G. M. Roak, \$1.
197. Verbenas. Miss L. M. Pope, \$2 ; John Burr, \$1.
Geo. M. Roak.

SECOND DIVISION.

198. For best pair of parlor bouquets. Mrs. Charles Stanley, \$2.
199. For best pair of wall bouquets. Mrs. E. N. Nelson, Minot,
\$2 ; Mrs. Charles Stanley, \$1.
200. For best pair of hand bouquets. W. E. Morton, \$2 ; Mrs.
Charles Stanley, \$1.
201. For best bouquet of Asters. Mrs. Charles Stanley, \$1 ;
Mrs. A. B. Strattard, 50 c.
202. For best bouquet of Dahlias. No entry.
203. For best floral pillow. W. E. Morton, \$5 ; G. M. Roak, \$3.
204. For best floral design. W. E. Morton, \$5 ; Mrs. A. B.
Strattard, \$2.
205. For best floral wreath. W. E. Morton, \$2.
206. For best dinner table decoration. Miss Edith Leavitt,
Auburn, \$1.
Mrs. A. B. Strattard, Miss L. M. Pope.
207. For best basket of wild flowers. Miss Edith Leavitt, \$1 ;
Miss Nellie True, Turner, 50 c.
Mrs. Strattard, Mrs. Mayhew, Auburn ; Mrs. Stanley.
208. For best exhibition dried grasses. Mrs. Charles Stanley,
\$2 ; Mrs. C. D. Mayhew, \$1.
Miss Taylor, Mrs. L. Brackett, Lewiston, Mrs. J. H. Merrill, Lewiston, Mrs.
Strattard.
209. For best everlasting flowers. Mrs. C. D. Mayhew, \$2 ; Mrs.
G. A. Emerson, Litchfield, \$1.
Mrs. C. H. Bradford, Turner, Mrs. Brackett, Mrs. Strattard, Mrs. Stanley.
210. For best dish of cut flowers. No entry.
211. For best fancy basket of flowers. Miss L. M. Pope, \$2 ;
G. M. Roak, \$1.

SUNDRIES. Mrs. Peiree, Lewiston, card receiver; Mrs. A. O. Hilton, Lewiston, shell flower wreath.

THIRD DIVISION.

212. For best exhibition of green house plants. John Burr, \$8; G. M. Roak, \$5.

213. For best exhibition of pot plants, not less than 20 pots. Mrs. J. H. Merrill, \$5; Miss Nellie Morse, Auburn, \$3.

“Persons exhibiting green house plants, (No. 212) cannot compete for premium No. 213.”

214. For best exhibition of ferns. G. M. Roak, \$3; John Burr, \$2.

215. For best exhibition of Geraniums. John Burr, \$2; G. M. Roak, \$1.

216. For best exhibition of Begonias. G. M. Roak, \$2; John Burr, \$1.

217. For best exhibition of Coleus. John Burr, \$2; G. M. Roak, \$1.

218. For best specimen plant of Tuberose. G. M. Roak.

219. For best specimen plant of Draceana. G. M. Roak.

220. For best specimen plant of double Geranium. John Burr, 50 c.

221. For best specimen plant of single Geranium. No entry.

222. For best specimen plant of Salvia Splendens. G. M. Roak, \$1.

223. For best specimen plant of Foliage Begonia. G. M. Roak, \$1.

224. For best specimen plant of Flowering Begonia. Mrs. Isaac Haskell, Lewiston. \$1.

Roak, Burr.

225. For best specimen plant of Coleus. John Burr, \$1. G. M. Roak.

226. For best specimen plant of Fuchsia. G. M. Roak.

227. For best specimen plant of Carnation. John Burr, \$1; G. M. Roak.

228. For best single pot plant. G. M. Roak, century plant, \$1; Mrs. J. H. Merrill, Mrs. H. J. Walker, Lewiston; Mrs. John Vickery.

229. For best hanging basket with plants. No entry.

230. For best climbing plant, on trellis. Mrs. E. N. Leavitt, wax plant. \$1 ; Mrs. J. H. Merrill.

231. For best Wardian case. No entry.

232. For best aquarium, with plants. No entry.

233. For best rustic stand not less than three feet in height, to be filled with choice plants. No entry.

234. For best exhibition of wax flowers. No entry.

PROCEEDINGS OF THE WINTER MEETING.

The eighth Winter Meeting of the Society. (being an adjournment of the annual meeting which was held at Lewiston, Sept. 28, 1882.) was held at the Town Hall in Waterville, on the 30th and 31st days of January, 1883, in connection with a Farmers' Institute under the direction of the Secretary of the Board of Agriculture.

The attendance of persons from places other than the immediate vicinity of the place of meeting was larger than at any previous Winter Meeting of the Society. Free return tickets were furnished by the Maine Central and other railroads. The use of the hall, attended and lighted, and the tables, dishes, &c., for the exhibition, were provided by the liberality of the citizens of Waterville, free of expense to the Society. Guests were entertained at the Elmwood Hotel at reduced rates. For all of which favors due acknowledgment was made by votes at the close of the proceedings.

A stenographic report of the discussions was made by Mrs. S. G. Crosby of Waterville, from which, in a condensed form, the report herewith presented is made.

An exhibition of fruit was made in connection with the meeting, for the purpose of presenting the Winter fruits of the State in their perfection, which cannot be done at the Autumn exhibitions,—also to afford special means for study and comparison. A limited list of premiums was offered. The exhibition was satisfactory in character and extent; and for particulars, reference is made to the report of the examining committee in subsequent pages.

FIRST DAY.

The opening hour of the morning session was spent in arranging the fruit exhibition and preliminary business.

At 11 o'clock listened to an interesting lecture by Prof. C. H. Fernald of the State Agricultural College, on "The Potato Rot, and Fungoid Growths in Fruit Culture," which is reported, with illustrations, in the report of the Board of Agriculture. This, with the discussion to which it gave rise, occupied the forenoon.

Afternoon Session.

Met at 2 o'clock P. M., when the President, Hon. R. H. GARDINER, made his annual address, which was listened to with close attention.

OPENING ADDRESS OF THE PRESIDENT.

This is the eleventh year of the existence of the Maine State Pomological Society, and in accordance with custom, your President will say a few words of introduction to the various exercises of this, our winter meeting. In the few years that we have existed as a Society, we think it will generally be acknowledged that we have accomplished a good work, and at any rate, never in the history of our State, has so much attention been given to orcharding as now, and very many farmers begin to realize that a good orchard well cared for, yields more income and at a less cost than any other product of the farm.

Our last winter meeting was held at Biddeford, which was in many respects a very satisfactory meeting, with a fine display of fruit, and where we were cheered by the presence of Friend Taylor, so devoted and enthusiastic a member of our Society from the beginning, who, notwithstanding his advanced age, had driven in a sleigh to attend the meeting, some ninety miles, the thermometer a portion of the time twenty degrees below zero, and bringing with him some eighteen or twenty varieties of handsome apples for exhibition. Alas! his presence no longer greets us, but at all our meetings he will ever be remembered with affection and respect.

The summer of 1882 will ever be noted for the long continued drouth, in consequence of which, the larger portion of the apple crop, which had been so very promising, fell off or was affected with worms, and was generally small and not well colored. Heavy rains fell the middle of September, which in some instances wonderfully improved the apples both in size and color, but it came too late to be of very general benefit. As the supply of apples in Maine was far from abundant, high prices were expected; but from the supply of windfalls, the apples from Massachusetts, where the crop was abundant but very inferior, and also the best qualities of apples from Missouri and Arkansas—one county in the latter State produced over a million of barrels—the prices ruled low till late in the season. Our autumn exhibition was held the last of September in connection with the State Fair, and taking into consideration the

season, it was a remarkably fine one. As to the flower garden the past year, from my own experience, whether as to roses, bulbs, perennials or annuals, I should say that I never remember so unpropitious a season, cold and wet in the spring and very dry in the summer.

In all farming operations, what is there that gives greater satisfaction to the farmer, than to gather a bountiful crop of fruit at the different seasons, that years before he planted in faith, then grafted, and for year after year has been watching to see if they continued erect—had an open top to admit the sun, no branches crossing one another, that they were well balanced and that no borers, mice or caterpillars were at work to destroy all his hopes. How many deprive themselves of this pleasure and profit, because the results are not immediate, but that patient waiting for some years is necessary, forgetting the familiar story of the man who had always made this excuse for not planting an orchard, but lived to eat fruit raised by his grandson.

Besides planting an orchard, there is another subject now exciting great attention all over the world—owing to the destruction of the forests what sad results have happened. The land of Palestine, in the days of Bible history, was a land described as flowing with milk and honey, now, owing solely to the destruction of the trees, is a barren waste; and such, too, is the case with many parts of Spain, once so very fruitful. We, perhaps, can scarcely expect our farmers just yet to devote much time or expense to planting forest trees, but when driving through the country one sees the school-house with not a tree near it, exposed to the scorching rays of the sun, and the bleak blasts of winter, and no shade for the children to enjoy at recess,—and the same, too, may be said of many a farmer's house—when all this could be changed at such a trifling expense, it does seem passing strange. And, besides a tree or two in front of the farmer's house for shade, and a clump at the north-west as a protection, at what slight cost can he add a cheap porch made of branches of trees or of laths, and upon this train a honeysuckle, a Virginia Creeper, or Clematis, or better yet a grape vine, and then by the expenditure of two or three hours labor, make one or two beds for his wife and daughters to ornament with flowers and shrubs; nothing can be more refining and civilizing than this. The clearing up of trees and bushes causes springs and brooks to dry up. Nearly every farm in this region has swales or gullies, and these

when cleared up are of little value. Now if every one will leave these gullies in a natural state, not only the bushes but trees will spring up, and the farmer who has been greatly troubled by the want of water, will find that he has an abundant supply, beside a growth of valuable trees upon land fit for nothing else.

To return to apples. But a few years since the foreign export of apples was confined to the Newtown Pippin, shipped by one man, Mr. Pell, from New York, but now in a good season the export exceeds a million of barrels, and except in very rare seasons of extraordinary abundance, there seems no probability but what good apples will always find a sale at a fair price. As in the progress of this meeting you will hear essays and discussions by those well qualified to speak upon the various special subjects appertaining to pomology, I shall not touch upon them at all, but continue with a few general remarks.

There has been a great discussion and difference of opinion as to the different kinds of apples one ought to cultivate. Allow me to say in answer that different soils and locations suit different apples. For instance, with all my endeavors, I find it impossible to raise a barrel of good Roxbury Russets, an apple that so many, and some of them located not far from me, find to be the most profitable apple they can raise. On the other hand, I have been peculiarly successful with the Bellflower—large crops annually, and generally of better size, color and flavor, than any others seen at our exhibitions. In consequence of this I am every year setting out more trees of the same sort. I therefore would advise every one to experiment with different trees of the standard varieties, and when he ascertains which does the best, then go in largely for that. The general opinion is that the Baldwin is *the* tree for market and also for home use, and that nine-tenths of every orchard should be Baldwin. But as I have already said, first ascertain what variety will flourish best with you, whether Baldwin, Roxbury Russet, Bellflower, R. I. Greening, Talman Sweet, or some other standard, and then plant largely, if not exclusively, of the variety you find succeeds best with you.

Inquiry has often been made as to the best season for planting trees. I believe that taking one year with another, the spring is the most safe, but I have had great success with autumn planting. It depends upon the season. If, after planting in the autumn, dry weather prevails, and this continues till the ground freezes,

you will lose many of your trees, but if rains follow and settle the earth around the roots, probably every tree will live. Allow me to say here, though not pomological it is arboricultural, a subject embraced by our Society, that the proper time for planting evergreen trees is very different from that for deciduous. The time for planting evergreen trees such as the Norway Spruce, Hemlock, etc., is either in May, just as the new leaves put forth, generally towards the last of May, or else in August when the second growth puts forth. I think I have generally been more sure of success in August than in May, but either will do. In planting an orchard, great care is necessary. The ground should be prepared as for a crop of corn. Then procure trees with good roots, not dried by exposure to sun and wind. Avoid if possible setting them out on a very windy day. From my own experience, and that of many others, I should advise that apple trees should be planted thirty feet apart each way, never less. A tree forty or fifty years old will often cover a space forty feet in diameter — I have often seen trees planted eighteen feet or less apart. These do well for a few years, but after twenty years when the trees should be in full bearing you will find only the outside trees bearing good fruit, the rest are so crowded and shaded they bear but little fruit and that small and without color.

A word or two now as to the mode of planting. Dig a hole the size of the roots, and six to twelve inches deeper than you wish to set the tree, then all around the hole undermine the sod at least six inches. This is to enable the roots to make a ready start. Next in the centre of the hole, make a little mound of good earth, six to twelve inches high, set the tree upon this, carefully stretching out the roots, then be careful to cover all the roots with good soil, and especially fill the hollow beyond the roots with the same, and as you proceed in filling in the earth, occasionally lift or shake the tree so as to be sure there is no space not filled with earth, and the last operation is to press the earth very firmly around the tree. Planted in this way no stake is required, and if the tree was all right when set out it will be sure to grow. In France they transplant the largest trees with uniform success. I remember when in Paris, passing by the Place de la Bourse. This was a paved avenue or court of some length, at the end of it stood that splendid building, the Exchange, the centre of the commercial operations of France. I was absent a few months, and upon my return what was my amazement at seeing

on each side of this avenue a row of large trees, apparently growing there for forty years. It seemed miraculous. But the next year, passing some time in the South of France, I was one day in Marseilles, and the marvel was explained. The splendid Hotel de Ville (City Hall) had just been completed, and it was desirable the large square in front should be filled with trees. I watched the operations with the greatest interest. A tree more than thirty feet high was dug round, a diameter of say ten or twelve feet, and as deep as the roots. It was then partially undermined, and plank put under and at the sides. A peculiar carriage was then brought into requisition. There were two large timbers, say thirty feet long, which rested at each end on a pair of low wheels. This was brought up to the tree, one timber removed till the carriage was in place, and then it was replaced on the wheels and the tree stood between the timbers. A tall derrick was then placed on the timbers, and the tree raised in its box so as to clear the ground. Stays were fastened from the top of the tree to each end of the timbers so as to keep the tree upright. It was then drawn by a very strong team to the place where it was to be planted. Previously a hole, a little larger than the roots of the tree had been dug. This hole was then filled with good earth. The tree was drawn over this, the loose earth all removed, the tree lowered into its place, the plank taken out, and the hole filled up. After this a large hole was dug on each side of the tree and these were filled with good earth. Seeing these trees afterward one could scarcely believe they had been so recently planted.

Returning to apple trees, I wish to say a word about the general mistake of planting too great a variety. This is the point which has of late been frequently touched upon, but such is the temptation to produce a large variety at the annual exhibition, or to try a new variety recommended by fruit tree dealers, that it is well to reiterate its great disadvantages. I trust that our Society will never again give a premium for the greatest variety of apples. I once had over fifty kinds but am reducing the number as fast as possible. Last year I cut down a large tree, a New York Russet, which always bore several barrels of apples, to reduce the number of my varieties. It is very well for those who have leisure and taste to experiment with new varieties, and we may sometimes in this way obtain a valuable addition to our standards, but for one who desires to raise apples for the market, beside a few summer, autumn and winter for family

use, let him ascertain which of half a dozen standard sorts suit his soil and location best, and then plant at least nine-tenths of his trees with this.

I wish to say in concluding these few remarks that our Society embraces a large number of subjects, and I have barely alluded to one or two, but you will soon have the pleasure of hearing interesting papers and discussions upon many of them, which I feel confident will be practical and of lasting benefit to us all.

Following the delivery of his address, the President read an original paper contributed by Dr. T. H. Hoskins of Newport, Vt., on "Hardy Winter Apples," an article then recently written by himself for publication on "Nomenclature of Russets," and an article on the same subject by Dr. Hoskins. Mr. Gardiner's article was originally published in the *Home Farm*, and was copied by Dr. Hoskins, with comments, in the *Vermont Watchman*; and the notes by Dr. H., here given, were published in the last named paper in pursuance of the subject; all of which are here inserted in their order.

HARDY WINTER APPLES.

BY DR. T. H. HOSKINS.

The Baldwin is the great market apple for winter in New England, and has held that position for so long a time that it must be a wonderful fruit that will replace it in the regard and confidence of growers and consumers. It is quite as hard to dethrone a popular fruit as to revolutionize a popular government; and as with governments, so it will be with fruits, they must themselves deteriorate far before the people will begin to consider the question of dispensing with them.

But we cannot, even in behalf of our greatest favorites, prevail to reverse the fiat of nature when she cries, "thus far, but no farther!" It must be conceded that the Baldwin apple is a fruit of southern New England only, and that more than half of our area has a climate in which that apple can never be grown with profit, if even at all.

Unfortunately, not only the Baldwin, but all the other standard and marketable winter apples of the country, partake, more or less, of this intolerance of severe winter temperature. The Rhode Island Greening and the Roxbury Russet are scarcely at all hardier than the Baldwin, and the Northern Spy only a little hardier than these.

The Yellow Bellflower ranks only by the side of the Spy, while the Ben Davis, though somewhat hardier than either, is of so poor a quality that it can never be of much value where any of the preceding can be had, either by growth or importation. After all these have been tested, the fact still remains that there is not found among them one which can be grown with profit in the northern half of Maine, New Hampshire and Vermont.

Now I know by experience that at meetings like this the bulk of the attendance is from the Baldwin country, and I have been chilled in my enthusiasm greatly to find that my brother fruit-growers from the Baldwin country not only do not want any other apple for themselves, but they are not at all anxious for the discovery and distribution of any rival of the Baldwin in the region where the Baldwin will not grow. I suppose that this must all be regarded as quite human and natural, yet nevertheless the interests of the few must yield, in the long run, to the necessities of the many. We who live in the "cold north" where Baldwins, Greenings and Russets do not thrive, feel exactly as the peach and grape-growers of southern New England feel, in desiring at least to possess some varieties that will make them independent for home use, if not for market, of the more favored regions to the south of them. And as the southern peach and grape-growers do not seem to suffer at all from New England competition, so, I think, in view of the wide home and foreign market that is open to the peculiar apples of southern New England, (and which is as free from any possible southern as it is from more northern competition,) our Baldwin growing friends can well afford to look kindly, and even with some interest, upon the efforts of pomologists in the "cold belt," to find out what may be done to make orcharding possible there, at least so far as to yield a home supply sufficiently abundant and cheap to make life tolerable in our long winters of zero temperature.

I am sure that, as a State, Maine is vastly interested in the development of fruit-growing north of the Baldwin region, which covers but a few of her 32,000 square miles of territory. I doubt if there is a space so large as Connecticut, in southwestern Maine, where the standard winter apples are successfully grown on the commercial scale; and when the remaining 28,000 square miles are even moderately populated, with all the people may do there in the way of orcharding, it is quite likely they will still make a home market for every surplus apple of the Baldwin-growing portion of the State.

Meanwhile it will be a great encouragement toward the settlement of northern Maine to be able to show that some kinds of fruit have been discovered that can be grown there successfully, even with the moderate amount of care that is bestowed upon them by the average farmer.

One thing in this connection is but little known that ought to be known. It is a fact that apples which do not keep well in one section become good keepers when grown a little farther north. The Rhode Island Greening and even the Baldwin, grown in Pennsylvania, are only late fall apples. But starting into growth only two weeks later, in New England, makes them good keepers. The little difference between Connecticut and southern Maine makes Maine Baldwins and Greenings very much the best keepers, and therefore the most valuable and salable fruit, either for home use or for export.

Now this rule holds good when you go still further north. Jewett's Fine Red (Nodhead) is an early winter apple in Massachusetts; but although it cannot be grown more than 80 or 90 miles north of the Massachusetts line in New Hampshire, it there becomes a very good keeper. Even the Gravenstein (too tender to succeed very far north) becomes an early winter fruit along its northern limit, and I am assured that the Duchess of Oldenburgh is one of the standard winter apples of Russia between latitudes 55° and 60° . The reason for this is undoubtedly the shortness of the growing season in the higher latitudes.

While here, on the eastern side of America, we have as cold winters as Russia combined with summers as long as those of France, and warmer, yet the same rule will be found to hold good, though not with the same apples. I doubt if we shall find many, if any, very long keeping apples among the apples of Russia, when brought to this country. We shall have to depend upon our own seedlings.

It is unfortunate that the family of apples brought by our ancestors from England produces very few seedlings that are what is called "iron clad" in resistance to a low winter temperature. I have never found one variety that is entirely and reliably hardy where I live. The family of apples brought from France into Canada is a little hardier than our New England apples, yet they only succeed well in the immediate vicinity of the St. Lawrence river. I know of but one Canadian apple that is truly "iron clad," and that, the "Peach

Apple of Montreal," though brought from France, is pronounced by Prof. Budd of the Iowa Agricultural College (who has made the subject a study) to be a "stray Russian." It is certainly entirely unlike any other Canadian apple.

Maine has quite a list of winter apples hardier than the Baldwin, and some of them possess merits which entitle them to more attention than they have yet received. One of these is the Rockwood apple, recommended and sent to me some 14 years ago by the late John Nelson of Hallowell, but originating in Belgrade. It is not strictly "iron clad," but belongs in the same list with the Red Astrachan, Talman Sweet and Famense. Where these do well the Rockwood may be planted with success. It is a thrifty grower, a free bearer, and the fruit is of good size, color and quality, but in flavor it belongs to the class of "neutrals," being neither sweet nor sour. It is good for dessert and for baking, but not tart enough for pies.

Undoubtedly the hardiest winter apple that has ever been made widely known in this country was produced in Minnesota from a Maine apple seed, or rather crab-apple seed, sent from Bangor to the grower of the original tree in Minnesota. And this, I believe, is indicative of the source from which we may expect many hardy apples—Siberian crab-apple seed from fruit of trees growing among our best apples, and fertilized in the bloom by their pollen. We have already a fine seedling of this kind in Vermont, grown from a seed of the common yellow Siberian crab, but of good size, great beauty and excellent quality—the Northfield Beauty, grown by Leonard D. Cady of Northfield, Vt., and sometimes called "Cady's Crab." It is an early winter fruit, the tree not perfectly "iron clad," notwithstanding its origin, yet hardy enough for most places.

The Minnesota seedling referred to, the "Wealthy," grown by Peter M. Gideon of Excelsior, Minn., is becoming tolerably well known in Maine, and as it bears very young and very full, will soon become abundant where planted. It is apparently as hardy as Duchess of Oldenburgh, and is much like that variety in tree and habit of growth and fruiting. It is not as valuable for market, or for all uses of the household as the Baldwin, and grown where the Baldwin grows is not nearly as good a keeper. But grown where it belongs, far north, it keeps well all winter in a good cellar. It is soft fleshed and well flavored, but lacks acidity for a pie fruit, though not so decidedly as the Rockwood, being more like the

Fameuse. In general appearance, size, color, &c., it is not inferior to the Baldwin, and in a near market would outsell it as a dessert fruit in the first of the season. How it will endure transportation over long distances is yet to be thoroughly tested, but I think about as well as Fameuse—not so well as the Baldwin.

Two apples of this vicinity (shores of Lake Memphremagog) have shown remarkable hardiness, large productiveness and good keeping qualities, combined with good to very good quality. The first of these, Magog Red Streak, is somewhat of the shape, size and general appearance of the Yellow Bellflower, but with more or less striping of red upon the sunny side. The tree is hardy, though somewhat subject to hark blight in some places. It grows rapidly, and comes into free bearing when eight or ten years planted. In some seasons the fruit is apt to be ribbed, even more than the Bellflower, but is always fair. It has yellow flesh, a mild acid and quite peculiar favor, not always liked at first, but is of unquestionable excellence as a culinary apple. Until I received the Wealthy I considered this my best winter apple, and the Wealthy by no means displaces it, for though better for eating it is not its equal for cooking. The Wealthy bears younger than the Magog, and also more abundantly, about in the proportion of the Baldwin to the R. I. Greening or Bellflower.

For long keeping we have to choose, as yet, between the Golden Russet of western New York and Scott's Winter. Both are hardy, though the Scott is the most so. In size the Scott is fully twice that of the Golden Russet, of a fine deep red, laid on in heavy stripes and often covering the whole fruit. Both these varieties bear too heavily, and would be more valuable if less productive. But in good soil, well treated, the Scott keeps up to a good medium, and is very salable. It is a perfect keeper and, unlike the russets, never withers. Though hard and sour until February, it becomes more mildly acid, with a high, spicy flavor in the spring, which makes it very acceptable, especially as other apples become scarce. For cooking it is very much liked.

I give the above list, not for the country where the Baldwin grows, but for that large part of Maine where none of the standard sorts succeed. I believe them all worthy of trial in such localities. In the Northwest they are already well known and approved.

In addition, and by way of postscript, perhaps it would be well to say a word about two other apples now attracting attention, and

recommended for extensive planting. The first of these, McIntosh Red, will bear all that can be said in its favor for excellence of quality, beauty and productiveness, and *where it does not spot* it will be a great acquisition. The tree is not "iron clad," but is hardier than Famense, and a good though rather slender grower. The fruit averages with Wealthy or Baldwin in size. Its chief defect is spotting and cracking, which I fear will make it unprofitable in many places.

The Mann apple, which is being strongly pushed and widely advertised, is by no means an "iron clad," or even a commonly hardy tree. It winter-kills badly with me, even worse than Pewaukee, which has also been highly extolled, but will not do for hard places. In appearance and quality the Mann is an inferior R. I. Greening, *much* inferior, but a considerably better keeper. I think this postscript may perhaps be worth as much to those now about to set new, or increase old orchards, as all the rest of the paper.

NOMENCLATURE OF RUSSETS.

There is, perhaps, no variety of apple about which there has been so much doubt and confusion as the various kinds of russet. During the past winter, I was engaged in a quadrilateral correspondence on the subject, and the result may be of interest to fruit growers, though I regret I did not publish it at the time, when the subject was fresh.

I think the correspondence originated in this way. I received a letter from Mr. Charles G. Atkins, requesting some scions of American Golden Russet. I answered that I did not think I had ever seen an American Golden Russet, and I doubted if it could be found in Maine. Mr. Atkins would not give the matter up, and at last obtained scions of the real American Golden Russet from West Chester, Pa., and kindly sent me some. It is known there and in New Jersey under the name given by Coxe, *Sheepnose*, and elsewhere as *Bullock's Pippin*. Hon. Henry Ingalls, at all our exhibitions, has maintained that an apple he exhibited was the American Golden Russet. Hiram Pope of Gardiner, raises a delicious russet which came from Massachusetts, and which he called the American Golden. I sent a specimen of these to Mr. Atkins and also to Mr.

Ingalls. Mr. Atkins found a tree at Bucksport, seventy or eighty years old, which produced the same apple, very delicious, and as juicy in June as in March. After exchanging apples, we decided that Mr. Ingalls' apple and the Bucksport and Pope apple were different, though, to settle the matter, we sent specimens to Mr. Charles Downing. He decided, without hesitation, that the Bucksport and Pope apple was the one so well known and so highly esteemed in Massachusetts as the Massachusetts Golden Russet, the true name of which is Hunt Russet, which originated in the Hunt family, in Concord, Mass., two hundred years ago. Mr. Ingalls' apple, he thinks, is the American Golden Russet, known elsewhere as *Sheepnose* and *Bullock's Pippin*. Mr. Downing remarks that he thinks his late brother (A. J. Downing) made a mistake in calling it "American Golden Russet," as it has led to great confusion.

In correspondence with Mr. Cole, of the firm of Hall & Cole, extensive dealers in apples in Boston, he advises Mr. Atkins and myself to drop all russets but the Roxbury, as the American Golden, he says, "is almost sweet, tough, tasteless, miserable;" but in condemning all Golden Russets, he excepts "the old-timer, grown here in Massachusetts, which has a red cheek, and is as fine eating as need be." This is the Hunt Russet. Evidently, Mr. Cole has not seen the genuine American Golden, or Sheepnose.

I should add that I have every year exhibited a small round apple, which is entirely russet, as the American Golden. This, I supposed, might be the English Golden; but Miss Alice Foster informs me that, as far as she knows, it originated with Dr. Ford of Gardiner, and that Mr. Downing could not identify it. Our late associate, Friend Taylor, raised the same apple and called it American Golden. It is a nice apple in December and January, and a most profuse bearer alternate years.

R. H. GARDINER.

Oaklands, August 28.

Notes on the Same Subject by Dr. Hoskins.

Since printing Mr. Gardiner's letter about the mixed-up state of the russet question, we have been studying it up, with the help of friends, and now think it may be unravelled as follows :

AMERICAN GOLDEN RUSSET.

Synonyms: Sheepnose, Bullock's Pippin. This is grown upon Grand Isle, and our correspondent, J. T. Macomber, says that though small it is one of the best apples he has tasted. Downing says it is one of the most delicious and tender apples, in flesh more resembling a buttery pear than an apple. This is very often confounded with the next, Hunt Russet, which is, however, quite distinct, having a red cheek. The American Golden Russet is of wide distribution, east and west, but is not perfectly hardy on Grand Isle, and is therefore far from being "iron clad." Its fruit is below medium size, roundish-*ovate*, dull yellow, sprinkled with a very thin russet. Flesh yellowish, very tender, juicy, with a very rich spicy flavor. Season in New York, October to January. Keeps better in Vermont. The tree is of erect growth, leaves sharply serrate.

HUNT RUSSET.

Synonyms: Golden Russet of Massachusetts, Fay's Russet, Russet Pearmain. This apple originated on the Hunt farm, Concord, Massachusetts. Fruit medium in size, roundish-*oblate*, conic. Skin golden russet with a red cheek. Flesh yellowish-white, tender, rich, mild, sweet sub-acid. Season in Massachusetts, January to April. This variety is not very much known out of New England. It is as highly esteemed, where known, as the preceding, and is a better keeper. The tree is vigorous, upright and productive, the young shoots a clear, reddish brown. It succeeds in southern Maine. We do not know of its being grown in Vermont.

GOLDEN RUSSET OF WESTERN NEW YORK.

Synonyms: English Russet, English Golden Russet. This is an old English variety, but first became widely known and popular as a market apple when grown on the rich, fresh soils of western New York. The tree is thrifty, spreading, rather irregular, forming a bushy head. The young shoots are the distinguishing peculiarity of the variety, compared with other russets likely to be confounded

with it, being slender, dull reddish brown, slightly downy, with *numerous small white dots*. Undoubtedly this is the hardiest russet, succeeding well on the banks of Lake Memphremagog. At the same time it is one of the smallest and poorest, and needs rich soil or heavy manuring to make it at all profitable. It is a long keeper, but must be kept in tight barrels and in a very cool place, or it becomes worthless from shrivelling. This is true, more or less, of all the russets, the "russeting" being in fact a mere open state of the pores of the skin which allows the juice to evaporate unless kept from the air and warmth. Fruit medium or below in size, roundish, or roundish-oblate, *not* conic. Skin very rough, color yellow, dull russet, the skin bronzed (not red) on the sunny side. Flesh whitish yellow, fine-grained, *compact*, mild sub-acid. December to March in New York, but keeps late in the spring when grown in northern New England and properly cared for.

ENGLISH RUSSET.

Synonym: Poughkeepsie Russet. As the "Golden Russet of Western New York" is really an English apple, so, by the misnaming of ignorance, the so-called "English" Russet is probably of American origin. It is a valuable long-keeping variety, which has been quite extensively grown in New York and New Jersey for market, but is, we think, being much replaced by the large Roxbury Russet. As grown there it is not fit for use until February, and may be kept the year round, according to J. J. Thomas. The tree grows very straight, forming an upright head, with smooth, reddish-brown shoots. The fruit is of medium size, roundish, slightly conical, and very regularly formed. Skin pale greenish-yellow, about two-thirds covered with russet, which is thickest near the stalk. Flesh yellowish-white, firm and crisp, with a pleasant, mild, sub-acid flavor. The quality of this apple is inferior even to the Golden Russet of western New York, and therefore the poorest of the whole four that are likely to be confounded.

As this article is mainly written to distinguish these four sorts from each other, we need not refer particularly to other russets. The Roxbury Russet has now taken its place alongside of the Baldwin and Rhode Island Greening as the great market apple of its class, and is gradually excluding the other sorts, not because it is better, but because it is larger and more showy. In quality it is no better than the two last named, and no better keeper. It is not

much more hardy than the Baldwin and Greening, and cannot therefore be grown far north. If Russets are desired, therefore, in those sections. that of western New York must be chosen. When we come to amateur apples, that is, apples grown only for home use, the old American Golden Russet and Hunt Russet are the ones to choose for the east, though it would not be a bad thing to try the Egyptian or Bagby Russet of southern Illinois, a good keeper, even there, and of such high, rich flavor that it has been called the best of all the russets. Like the Hunt and old American, it is only of medium size, but the tree is productive.

Among russets that are not keepers, but are of the highest quality as dessert fruit, and are quite hardy far north, (though not strictly "iron clad,") we would like to call attention to two sorts which we have growing in our own grounds. They are both Canadian in their origin, unless, indeed, they came originally from France. One is the Whitney Russet, a thrifty variety, fruit medium size, yellow, with thin russetting, and an occasional shade of crimson in the sun. Downing has this as a keeper, which cannot be correct, as it is a fall apple in northern Vermont. In quality it can hardly be surpassed. The other is the Bourassa, (pronounced Boo-ra-saw,) which is a very poor grower when root-grafted, but does well top-worked on a strong stock, and then produces bountifully of apples varying remarkably in size on the same tree, but all with a dark russet coat and a rich crimson cheek. In quality the Bourassa leaves nothing to be desired, being, when well grown, rich, soft-fleshed, and very pear-like in quality. Its season is September.

DISCUSSION.

Hon. Z. A. GILBERT, Secretary of the Board of Agriculture, was called upon, and in reply, said: While I think there are many points in the first paper by Dr. Hoskins deserving attention, I hardly know what one it will be most profitable to discuss at this time. There is, however, one point which at this moment suggests itself as worthy of consideration: and that is, his reference to the Russian apples. I was especially pleased with the remark that for long keeping varieties we must look to our own seedlings, and not to the varieties of Russian origin. He has experimented with the latter enough to make his opinion of great value,—and it corresponds with the experience of others.

I have become so completely disgusted with these pomological Jack O'Lanterns, that in discussing them, I may say some things more strongly than I ought to; but we have been chasing these delusions here, in the best fruit-growing section of the State, for a good many years,—and with what result? What have we gained, or what need we expect from them? It is about time for us to find out what they are; what we have got from them, and what we may *not* expect from them.

Several years ago the Department of Agriculture imported scions of a large number of varieties of Russian apples with the view to secure especially hardy varieties for propagation near the northern borders. The result, as we all know, is a failure. There has not yet been obtained a single variety of a goodly winter fruit, from something like a hundred varieties, which have received the care and attention, time and money, of our pomological experimenters from the east to the west.

There have been a few, two or three varieties of extremely early fruit, which proved valuable and really worthy of attention in certain localities. But we all know about early fruits. We have no room for any more varieties here. We have no market for any considerable amount of early fruit; we do not want to raise a large amount for home use because we have enough already. We have no need of special efforts in that direction.

Now what is the reason of this? May we not discuss the whole subject of Russian fruit right here? It is an established fact that we need not look for late keeping varieties of apples from localities of extremely low temperatures and short growing seasons, for the reason that the late keeping apple requires a long season to grow. The wood corresponds in a measure with the fruit it bears, and in the late keeping varieties requires a full and complete season of growth; while in the Russian varieties both the fruit and the wood ripen early, as they necessarily must in the short seasons of their native localities. The Russian apples, when grown in our climate, retain their habits of early ripening, consequently the two conditions of an extremely hardy, thoroughly "iron clad" variety and a late keeper are not found in juxtaposition, and we need not chase these shadows in that direction any longer. The experimenters who have been at work upon these numerous varieties have come to the conclusion that there is nothing valuable among them for late keeping;

nothing but the early ones, that we have no call for, have proved valuable.

I expect that these views will receive some criticism, and I care not how much; enough, I hope, so that by the discussion we shall be able to settle upon some facts. We want more facts and less of mere theories and speculations.

With respect to the extreme hardness of *certain varieties*, I am not prepared to speak at this time. My experience in fruit-growing has been largely in the central portion of the State. We have here a large number of varieties of standard apples of superior quality, both early and late keeping, and sufficiently hardy for all practical purposes; besides a large class of native seedling varieties of excellent quality and perfect hardness, but generally early ripening.

What I have learned of the difficulties of fruit-growing on our northern border has been learned from conversation and correspondence with individuals in that locality. There is no doubt that we want for that section varieties of extreme hardness, but with that we want also the quality of long keeping, which as has been shown is not to be looked for in the Russian varieties.

Mr. W. H. PEARSON, of Vassalboro'. There may be some merits in the varieties of apples so often presented to our attention by "agents" under the name of "iron clads." Some of them may be good, but it seems to me that we have gone far enough in that direction. If we confine ourselves to home-grown trees, sowing seeds ourselves, producing trees ourselves, making such selections as seem right, we shall avoid a good deal of useless expense, and shall, at the same time, improve greatly our home-grown apples.

[At this point a brief discussion took place upon certain varieties of apples which had been mentioned or inquired about. As the subject was resumed at a later period, the report is postponed.]

The following extracts from a report made by Mr. Charles Gibb, of Abbotsford, Que., made to the Montreal Horticultural Society, in 1882, are introduced here as bearing on the subject of the foregoing discussion. This report covers fifty-five pages, and contains much valuable information in relation to the fruits of Russia and Central Europe. I have copied only such parts as seemed to be of special interest, including the descriptions in whole or in part of a few of the many varieties of apples mentioned, only regretting that the want of space prevents me from transcribing the entire report to these pages.

SEC.]

EXTRACTS FROM REPORT ON RUSSIAN FRUITS.

BY CHARLES GIBB, ABBOTTSFORD, QUE.

* * * * "The fruits of Western Europe and their pure offspring born on this continent, as a rule, are not long-lived upon the Western prairies above latitude $43\frac{1}{2}$, not a success above $45\frac{1}{2}$ in this Province, and that only in exceptionally favorable localities. In Eastern Russia we find fruit growing a profitable industry in climates decidedly more severe than that of the City of Quebec. Hence we may expect to increase the area of fruit culture northward upon this continent very largely."

"The uncertainty of these fruit trees of Western Europe in the severer climates, had led to large importations by the State Agricultural College at Ames, Iowa. (See 7th Report Montreal Hort. Soc., p. 151.) Prof. Budd had gathered there the largest collection of fruits for severe climates, which I know to exist; but such was the uncertainty of nomenclature, such the difficulty of getting exact information as to their probable value, that the work of sorting out the best seemed a work of many years. Northern horticulturists were looking with great hope to the Russian fruits. The work could not be allowed to rest. Some one had to go to Russia. Mr. Budd and I went."

"Nomenclature in Russia is hopelessly confused. Different names are given to the same apple in different localities, the same name to different apples growing in adjacent districts. So, many names, however formidable they may sound in Russian, mean merely round white, white sweet, white transparent, &c., names without individuality. Fortunately, a few names have been fixed by commercial demand, and are known by the same names throughout Russia."

"One great difficulty in Russian nomenclature arises from the strong family likeness of seedlings of like parentage. A hardy race of the apple, seemingly more nearly allied to the wild form than the cultivated apples of Western Europe, has been grown for many centuries by seedling production, and has been reproducing itself from seed. Yet this is not strange news to us. Some families of apples, even when surrounded by apples of other types, have a strong tendency to reproduce themselves in their seedlings." * * * *

ON CLIMATES.

“In this part of Canada we suffer from drought but not from diminished rain-fall. I must explain this apparent contradiction. England is a land of verdure, the lawns are like velvet, the trees and thatched roofs covered with moss. What a contrast to our dry climate, and yet the annual rain-fall of London is nearly thirteen inches less than that of Montreal. It is from aridity of air, and consequent rapid evaporation that we suffer.

In Russia we find fruit cultivated largely in climates where the conditions of extreme cold, dryness of air, and scanty rain-fall are greatly intensified.

In the Government of Kasan, above latitude 55 where the winter temperature is five degrees lower than in the city of Quebec, the rain-fall a good deal less than one-half, the evaporation as great, we find apple growing a great commercial industry, *the* industry, in fact, in twelve peasant villages. This is the coldest profitable orchard region of the world, and the conditions of growth deserve study. The soil upon these exposed bluffs is a fine comminuted dusty clay, like a “loess.” For retaining moisture, for absorbing it, for holding frost without injury to the roots, there is no better. The dry fall here causes perfect maturity of growth; the thick, fine textured leaf does not suffer from the dryness of the air. It was Mr. Budd, whose microscopic study of the leaves of these climates first showed their peculiar cell structure. Thus we see that the apple tree of Kasan is a tree thoroughly adapted to the climate it lives in. However, the cold of Kasan seems more uniform than ours. In this Province we suffer from the warmth of the sun in the late winter and early spring, warmth followed by sudden cold. This results in “bark-bursting” and “sun-scalding” of the trunk and lower branches. Such injury is rare in Eastern and Middle Russia, but how much this is owing to the climate, how much to the character of their hardy race of trees I cannot say.” * * * *

“St. Petersburg is in lat. 60, so far North that the stars cease to be visible during two months in summer, the sun is too short a distance below the horizon. A cold coast climate; a Gaspé or Anticosti climate, one would suppose. A cool, short summer, a long changeable winter, not colder on an average than Montreal, but subject to greater extremes of sudden cold. Early terminate growth is the special characteristic needed here.”

APPLES.

“*Anis*.—This is the leading apple of the Volga, the apple tree most highly prized, most largely grown. To the inquiry, which are your most profitable varieties? the reply invariably was *Anis*. I think, invariably, my notes show no exception nor do I remember one. Such was the verdict in all the orchards of the different towns and villages between Kazan and Saratof. We first met with it in that curious semi-oriental bazaar, the Nijni Novgorod fair. Here we find the Russian peasant orchardist bringing large quantities of it to the bazaar in bark boxes, usually willow bark boxes, holding about three bushels.

In the southern part of the Government of Kazan, in latitude 55, the same latitude as Moscow, but 430 miles to the east of it, in a continental climate, a climate of extremes, and yet 600 miles nearer the North Pole than the City of Quebec, there are twelve villages where the peasant proprietors are apple growers, the chief industry in fact is apple growing. When we were there the little trees were loaded with fruit, yet the thermometer had been down to forty below zero the winter previous. Five years before, during one day, the temperature on these exposed loess bluffs was—40 Reaumur, or 58 below zero by Fahrenheit's thermometer. These low temperatures, however, do not seem verified by the meteorological records in the City of Kazan. Hearing of these low temperatures I looked for winter injury to the trees, but did not find any traces of it.

In answer to the query, which is the hardiest apple tree you have the tree that has stood best the most trying winters? the answer, I believe, always was *Anis*. The general idea there is that it is of all kinds known, the apple tree that can be grown the farthest North, except what they call the Chinese apple, or as we would say, the Siberian crab, and these crabs, which are not common, are true Siberian *Prunifolias*, and not less hardy hybrids. In these villages the apple is grown, in a good season, certainly to the value of \$50,000. In this, the coldest profitable orchard region in the world, the *Anis* is noted as their hardiest tree.

Many species of trees become dwarfed towards the northern limit of their growth. The most northern pines and spruces, birches and poplars, are but little shrubs; in the same way we find this *Anis* in Kazan, especially when growing on thin soil and without

cultivation, loaded with fine fruit, and this, evidently, not one of their first crops, and yet the trees not more than six feet high. We find little trees planted two, three, and even four together in a clump like stalks of corn, three or four to a hill, and these clumps ten feet apart each way. This is strictly true of some orchards, not so of others; for upon richer and moister soil, the trees grew somewhat larger, and, as we went southward, at each town we stayed at, we found the Anis larger, until, at Saratof, we saw Anis thirty-five years planted which had attained a diameter of trunk of ten inches. In nursery it is a slow and crooked grower such as nurserymen hate to grow and hate to sell after they have grown them. In orchard a slow grower. Trees in different places, pointed out as thirty years planted, seemed very small. In old orchards at Khvalinsk and elsewhere, it was considered the most long-lived tree. We saw there, trees seventy years at the very least. These were fourteen inches in diameter of trunk, branched low as the Anis usually is, and, though some large limbs had been removed some years ago, yet the trees were sound in trunk and top."

* * * * "We were always struck by the beauty, even when some distance off, of one variety of the Anis. This is the Anis Alui or Pink Anis, and, I suppose, the same as the Anis Rosovoi or Rose Anis spoken of at Simbirsk and other places on the Volga. It is an oblate apple of full medium size, or about the size of the Fameuse, the color of our Decarie, mostly a deep pink with a light blue bloom. In these dry climates we may expect high color. When we were on the Volga it was too early to taste it in good condition, and besides this, it is often picked too early, perhaps, to reach distant markets by a certain time. Whether it will color and ripen on its way to market, like a Duchess, or whether, like our St. Lawrence, it will almost cease to mature after it is picked from the tree, I cannot say. The grain is fine, the flesh white and firm. It is really a dessert apple of fine quality. It often sells at two roubles per pood, that is one dollar per thirty-six pounds, when poorer fruit is selling at thirty cents, and under Russian care it keeps till late winter or spring."

"*Anisovka*.—Under this name Mr. Shroeder tells us of a medium sized, flat, yellowish green apple, with bright red side, grown a good deal about Moscow, and said to be a very good dessert fruit that keeps a long time, in fact all winter. Farther south it would not keep so long." * * * * *

“*Antonovka*.—This is the leading apple of the Russian steppes, the king apple of that vast prairie region from Tula to the south of Kharkof, from Kozlof to Kiev, a vast prairie region unsurpassed in fertility by any region on this continent. It is the leading apple over a larger section of country than any other in Europe, than any other apple I know of. No apple holds so high a rank above others in any large section of this continent; and yet if the Baldwin were equally hardy I would much prefer it.”

“At Kursk we still find it their leading market fruit, and on the Bogdanoff estates, find it being planted in quantity as about the best investment the proprietors know of. Such investments scatter broadcast innumerable little dividends in the form of food and labor. What a blessing to a country is a horticultural aristocracy—it begets a horticultural peasantry, a home-loving, peace-loving, law-abiding peasantry. In Horticulture, we find the safest anchorage for a peasant population.” * * * *

“At Warsaw, where the climate is a cold North German rather than a steppe climate, we find the *Antonovka* one of their leading apples, but not their best, and there not a late keeper. * * * In quality it is not quite like any apple I know. It may, certainly, be rated as second quality for eating and, I hope, first for cooking. But few of the best commercial apples of this continent are of first quality as dessert apples. * * * At Warsaw it rarely keeps past Christmas. At Moscow, Mr. Shroeder cautiously says, till January or February. In Central Russia it was often said till March, and, I think, even April was mentioned. I doubt if it will prove a much better keeper than our *Famense*.”

How long an apple keeps depends very largely upon how it is kept. The Russians handle their fruit, pack it and keep it, with more care than we do. They seem to look upon an apple as a living thing, to be kept alive as long as possible. If allowed to ripen on the tree it has a rich melon flavor but then it will not keep. All apples in Russia picked for a distant market are picked rather earlier than we should pick them. When we arrived at Saratof, on September 11th, the apples were all picked and shipped to Moscow. At Tula, on September 18th, *Antonovka* was in huge piles in the orchards five feet wide, covered with basswood bark matting. At Orel we find what has not been shipped in an open shed in layers with straw between them.”

“*Aport*.—This is the family of which our Alexander is a member, a large and widely scattered family and often of strong family type. No accurate notes seem to have been taken of the places where they live and thrive.” * * * *

“It is named *Aport* because imported long ago from Oporto in Portugal, just as another Russian apple which long ago found its way into Virginia, comes back to Russia *via* Germany under the name of *Virginischer Rother*.”

“I am not sure that we saw the Alexander in Russia, though I believe it to be grown there.” * * * *

“*ARABKA (Arabskoe)*.—Under this name there are one or more apples of decided promise At Moscow, Mr. Shroeder tells us of a large conic apple of very deep color which is a long keeper. The tree he finds a little tender at Moscow, but says that it is grown a good deal in central Russia. * * * At Volsk, on the Volga, in latitude 52, we found in an orchard, about 12 trees in profuse bearing, of an apple known there as *Tchougounka*, which means east-iron; the fruit was roundish, of a dark purplish red, covered with a light bloom, much like the Blue Pearmain. It was above medium in size, although the trees were so overloaded; a firm solid acid fruit said there to keep two years. It also has the merit of holding on to the tree so firmly, that I could hardly find a windfall. It and *Steklianka* were the only varieties in this orchard not yet picked, on 8th September.” * * * *

“*Arcad*.—I am not sure that there is any apple in this family of special value. They are a family of early apples, sweetish, and of but medium size, but the trees have proved very hardy.”

“*Beresinskoe*.—Mr. Shroeder speaks of this as a large whiteish apple with yellow side, flesh firm but breaking, not able to bear carriage well, but a very fine autumn dessert fruit.

Beriosovka.—This we met and took a great fancy to in the Kozlof market. As we saw it there, it was a fruit of full medium size, oblate, red on one side in splashes and specks; very firm, yet breaking, very juicy, with a fine mingling of sub acid and sweetness. The seeds were black on 13th September, yet it seemed likely to keep two months.” * * * *

“*BOROVINKA (Borovitski)* must be looked upon as a family name. It was a member of this family that, long ago, migrated to this

country and became known everywhere as the Duchess of Oldenburg. This apple we did not see in Russia. At Tenki, in the Government of Kazan, in a peasant orchard, we saw trees in full bearing of a fruit which both Mr. Budd and I looking carefully at it thought to be Duchess; but on tasting it we found it so fine in grain and so mildly acid, that we felt that no such difference in texture and flavor could result from change of soil and climate." * * *

"GRAND MOTHER (*Baboushkino*) is described by Mr. Shroeder as a beautiful bright red medium sized oblate apple of fine quality. At Voronesh, Mr. Fischer says it is a good and productive tree, and an excellent large sized apple that keeps till March. Mr. Regel describes it as an apple of first quality that keeps till May. What we saw under this name were above medium size, flat rather, with a large thick stalk; flesh white, firm, breaking, juicy, fine grained, unripe, but showing every sign of fine quality, and of being a long keeper. Its appearance is against it, yet these hardy long keepers deserve thorough trial."

"RED KOROSHAVKA (*Koroshavka Alui*) is one of those strikingly beautiful apples one cannot forget. It has the color of our Victoria, a bright deep pink, and any part not so colored is as nearly as possible pure white. It is usually of medium size, often above, regular in outline, and never ribbed like Pink Anis. Like Victoria, its flesh is a pure white, and on 29th August, firm, crude acid, not ripe enough to fairly judge. This tree, like the Anis, when grown in the North is dwarf in habit, and where broken down by weight of snow, sound at the heart, and evidently a young and abundant bearer. At Tenki it was said to keep till January."

"*Skrusapfel*.—Dr. Regel speaks of this as an excellent table apple that keeps until the following Summer, and says that the tree endures the coldest Winters at St. Petersburg, and has been grown at Moscow, Tula, &c. Mr. Shroeder says it is a medium or small-sized apple, striped (but perhaps this only on one side, I am not sure,) a very hardy tree, an apple of really good quality; good for dessert and cooking, that keeps sometimes till August. The tree has branches like a Scott's Winter, which cannot easily be torn out. The fruit, as we saw it, green, with a little dull red, beginning to appear on one side, and very heavy. Flesh greenish, juicy, rather tender, crude, and but very mildly acid, when ripe lacking acid one

would think, otherwise quite good. A good late keeper for cold climates."

"The *Zelonka Moldavka* of Voronesh is an apple I wish to draw special attention to. The specimen we had was large oblong, a solid apple with a texture somewhat like a Rhode Island Greening, firm, acid, with very little sweetness. We got it at Voronesh on 13th Sept., and this description was made when tasted at Warsaw on Oct. 4th. It had been kept in our apple bag but had not suffered. Mr. Fischer showed us trees which seemed hardy and healthy, the fruit has the points of a first-rate cooking apple, and is a fair eating apple, a variety of great promise."

ТИТОВКА, (*Titus apple*).—A large handsome fruit to be seen in quantity, in all the markets of the Volga, and of Middle Russia. It looks like a large ribbed, elongated Duchess, and on account of its large size and attractive color, very salable and therefore valuable. At Simbirsk it is considered one of the most profitable. At Tenki, near Kazan, it is a success, both in nursery and orchard, and from what we saw would seem to have been grown there for many years. At Tula we see one very old tree of it, a survivor of an ancient orchard, killed by a severe winter many years ago. It is therefore a tree that thrives in the severest climates. It would not be safe to assume it to be quite as hardy as Anis of Antonovka, yet it is not very far from it. The flesh is coarse, but juicy and mildly acid, quite good, not at all disappointing, rather better than Duchess, because less acid. In season it is not one of the earliest, yet is a summer or late summer fruit." * * * *

Virginischer Rosenapfle.—It is strange how a fruit may wander to distant lands, and generations after, return to its native land unrecognized. We first saw this in the nursery of the Pomological School at Proskau, and Mr. Budd declared that it must be the "Fourth of July." We then looked up the east of the fruit in the museum and so it seemed to be. Why should it have the name Virginia unless it had been there, and how in those early days get there except *via* England. Yes, we may suppose it to have been included in those importations from Russia, made during the lifetime of the late Andrew Knight, and thence found its way to Virginia. Its name becoming lost, it was grown westward and northward in America as the Fourth of July, and returns to Russia, the land of

its ancestors, even if not the land of its birth, as the *Virginischer Rosenapfel*."

"Of the coast apples in Russia I seem to know very little. We had no opportunity of seeing them in bearing. The climate is not our climate, yet experience is valuable. Dr Regel selected out of a longer list 41 kinds which he recommended, and out of these he marked ten kinds with double stars. These ten kinds are *Antonovka*, *Aport*, (*autumn*), *Borovinka*, *Belui Naliv*, *Red Summer Calville*, *Koritschnevoe* (*Zimmetapfel*), *Koritschnevoe Ananasnoe*, *Polosatoe Novgorodskoe*, *Skvosnoe Naliv*, *Skriusapfel*, *Titovka*."

REPORT OF THE CORRESPONDING SECRETARY.

GRANVILLE FERNALD, OF HARRISON.

The year 1882 in our State, although disappointing the well-grounded expectations of the orchardists, has yet a lesson of encouragement to all, and it may be safe to assert that the faith in fruit culture as worthy to lead most other branches of farming, and thorough determination to make it so, is as well established in the minds of our farmers as any other sentiment or resolve.

A digest of the reports on the condition of general fruit-culture in the United States, submitted to the last meeting of the American Pomological Society at its session in Boston, in 1881, will show that in every State from Maine to Texas, and in many western and in all the Pacific States, the subject of fruit-culture is receiving increased attention, and is only next to wheat and corn-growing in the regards of the best and most intelligent agriculturists.

The last year opened with great promise of an abundant crop of fruits. If blossoms are a reliable indication of a fruitful year, we were certainly justified in expecting a rich harvest; but later on, certain causes conspired to blight the young growing fruit, and the hopes of the sanguine orchardist were sadly disappointed. Yet there remained some encouraging conditions, and spite of the small crop of inferior quality of fruit, a handsome display graced the tables of the annual exhibition, and the prices of apples since harvest time to the present have so stimulated the belief in the success of orcharding, that the aspects of fruit-growing at the present time

warrant us in asserting that at no past period has it stood on so stable a footing as now.

By a careful comparison of the advantages and disadvantages of Maine with other prominent fruit-growing States and territories, as revealed in the reports from diverse sections to the American Pomological Society, two years ago, it is certain that we have fewer of the obstacles to successful fruit-culture in Maine than exist in many States renowned for their fine climates and fertile soils. It is a fact that in nearly every State south of the latitude of southern Ohio, especially in those States near the Gulf of Mexico, disastrous frosts nearly every year, in March and April, destroy every sign and promise of fruit for the year. The winters are far more severe in Kentucky than in Maine in their effects on fruit trees. The committee from that State report several disadvantages suffered by orchardists there, as follows: "Chiefly among them are the different species of insects that prey upon the fruit and tree; climatic influences, such as scalding by the piercing rays of the summer sun, and the alternate freezing and thawing in winter."

If we examine the statements of expert witnesses from the various States west and south respecting obstacles to success in fruit-culture, we shall find that they have all the obstacles which retard our progress, and in some places, many besides. At Norfolk, Va., the pear-blight and a generally demoralized condition of the climate for eight or ten years, was the complaint. Ohio reports an ordeal of sudden and severe changes of weather—so cold, indeed, as to kill the hardy Snyder blackberry, and by contrast, a week of heat in midsummer recording 98° to 104°. The report further says: "Disease and insect depredations are the chief causes of failure. Climatic influences sometimes sweep away the entire crop. Apples, peaches, pears, cherries and plums, are all injured by the curculio.

* * * The scab affects the peach, pear and apple, sometimes so badly that they are entirely worthless." From Georgia, reports of spring frosts, borers and fungoid diseases affecting peach culture, phylloxera the grape, curculio the plum, with pear-blight, show that in that famed sunny region no exemption is enjoyed from many of the obstacles to success that afflict us. The reports from Arkansas and Indian Territory show great damage by frosts, severe drought, twig-blight of apple trees, and about a dozen varieties of depredating insects. In Texas, April frosts sometimes destroy the peaches and grape crops, while fungoid diseases of the apple and pear frequently

cause decay of the fruit. While New Mexico is reported as free from insect depredations or diseases affecting the fruit interest, yet the March and April frosts are noted as an obstacle to fruit-culture.

Many interesting and highly instructive suggestions are noticed in the various reports of transactions and discussions of other Horticultural societies. The veteran pomologist, William C. Strong of Brighton, Mass., in an address delivered before the State Horticultural Society, laments the "sore evil" which has afflicted every section of the land in the matter of numerous varieties of inferior fruits. He feelingly exclaims: "What immense injury has been done to pear-culture, for example, by the dissemination of second, third and fourth rate kinds which come to be only a vexation and a nuisance to the producer!" He makes a noteworthy confession in the declaration that "the nurserymen are answerable for this state of things." He furthermore condemns emphatically, the practice of "offering prizes for long lists of kinds;" and says to the society, "now let us publish the simple truth, that there are but few kinds worthy of general culture." In this expression of disapprobation of multiplying inferior kinds of fruits, the speaker was joined by Hon. Marshall P. Wilder, who said that in testing new varieties of fruits for many years past, he had expended twenty or thirty thousand dollars. Mr Wilder said,—referring to apples for exporting: "of all the apples exported from Boston, ninety per cent. are Baldwins"

The wide range of topics which are legitimate subjects of discussion and properly within the sphere of labor belonging to horticultural societies is worthy of the attention of this society. We find kindred organizations in other States working vigorously to promote other interests than those belonging merely to fruit growing. For instance, the subject of arboriculture—the planting of trees in forests or groves, or for the adornment of lawns, parks, streets and common highways, forms a prominent theme for discussion and treatment by original essays in several societies which are the largest and most influential on the continent.

The rapid destruction of our native forests and the increasing demand for timber and fuel in our country is a cause for much alarm to the industrial economist, and nowhere is the subject receiving more earnest attention than in the Dominion of Canada. The Government, seconded by the efforts of influential local societies, and by the arguments of some of the most intelligent citizens, is

taking active measures towards a conservation of the valuable timber resources of the various provinces, and it is also suggested to engage in the attempt to establish tree-growing on the extensive prairies of Manitoba. The able reports on this subject, with accompanying map, showing the northern limits of the principal forest trees of Canada, east of the Rocky Mountains, published in the transactions of the Montreal Horticultural Society and Fruit-growers' Association of the Province of Quebec for the year 1881, is a forcible reminder of a duty which our State owes to her citizens to initiate measures for the care and economical use of her remaining supply of timber. And it seems to be one of the appropriate functions of a society like our own to exercise its influence to educate the public mind on this most important of subjects pertaining to the agricultural and commercial prosperity of the State.

There are many powerful reasons why the subject of forestry and the planting and protection of trees should be a prominent matter of investigation. But it may be thought that our Society, under its present name and organization, cannot properly include that with all other topics belonging to the undoubted sphere of its work. If so, and it is believed to be desirable to enlarge its sphere of usefulness and employ it in a new line of duties, I think it can be easily accomplished by giving our society a new name, and by means of slight constitutional changes if necessary, endow it with ample power to devote itself to the betterment of some phases of our agriculture, from the consideration of which we are now virtually debarred.

Two years ago, your corresponding secretary was a member of a committee to consider the propriety of changing the title of this society from Maine Pomological Society to Maine Horticultural Society. It was subsequently reported that it was believed by said committee that any change of name of this society was inexpedient. Since that time, I think I have seen certain reasons why it might be for the advantage of our State and the industrial welfare of its people, that we might be empowered in some way to adapt and apply our energies to some branches of inquiry and labor, other than those strictly embraced in the special subject of Pomology.

The magnitude of the fruit growing and shipping operations in some of our northwesterly States, and the almost marvellous increase of the demand for our apples in foreign countries is exercising the minds of fruit-culturists of those States on the matter of

improving the present facilities for direct transportation of fruit from the wharves of the principal lake cities through the St. Lawrence to the Liverpool and London markets. In suggesting the importance of securing government appropriations to aid in enlarging certain inland channels of navigation for the passage of ocean steamers, by which their objects might be attained, the possibility of interference and opposition from those interested in the trans-shipment of western produce from the principal Atlantic ports, whence the bulk of our fruits now go forward by steam conveyance has occurred to them ; as if the subject of speedy and cheap transportation of western fruits to foreign ports could be inimical to the interests of either the apple-growers of the eastern States or the proprietors of the ocean carrying-trade. Why we should wish to use any obstacles for the prevention of the economical transmission of fruit from the far west to Europe, I cannot comprehend. The excellent quality and well known reputation of Maine apples in distant markets render it unnecessary that we should feel any jealousy of the success of even the most highly favored sections in the matter of seeking a market for our own increasing products. Maine, with the maritime provinces of Canada, constitutes the very best located position for foreign commercial operations in fruit of any section of the continent

It has moreover, all the essential requisites for growing the best fruits in unlimited abundance. A million barrels of the best quality of Baldwin apples per year is not an extravagant estimate of the capability of our State to raise for a foreign market within the next twenty-five years, if our farmers and orchardists improve well the advantages within their control. At the lowest probable price, that will be equal to an income of \$1,000,000 and at average annual prices, not much less than \$3,000,000.

A notable invention is reported from Montreal of interest to shippers of fruit to foreign ports, by which some of our tender and perishable fruits can be kept for months in good condition and even endure the risks of an ocean voyage to Europe. The inventor, Mr. George A. Cochrane, made a very satisfactory test of his process by putting away pears, apples and tomatoes about the 23d of September, which were mostly in excellent condition on the 6th of December. He also reported that he had transported melons, tomatoes and such like delicate fruits to the London market the past summer (1881) in perfect condition.

The following volumes of reports have been received, since the last annual meeting, to wit :

Proceedings of the eighteenth session of the American Pomological Society held in Boston, September 14th, 15th and 16th, 1881, from Hon. Marshall P. Wilder, President

Transactions of the Massachusetts Horticultural Society for the year 1882. Part 1. from Robert Manning, Secretary.

Eleventh annual report of the Secretary of the State Horticultural Society of Michigan, 1881.

Seventh report of the Montreal Horticultural Society and Fruit-growers' Association of the Province of Quebec, for the year 1881.

The following paper was then read and followed by discussion :

ON THE RAISING OF HEALTHY AND HARDY ORCHARD STOCK.

BY J. E. BENNOCH, OF ORONO.

The subject that I have selected for this occasion is one which I think of great importance, and one that is hardly ever thought of, except by a few. Until within a very few years past, one seldom if ever heard the question asked concerning the raising of hardy trees, but of recent date inquiries come forth in regard to the causes of so many tender and worthless varieties, or generally of trees of any variety, and this has become a topic of much discussion and study. All know that in all orchards or grounds containing fruit trees, there are more or less tender and dying, when all ought or should be in a healthy and vigorous condition. In this state of things, time, labor and money are wasted. There is a cause as a rule in nature for all things, and there must be a cause for this deterioration, as I can place it under no other term ; and I shall endeavor to show to a great extent, if not fully, where the error lies, and the causes that produce this national waste and misfortune. I think the problem can be solved that will finally exclude and do away with degenerated and tender fruit stock, or at least in a measure.

Many are the disappointments in purchasing trees for hardy varieties, after a few seasons of care and trouble in watching their growth and waiting for promised results, to find that they are in a

feeble condition. One will tell you they need dressing, another will say your ground is not suitable ; and you are at a loss to know what to do yourself, and at last will give up trying to raise any fruit or trees. In all the occupations of life study is required.

The breeder of animals is constantly studying for the improvement of his stock that he may gain valuable points over former years. first starting from the right source, the point is easily gained ; so it is with the vegetable kingdom, it requires thought, study and experiment to arrive at a sure foundation. We expect losses to a greater or less degree in attaining what we seek ; but perseverance will surely win. No person of sense would think of starting with sickly, degenerated stock in the animal kingdom, knowing or even thinking that they would produce healthy, robust results—if he did, I am quite sure his labor would be crowned with bitter disappointment. It is the same with all animated nature, and, as a rule, like begets like.

The present system of producing fruit stock is very much on the degenerating order. In order to produce good healthy fruit stock, the seed germ must be obtained from healthy native trees of as good quality as can be had. If you want to test the fruit and are seeking for improved varieties to be used for grafting purposes, you need not care so much. I should discard all seed from grafted fruit in order to produce healthy stock ; you can test this experiment by planting a row of seed from a native tree by the side of a row of seed from grafted fruit, which will tell you which stands the winter the best. You can see a difference in the growth as to hardiness and tenderness,—you will find in ninety-nine cases in a hundred the natural fruit stock is the best ; there is less winter killing, it resists the cold and piercing winds better than the stock from grafted seed.

Another thing : using stocks from grafted seed, and using scions from grafted trees, tends to degeneration, with no improvement as to hardiness ; but, on the other hand, in using scions from grafted trees or stock, upon natural seed stock, is advancing one step toward hardiness, or rather a slight improvement in that direction ; but if by chance, and there are possibilities of obtaining fine varieties of merit and worth, propagating from natural seed, place the scions on to natural fruit stock, and you are likely to meet with results desired. There is no doubt in my mind but this is a correct rule to produce good healthy trees ; and I have no doubt but degen-

eracy commences by using grafted stock upon grafted stock, and by using seed from such stock, the result is further accomplished. We of course have good varieties from grafted seed, but generally there is some "out" with them. The St. Lawrence, supposed to be a seedling of the Famense, which to many is of fine flavor, has its defects; first, it spots, which is fatal to its character, it loses its flavor early, grows soft, and generally cankerly or dry rot. The tree is of a tender nature. I think the variety is one of the kind that is likely to run out like the Ortly and some others, by continual grafting.

It requires the utmost care to raise pear seedlings from grafted stock seed. I expended twenty-two dollars for pear seed, and did not raise one single plant. This seed I had from different parties. I did not give up trying. I was in Boston and went into the seed department at Faneuil Hall to purchase one more quarter of a pound. The dealer had it on hand but told me he would not warrant it to grow, but that he knew where he could procure what he called "wild seed." He explained to me that it was from the native natural tree, and that he would send me some as soon as he obtained it, which he did, only one-half ounce being my share among others to whom he had promised it. The result was, I raised a crop of fine seedlings, only a very few showed any signs of tenderness.

There is one thing more that produces tender trees, and a verdict of "guilty" should be pronounced on the nurseryman who raises and sends them out for sale, not as nature planned, but as man sought to improve them by cutting off their tap root. After using the grafted seed they resort to this practice claiming that it is the very life of the tree, then by applying strong dressing causing a forced growth which cannot be otherwise than tender. By growing so quickly it does not give time to ripen up its wood. In this direction come thousands of tender trees. This is not all that nurserymen are guilty of; in producing tender stock they take slips of roots six to eight inches long and set on to the growing end of a scion. This is done in work-shops through the winter months, being placed in sand in a cool cellar until wanted for setting or planting in the spring, which is done in a rich plat of ground for the purpose — a perfect hot-bed. This is another way of producing tender stock. These things are evils of a bad order.—I see no way to remedy it, but for each one to raise his own trees. You can get fruit sooner and you will know that by raising your own trees, what you have, by graft-

ing at three years old with scions from bearing trees, you will not have to wait long for fruit. I think by doing this, an improvement will be made in orcharding that will result in a great degree of hardiness to the trees, and that is what all growers of fruit should aim for, and not be obliged to buy from Western parties and not know what they are purchasing. Trees for orchards would be better to plant or set near the locality where they are raised. It is not a hard task to raise a small nursery of two thousand or more, or less, as may be wanted. The sooner our feeble and half hardy varieties are cut down and replaced by healthy natives, re-grafted to good valuable sorts, the better it will be for all concerned. The idea of planting out anything in the fruit line under the representation of being "half hardy," is not what Maine fruit growers want. We want the pure, hardy stocks to begin with, and I have no doubt the results will be acceptable, and all will enjoy the fruits of their labor.

I think in all localities there are some good valuable native varieties that should be disseminated, and propagators of such could exchange with their neighbors and others. Most people will be seeking after new varieties and they will always be wanted by amateurs and small orchardists, of which there are many. The commercial fruit grower is better off with less varieties, but if good sorts present themselves, they should be cared for, experimented with and disseminated. We have of late, many new kinds that are already making their mark, such as Wealthy, Rolfe, etc.; also some that are being introduced that I fear will turn out to be something that many of us knew of before. One for instance, the New Brunswick; and I very much have my doubts in regard to the McIntosh Red, I have raised what I had for the variety for the past two years and I feel very well acquainted with it. Our aim is for hardy trees and generous producing orchards, and it is our duty to try and make the improvement, as I very well know it can be accomplished by study and work, and these two things can conquer all things as they have ever done.

T. M. MERRILL, West Gloucester. From Mr Bennoch's paper I get the impression that he does not favor imported trees—those raised elsewhere than in this State. I am interested in this business. If one locality is better than another, I would like to get light. I would like to hear from some practical orchardist who has had

experience in growing orchards and fruit, and who has obtained fruit trees from different localities.

BENNOCH. Thousands of trees have been brought into Penobscot county, and I will venture to say that very few of them are in a flourishing condition. I think our own trees are best. I don't believe in buying trees of foreign growers.

The PRESIDENT. A few years ago I set out about a hundred trees which were raised by Mr. E. K. Whitney of Harrison. Never in my experience (and I have set a great many trees, of all sorts) have I seen so fine trees as he sent me. Of the whole number of trees there was not a root broken or cut. The roots were coiled up and packed in moss, and when the trees arrived they were all ready for planting. How he managed to take them up and pack them so skilfully I cannot understand. Every one of them lived; which I attribute to the great care with which they were raised and handled. I am sorry to say Mr. Whitney has gone out of the business. I have sometimes ordered trees of agents, and must confess that I have not saved one in ten of them.

Mr. Dow. I think the great trouble is that generally trees are not taken up and packed properly. I have bought a great many which have come in bad condition. Many of the roots were cut off. I am now trying Maine trees and they are doing well.

Capt. F. C. JORDAN, Brunswick. I have set western trees and thought they were as good as Maine trees, but am now satisfied they are not. I had fifty from Mr. Alfred Smith of Monmouth, mostly Baldwins, several years ago; they are all alive and have grown well. I had fifty more from Mr. Whitney of Harrison, the same year; *they* are all alive. I found all good roots. Of all the trees I have had from Maine, I have never lost one. Of the western trees, last winter and last summer, I lost twelve of the finest trees I had. Two Nonesuch died in the winter and the rest are all dying. I had twenty-five Baldwins from abroad, the best part of them died last spring and summer. That looks as if something was the matter with western trees, because they are on the same piece of ground, received the same treatment and were set about the same time. I set them all out myself and know they were carefully set out; they are of the same varieties. I shall not buy any more New York trees. I think Maine is the right place for us to get trees.

S. F. STROUT, West Falmouth. I am a new beginner. Last spring, somebody visited me with a picture book, and I subscribed

for and now find myself possessed of a large number of Ben Davis and another kind which I will not mention. I want to know what to do. I have come quite a distance to attend this meeting. I want to know about this matter of grafting, especially the system of double-working; perhaps it may be a necessity for me to re-top some Ben Davis.

The PRESIDENT. This is a pertinent question. I once had a large number of trees of early varieties, which I wished to change to Bellflowers. I wrote to Mr. C. G. Atkins, who is constantly experimenting in such matters. He said it was a mooted point, and many persons thought the character of the stock might more or less influence the scion; he was not prepared to say.

S. RICHARDSON. I should like to have some one give us information upon that point. I have Duchess of Oldenburgh and Ben Davis trees which I want to graft to other kinds.

GILBERT. I can say to the gentlemen that they might have done a great deal worse than to plant the Ben Davis, for that is one of the best stocks to start with that can be planted. They have only to change it into what they want. What they want will depend in a great measure on soil and location. If they have healthy stock they have not made a mistake, so far. I wish to say a word about hardy nursery stock, which I understand to be the subject before the Society for discussion at this time. I no more think of losing an apple tree set out in my orchard than I do of one of my family dying. Of course sickness enters our family circles, and people die of old age; but I say, unless some accident befalls it, I no more think of failing to grow an orchard tree than I do of failing with my other crops. It is as certain as my hill of corn or as any of my farming operations. It is requisite to start with good stock and put it upon good soil. What is good stock? One that is healthy. We have had a great deal of bad and unhealthy stock sold out of nurseries in the State of Maine. The soil usually devoted to nursery growing, especially the commercial stock, designed for sale, has been alluvial soil; the better kind of plains land. These lands have been used for that purpose because the soil was mellow and easily worked. When you come to transplant trees grown on such soil to the high-land soil where our best orchards grow, not a quarter of them will survive in a healthy condition, except in very favorable seasons. No order ever taken in Maine, for trees grown on such

soil, has proved valuable, or ever will. Yet I know of hundreds of acres of nursery stock standing to-day in Maine on just that kind of soil. If you want a healthy stock, grow a healthy tree on your high, rocky, natural soil. I was glad to hear in the paper by Mr. Bennoch a recommendation to farmers to grow their own trees. I will not dwell upon that point, but you can see the advantage of growing them upon soil where you can produce a tree which will be healthy after it is grown. You may take such stock as that, take the Ben Davis; take your Haas; take many others of those varieties which people have had forced upon them at fancy prices, and graft them with what you want. Now what do you want? I don't know of how many of the celebrated orchardists of this State I have asked this question: "What are your most profitable varieties of apples?" and have almost invariably received this "old foggy" answer: "Baldwin R. I. Greening, Bellflower"—and there they stop. If that is the sum of the wisdom of the best orchardists of Maine, that they obtain the best results from an orchard of Baldwins, Bellflowers, and R. I. Greenings, why in the name of Heaven are we chasing after russets, crab apples, and the Lord knows what? Is it business-like? Is it sensible? We want to apply our good common sense to this question as we do to other matters where our business is successful, and not be in trouble all the time about new things.

QUESTION. Would you not add Northern Spy and Roxbury Russet?

GILBERT. I was talking with a gentleman who has been a successful farmer in every sense of the word, in the southern part of Penobscot county, and he said the most profitable enterprise he ever engaged in was raising Baldwin apples. This winter it was my privilege to see a very creditable exhibition of fruit. I met a man well versed in fruit-growing, and asked him what were the most profitable varieties for commercial purposes? And the answer was, "Baldwins, R. I. Greenings, Bellflowers." I went into the southern part of Franklin county and talked with successful orchardists there. I raised the question, "What is the most profitable *single* variety of fruit for commercial purposes in Franklin county?" They said "the Baldwin." I asked what would you add? *Answer.* "R. I. Greenings and Bellflowers, and the Roxbury Russet in localities where the soil is adapted to it." That to a young American, or to a man starting out for the first time in fruit growing, would sound old foggyish; but within the last fifty or seventy-five years we have been

experimenting in this country with two or three thousand varieties of apples, and we have not yet found anything that exceeds the good old varieties, Baldwins, R. I. Greenings and Bellflowers. The wisdom of this State seems settled upon that point.

STROTT. I have been told that the Ben Davis would be profitable to raise for a late keeper.

GILBERT. Good looks will go a great ways sometimes, but if I was situated as you are I should not dare to base an expectation on a market fruit so inferior in quality as the Ben Davis. We do not care so much for extremely late keeping apples as we have done in the past, because we get early apples from the south in better condition than formerly. They will be better and better as means of transportation are improved. We don't want to keep apples after the first of July, because new apples come then. The market does not call for old apples in August; hence an extremely late keeping apple may not sell upon that quality alone.

QUESTION. Are there nurseries in this State where we can procure such trees as we want for high land?

GILBERT. I cannot answer the question with certainty. I do know of some good nurseries that are putting out good trees; but how many, I have no means of knowing.

Many of our nurserymen have given up because they could not compete successfully with the western nurserymen. These sharp-men, who make a special business of making sales, get the field, so the business has greatly failed, and every orchardist had better take a good piece of ground and raise for himself a patch of trees, and take good care of them, keeping the ground clean, as a supply to draw from to enlarge his orchard, and thus keep his stock good.

The SECRETARY. I have only a word to say. I do not believe it makes much difference whether a tree is grown in Maine, Massachusetts, Connecticut, or New York. I do not believe it is a question *where* it is grown, so much as *how* it is grown; I do not understand that this Society has undertaken, (although it has done what it could to encourage the production of Maine trees as a home-industry,) or has gone so far as to say that Maine is at present producing all the trees it wants; nor that the Society takes the position that a tree *must* be grown in Maine. The important question is, *how* the tree is grown, how it is transplanted; how it is cared for in the nursery; *not* where. And for the information of everybody who asks for information, we designed at this meeting to ask

nurserymen of the State to make definite returns to us of what they had for sale, and what they would have in the future, that we might publish a definite statement to answer such questions as gentlemen ask. This has not been accomplished; but I think we can at this meeting give such notice to the nurserymen in the State as to induce them to make returns which can be published hereafter in our proceedings. If we can, it is desirable that we should do it. We want to give them a gratuitous advertisement, if they will furnish us the information.

MERRILL. I think it is the worst thing we can do to recommend growing trees for our own use. We may get a good many ideas by growing trees that will be profitable, as fruit-growers. I find the best orchards in the State, or as good as any, coming from western New York, raised by men who have had thirty or forty years experience. I am considerably indebted to New York and Pennsylvania men for things I have learned in fruit growing. I think when we discard these men we are giving ourselves away.

The PRESIDENT. These trees are raised in mellow soil, and grow rapidly. Take these trees and transport them long distances, tied up a month before setting out, then exposed to cold winds, and set them on hard soil, and they cannot do well.

JORDAN. In speaking of western trees, I do not mean to say there are no good western trees. The trees I had of Whitney were grafted in the limbs; also of Smith. New York trees are grafted in the butt; they die easily—don't seem to be hardy. In the New York trees I didn't see anything but the graft. I have no trouble about making one of those trees live a year or two, but cold winters kill them. I don't think it makes any difference where the root of a little tree is grown; I think it will grow as well in one place as another.

GILBERT. I dislike to have this meeting adjourn without repudiating any sweeping assertions with regard to the worthlessness of New York or Maine trees. I do not quarrel with nurserymen, whether they grow trees in Maine or New York. I have repeatedly stated that in order to secure success we must have *good trees* to start with. If the gentleman who denounces Maine nursery trees bases his judgment upon the trees sold and offered for sale for several years past at Mechanic Falls, by a person celebrated in connection with the "scythe sharpener," I should agree with him.

Gentlemen, the only tree that I have lost in the last twenty-five years, dying without any apparent cause, in my orchard, was a purchased tree. Nearly all of my trees were grown in Maine from the seed, and I could point you to thousands grown in the same way, and planted and now doing perfectly satisfactory duty. Many of you are acquainted with the locality of North Monmouth, celebrated for its thrifty orchards. They are grown in the way I have recommended; grown in Maine and transplanted; making some of the best orchards in the State. Examine the splendid orchard on the grounds of the Insane Hospital, Augusta, and you will see only trees grown from the seed in the State of Maine. To leave the impression that none of our Maine grown trees are good for anything would be most unjust. I make no issue about the comparative merits of western trees; but I can cite you to some of our best orchards as having been grown in this State. I know men don't want to wait six years for trees to grow from the seed, but gentlemen if you are going into the orchard business, and live so long, in six years from now you will want to set more trees, and if you don't plant the seeds, you must purchase trees. So if you plant a nursery this spring, you will find use for the trees and your neighbors will want some. You will be adding to the wealth of your neighborhood and doing good for the world, if your trees are well grown, on suitable soil.

DISCUSSIONS ON SOME VARIETIES OF APPLES.

Golden Russets. GILBERT. Allusion was made in Dr. Hoskins' paper on the nomenclature of russets, to the Golden Russet of western New York, as being a remarkable bearer,—and it was recommended for cultivation. I would like to hear from members on that point,—especially from those of the northern part of the State. I should take some exceptions to the high recommendation given to it.

In the first place it will be well to set ourselves right as to the variety which is meant. There are several varieties of apples introduced from western New York, under the name of Golden Russet. The one which I understand to be referred to by Dr. Hoskins bears a high reputation in western New York. [Exhibits specimens from the exhibition table.] It is grown extensively in this county and throughout the State. It grows on the twigs, which are slender and quite naked until near the ends,—hanging on the tree in a drooping form. The fruit is not very plentiful on the tree, one single apple

in a place,—not in clusters. You all know what the result is where apples grow in that manner. The tree never yields *barrels* of fruit. They should grow in clusters,—load up the tree—if you are to get a large number of barrels. I don't know what the experience of others has been, but in my experience, and in the observation of hundreds of orchards in this State I never have seen a tree of that variety that I called well loaded with fruit. Yet it is a passably good fruit, for the reason that it is a very late keeper and we have but *few* late keepers; consequently if you want a very late keeping apple for home use it may be desirable to introduce this; but in my judgment it will not bear so high a recommendation as the paper gave it. With regard to its extreme hardiness, I am not able to corroborate or deny the claim made. It is generally called hardy, and does passably well along our northern borders.

There is another Golden Russet, introduced from the same locality as the one I have just spoken of. This is regular in shape not tapering like the other; completely covered with russet; flesh white; are of passable quality, and will keep until June when barrelled carefully so it will not shrivel.

There is another apple, which I now hold in my hand, [exhibits specimens] introduced from New York as a Golden Russet, but as worthless as worthless can be. This tree grows differently; it loads itself with fruit, growing all up and down upon the branches, from stem to top. As it approaches the top, the fruit grows smaller, and by the time you get half way down the limb, they are inferior in size and quality. It is important to keep in mind the distinction between these varieties,—to know what we are buying and for what purpose; and to avoid getting what we do not want.

Fall Queen, or Haas. Inquiry was made concerning this variety, and the Secretary read from the description given in Downing's First Appendix, page 10:

“Originated near St. Louis, Mo. It was at first called Gros Pommier, but now generally Fall Queen or Haas. * * Very popular through most of the West and Southwest as a profitable market fruit, and for family use. Tree hardy, very vigorous, upright, forming a beautiful symmetric head; an early, annual, and abundant bearer. Fruit medium to large, oblate, slightly conical, angular or slightly ribbed; skin smooth, pale greenish yellow, shaded nearly over the whole surface with light and dark red, some rather obscure splashes and stripes, and a few light dots;

stalk short, small; cavity medium, a little greenish; calyx closed; basin small or medium, slightly corrugated; flesh quite white, fine, often stained next the skin, and sometimes through the flesh; tender, very juicy, vinous, brisk sub-acid; good to very good; core medium or large. September, October."

W. P. ATHERTON, Hallowell. I have a tree of this variety, which was set about three years ago. The tree appears to be very hardy and a rapid grower. The first year it fruited the fruit was small and unsatisfactory, but last year it bore some good specimens. It is an autumn fruit, and we do not need it. I think it does well in New York, but in Maine we do not want it.

S. R. SWEETSER, Cumberland Centre. I have found the Haas apple good for nothing,—the same in my neighbors' orchards as my own. It is not worth gathering. I should call it as mean a fall apple as the Ben Davis is for a winter one.

PIERSON. I have the Haas grafted into a Siberian crab, standing in a sand bank. It has borne two years,—this year large and fine specimens,—dark red, larger than the Baldwin, and a good dessert apple. I should advise any one who has Siberian crabs to graft them with it.

MERRILL. The Haas should not be set in clayey soil, but it grows well on sand. It is *iron-clad*, hardy as the Ben Davis and a better apple to keep, but is quite mellow in the fall. I gathered mine late, and they are sound at the present time.

RICHARDSON. If I wanted seedling stocks, I would sow seed of the Haas; but after four years' trial, I am obliged to condemn the fruit. I have not been satisfied with it. It is a splendid growing and hardy stock,—the best in my orchard, as far as that is concerned.

Newtown Pippin. SWEETSER. I have specimens here which agree with Cole's description; but it is not a good bearer, and I do not consider it a profitable variety.

Peck's Pleasant. THE PRESIDENT. One of the most delicious apples.

MERRILL. I think it is a rather moderate bearer. It has been extensively raised in western New York and is regarded as a valuable fruit.

IRA E. GETCHELL, Winslow. I consider it one of my best apples. It is a good bearer, bearing every year. The wood is very hard

and strong. [In answer to a question]—perhaps it is liable to overbear, rendering the fruit small.

CHARLES S. POPE, Manchester. It is a very nice apple for some purposes, but not profitable for market.

Esopus Spitzenburgh. THE PRESIDENT. This apple, as grown here, is of fair quality, but no better than the Baldwin. In New York, it is totally different, and very delicious.

Red Canada. POPE. Very hardy, but does not belong to the class called "iron clads."

Baldwin W. B. FERGUSON, Dixmont. Allow me to say a word in relation to the Baldwin. I raise many kinds of apples. In my vicinity the Baldwin is *the* apple, thoroughly hardy (that is, in Penobscot county.) I have known Baldwins there ever since I have known anything, and still they are bearing. I grafted Baldwins twenty-five years ago and they are now vigorous, healthy and prolific. I would'nt give one Baldwin tree for a whole row of your "iron clads," with half of the Russets thrown in.

THE PRESIDENT. I advise everybody who has a soil and location which suits the Baldwin, to raise it extensively, but if other apples do better, raise *them*. Several years ago I lost a great many Baldwin trees by winter killing. They were not upon good land, and I afterwards neglected those that survived,—but finally thought I would try them again. I went to work on my Baldwin trees, and have been amazed at the result. The trees are remarkably healthy and have borne large crops of very fine fruit. I have not lost any trees since that time.

COMMITTEES APPOINTED.

Voted, That a committee be appointed by the chair to take into consideration the subject of Russets, with reference to their nomenclature and the merits or value of the different kinds, and make report, with such recommendations as they see fit, at a future meeting.

The President appointed as said committee Messrs. Z. A. Gilbert, Charles S. Pope and W. P. Atherton.

Voted, That a committee be appointed by the chair to examine the fruit exhibited at this meeting, and make report with their recommendation as to the award of premiums.

The President appointed as said committee Messrs. A. E. Andrews, W. H. Pierson and C. A. Dow.

Adjourned.

THE EVENING SESSION

was devoted chiefly to a lecture by Mr. S. L. Boardman, under the direction of the Board of Agriculture, on "How to elevate the Standard of Maine Farming."

Adjourned.

SECOND DAY, Wednesday, January 31.

Met at 9 o'clock, A. M.

The morning hour was occupied with the transaction of business, postponed from the annual meeting in September.

The Treasurer presented his report for the year 1882, as follows :

GEORGE B. SAWYER, TREASURER,

IN ACCOUNT WITH MAINE STATE POMOLOGICAL SOCIETY.

DR.

To cash in the treasury, January 1, 1882.....	\$25 03	
amount on deposit in Wiscasset Savings Bank.....	344 40	
“ received from the State, bounty for 1881.....	500 00	
“ “ of life members.....	40 00	
“ “ annual members.....	33 00	
“ “ State Agricultural Society.....	325 00	
“ “ from donations.....	102 00	
“ “ sales of fruit, &c.....	7 28	
“ “ for interest.....	15 49	
		\$1,394 20

CR.

By amount paid loan of 1881.....	\$200 00	
“ “ interest on loans.....	12 73	
“ “ orders of Executive Committee.....	248 52	
“ “ premiums of 1881, balance.....	120 00	
“ “ “ winter meeting, 1882.....	38 50	
“ “ “ annual exhibition, 1882.....	331 00	
“ on deposit in Wiscasset Savings Bank.....	344 40	
By cash in treasury, December 30, 1882....	99 05	
		\$1,394 20

GEORGE B. SAWYER, *Treasurer*.

WISCASSET, December 30, 1882.

The report of the Executive Committee, for the year 1882, was presented, as follows :

To the Members of the Maine State Pomological Society:

The Executive Committee hereby report that they have examined the foregoing account of the Treasurer, for the year 1882, and have found the same to be correctly stated and properly vouched.

That they have drawn orders on the Treasurer during the year, to the amount of \$248.52, for the following objects, viz:

Expenses of winter meeting, 1882.....	\$75 22	
" annual exhibition, 1882.....	154 54	
Incidental expenses.....	18 76	
		\$248 52

Statement of the financial condition of the Society, December 30, 1882:

ASSETS.		
Cash in the treasury	\$99 05	
Amount due from the State, bounty for 1882.....	500 00	
Property owned by the Society, estimated	100 00	
		\$699 05
LIABILITIES.		
Amount due on loan	\$140 00	
" of unpaid orders.....	97 53	
" " premiums of 1882	234 50	
Balance due permanent fund.....	375 60	
Other liabilities, and bills not rendered.....	250 00	
		\$1,097 63

(Deficiency of assets, \$398.58.)

PERMANENT FUND.

Cr.		
By fees of 72 life members.....		\$720 00
Dr.		
To amount on deposit in Savings Bank.....	\$344 40	
balance due from Society.....	375 60	
		\$720 00

Respectfully submitted,

GEORGE B. SAWYER, *for Executive Committee.*

The foregoing reports were severally accepted.

Voted, That the Secretary be paid a salary of two hundred dollars per annum for his services.

Proceeded to the election of officers. Messrs. J. E. Bennoch and S. R. Sweetser were appointed as a committee to receive and count the votes.

The election resulted as follows :

For President—Robert H. Gardiner of Gardiner.

For Vice Presidents—Stillman W. Shaw of Minot,
S. C. Harlow of Bangor.

For Secretary and Treasurer—George B. Sawyer of Wiscasset.

For members of the Executive Committee—(in addition to the President and Secretary,) Samuel Rolfe of Portland, Charles S. Pope of Manchester, Henry McLaughlin of Bangor.

For Corresponding Secretary—Granville Fernald of Harrison.

For Trustees :

Androscoggin county—D. J. Briggs, South Turner.

Aroostook “ Henry Tilley, Castle Hill.

Cumberland “ S. F. Stront, Falmouth.

Franklin “ S. R. Leland, Farmington.

Hancock “ Charles G. Atkins, Bucksport.

Kennebec “ W. P. Atherton, Hallowell.

Knox “ Elmas Hoffses, Warren.

Lincoln “ H. J. A. Simmons, Waldoborough.

Oxford “ N. T. True, Bethel.

Penobscot “ J. E. Bennoch, Orono.

Piscataquis “ H. A. Robinson, Foxcroft.

Sagadahoc “ H. S. Carey, Topsham.

Somerset “ James S. Hoxie, North Fairfield.

Waldo “ D. L. Pitcher, Belfast.

Washington “ H. A. Sprague, Charlotte.

York “ John Hanscom, Saco.

Then proceeded with the reading of papers ; the first being on

VEGETABLE AND SEED GROWING.

BY WILLIAM DUMONT, OF WEST GLOUCESTER.

In presenting this paper, it is not my intention to advance any new ideas, but simply to remind my fellow farmers of the importance of growing our own seeds, more especially those intended for the garden.

The farmers of this State pay out, annually, a large sum to seed raisers of other States, which ought to be kept at home. The

greater part of these seeds sown here are for raising vegetables to be consumed as such, and it is an established fact that northern grown seeds are vastly superior to those grown either in the south or west. The onion, for instance, for the seed of which any farmer would rather pay a dollar a pound for Maine grown seed than fifty cents for the same variety grown in Pennsylvania. The same holds good with other kinds, but probably not to so great an extent.

Our State has a good reputation for all its products in the south, west, and even across the Atlantic. Wherever you find them they almost invariably lead the market. The same might be said of her vegetable seeds, but they must first be grown and put in the market.

The demand for garden seeds is increasing year by year and more are raised to meet this demand; and why should not Maine increase her product? The time was, and that not many years since, when Maine produced all the seed sown within her borders, and it ought to be the case now. But go into our seed stores,—go into the country store on the cross roads throughout the State, and ask to be shown some vegetable seeds,—and how many will show you Maine grown seeds? Very, *very* few. I presume there are as many seeds raised in our State as formerly; but as the demand increased, our seedsmen were obliged to get their full supplies from other States.

It might not pay each farmer to raise seeds and put them up in small retail packages; but there are several seedsmen in the State that do a wholesale business, and willingly pay a remunerative price for good seed, but cannot always get a supply without going abroad. But to be successful, we must start with good, reliable seeds, and varieties for which there is a demand. Then for seed raising, reserve only the very best, and thus we may be improving the variety every year.

For winter storage for roots intended to be set in the spring, generally a good amount can be stored in the cellar; but for those who lack such room and even those who do not, a very convenient way is to dig pits on or near the plot of ground to be planted, providing it is well drained, for this is most essential. They need not necessarily be very deep, two feet will answer as well as deeper, for the roots may be heaped up and covered with straw, chaff, evergreen boughs, or anything of like nature, with the soil thrown over all to the depth of a foot or more, and they will come out in the spring in prime condition. The onion need not be pitted, but can

be kept in any outhouse, well buried in chaff or straw, with a foot or more of it both over and under them, so that the frost may come out gradually as warm weather approaches.

In culling out the inferior roots the greatest care should be exercised that none but the very best be set. There is always a demand in our stock barns for all inferior lots that are not fit for setting, which sometimes are worth nearly as much as the cost of the whole crop. The setting of the roots and care while growing the seeds, is as simple as the growing of a crop of corn or potatoes, and farmers of ordinary intelligence will succeed if they put their minds to it. The cleaning of the seed can be done in the fall after the pressing outdoor work is over.

Very few farmers realize the importance of a good crop of squashes, for aside from its being a healthy article of diet for both man and beast, the seed will often sell for more than the cost of raising the whole crop. Thus while raising seed for market, we are at the same time furnishing our tables and stock with an abundance of healthful and nutritious vegetables, without impoverishing the farm.

Let our Maine farmers consider these ideas, and if they do not feel to raise seed for market, they can grow enough for home demands. But if they should put hundreds of tons into the markets of our own and other States, we should see the same results as in her other products. They will be sought after above all others. Well may our State feel proud of her motto, "Dirigo," for surely she does direct and lead in many ways.

PIERSON. I have thought considerably about the matter of seeds. Last spring I bought a package of early peas. They were raised in Michigan. When I opened them, I found they had all been injured by the pea weevil. I sowed the package in two rows about $1\frac{1}{2}$ rods long. But very few of them came up, owing to the weevil. I found the peas had been sold at the rate of \$48 a bushel, which I thought was rather steep for a farmer to pay. It was quite a large package but the peas were few. So it is with packages of seeds; as the paper grows larger, the amount of seeds grows less. It has occurred to me that it is just as easy for every farmer to raise his own vegetable seeds and tubers. He can set the roots in the spring, and with a little care raise his seed and not be dependent upon those who raise and put upon the market such inferior seeds at exorbitant prices. Seeds raised at home are so much better than the seeds in

the market. Every one should be in the habit of raising his own seeds.

I wish to call attention to the matter of grass seed. The foul seeds we have purchased in our grass seed have been of immense damage to the fields. There is a new weed that has appeared within a few years; that is the wild carrot. It is one of the worst weeds we have. The prairie sunflower is an abominable pest. It is a yellow weed a little larger than white weed; it will stick in the ground year after year. This wild carrot spreads over the ground. It is not more than five years since I first saw it, in a trip from Vassalboro' to Winthrop. Since then it has increased rapidly, until many of the fields in Vassalboro' are entirely white with it. [In answer to question.] I do not know how it was introduced, unless by purchasing grass seed.

THE OLD AND NEW METHODS OF DRYING FRUIT.

BY E. N. PERRY, OF PORTLAND.

The request coming to me through the Hon. C. J. Gilman, from the Maine State Pomological Society to prepare a paper on the fruit growing interests of Maine, is eminently a reasonable one, and as far as I am able my interest in the subject will prompt me to furnish the paper requested.

I regard our State as among the best for fruit growing and in that interest capable of occupying a leading position and stimulated by increased and improved facilities for manufacture and preservation, is sure to take such a position.

Much has already been accomplished through your Society and other instrumentalities in the line of improvement, and much yet remains to be done. The comparative value of the various methods of culture, preservation and manufacture and their attendant results can be seen most clearly by a comparison of the present with the past.

Once orchards were set, and little more was done until some kind of fruit appeared, some good and some good for nothing, and all alike the natural production from the seed. Hence trees were permitted to occupy their position for generations, undisturbed, to vegetate or die without care, culture or little attention of any kind

except at gathering time. A portion of the fruit thus produced was prepared for winter by drying, a portion manufactured into cider and a large portion fed to cattle and swine or suffered to decay where it had fallen.

The method of drying was almost exclusively used among the farmers to preserve their winter stock. Let us look in upon the process, say fifty years ago. Towards nightfall a few baskets of the fairest and best of the apples were gathered and brought into the kitchen, and after the members of the family gathered from their daily employment the evening was spent in apple paring; father, mother, brothers and sisters, each with knife in hand, commence the tedious operation. Each apple was taken singly, slowly peeled by hand, cut in quarters, the core removed and passed to the younger children for stringing. This process was accompanied at every step by litter and weariness, and absorbing the time of the whole family. And not of a single evening only, but for weeks shutting away more congenial and profitable employment. The united efforts of an ordinary family could prepare for drying perhaps five bushels in an evening. But the preparation of the fruit for drying was by no means the end of the tedious process. Poles must be erected in a sunny place, the fruit carried out mornings and brought in evenings for several days, perhaps weeks, before suitably dried. For the sun being depended upon for drying, the process was stopped on cloudy weather, and at the prospect the fruit must be returned to shelter. The result of all this labor, care and time was an average of say five pounds of dried apple to the bushel, worth in barter five cents per pound, making an aggregate of twenty-five cents per bushel for the best of the fruit. Or more concisely, a family of five prepare for drying five bushels of fruit per evening. A large amount of time must be consumed in clearing away litter, attending the drying, packing and carrying to market, making a total of forty hours' time, equal to four days of ten hours' each for twenty-five pounds of dried fruit. This could be sold on an average of five cents per pound, making one dollar and twenty-five cents for four days' time,—thirty-one and one-fourth cents per day, leaving nothing for the fruit. If we call the fruit twenty-five cents per bushel nothing remains for labor. Some improvements were made by introducing simple machinery for the more rapid preparation of the fruit, and some in the fruit itself by better

culture and occasional grafting of better qualities; but the process of drying remained essentially the same until very recently.

Another fact; as the drying process must be carried on by exposure to the sun and wind, dust was liberally added to the generous supply of filth furnished by insects attracted to the sunny exposure and drying fruit. Nor was this all; decay often occurred in the middle of the fruit, while the sugar was largely converted into an acid for consumption—a dirty, woody, acid compound, resembling apple in some respects, but robbed of its most valuable qualities. These facts were sufficient ground for the feeling, then almost universal throughout the State, that orchards were of little value to the farmers as a source of revenue; for it was literally true. But the more thoughtful and enterprising turned their attention to the cultivation of a better quality of fruit, both by grafting and by planting better varieties, thus seeking to find an outlet for their industries by the sale of fruit in its natural state.

The enterprise met largely with success, and the commercial value rapidly increased and the products of the orchards became a revenue to the farmers. But only the best fruit was of marketable value, and a large percentage of an inferior quality was left to be dried, manufactured into cider, fed to stock or allowed to decay. This was the state of the industry up to a very recent date. But the method of evaporation is changing the entire process of disposal of the fruit, and bids fair to change the entire commercial value of the fruit crop of the State. By this new process all the litter which formerly incumbered the farmer's dwelling is removed to places where it can be easily and cheaply cared for. Thus the farmer and his family are left free with their evenings for social, intellectual and moral improvement. The place once occupied by apple peelings, corings, baskets and tables can be taken by books, papers and magazines, thus bringing the farmer and his family nearer the pulse of the great social world. The change also furnishes a ready sale for fruit with no loss and little trouble. The best of the fruit can be reserved for sale in its natural condition, while the medium and poorer qualities are available to the new process. Again he is saved a great amount of labor for all storing, sorting, and harvesting is condensed into the simple process of gathering the fruit into wagons and drawing it to the factory. And the prices paid for the fruit direct from the orchards is largely in advance of the price obtained for that dried in the old method. Prices for the current year range from twenty-five to

sixty-five cents per bushel. Thus giving to the farmer, with little time and trouble attending, from three to five times the former amount for his fruit. And he can supply his family with their usual quantity and of a vastly superior quality for the money received from the sale of his crop and retain a liberal margin for profit. Another fact in favor of the new process is the keeping qualities. Being simply apples dried, they will remain the same for any length of time if water is withheld. Thus is added to our stock a supply of no small commercial value. While the old method of exposure to the sun often allowed partial decay, thus greatly reducing its keeping quality and its value. But the greatest distinction between the two methods remains to be presented. The fruit by the new process is prepared in a few hours, against several days in the old, and is exposed to neither sun, wind, insects nor dirt. The products are perfectly free from dust and all other impurities. The process is carried on in absolute cleanliness. The water only is removed, and that so rapidly that all the natural elements of the fruit are left undisturbed. No changing of sugar to acids, no transformation to a woody substance, no approach to decay and no mingling of impurities,—simply dried apples; and so natural that the restoration of water restores the fruit to a state so perfect that the Baldwin, Greening, Northern Spy, or any other variety can readily be distinguished by its flavor. The process is a long step in the direction of improvement, and must, on becoming general, revolutionize the fruit growing interest of the State, and place a largely increased revenue in the hands of the farmers. From our present point of observation we look upon the fruit growing interest of our State as in a healthy and prosperous condition.

But the capabilities of our State are comprehended by a few only, and the mission of that few appears to be to enlighten and stimulate the many. May their work be steadily and faithfully pursued until the broad acres of our noble State shall gleam with its pendant golden fruits and every farmer be enriched by his abundant harvest.

Accompanying Mr. Perry's paper, was a letter transmitting a "Weekly Apple Report" from Liverpool, dated January 6, 1883, concerning which Mr. P. said: "By this you will see that the Boston apples, which includes Maine and New Hampshire, sell much lower than any other. I think it would be well for the Society to inquire into the reason for this, and also as to the kinds best adapted,

to that market. The reason I give for their not bringing so good price as others is this, unsuitable packages and dishonest packing; in other words, the packers put choice apples in the top of the barrel and poor ones in the middle, or as we call it they are 'badly deaconed'."

The following paragraphs from this apple report will explain Mr. Perry's criticisms :

"Our market this week has been dull and inactive, and the buyers have shown no spirit even when the choicest samples have been shown; at the same time arrivals having been light and mostly out of condition, best selections of colored fruit have not declined in value, but apples out of condition and tender or small and common have done very badly, the trade not seeming to care for them even at low prices.

The demand has been entirely for Red Fruit, and Russets are selling comparatively low, best samples not making over 21s. per barrel.

Arrivals for the week are as follows: From New York, 2,846 barrels; from Boston, 1,564 barrels; from Montreal, 1,643 barrels.

Total for week, 6,073 barrels. Receipts to date, 210,483 barrels.

The following are the quotations: Baldwins, (Boston) 20 to 24s.; Baldwins, (New York) 23 to 25s.; Baldwins, (Canadian) 23 to 25s.; Greenings, 19 to 23s.; Canada Reds, 20 to 24s.; Newtown Pippins, 20 to 35s.; Golden Russets, 18 to 21s.; Rox, 18 to 19s.; Pomeroys, 20 to 26s.; Seeks, 23 to 25s.

Slack Packed, 14 to 18s.; Slightly wet, 12 to 15s.; Wet, 8 to 11s."

The PRESIDENT. I lately received from my correspondent in Boston the price current from Liverpool, London and Hamburg. He says it is a fact that Canada apples are two or three shillings higher than our apples of the same quality, naming some particular apples. He says it is a prejudice of the English people; they will favor the Canadian fruit in spite of everything. A great many apples are shipped from Halifax and sold for Canada apples and bring Canada prices. What helps the prejudice against our apples is the false packing spoken of. This gentleman told me that nothing so injures the sale of apples. It is only by sending out a good quality of apples, well and honestly packed, that we shall in a short time overcome that obstacle and our apples will be quoted higher or as high as any other. We all know that the apples grown in Maine will keep better than those of New York.

The SECRETARY. I understand Mr. Perry's criticism to apply only to that portion of our product which is shipped from Boston; and that forms but a small part of the whole amount shipped from that port, and quoted in Liverpool and elsewhere as "Boston apples." On the other hand it has been repeatedly stated at our former meetings that many of our apples are packed and shipped

via Portland as "Canada apples," thus bringing the highest price instead of the lowest. Whichever of these statements is correct, or if both are so to some extent, the facts ought to be ascertained and made known. If we are building up the reputation of Canada apples at our own expense, and in another quarter getting the reputation of "deaconing" our apples, both practices are reprehensible. I do not believe that our apples as a whole are packed less honestly than those of other States.

ATHERTON. I saw a large quantity of apples brought into Hallowell, a year ago last fall, for a buyer from Boston. They were in flour-barrels, and were completely covered with flour. Flour-barrels should never be used for packing apples without being first thoroughly cleaned. It is utterly impossible to sweep them clean, so but the flour will show upon the apples; they should be washed with water and dried, then there is no trouble.

BOARDMAN. With regard to the price of apples in the Liverpool market. I was at the house of Mr. Carr, in Winthrop, last year, and saw there a gentleman from Montreal who was engaged in shipping apples from Portland. They were put up at Mr. Carr's house, in Winthrop, where he had apples stored and were packed and marked as Canada apples; and the reason given by Mr. Carr, was that the home people had a preference for their own apples, and Canada apples brought a higher price in Liverpool than those from the States. A large proportion of the Carr apples are sold, *known* to be Maine apples. I believe as a rule that it is the design of fruit growers to pack well so far as they understand, and as required by the shippers.

POPE. If parties come in and purchase our apples, how can we prevent them from putting the Canada brand upon them. It is very little use to put them up to keep up a reputation in England putting the larger ones in the ends and small ones in the centre. Their method there is to burst out the head and pour the apples out so that they are all in sight. Whether the apples are put up in poor or good shape it is known immediately, and known where they come from. It is a new business putting up apples for a foreign market, and it is not generally understood how they should be packed.

The PRESIDENT. I believe it is necessary to keep our apples branded from Maine and wait patiently, and in time we shall get a reputation as well as Canada.

A man from Boston once came to look at my apples. They had not been headed up. He said he should like to see a barrel; so the apples were all taken out, one after another. It happened accidentally that as he went down deeper the apples were larger. He was satisfied and from that day to this he has made no question. He showed me how to pack apples, putting the stems down at the bottom of the barrel, and pressing in the head, and turn them over and mark the other end so that is the one opened. There were some apples that were precisely equal to mine, had been carefully packed, and sorted honestly and fairly,—that he went to look at and wouldn't truck them even at half a dollar less, because they were not packed tight, and would bruise in shipping to Boston. When a person gets a reputation established for packing, there is no further trouble, but when parties are not known there is the strictest examination.

JORDAN. The way fruit has been shipped to England, putting the poor apples in the middle and good ones on top has been a great injury to the business; they soon found that out. They knock a head out and pour the apples upon the platform. The minute they see that, it has a great effect. Maine people are doing better every day.

GILBERT. There are some suggestive facts in connection with this subject, but in time they will be swept away. I know a case where Canadian purchasers came into this county to purchase car loads of apples to ship to England. A Maine man who assisted them in purchasing and packing, sent by the same steamer a car load of his apples. Those purchased by the Canadians were branded as Canadian. Those sent by the Maine dealer were branded as from the State of Maine. They each went into the same market at the same time and were sold at the same time. Those branded as Canadian, sold for three shillings a barrel more than the Maine apples. Dealers are looking for the *dollars*. When a Maine man ships to England he brands his apples Canada because he gets more dollars for his apples. While this is a fact, what are we going to do about it? All we have to do, I think, is to do our part of the business justly and honestly, in a straight-forward manner, and bide our time. If we are putting better apples into foreign markets from the State of Maine than from any other section of the country, they are to be recognized; by and by we shall get credit for what we are doing but meanwhile we have got to pass through this experience and these difficulties pending the establishment of trade. This whole business

of shipping apples is comparatively in its infancy; it has not been put into the best working shape, it is going to be handled better by and by. It is a new industry in Maine.

Finally it is said that it is practically impossible to pack apples, oranges or raisins so that the best won't come on top. That may be so, yet I believe that the man who packs his fruit honestly and brands it with his own name, is going to fare the best in the end, although the dishonest packer may get some advantage temporarily.

I hope the subject of the body of Mr. Perry's paper, THE EVAPORATION OF FRUIT, may not drop out of sight without some further notice. It is a business, I believe, of considerable importance to the State and to the individual fruit grower. I hoped that before this meeting finally adjourned the whole subject would be carefully examined to see what there is in it, and what are the best methods to get out of it what there is in it.

The PRESIDENT. I wish to know, as a matter of profit to the farmers, what sort of apples are necessary to be used for evaporating purposes; whether they must be first quality of apples or refuse. It is spoken of as a saving of those apples we used to feed to stock or allow to rot. My impression is that the evaporated apple is so nearly like the original that you can distinguish the kind of apple in the evaporated product. In this case it seems impossible that ordinary apples will do for evaporating and bring the same price as better ones. They bring from fifteen to eighteen cents a pound when common dried apples are worth five or six cents.

Mr. BRETT, of Winthrop. (?) On that point, I made the best work from sour apples.

QUES. Can you use wormy apples?

ANS. You can use wormy apples, but it costs a great deal more. The sound part is as good. I use common fruit mostly; nearly all kinds of fruit.

QUES. Natural fruit will not bring as much as grafted fruit?

ANS. Mine did; and they looked better than grafted apples. I use a great many apples, down to two inches in diameter.

QUES. Cannot you use an apple as small as half an inch?

ANS. A two-inch apple is a very small one.

QUES. What is the cost of machinery for evaporating apples?

ANS. There are a great many kinds. They cost from \$75 to \$1,000; I am acquainted with only one kind.

QUES. A neighborhood could buy the machinery together, and one machine evaporate for the whole?

ANS. I don't know why they could not, like any other machine.

GEO. E. BRACKETT, Belfast. I believe there is an evaporator established in Waldo county, where a good many thousand bushels of apples are purchased and put through the process of evaporation. The price paid is about fifty cents per bushel. The larger portion of those apples were natural fruit. They were in as good demand as grafts, when large and fair. So far as I know, the market price did not change with respect to the quality of the apple. They used natural fruit or any other that would come in at the same price.

MERRILL. I went into an evaporating establishment to learn the price of evaporated apple. They told me that the price depended upon the fruit. The cheapest was the natural. Baldwin, Northern Spy, Roxbury Russet brought the highest price; although manufacturers might make as much margin on native as on Northern Spies, which brought the highest price. One man I talked with, in New York, told me that he made as much money from the Northern Spy that he paid four shillings a bushel for, as he did from natives that he got for twenty cents. There must be more waste in using small apples. In New York State there is a great difference in the price of evaporated apple. It is a staple article of foreign trade. I was speaking with a New York commission merchant; he told me that the people who were manufacturing evaporated apple here were getting large quantities of good natural fruit suitable to evaporate. They can get a certain price for it and it may be better for them to buy that surplus and use it up. I noticed that the manufacturers commenced on natural, and early grafted fruit until it is gone; sometimes evaporating into the winter, sometimes to the first of February, buying out of cellars. One large orchardist in Limerick stored them in his cellar for shipping purposes and evaporators came and paid him four shillings a bushel for the apples, Northern Spy and some other kinds. He said he availed himself of that opportunity as those apples turned for more than the others.

DR. W. B. LAPHAM, Augusta. I purchased of the American Manufacturing Company last summer a small drier, to dry ten bushels of apples a day, but I found its capacity was less than that. I had it as an experiment. It was set up at my brother's in Litchfield. We dried through the apple season; used native apples and the inferior quality of grafted fruit. We used No. 1 apples. We con-

tracted beforehand for the sale of the product at thirteen cents a pound, at Augusta; it is now worth eighteen cents in that market at wholesale. It worked well, and my brother was very well satisfied with what he had done with it, and intends to get a larger one next year and carry on that business on a more extensive scale. A good many of the orchardists in Litchfield have become interested in the subject and will go into the business next year. We get five pounds of evaporated apple from a bushel.

GILBERT. In the town of Green an evaporator has been operated two seasons. Last fall a double machine was used, evaporating more than one hundred bushels of apples a day. It is not expected that when good apples sell for three dollars a barrel, evaporators will pay this price and take them. We have apples of second quality among grafted fruit that we could not get as much money out of if put upon the market; they will sell for about enough to pay for handling and that is all. That class of fruit can be put into evaporators and made profitable both to the seller and the purchaser. Of course they must be put in at a lower price because not worth as much. The price for this quality of fruit has been from twenty-five to thirty-five cents per bushel at the evaporators. In York county, where evaporators were first put in operation in this State, they had one or two very bountiful crops of fruit and prices run extremely low. A good many of the fruit growers in that section who raised nice fruit shook it from the trees without any care whatever and sold it for prices which satisfied them, to the evaporators, who took the whole quantity as it was shaken from the trees. The cost of picking was slight and the growers were satisfied. But those were years of exceptionally low prices.

The manufacturers do not pay as much for native fruit because it does not sell for as high prices; the operation is a profitable one, as otherwise the fruit is worthless. There is room for a great deal of this work to be done and I have no doubt it will extend all over the fruit growing section of the State. Our cheaper fruits will be put into cash in that way. Our early fruits are so plentiful that the market is glutted,—they have become almost unsaleable. I hope those early fruits will be utilized by drying so they can be preserved and carried to a profitable market. No. 1 grafted fruit probably would average six pounds of fruit to the bushel; those of inferior size and with worm holes which make considerable waste, I believe average about five pounds to the bushel; depending somewhat upon

size, as the same size for core is taken out of apples of every size. The machine cuts a core of equal size whether the apple is large or small. The difference in the size of the apple makes a difference in the number of pounds of the product. The product is sold at eighteen cents a pound; six pounds of evaporated fruit from a bushel would give one dollar for the evaporated fruit from a bushel of apples. The cost of the operation is not heavy; so that that is a very fair price to get even for perfect fruit,—a price fully equal to what we get in our most fruitful years.

JORDAN. I have a relative in Fayette who has made money from his large orchard. He has dried a good many apples; sliced them and used a kiln to dry them in; though within two years he has commenced evaporating. He says you don't want to evaporate bitter-sweet apples. The more sour an apple is, the nicer it is for this purpose. It uses up that sort of apples. He has dried from one to two tons a year. I think there is an advantage to be gained by orchardists in using up everything. Every man who has a good orchard can have an evaporator of his own; he need not let it go into the hands of others; he can own one of these machines that cost \$60 or \$70, and keep it himself. That is where the advantage comes from. He need not form companies while he can get all the profit himself.

S. W. SHAW, Minot. There is one point which has not been discussed. If evaporated fruit from natural growth, does not sell for so much as that from grafted fruit there is a reason for it. That reason is this: Evaporating fruit does not change its nature. If we would not go into our piles of apples gathered for cider and promiscuously select our fruit for the market, neither should we select in that miscellaneous way for evaporating, provided we design to get a good product. That is business. A clear sour seedling apple is good to evaporate; is worth as much as a grafted one, and would bring as much; but a large proportion of our natural fruit is not well flavored, and evaporating it will not make it so, consequently it makes a poorer product. Yet it is desirable to work up poor apples, because they will sell and that class of fruit will find a market. One more point. The price has been quoted at eighteen cents a pound. That is so. Last year our friend from Winthrop sold his fruit at Lewiston for ten cents a pound, and was glad to do so. He said he paid out twenty-five cents a bushel, so you can make your own calculation with regard to the profits. Six pounds to the bushel at

ten cents per pound is sixty cents; twenty-five from sixty leaves thirty-five cents per bushel for No. 2 Baldwins.

STROUT. There is another aspect presents itself to me. In front of my house is a cider mill, where a class of people gather to guzzle cider, and I want to get rid of that sort of a nuisance. Moral and social as well as financial questions are involved in this matter. I have determined in my own mind that I will have something to use up the apples. I want to buy those apples that are being ground up there, and dry that mill up.

Adjourned.

Afternoon Session.

Met at 2 o'clock P. M. The committee on award of premiums presented their report, as follows:

REPORT OF AWARDING COMMITTEE.

The committee appointed to award the premiums offered at this meeting, submit the following report:

There were on the committees' book, 131 entries of single dishes of apples, by 16 exhibitors, as follows:

R. H. Gardiner, Gardiner.....	9 varieties.
L. Lennan, Gardiner.....	2 "
George H. Pope, West Gardiner.....	1 "
S. W. Shaw, Minot.....	5 "
Miss L. L. Taylor, Belgrade.....	10 "
William B. Ferguson, Dixmont	1 "
J. S. Hoxie, North Fairfield.....	15 "
F. E. Nowell, Fairfield	16 "
W. P. Atherton, Hallowell	1 "
D. P. True, Leeds Centre.....	9 "
A. E. Andrews, Gardiner.....	7 "
Perley & Perkins, Vassalboro'.....	21 "
W. R. Wharff, Gardiner.....	9 "
Charles S. Pope, Manchester.....	2 "

S. R. Sweetser, Cumberland Centre	22 varieties.
J. C. Blaisdell, Waterville	1 “

Besides these there were some specimens brought in at a late hour and not entered on the books, making in all about 170 dishes of apples.

There were no entries of pears, grapes or flowers.

Premiums are awarded as follows :

For the best exhibition of fruit :

S. R. Sweetser, 1st premium	\$3 00
William R. Wharff, 2d premium.	1 00

For the best dish of winter apples :

R. H. Gardiner, (Yellow Bellflower,) 1st premium.	2 00
S. R. Sweetser, (Baldwins,) 2d premium.	1 00

For the best dish of Baldwins :

S. R. Sweetser, 1st premium	1 00
R. H. Gardiner, 2d premium	50

For the best dish of Rhode Island Greenings :

S. R. Sweetser, 1st premium	1 00
W. R. Wharff, 2d premium.	50

For the best dish of Northern Spy :

A. E. Andrews, 1st premium.	1 00
S. W. Shaw, 2d premium	50

For the best dish of Peck's Pleasant :

James S. Hoxie, 1st premium.	1 00
L. Lennan, 2d premium.	50

For the best dish of Mother :

Charles S. Pope, 1st premium	1 00
Miss L. L. Taylor, 2d premium.	50

For the best dish of Jewett's Fine Red :

S. R. Sweetser, 1st premium	1 00
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For the best dish of Hubbardston Nonesuch :

A. E. Andrews, 1st premium	1 00
Miss L. L. Taylor, 2d premium.	50

For the best dish of Red Canada :

Frank E. Nowell, 1st premium.	1 00
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For the best dish of Black Oxford :

D. P. True, 1st premium	\$1 00
Frank E. Nowell	50
William R. Wharff, gratuity	25

For the best dish of King of Tompkins County :

S. R. Sweetser, 1st premium	1 00
Miss L. L. Taylor, 2d premium	50

For the best dish of Danvers Winter Sweet :

S. W. Shaw, 1st premium	1 00
Miss L. L. Taylor, 2d premium	50

For the best dish of Talman's Sweet :

D. P. True, 1st premium	1 00
S. R. Sweetser, 2d premium	50

For the best dish of Yellow Bellflower :

R. H. Gardiner, 1st premium	1 00
William R. Wharff, 2d premium	50

For the best dish of Roxbury Russets :

S. R. Sweetser, 1st premium	1 00
A. E. Andrews, 2d premium	50

For the best dish of American Golden Russets :

William R. Wharff, 1st premium	1 00
J. C. Blaisdell, 2d premium	50

For the best dish of English Golden Russets :

A. E. Andrews, 1st premium	1 00
Perley & Perkins, 2d premium	50

For the best dish of Gravenstein : (no premium offered.)

S. R. Sweetser, gratuity	50
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For the best dish of Winthrop Greenings : (no premium offered.)

W. R. Wharff, gratuity	50
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Amount of premiums and gratuities awarded, \$31.25.

The committee were somewhat in doubt whether any of the specimens exhibited as American Golden Russets were true to name. They recommend that the English Golden Russet be stricken from the Society's lists.

Respectfully submitted.

A. E. ANDREWS,	} Committee.
WM. H. PIERSON,	
C. A. DOW,	

Then listened to an essay on

WHAT WE LEARN BY FAILURE.

BY S. W. SHAW, OF MINOT.

What is truth? What is error? These questions have in all ages engaged the attention of the wisest, and the wisest have sometimes made mistakes. As affecting the various avocations of life, their correct solution is as vital as the air. The line which separates the false from the true is sometimes so faintly marked, so obscured by plausible speculations that the honest inquirer after truth embraces error instead and in its pursuit plunges into failure.

The most beautiful theory, if at variance with the teaching of experience, like the will-o'-the-wisp of the valley, leads its votary into the pitfalls of disappointment. It is safe to follow only when theory and practice unite in leading the way. The theorizer of to-day says that the farmer should live mainly on the products of his own farm, and refers to the practice of the fathers in its support. It is true they so lived and were prosperous. In our time many have attempted the same thing and failed. Whence their failure?

It is said our remote ancestors lived in caves, and subsisted on roots and nuts dug from the ground with their fingers, and as far as we know, were satisfied. Who would now be willing to revive the practices and the civilization of the olden time? Neither do we believe it best or practicable to follow the former practices except under similar conditions which, in most cases, do not exist, as must be apparent to the most careless observer. Steam, the railroad, manufactures and mechanical ingenuity have completely revolutionized the whole fabric of industrial and social life. It is not wise to resist the inevitable. The opportunities for agricultural progress and development by the introduction of a more varied and profitable production were never, it is believed, better than to-day.

New industries are taking the place of the old, and in some cases the old, in response to an increased demand, have come to the front with a prominence not possible before. Of the latter class is fruit growing. This, we have no doubt, is to become one of the most remunerative, as it is one of the most agreeable occupations of the farm, in a large part of the State. In the prosecution of this industry in the past, failures indeed, not often absolute, but comparatively such, it is to be regretted, have too often occurred, and

been a source of much discouragement. I now proceed to the consideration of a few points bearing on the

TREATMENT OF ORCHARDS.

In the vegetable, as in the animal kingdom, age never resumes the appearance and the functions of youth; and he who disregards this natural law in his treatment of either his orchard or himself, will inevitably meet with failure and disappointment. Orchards may become prematurely old in consequence of neglect, overbearing, starvation, and other causes. Unproductiveness and decay follow; and their owners, as well as others, in many cases, unsuspecting of the cause, are led to regard orcharding a failure. But the observing mind looks upon such failures as incentives to a more intelligent and careful practice and the result will rarely disappoint the expectation. The first appearance of unthrift in a tree should receive prompt attention, the cause sought for, and a remedy applied if possible. Sometimes it is difficult to determine in advance the result of any prescribed attempt at renovation. Usually, it is believed, well directed efforts bestowed upon a tree not evidently too old, will prove reasonably remunerative and sometimes wonderfully so. In this, as in other matters pertaining to every day life, theory needs to be supplemented by experience, to be modified and corrected by failure as well as by success.

No apology is deemed necessary for the introduction, in this connection, of certain facts bearing on this subject, occurring either in my own experience, or under my immediate observation. I have in my mind an orchard planted about twenty-five years ago with State of Maine grown nursery trees—variety, Baldwins. Receiving proper care, it grew finely, came early into bearing, and has usually borne splendid crops of fruit till last year. For the last eight or ten years it has been treated with neglect. Numerous dead and decaying branches, sure indications of decay, disfigure the trees standing on high land; while those on low ground, benefited undoubtedly by fertilizing material washed from above, are, as yet, thrifty in their appearance, and a few trees receiving an accumulation of road-side washing still make a splendid annual growth of wood as well as fruit. The teaching of this illustration is, we think, too obvious to be misunderstood or misapplied.

Another illustration occurs to me foreshadowing the probable result in the case just mentioned. This orchard was grafted in the

limbs when young, and within my own memory. For fifteen or twenty years it was well cared for and produced bountiful crops. Passing into the hands of another proprietor, pasturage only, was substituted for the generous treatment of the former owner, first with sheep, then with swine. For some time the harvests continued to be as satisfactory as before, but after a few years the production decreased, and the former vigorous and thrifty appearance of the orchard existed only in the memory of the beholder. The owner then attributed the change to overbearing; he now adds starvation. Under this state of things, the owner plowed, manured and mulched the whole surface of the ground, bringing it up to a high state of fertility and keeping it in that condition. He also cut out large quantities of dead wood, removing in many cases more than half the top. Result: The foliage at once assumed a fresh and lively appearance, and the fruit production now seems to indicate that the attempt at renovation was a profitable and judicious expenditure; but the annual product of dead wood indicates certain and speedy death. The epitaph must be, died of premature decay induced by starvation.

I come now, somewhat reluctantly, I confess, to the consideration of some points in my own experience, which at much cost have led me to believe some things false I once supposed true. About thirty years ago I came into possession of an orchard planted early in the settlement of the town. It was grafted in the limbs when young, and, under the judicious treatment of its careful owner, grew into a beautiful maturity. Subsequently it fell into negligent hands, receiving no care whatever. Besides, it was annually robbed of its scanty production of grass as well as fruit. This process had continued for more than twenty years when I became owner. It was then in fact as well as in appearance an old orchard.

Much was said at that time in support of the theory, that by the proper use of the saw and the plow, and other specified treatment, old trees might be rejuvenated and become as good as new — almost. At the same time it was claimed that it was not advisable to plant young trees as they would not grow as well as formerly.

So with strong resolution and much courage, I set about the process of revivification. I pruned and cultivated, and dug and manured so far as practicable with the resources of a worn out farm. A few trees were grafted with new and choice varieties. Others were grafted in the sprouts growing from the trunk, while sprouts

growing from the root with apparent vigor, were also grafted. All this, and more was done in accordance with the most approved prescriptions of the pomological doctors of the time, with the expectation of gathering for many years rich harvests of beautiful fruit.

Almost immediately, results seemed to indicate that the experiment had been at last a partial success. The foliage changed its deathly hue for one of living green, and for a few years the harvests gave encouragement to the hope. But as in human life, the most sanguine hopes and anticipations of declining years often come to an unexpected and abrupt conclusion, so these old trees after having given so good promise of continued usefulness, went rapidly down. Of that ten acre orchard, once one of the most noted in Cumberland county as then existing, not more than half a dozen trees of any value whatever, still remain. Three only of those grafted in the sprouts ever amounted to anything; and no scion set in a sprout growing from the root ever came to maturity. The failure in this case evidently consisted in undertaking for permanent improvement what resulted only in temporary advantage, for so far as actual profit and loss were concerned, the balance was undoubtedly on the right side of the ledger.

These illustrations are introduced in this connection as beacon lights of danger, warning against the practices resulting in so much mischief and loss. These are no isolated cases; similar experiences are constantly occurring wherever decaying orchards are found.

The unsatisfactory results of former practices have induced fruit growers to resort to new methods and processes of production. Instead of relying wholly on the old trees, new orchards have been extensively started, but with varying success. Thousands of trees have been planted but failed to grow. Thousands of others have made but a feeble and sickly growth, while the flourishing condition of many young orchards demonstrates the feasibility, if not the certainty, of growing as good trees as were ever raised by the fathers.

It is generally believed that orchards will not grow and flourish now as formerly. If this belief, so potent in retarding progress in this direction, be a falacy, as I believe it to be, it is of the greatest importance that its falacy be made apparent to all. I do not now propose to discuss this question except incidentally.

We cannot, if we would, ignore the force of such questions as these: Why are there so many failures in this business? Why do

not our trees grow as well as did those of the fathers? Why is there not as much certainty in this as in other farm pursuits? In reply, I unhesitatingly express the opinion that, the conditions of success being observed, there may be as much certainty in the prosecution of this as any other farm industry. I also believe that, as "distance lends enchantment to the view," the success of the early settlers has been very much magnified and their practices lost sight of in the fog, while the mistaken views thus obtained have contributed largely to many a failure which might have been made a success.

The old orchard again affords an illustration. My ancestral relative used in planting well grown, symmetrical trees. Not having enough of that quality to complete the work, he used inferior trees on about two acres. After finishing the job, he remarked, "he supposed he should have been better off if he had purchased better trees at a cost of one dollar apiece." The result verified the wisdom of the remark if not his practice. I well remember the whole orchard as it appeared in my childhood. The first planting grew into large, beautiful trees, loaded with an abundance of excellent fruit. I often wondered at the marked contrast between that and the other portion, where the trees, with some favorable exceptions, were much dwarfed in size and unsightly in appearance, nor was the fruit production nearly so satisfactory. Within a hundred rods from that orchard I remember another which never grew to a large size, and its fruit production was always small. Cause—poor soil, poor care, starvation, and perhaps poor trees when planted.

From these illustrations and other cases known to me, I deduce the following propositions: First, when the fathers failed to observe the conditions of success in orchard culture, they, like their descendants, met with failure. Second, that essential conditions of success are good soil, good trees, and good care.

I can hardly refrain from considering here the question, what constitutes a good tree. Evidently something is required besides a large number of even fibrous roots, or well formed trunk and branches, or both combined. Within the last twenty years, I have had considerable experience in the resetting and subsequent treatment of trees. Have used all sorts of trees, practiced different methods of after treatment, and obtained results ranging from absolute failure to complete success. I have used trees growing spontaneously by the roadside and other waste places, also nursery trees grown by

differing methods and in various localities. I have learned to reject an unthrifty tree from whatever cause, as worthless.

I early adhered to the theories, that root grafting is an unnatural process, producing inferior trees; that grafting in the limbs produces a more hardy tree than can be obtained by grafting in the trunk or crown of a root grown from the seed; and further, that an ungrafted tree is of stronger growth, more productive, and longer lived, than one grown by any method of grafting whatever. Regarding them as theories still, I would speak of them cautiously. In the light of my experience, I will only say that I would reject root grafted trees altogether. Whether an ungrafted tree be more hardy and productive than others, or not, there certainly can be no profit in growing poor fruit; hence I would use the best grafted trees obtainable, and I will here express the opinion, possibly a theory not well founded, that it is of very little consequence at what period of growth the operation of grafting is performed, provided it be done before the maturity of a tree grown from the seed.

Regretting the necessity of leaving so many points involved in this subject, unnoticed, I will here close by deducing the following conclusions:

That an old orchard cannot be permanently rejuvenated.

That in consequence of overbearing and neglect, trees may become prematurely old, and the injury thus sustained can never be fully repaired, or the penalty for thus violating natural law be evaded.

That young orchards can now be grown with more profit, and with as much certainty, as by the fathers.

That in planting orchards, good, thrifty and hardy trees only should be used, to be followed by generous and careful treatment, or failure will result.

That the quality and fitness of a tree for transplanting, depends not so much on the longitude in which it is grown, as upon the method of its production.

DISCUSSION.

After reading his paper, questions were put to Mr. Shaw by several members, which he answered, as follows:

QUES. Do you mean to say you would object to grafting a natural tree that was of considerable size, provided the tree was perfectly thrifty?

ANS. I would graft any tree before maturity. I have often been asked whether it would be advisable to graft a tree that was fully grown, bearing good crops and not making new wood. I think there is just the line of separation between a tree *profitable* to graft and one *not* profitable. If a tree makes no new wood, I would not graft it. It is a safe line of demarkation between the two.

QUES. What was the age of your orchard at the time it came under your care?

ANS. I don't know exactly. The man who planted it took up that piece of land about 1785 or 1786. The orchard was probably planted in 1790. I came into possession in 1850. It was then, as I suppose, sixty years old; a little too old. The point I make in these matters is: that if an orchard has been neglected in its prime, or reduced by over-production, it is like a man who over-works himself all through his life, he is not likely to live as long as he otherwise would. He will look older at seventy than he would if not over-worked. I think you cannot violate natural laws without suffering the penalty. If a tree has become prematurely old, it never can go back. Another point: After you begin to renovate a tree, as my friend is now doing with his old orchard, that practice must be continued in order to reap any benefit. When that practice ceases, my observation is that the orchard will cease to *be*.

QUES. I understood you to say that you lost that orchard, or it went down suddenly, under your care, after a certain amount of high cultivation which you gave it?

ANS. I mean to say that the neglect of twenty-five years wrought as much mischief as fifty years of age would if it had been cared for properly.

STROUT. I understand that Mr. Shaw's theory is, that there is in both animal and vegetable life a certain amount of vital force. That is to say, a man lives, under ordinary circumstances, to eighty or ninety years. A tree will live to eighty or ninety. That period may be reached sooner by neglect or by over-work. There are so many years of life for a tree, to start under the most favorable circumstances; beyond that you cannot expect to go. So you shorten that period by neglect. Any attempt at revivification must be a failure by virtue of that law.

QUES. How long will an orchard live under such care as it ought to have?

SHAW. That is a fair question, but any answer I can give to it would be mere theory. I have not seen an orchard cared for in that way long enough. I am not disposed to say much about theories; they have cost me a good many hundred dollars.

QUES. I have heard it said that you cannot raise a young orchard where an old one has grown; that all the material that went to make a good apple tree would be exhausted after they had decayed and gone down. I don't suppose it would be proper to put out a new orchard where an old one grew?

ANS. I advocate the idea that it needs common sense in the treatment of orchards, as much as it does in raising corn. If you can raise one crop of corn after another has been taken from the ground, you can raise a crop of apple trees. In order to reach the success of our fathers, we must have as good and fertile soil. We can raise as good crops as they did. It may cost more to keep the ground in condition; it may cost us something to replace what they have taken from the soil. That is our misfortune; but that can be done. The difficulty does not exist in the nature of the case, but in our misapprehension of their success. The real difficulty is in the conditions. If any condition has been interfered with, it must be supplied.

ATHERTON. I wish to speak of my own experience in the renovation of an old orchard. I think the trees must have been sixty years old, and were mostly grafted. They had been neglected. After it came into our possession we plowed it, manured it highly and pruned the trees. Of course the effect was seen at once. The leaves put out with greater vigor and better color, and the fruit was larger and better. The consequence was, that this treatment stimulated the trees, and although they produced fruit heavily, they began to go back, and to die faster. The limbs broke down. There was an unnatural stimulation. Since that I have mulched the old trees by spreading manure under them. By mulching them and not disturbing the roots the effect, so far as I have learned, will be much better than plowing, and thus breaking the roots. The old trees cannot stand as much they could once. I know of another orchard standing on the side of a hill which, when it was young, the proprietor used to plow year after year and sow with oats. He used to have great crops by that practice; keeping it under cultivation. The trees were old and healthy and strong. They raised oats and put on dressing; but after a while he seeded it down.

Afterwards the orchard came into the hands of another man, who plowed it up and pruned it heavily. That orchard went down quickly.

There is another point in Mr. Shaw's paper, with regard to grafting from the roots. I have a number of good healthy trees that are of quite good size and have borne fruit, that came from sprouts; I think Mr. Smith, of Monmouth, has a number of such trees. I have been watching those trees to see how they would get along; how much they would bear as compared with other trees. I find they are doing well so far, and see no difference in any way whatever.

SHAW. I did not advance any theory respecting the growing of trees from sprouts; I only stated my experience. I have no doubt that trees can be grown from sprouts.

BENNOCH. With respect to the matter of grafting, alluded to by Mr. Shaw: the younger a tree is grafted the better it is for it. I want a tree three years old to graft if I can have it so; then I want to put the top on. Then they heal over readily. Grafting in the limbs is a good way, but you have to contend with suckers.

Mr. BENNOCH, by request, explained the method of grafting practiced by himself, which he calls "lap-grafting." He exhibited specimens of scions set in this manner in different stages of growth, and illustrated his remarks by reference to them and by performing the operation of grafting, consequently no report could be made. This method is illustrated in the report for 1881, as a "modified form of saddle grafting," and as explained by Mr. Bennoch at the meeting at Gardiner.

IN MEMORIAM.

JOSEPH TAYLOR.

The death of JOSEPH TAYLOR, which occurred about the first of July, 1882, at Westport, Mass., where he was visiting at the time, was announced, and appropriate remarks were made by the President and several members.

The following sketch of Mr. Taylor's life and character, contributed mainly by Mr. George E. Minot of Belgrade, was read by the Secretary :

Joseph Taylor was born in the town of Belgrade, in the year 1804. He was brought up on his father's farm and attended the town school. After having acquired a good practical education he devoted himself to teaching in the winter and farming in the summer. As an instructor of youth he was very successful, always winning the respect and love of his pupils. He served in the capacity of Selectman and Treasurer of his town; and during nearly all of the time from 1835 to 1870, he was a member of the Superintending School Committee, which position he filled with much credit to himself and to the entire satisfaction of his townsmen. In his frequent visits to the schools he was always welcomed by both teachers and pupils. He always manifested great interest in the youth of his town, especially in their moral and religious training, ever speaking to them words of encouragement and cheering them on in their preparation for the conflicts of life.

In 1846, Mr. Taylor was elected as Representative to the Legislature and was again re-elected in 1852, in which position he served upon important committees and was a useful and careful legislator. He was a leading and influential member of the Society of Friends, and was often employed in missionary labor for the upholding and propagation of the faith of which he was an earnest defender. In the local and quarterly meetings of the society he was always an interesting speaker. At the time of his decease he had recently attended the yearly meeting of his denomination, at Providence, R. I., whither he had gone about three weeks previously, in his usual

health. At the close of the meeting he went to visit one of his sons at Westport, Mass., where he was taken sick and died as above stated.

Mr. Taylor was early interested in fruit-culture, and during the last twenty years of his life was so extensively and successfully engaged in it, as to justly place him in the front rank among the best orchardists of the State. The numerous exhibits which he made at the State and county exhibitions and the uniform excellence of the specimens which he exhibited, as well as his extensive sales and the high reputation of his products in the markets, are the best evidence of his success in his favorite avocation. He became a member of this Society at its organization, and was punctual in his attendance at its meetings and exhibitions. As senior Vice President, he was frequently called upon to preside at the meetings, which he did with ease and dignity. In the discussion of pomological questions and in his written articles for the Society's reports and the agricultural papers, he expressed his ideas clearly and forcibly, but always courteously.

It was in the social and private relations of life that the true character of Mr. Taylor shone most conspicuously. The words of cheer which he ever had for every one struggling under adverse circumstances, and the smiling countenance with which he always met his friends will be long remembered. In his family relations he was remarkably happy, living to see his five sons and two daughters grow to manhood and womanhood, and all respected in their several positions in life. Universal sorrow filled the hearts of his neighbors when the news of his death spread throughout his native town, and every one united in saying that a truly good man had been taken away.

The following resolutions were adopted :

WHEREAS, Joseph Taylor of Belgrade, a life member and first Vice President of this Society, has since the last Winter Meeting, been removed from among us by death, and

WHEREAS, His constant attendance and participation at our meetings, his deep interest in the Society, his marked success as an orchardist, and his upright and amiable character and disposition have endeared him to us as his associates, therefore

RESOLVED, That it is with the deepest sorrow that we record our loss, and that we will ever cherish the memory of his virtues and of his labors among us.

RESOLVED, That as a token of our regard for his memory, these resolutions be entered at length upon the records of the Society, and published with the proceedings; and that a copy of the same be transmitted to his family.

Adjourned.

Evening Session.

Owing to the inclemency of the weather, the evening session was held at the Elmwood Hotel, where a large number of the members boarded. The exercises were of a highly interesting character, but as the reporter could not be present no report was made, and we can only present a brief outline.

Instructive remarks were made by the President, on the process of budding fruit trees. Mr. Gilbert spoke of the Apple Maggot. (*Trypeta pomonella*,) and read extracts from a paper by Professor Comstock in the Report of the Department of Agriculture for 1882. A paper on the same subject was also contributed by Mr. S. C. Harlow of Bangor. A paper on "Commercial Rose Growing," was presented by Mr. William E. Morton of Portland. Various local reports and letters from absent members were read by the Secretary, a portion of which will appear hereafter.

Votes of thanks were passed to the municipal officers and citizens of Waterville for the use of the town hall; to the Maine Central Railroad for free return tickets; to the proprietors of the Elmwood Hotel for reduction of rates of board and their kind attention to the comfort of the members; to Messrs. Peter De Rocher of Waterville and William H. Pierson of Vassalboro', for the thoroughness and perfection of the local arrangements for the meeting; and to the several speakers and essayists.

Various pomological subjects were discussed informally, among them a large collection of apples, presented by Mr. Merrill of West Gloucester, and, at an early hour, after a most interesting session, the meeting was

Adjourned *sine die*.

THE APPLE.—USES IN FAMILY, WAYS OF PREPARING,
PRESERVING AND SERVING IT.*

BY MRS. A. L. HERSEY OF OXFORD.

I venture to say that no one present would be willing to exchange the apple for either the peach, the pear, the orange or the lemon, the pineapple or the bannana, or, indeed, for any other tropical fruit. I presume there is no fruit the New England house-keeper would miss so much, especially in the culinary department, as the apple, and certainly there is nothing that could supply its place. Judging from my own observation, the good father of the household, too, would find it, if possible, still more difficult than would his housekeeper to dispense with the apple in the bill of fare at the family table.

Only last month some of the convicts at Sing Sing rebelled, because they did not have their apple-sauce twice a week. Indeed, I quite wonder it had not been Adam, instead of Eve, that yielded to the temptation of the fair apples in the Garden of Eden; and had it not been that Eve was the quicker to appreciate, by sight and by smell, the beauty and lusciousness of the fruit of the "Tree of Life," I've no doubt but that the blame of our depraved natures would have been laid at the door of man's frailty, instead of being borne by his young, impressible wife. I presume it was with Eve as with the rest of us loyal wives. If anything new and nice is to be had, it goes to our husbands; and the sins we commit, first and last, for his benefit, would ruin us all, were it not they were committed from a purely unselfish motive—our love and devotion to our "Adam."

But, to my subject—the apple, its uses in the family.

The same apple, uncooked, is a good digester, and is always a welcome lunch. The tiny child, with only a half-dozen teeth, will gnaw all around an apple, holding on to it with its little chubby hands with the tenacity of a squirrel. The school boy or school girl will eat more apples, ripe or green, than I should dare tell, and that with impunity. The young miss and lad from twelve to sixteen will fill their pockets with apples, and with book or paper and per-

* Read at a Farmers' Institute in Oxford county.

haps a kitten or a dog for company, will go away by themselves and read and eat by the hour, apparently supremely happy. The pater familias, when he comes into the sitting-room for a rest or for a passing word, always helps himself to the appetizing fruit from the dish on the table; and, in olden times, the pitcher of cider over the broad fire-place, would be the loser when he left by a good full glass of the yellow sparkling juice.

Through New England, in the country, apple-sauce is on the table three times a day as regularly as is bread and butter. The apples are pared, cored, stewed and sweetened, and if by chance the same is spiced, as if for pies, the family eats a double portion. When the cider comes home, all sweet from the mill, the cider apple-sauce or apple jack is made. The cider is boiled down in large quantities, sweet apples are placed in the bottom of the big kettles to prevent scorching, and frequently a barrel is made at one time for the winter's supply. It has a very tart, clean taste, and eaten with meat is almost as nice as cranberries.

You have all heard of the pan-dowdy or pan-pie, the pride of our grandmothers and the delight of many of their daughters. It was baked in the brick oven. A large earthen pot was heaped full of sweet apples, pared and cored, and was then half filled with equal quantities of molasses and water, covered with a very thick crust, and not disturbed till morning. Then the crust was broken into the steaming contents, which were rich and red, and the whole replaced in the oven to stay till the oven was cold. It came out one handsome jellied mass, and was eaten with cream, and was second only to strawberries and cream. The Indian pudding, which suggests baked beans and brown bread, is better far with a good generous addition of sweet apples.

What is richer than baked sweet apples eaten with cream or a bowl of creamy milk; sprinkle sugar over them before baking and put a little water in the dish. All good wives cut them up for their husbands, (this for the ladies only.) Nothing tastes so good to the invalid, just beginning to rally from a long sickness, as the baked sour apple, and nothing is safer for him to eat.

Perhaps the most palatable, as well as the simplest way of cooking the fruit for dessert, is in the form of sago pudding. Put a cup of sago in a pint of warm water to soak; cover your pudding-dish with whole sour apples, pared and cored; sprinkle a small cup of sugar over them and nearly enough hot water to cover them.

Let it remain in the oven till the apples begin to soften, then pour over them the sago and water and replace it in oven for twenty minutes or more, till it thickens and browns; it should be eaten with cream and sugar, and is very harmless and delicate.

Birds-nest pudding is a very tempting dessert, as all know who have tried it. Pare six apples; take out the cores without breaking; fill the holes with sugar, after placing the apples in an earthen pudding-dish; make a batter of one pint milk, two table spoons flour and three eggs; pour over the apples and bake until the fruit is soft; to be served with cream sauce, viz: half a cup of butter beaten until light, cup of powdered sugar, half a cup of cream. Set the dish in a basin of hot water and stir until it is creamy. This will take but a minute. Then there is the apple-dumpling steamed and the apple-dumpling baked—both good and hearty. Apple-snow is nice, and quite ornamental for the tea-table. Steam a cup of sour sliced apple until soft; beat light the whites of two eggs; add a cup of pulverized sugar, gradually beating in the steamed apple; to be placed on boiled custard, as in floating island, and ornamented with jelly.

But the all-essential, omnipresent dish at the New England farmer's table is the apple-pie. Apple-pie in the morning, apple-pie for lunch, apple-pie for dinner, apple-pie for supper. He never tires of it. There is the Yankee apple-pie—sliced apple, sweetened with molasses, with a dash of sugar and spice and a little salt or butter; and then there is the same, sweetened with sugar only; and there is the stewed apple-pie, made of sauce with extra sugar and spice placed between the flaky crusts; and how luscious are the little apple-pies, cut with biscuit cutter, made to grace the tea-table when apples first begin to ripen; or apple turn-overs fried *a la* doughnuts. Last but not least, our never-failing winter dessert, mince-pie, is dependent upon chopped apples and cider for its rich unique composition.

Some of you know that there has been a great outcry over this so-called "relic of barbarism," "the pie." They tell us it is prolific of dyspepsia, of sleepless nights, of consequent ill-temper and fretfulness; and if this be so, who knows but the majority of our diverse cases are ascribable to *bad pie-crust*? for here is where the mischief lies. Pie crust made with poor lard, poor at best, which we get at our grocers; pie crust made with olive oil, which is now sold for shortening; pie crust made with oleomargarine; pie crust

made with top of the pot, or with such soap grease generally; pie crust thick and heavy; pie crust soaked, soggy, half cooked; *such* pie crust is an abomination. It is unfit for any human stomach. If I had cream and butter I should use nothing else for pastry. Put soda and salt in cream before mixing, roll out two or three times, spreading over it small pieces of butter and a little flour each time; roll very thin for plate—be sure your plate is not an old one soaked with fat—and bake a good, rich brown, on both sides. Better burn than have a slack bake. Thus pie crust can be made simply, yet appetizingly, and the farmer can have his pie without dyspepsia.

I have tried a receipt for cake, where dried apples chopped and stewed in molasses, is substituted for raisins and currants, but I did not think it nice.

I have heard of fried apples and pork, and of some being very fond of the dish, but it seems to me the ingredients are incompatible.

PRESERVING APPLES.

Canned sweet apples flavored with quince are almost or quite as nice as pear. Preserved with equal parts of sugar, flavored with quince and lemon, the apples' transparent richness delights the eye and the palate. Apple jelly, or marmalade, from the common or crab apple, is equally good.

The primitive way of preserving apples by paring, coring and stringing, and hanging on long poles in the spacious kitchen, inaugurated the apple bee. To this the young people looked forward with as much glee as to the husking or to the quilting. How many of us can remember how, on such occasions, apple seeds would go shooting across the room, hitting some unsuspecting youth and bringing an involuntary scream—or remember, perhaps, of taking an apple and counting the seeds with the favored one, as we went through with the conventional:

1, I love,	7, She loves.
2, I love,	8, Both love.
3, I love, they say;	9, He comes,
4, I love with all my heart,	10, He tarries,
5, I cast away.	11, He courts,
6, He loves.	12, He marries.

I believe the twelve seeds were never forthcoming. Alack-aday! Those were happy days indeed. But only memory can bring them

back, for the indomitable Yankee has given us machines to pare, machines to core, machines to slice, and the evaporator to dry—and there are no more excuses for youthful flirtations.

In those days the apples were shaken from the trees and put in bins, like potatoes—were worth but a trifle in the market. But now the demand for exportation keeps the prices up, and the farmer finds his crop of apples pays him better than his corn or potatoes, and is almost as necessary for family use. The young trees mature quickly, and with plenty of ashes dressing, as I know from experience, will astonish you with their heavy burden of large, handsome fruit.

Among the cheaper varieties I have found the Minister and Mother apples the best for cooking. They are very large bearers and keep well. The Greening and Yellow Bellflower are equally good, but command a higher price as eating apples. They are all juicy, easily cooked, and of a sharp, acid flavor. I think we do not half appreciate the value of the sweet apple. The Minister, as well as the Summer Sweets, should be more valuable than sour. They are scarcer, they are very hearty, and certainly, when properly cooked, there is nothing nicer. I find that the small, unmerchantable apples pay better, fed in small quantities to the cows, colts, pigs and hens, in the winter, when they can get no green food, than in any other way. They eat them with avidity, and they sharpen the appetite by giving a little variety.

The borer here is the greatest enemy of the apple tree. It requires time and patience as well as constant watchfulness to exterminate him. It is said that sand piled around the trunk of the tree will prevent his depredations, but I should not put too much reliance upon it.

Hoping the apple of discord may not enter your Society, and that your wisdom and your records may be as apples of gold in pictures of silver, I wish you all success.

COMMERCIAL ROSE GROWING.

BY WM. E. MORTON, OF PORTLAND.

This is a subject in which those who are engaged in pomology or general farming may not be so much interested as the florist or those who have an interest in the production of fine flowers in our cold winter climate. It is a trade by itself,—one that requires constant care, years of experience, and above all a love for the business. The farmer who produces his crops under the genial skies of our New England summer, hardly realizes the difficulties under which we labor in our cold, blustering winter weather, to produce an artificial summer atmosphere in which roses will flourish, sending forth a constant succession of fragrant flowers day after day, regardless of the zero weather outside. I propose to give a few brief directions, as practiced in my own business; and shall speak of the subject under the following heads. viz: Location, House or houses, Heat, Soil, Manure, Plants, Varieties, Care, Cutting buds, Market, Profits.

1st—*Location.* This must be well sheltered and exposed to the sunlight all day, or at least the greater part of the time. In our cold climate, with short dark days, we must have a location where all the sun that there is can be obtained, otherwise failure is certain.

2d—*Houses.* These ought to be not less than 20 feet wide, 100 feet long, walls 3 feet high and not over 8 feet high in center of house; low houses can be kept warm so much better than high ones.

3d—*Heat.* Whatever method you use, flue, hot water or steam, (and it is yet a question which is the best, hot water or steam,) the houses must be kept at a temperature of not less than sixty degrees, no matter what the weather may be outside.

4th—*Soil.* This must be a stiff clay loam, well enriched with manure and leaf mould.

5th—*Manure.* This must be well rotted cow manure. Our practice is to give the beds a coating of some three inches early in September and again in December. This has proved with us none too much.

6th—*Plants*. Always plant out small bushes in preference to large ones; good healthy plants, from three inch pots, are the best.

7th—*Varieties*. Bon Silene, Saffron and Isabella Sprunt, are the best for a continuous supply. Nephotos for white, with Marshal Niel. Souv. Malmaison, Paul Nieron, Pearl of the Garden, and a few others, for fancy varieties.

8th—*Care*. This must be constant, pruning, syringing, fumigating, weeding and ventilating, with the many things a careful cultivator will find to do.

9th—*Cutting of Buds*. This should be done as soon as the outside leaves commence to start. In other words, cut close buds. They will open all a uniform size in a vase of water in about ten hours, if in a warm room and are kept sprinkled.

10th—*Market*. It is of course better to have a retail trade. If not, find some dealer who will take all you grow two or three times a week. Otherwise, you will have to consign to some commission house in the large cities; they will sell at twenty per cent. commission, you to pay all express charges and stand all loss of unsold goods.

11th—*Profits*. I am hardly prepared to say what these will be. It will depend so much upon the weather, demand, supply, &c.

REMARKS. The foregoing applies to rose-growing under glass in winter. The production of fine roses out of doors for the summer trade requires different treatment, of which I may have something to say at some future time.

THE APPLE MAGGOT.

(Trypeta Pomonella Walsh.)

Order DIPTERA ; family TRYPETIDÆ.

“Eating into the pulp of apples and causing them to decay; a white cylindrical maggot, which when full-grown goes into the ground to transform. The adult is a black and white fly, with banded wings.”

[Extracts from paper by Prof. J. Henry Comstock, of Cornell University, N. Y., in Report of Department of Agriculture for 1882.]

“There is another enemy of the apple which, in certain localities, rivals the Codlin-moth in the extent of the injury it does. I refer to the insect known as the Apple Maggot, and which is becoming quite common in certain parts of New York and New England.”

* * * * *

“The Apple Maggot is a small white footless larva, measuring from .19 to .27 inch in length. In some instances the body is yellowish-white; in others it has a greenish tinge. The important peculiarity in the habits of this insect is that it bores tunnels in all directions through the pulp of the fruit; frequently these tunnels enlarge into cavities the size of a pea; and when several larvæ are present in the same apple it is honeycombed so as to be rendered useless.

It will be seen at once that the injury done by this pest is even more serious than that done by the Codlin-moth. For as the injury caused by the latter insect is confined to the neighborhood of the core and to a single, nearly straight, and conspicuous tunnel which the larva makes when leaving the apple, it often happens that the injured parts of an apple may be cut away and the remainder eaten. But the nature of the injury caused by the Apple Maggot is such that when fruit becomes infested by this insect no one cares to attempt to use it.

The Apple Maggot is a native American insect, which naturally feeds on the different species of hawthorn (*Cratægus*) and upon crab-apples. It is probable that this insect occurs throughout the country wherever hawthorns or crab-apples are found. Mr. Walsh observed it long ago as far west as Illinois, and I have bred the adult insect from a species of *Cratægus* growing on the Agricultural Grounds at Washington.

In certain parts of New York and New England the species has acquired the habit of feeding upon the cultivated apple. But, what is very remarkable, it does not appear to have done so in other parts of the country. Thus, although Mr. Walsh bred this insect from haws in Illinois twenty years ago, I can find no record of its infesting apples in that State yet. And in Washington it infests haws growing near an orchard in which it has not been observed.

In those localities in which this insect has spread to the cultivated apples and become common it is even a more serious pest than the Codlin-moth, except that it seems to be more fastidious in its choice of food than that insect. Thus, although I have observed it for several seasons in one of the orchards of Cornell University, I have found it only in a few varieties of fruit. This may account for the slowness of the spreading of the species from haws and crab-apples to the cultivated apple, and may afford a means of reducing to a minimum the injuries of this pest.

In certain parts of New Hampshire the Apple Maggot is known as the 'Railroad Worm.' The extent of the ravages of this insect in certain parts of that State is indicated by the following extract from a letter which I have received from Mr. N. W. Hardy, of the town of Nelson :

In regard to the Railroad Worm, I never saw one in this town. In the last six years they have worked in the adjoining towns of Hancock and Dublin. They are confined to early apples as soon as they ripen.

I saw a man the other day that said that this insect had ruined his apples so that he would have to graft them into winter apples.

Many of the early varieties of apples in Hancock and Dublin were rendered entirely worthless. We have more to fear from this insect than any other that preys upon the apple.

Mr. Isaac Hicks, of Long Island, who was one of the first to observe this insect in apples, many years ago, does not consider it so serious a pest as does the correspondent just quoted. The following extract from a letter recently received from him is interesting as bearing on this point, and as suggesting remedial measures :

Thine of 17th received; and, in reply, will give thee what little I know of the Apple Maggot, *Trypeta pomonella*. Its ravages bear no comparison to the injury done by the Codlin-moth to fruit. Last year being the non-bearing season, we saw very few apples, if any, infested with it. It is different from the Codlin-moth, which can place its egg in the very young fruit, go through its transformations, and lay its eggs in winter apples. We seldom see the *Trypeta* until about the 1st of September, and never in green fruit. Only in the ripest apples and in sweet or mellow subacid fruit are they found by us. I think they cannot exist to much extent if pigs or sheep run

in the orchard, as they prefer the ripe apples, in which alone the Apple Maggots can develop and attain their growth. Hence, where the fruit that falls is picked up frequently and sent to mill to be ground, or where pigs and stock or the family consume it freely, very few of the Maggots arrive to perfection.

It is evident, from my observations and from those of my correspondents, that the Apple Maggot is much more apt to infest early apples than the winter varieties. But the latter are not exempt from its attacks. Mr. Henry Thacker, of the Oneida Community, New York, writes me as follows :

This worm at this place, and at this time, is mostly confined to certain varieties of autumn apples. But at Wallingford, Conn., the winter apples were ravaged as well. Of late years, however, the Baldwin and some other varieties of winter apples growing here have been found bored by this maggot."

* * "In the autumn when the larvæ are full-grown they leave the apple and enter the ground and transform to pupæ. In my breeding-cages the pupæ were found about one-half inch below the surface of the ground. When the change to pupa occurs the body shortens, but the larval skin is not molted, the transformation occurring within the dried skin of the larva. The pupa, therefore, resembles the larva very much, except that it is shorter, of an oval outline, and of a pale yellowish-brown color. Length about 1-5 inch.

The insect remains in the pupa state during the entire winter and early summer. Specimens which I bred in Washington began to emerge as adults May 28, and continued to emerge till July 6. But as these were kept in a warm room during the entire winter, their development was doubtless accelerated."

* * "The length of the body of the adult male is 1-5 inch ; of the female, 1-4 inch. This fly can be easily recognized by the peculiar shape of the black bands on the wings, by the milk-white spot on the caudal part of the thorax (scutellum), and by the white bands on the abdomen." * * * * *

"*Remedies.*—The more practicable ways of lessening the injuries caused by this pest are those suggested in the letters quoted above—the destruction of infested fruit promptly after its fall from the tree, and before the maggots leave it to go into the ground to transform ; and when the pest is very abundant, the grafting of the trees into varieties less liable to be infested. In such a case it might be well to leave one or two trees of early apples to serve as traps, and

promptly destroy the fruit as it falls from them. If such trees could be inclosed, and sheep or pigs pastured under them, the success of the trap would be assured.

The Apple Maggot can be readily distinguished from the larva of the Codlin-moth by the absence of feet and the fact that it infests the pulp rather than the vicinity of the core. But there are other maggots which are associated with this species, and with the larva of the Codlin-moth also, which are not readily distinguished from the true Apple Maggot. These other species pertain to the genus *Drosophila*, and feed upon decaying fruit. They cannot be considered, therefore, under ordinary circumstances, as noxious insects in an orchard. Two species of this genus are described in following articles, under the name of *Pomace Flies*."

To the foregoing Mr. HARLOW adds: This insect seems to be increasing to such an extent in our own State within a few years as to cause serious alarm among growers of fruit. In my own experience, thus far, its ravages have been mostly confined to early ripening autumn apples, particularly mellow, sweet ones, such as the Golden and Hightop Sweet; but I have also found them in the Danvers Winter Sweet as well as some acid varieties, as the Gravenstein, Jenneting and Porter. Fortunate would it be were their depredations confined to early mellow apples, as some have supposed; but although preferring them, I find my own experience to the contrary confirmed by other cultivators of fruit. * *

There are several points of interest concerning this insect on which more light is needed, for successful warfare. The first is the identification of the egg and determining the exact time and manner of its deposit on the apple. A second one is, does the larva, like that of the Codlin-moth, pass from one fruit to another on the tree? Third; can the parent fly be caught in any way, by bottles or otherwise, more successfully than its ally, the Codlin-moth? Fourth; can it be driven from the tree or killed at the time of depositing its eggs, by spraying with any liquid which will neither taint or poison the apple, considering it does not infest the apple till nearly ripe? Fifth and lastly; is there any parasite which by being protected and cultivated can assist us in its extermination?

While trying to inform ourselves on these and similar points, let us lose no time in availing ourselves of the knowledge already gained.

Extracts from Letters Received.

[From N. T. TRUE, M. D., of Bethel.]

Perhaps I can do no better service to the cause of orchard culture than by giving my own experience since I described my method of setting out an orchard at a previous meeting of the Society. [Report 1876, p. 71.] Actual results are usually far preferable to theories.

My two young orchards were composed of seedling stocks transplanted with great care six years ago. I did not engraft them till they had become well rooted and growing thriftily, because I then believed, as I now do, that I should lose a smaller number of stocks than if I had done it when they were transplanted. Out of my two orchards, I have lost but two stocks—one, by transplanting to its roots a dead calf, and the other, from having a dead heart in its infancy.

The stocks are all engrafted in one orchard, but in different years, as they seemed best fitted for the purpose. I have always left some small shoots below the stock so that in case of failure I might save the stock. Many of the tops are becoming quite *treeish*. I have kept my trees all well mulched chiefly with maple leaves. These have been of great value. I have allowed the land to be seeded down to grass one year, but re-plowed last spring, removed the mulching and earth, and supplied a dressing of well decomposed compost of muck and barn manure. They have grown finely the past year. My other orchard has had less care, but is doing well. A few stocks engrafted with King of Tompkins County, were killed last winter.

I have endeavored to anticipate the future of the tree by shaping it as soon as I could with a good spreading top. I have applied whitewash made of lime and lye from leached ashes.

These are all the points I find worthy of note with reference to what I have done.

But as attention is not usually given to reporting our omissions and mistakes, I will simply add, that if I were to prepare my hard

rocky land for another orchard, I would run my dead furrows on the line where I would set the trees, dig down still deeper so as to make an underdrain, and then throw in all the small stone I could gather from the land, making a blind drain, fill it up with earth and plant the trees over the drain. If properly managed, the labor would not be great, while good drainage, and a healthier tree would be grown, drought would not affect them, the roots would extend much farther, and a larger tree with a more rapid growth would be secured, and, lastly, an abundance of fruit.

With reference to the borer, I have failed in every experiment except that of a sharp knife and wire. Trees should be examined every month during the season, and the borers dislodged as early as possible after the eggs have been deposited.

[From D. J. BRIGGS, South Turner.]

The fruit crop in this vicinity is not as large as in some former years. The high winds in early fall blew off one-quarter, and in some unsheltered localities, one-half of the entire crop, which were not matured, and of course sold at a reduced price. Those that did not blow off made a good growth and were colored very nicely but somewhat wormy. Apples are selling for a good price at the present time. Pears were scarce and sold well in the fall.

In this locality the scions that were set in 1881 made a very good growth; but from some cause, in the spring of 1882, more than one-half of them did not start. Some say they were winter killed, but my judgment is that in making so large a growth in September the same year they were set, and then being exposed to the severe cold of October 5th of the same year, (so cold that it froze apples on the trees,) I think the scions were frozen so as to stop the circulation of the sap.

Fruit production in a large portion of Maine is bringing a large income to the producers, and it would be well to have more legislative action on so very important a branch of farming; say give the Society that represents this industry \$1,000 a year, so as to encourage our farmers to enter into it with more zeal.

Would it not be well for the Society to hold more meetings, in different parts of the State, perhaps one in June and another in August, when the pomologist is in his glory? I think the Society

would increase its membership by so doing ; there ought to be ten members where there is one now.

[From B. F. MATHEWS, Hope.]

In the vicinity where I reside, the first settlers, being near the sea shore, did not engage in orcharding, but more especially in lumbering,—every farmer setting about one hundred trees, allowing them to grow the same as forest trees. If there happened to be a sweet apple the tree was clubbed and stoned until it ceased to bear fruit.

Nearly fifty years ago, Jacob White of Hope, brought from Massachusetts a small bundle of scions of the Baldwin, which were set in the orchards of Boyce Crane, Esq., Abner Dunton and Daniel Bartlett, of Hope. From that time the farmers began to improve their orchards, and now they have some very fine ones. It has been hard to dispose of our fruit for full prices on account of having no sale for it in large lots. But that time is past, and we can now sell at our homes all we can raise. Mr. L. S. True of Hope, is shipping all he can find in the vicinity, to Liverpool. He packs in barrels made to order, lined with paper. Mr. J. Gould is handling about three thousand bushels. Dr. Isaac Bartlett & Son are using three thousand bushels in their cider mill. So you perceive we have a market for all we can raise. The Baldwin is a good bearer in our valleys about our mountains. For winter fruit the Baldwin leads, and with the King, Northern Spy, Roxbury and Golden Russets, are all I would cultivate. For late fall and winter the Hubbardston, Fletcher Sweet and Gravenstein are about all that are profitable. It does not pay to raise early fruit for twenty-five cents per bushel.

If I were to begin life again, I would purchase twenty-five acres of land, set it to winter fruit, setting the trees forty feet apart each way, so as to give ample room to cart dressing without interfering with the trees, keeping the trees well mulched, allowing no grass or sprouts to grow about the trunks, keeping the tops open ; would not scrape the trunks, but apply the dressing and let that do its work. Never saw or cut a limb until the buds start in the spring, or later than August ; if you do the bark will not heal over the cleft. Cut when the tree is growing and it will heal over very rapidly. Fruit should be carefully handled, never allowed to lay on

the ground after being put in barrels. Market when the fruit is in its best condition.

[From H. A. SPRAGUE, Charlotte, Washington County.]

I would state that as yet a majority of the farmers of this county do not realize the importance of fruit culture, or rather apple culture, for this appears to be the only fruit, (except perhaps some of the small fruit), which has as yet been proved to be profitable here. Our farmers are, however, gradually seeing the profits of the apple crop, and more attention is being given to this branch of agriculture each year. As yet Washington county does not produce apples enough for home consumption, but I think the time is not far distant when she will have a surplus for export.

I have but little to add to what I said two years ago in regard to varieties tested in this vicinity. Of the King Sweeting, I think I ought to have said half-hardy, instead of hardy.

My *Tolman's Sweets* have borne every year since commencing, but bear heaviest in even years.

Ben Davis continues to sell well after Baldwins are out of the market, and many people think they are good, when they have no better ones to compare them with.

Wealthy, I think, will be for this latitude what the Baldwin is further south.

Magog Redstreak, I think, will prove hardy, vigorous and productive, but is not as good for eating or keeping as the *Wealthy*.

Scott's Winter has a good flavor in spring, and I think will, when well known, be more popular than *Ben Davis*.

Alexander has not fruited with me yet, but is said to be profitable by those who have it in bearing.

The greatest draw-back to fruit culture in this county is insects; and the greatest cause of the multiplication of insects, is the destruction of birds and toads; and the greatest destruction of birds and toads is caused by summer tourists. They kill the birds for sport, or for taxidermic purposes, and both toads and frogs for pickerel bait.

[From D. B. WOODBURY, Paris.]

The benefit that may be derived from this meeting cannot be over-estimated.

It is very necessary that we start aright in all things. Perhaps more so in Pomology than many others, as many years may pass before we discover an error involving much labor and delay to rectify.

That our labor may be both profitable and pleasant we must avail ourselves of each other's experience, and in no way can this be better done than by meetings like this.

The probable increase of our population should encourage us to do our very best to furnish them with an abundance of *the very best* fruit. It is a necessary article of food, as well as a luxury. It pays well to see it growing, and will pay well in the future at selling time. As the population has doubled every twenty-five years we should prepare to double our fruit product to meet the increasing demand. It might pay us to quit exporting our Main-born people, and have their help to double the fruit crop for exportation instead.

Our climate and location, though far at one corner, afford us advantages in growing and exporting fruit that should not be forgotten. Our long, cool autumn is just what our apples want to finish their growth, and prevent their ripening too early. With our rapid transportation we can send them around the world three months before they perish with us. If our Baldwins ripened by August we should have to catch and eat as they fell from the trees, but as they are slow growers they only finish their growth here before cold weather, and keep till spring. * * * * *

Perfection will never be attained, but let not this discourage us from coming as near it as possible.

Every farm or garden spot should contain a good supply of apple, pear, plum and cherry trees. Nor should we forget to provide the grape, raspberry, currant and gooseberry; and a strawberry bed sufficient for the needs of its visitors, which will include the birds. As we want their help and company we may as well grow enough of all fruits to give them their share of the best.

In our flowers we are more favored, for the birds have not yet learned their worth or their own needs, though they take their baths in my Pond Lily tubs of a morning. And as every living thing was created for some good purpose, let us give the flowers their place and read a cheering lesson from their bright faces.

The field in which we labor is a vast one, and we need never think to say "the work is done." But others will begin where we leave off, and our failures may aid them to success. Some one of them that loves to originate new varieties through hybridization may even produce "a successor to the Baldwin" and our best pear and grape.

I regret that I cannot be present, and await your report with much interest.

[From J. W. LANG, Brooks.]

Report from Waldo County.

In this vicinity the past year it has been a fairly prosperous season. The first of the season was wet and cool up to July 10th or thereabouts. After that dry with but little rain-fall. Apple trees blossomed with great fullness and a large crop set. On the approach of drouth, many fell off, and of the matured crop nearly all were undersized. The crop, as a whole, was an average one. Better varieties are more and more set, and grafted into older orchards year after year, and we can see a steady, though perhaps slow growth in orcharding and fruit culture in Waldo county. The first requisite in stimulation of any branch of business is faith in that business. We are getting a better faith in fruit growing, in our soils, in our location, and better knowledge and better appreciation is taking root in a healthy form. No variety of apple has stronger hold or is growing in popularity more with us than that old standard, the Baldwin. Home raised trees are set in larger proportion than formerly. Sales of trees from abroad are growing beautifully less. No more crabs, please!

One evaporator, consuming thousands of bushels of best natural and second quality grafted apples, has been established, and has operated two seasons, in Montville, turning out a superior product and doing a paying business. There are many good locations for other evaporators and creameries in our county, and we hope this pioneer establishment may very soon be many times duplicated. Cider apples, of which large quantities are suffered to grow, do not pay for picking and manufacture. Slowly these old cider orchards are dying out, or are being regrafted where practicable, and all the younger trees are being pressed into bearing.

Waldo county has many good orchardists scattered over its extent, notable among whom are F. W. Ritchie of Winterport, A.

B. Strattard of Monroe, B. Plummer of West Winterport, B. Webber and H. Webber of Monroe, Freeman Partridge of Prospect, and Charles Bellows of Freedom, and these are but samples. It is beginning to be understood that we have lots of excellent orchard sections, and every farm has at least, with hardly an exception, one or more good orchard sites.

In pears, we are just starting in here and there, and this fruit can, as yet, scarcely be reckoned as raised in our county, but it has a future with us nevertheless. With grapes the attention has been longer directed, and a vine or two is now found near almost every home. Our people are just learning how easily they can be grown, and what a blessing they are. Strawberries are cultivated in a little wider extent each year, and we have entered upon the cultivation of this fruit in earnest. With raspberries, blackberries, currants and gooseberries, the same may be said, and though for a long time past they have had a place here and there in gardens, as yet no systematic culture has obtained. Plums and cherries are grown to some extent, but that terrible scourge "black knot" dampens the ardor and crushes the hope at present.

On the whole the outlook is hopeful. There is movement in the right directions. There is progress and improvement.

MEMBERS OF THE SOCIETY.

NOTE.—Any errors or changes of residence should be promptly reported to the Secretary. Members will also confer a favor by furnishing the Secretary with their full christian names where initials only are given.

LIFE MEMBERS.

Andrews, A. Emery.....	Gardiner	Low, S. S.....	Bangot
*Atherton, H. N.....	Hallowell	McLaughlin, Henry.....	Bangor
Atherton, W. P.....	Hallowell	Metcalf, M. J.....	Monmouth
Atkins, Charles G.....	Bucksport	Moore, William G.....	Monmouth
Atwood, Fred.....	Winterport	Moor, F. A.....	Waterville
Bennoch, John E.....	Orono	Morton, Will. E.....	Allen's Corner
Burr, John.....	Freeport	*Noyes, Albert.....	Bangor
Cartor, Otis L.....	Etna	Perley, Chas. I.....	Seward's, (Vassalboro')
Chase, Henry M.....	North Yarmouth	Pope, Charles S.....	Manchester
Chase, Martin V. B.....	Augusta	Pulsifer, D. W.....	Poland
Clark, Eliphalet.....	Portland	Richards, F. G.....	Gardiner
Crafts, Moses.....	Auburn	Richards, John T.....	Gardiner
*Crosby, William C.....	Bangor	Richardson, J. M.....	Greene
Dana, Woodbury S.....	Portland	Roak, George M.....	Auburn
DeRocher, Peter.....	Waterville	Robinson, H. A.....	Foxcroft
Dirwanger, Joseph A.....	Portland	Rolfe, Samuel.....	Portland
Dyer, Milton.....	Cape Elizabeth	Sawyer, Andrew S.....	Cape Elizabeth
Emerson, Albert.....	Bangor	Sawyer, George B.....	Wiscasset
Farnsworth, B. B.....	Portland	Shaw, Stillman W.....	Minot
Frost, Oscar F.....	Monmouth	Simmons, H. J. A.....	Waldoboro'
Gardiner, Robert H.....	Gardiner	Smith, Alfred.....	Monmouth
Gilbert, Z. A.....	East Turner	Smith, Henry S.....	Monmouth
Godfrey, John E.....	Bangor	Starrett, L. F.....	Warren
Hanseom, John.....	Saco	Statson, Isaiah.....	Bangor
Harlow, S. C.....	Bangor	Stilphen, Asbury C.....	Gardiner
*Harris, N. C.....	Auburn	Strout, S. F.....	West Falmouth
Harris, N. W.....	Auburn	Strattard, Mrs. A. B.....	Monroe
Hersey, T. C.....	Portland	Sweetser, S. R.....	Cumberland Centre
Hopkins, Miss S. M.....	Gardiner	*Taylor, Joseph.....	Belgrade
Hoxie, James S.....	North Fairfield	Thomas, William W. Jr.....	Portland
Ingalls, Henry.....	Wiscasset	Tilton, William S.....	Chelsea
Jewett, George.....	Portland	Trno, Davis P.....	Leeds Centre
Johnson, Isaac A.....	Auburn	Varney, James A.....	Oregon
Jordan, Francis C.....	Brunswick	Vickery, James.....	Portland
Low, Elijah.....	Bangor	Vickery, John.....	Auburn

* Deceased.

LIFE MEMBERS—*Concluded.*

Wade, Patrick	Portland	Whitney, Edward K.	Harrison
*Weston, James C.	Bangor	Woodman, George W.	Portland
Wharff, Charles S.	Gardiner		

Annual Members, 1882.

Blossom, L. H.	Turner Centre	Lennan, L., (1883).	Gardiner
Blanchard, Chas. H.	Cumberland Centre	Merrill, T. M., (1883).	West Gloucester
Blanchard, Wesley.	Lewiston	Merrill, Mrs. J. H.	Auburn
Briggs, D. J.	South Turner	*Milliken, Joseph L.	Saco
Calef, George F.	Saco	Morse, Miss Nellie.	Auburn
Carey, H. S.	Topsham	Mountfort, Otis A.	Cumberland Centre
Chipman, A. B.	West Gloucester	Nelson, E. N.	Minot
Clark, Edward	Lewiston	Nowell, Frank E., (1883).	Fairfield
Dennett, J. Q.	Biddeford	Paine, Albert W.	Bangor
Dill, Seward	Phillips	Plaisted, Richard C.	Gardiner
Dumont, William D.	West Gloucester	Prentiss, A. G.	Saco
Dunham, W. W.	North Paris	Remick, Benjamin.	Saco
Emmons, Willis F.	Saco	Stanley, Charles	Winthrop
Fulton, J. M.	Bowdoinham	Staples, E. W.	Biddeford
Haskell, Miss Lizzie.	West Gloucester	Staples, G. K.	Temple
Hobson, Joseph W.	Saco	Towle, J. J.	South Carthage
Hooper, D. O. S.	Biddeford	Wharff, William R.	Gardiner
Jellerson, C. T.	Lewiston	Whitmore, Thos. P., (1883).	Bowdoinham
Lapham, Wm. B., (1883).	Augusta	Witham, N. D.	Biddeford
Leavitt, E. N.	Auburn		

*Deceased.

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