Public Documents of Maine:

BEING THE

ANNUAL REPORTS

OF THE VARIOUS

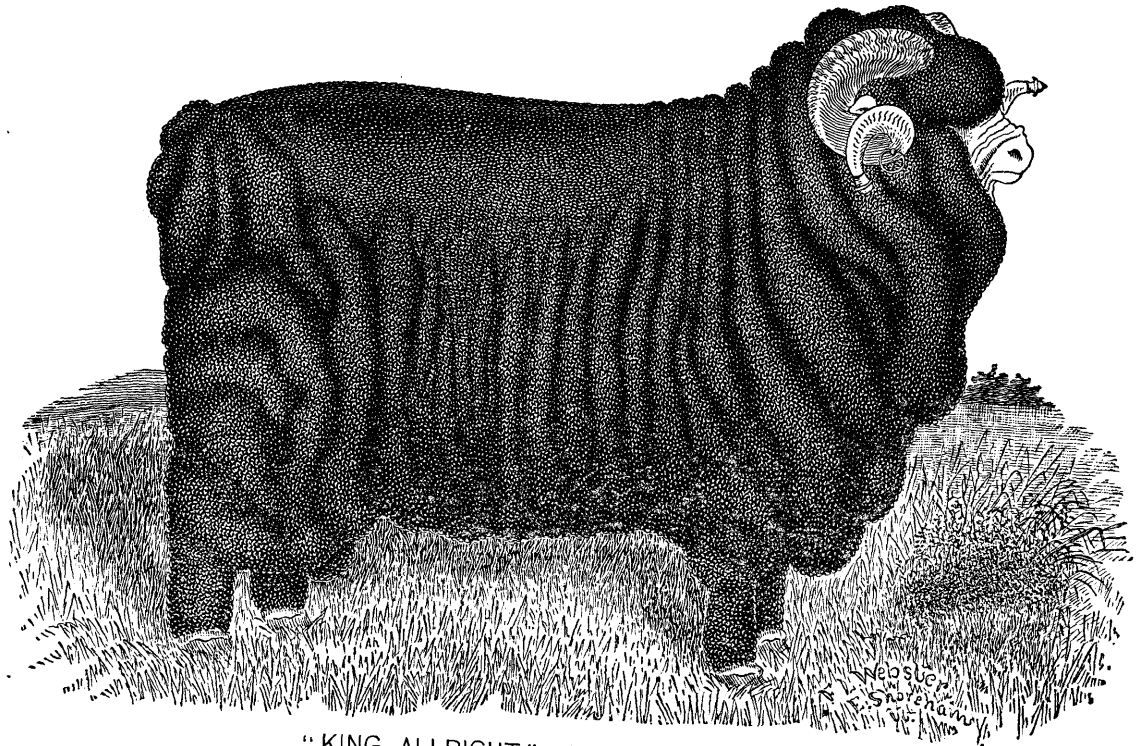
Public Officers and Institutions

FOR THE YEAR

1884.

VOLUME II.

AUGUSTA:
SPRAGUE & SON, PRINTERS TO THE STATE.
1884.



"KING ALLRIGHT." Always Shorn in Public.

AGRICULTURE OF MAINE.

TWENTY-SEVENTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

MAINE BOARD OF AGRICULTURE,

FOR THE YEAR

1883.

PRINTED BY ORDER OF THE LEGISLATURE.

AUGUSTA:
SPRAGUE & SON, PRINTERS TO THE STATE.
1884.

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 1883.

Z. A. GILBERT, *Secretary.*

AUGUSTA, January 16, 1884.

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 December 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 "	Edward 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.		

MEMBERS FROM STATE COLLEGE.

President, M. C. Fernald, Orono.

Professor of Agriculture, Walter Balentine, Orono.

ELECTED BY THE BOARD.

Z. A. Gilbert, North Green, Secretary.

REPORT.

The annual meeting of the Maine Board of Agriculture was held at the office of the Secretary at the State House, January 17, 1883. The member for Oxford county was not present. Hancock county is not entitled to representation, there being no legally organized agricultural society in the county, which alone is the organization specified by law as having the elective power. It is desirable that this omission be remedied, that the Board may have a representative in the county who is at the same time a medium of communication with the agriculture of the locality.

The meeting was called to order by the Secretary, and M. C. Fernald was called to the chair.

On motion of the member from Cumberland, a committee on credentials was raised consisting of Messrs. Harris, Stetson and Holbrook, who subsequently reported the following new members as present and duly qualified for seats on the Board:

Edward Wiggin, Maysville Center, Aroostook county.

Albert R. Smiley, Skowhegan, Somerset county.

M. R. Mathews, Warren, Knox county.

O. T. Goodridge, Milo, (re-elected) Piscataquis county.

John E. Bennoch, Orono, Penobscot county.

James W. Butterfield, Phillips, Franklin county.

The organization was effected in the election of

A. R. Lincoln, *President*,

C. H. Cobb, *Vice President*,

for the ensuing year; and Z. A. Gilbert, Secretary (re-elected), for a term of three years from the date of election.

Committee on Pay Roll—E. W. Stetson, Walter Balentine, S. L. Holbrook.

Advisory Committee—A. R. Lincoln, M. C. Fernald, C. H. Cobb.

On motion of M. C. Fernald, it was

Voted, That the Secretary be instructed to notify agricultural societies of the expiration of the term of office of their member in time for the election of a successor before the annual meeting of the Board.

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, it was

Voted, That until otherwise provided, the Maine State Pomological Society shall be allowed to expend a sum equal to one-half of the bounty received by it from the State, annually, in the payment of expenses of its winter meeting and the publication of its reports.

The Secretary asked instruction of the Board in regard to methods of work, character of exercises, leading topics of investigation, and any other instructions which it may see fit to give or which may seem to be called for. The same was referred to a committee consisting of Messrs. Harris, Pearson and Bodwell. The chairman subsequently made verbal report to the effect that the general line, and the character, of the work of the Board meets general approval, and the committee have no recommendation to make further than that the work be continued in the same general manner as during the past year.

REVIEW OF THE YEAR.

Another seed time has been given, another harvest has been gathered in. The work of spring-time was entered upon at about the average date. On some early lands, in some sections of the State, plowing and the working of the soil was entered upon the last days of April. The seed was nearly all put in during the month of May, though in some cases it was delayed into June a few days. A severe drought, beginning to be felt the middle of August, and continuing through the remainder of the growing season, extended throughout the State with the exception of Aroostook county. Its effects were chiefly manifest on the corn crop and on the pasturage.

The season must be denominated a cold one. An unusual low temperature has prevailed throughout. Some one has characterized it as a year without a summer. A frost occurred in August, which did some damage on low lands; while a still severer frost occurred September 4, which worked a wide damage to corn and all the tender vegetation on the low lying levels. The damage to corn on some farms amounted to the entire destruction of the crop.

The crops for the year, notwithstanding the cold, have in the main been bountiful.

Grass, the most important of our crops, gave an abundant yield. A year ago the record was made 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." Again it may be put upon record, that the hay harvest of 1883 exceeds in amount any previous harvest. The barns are literally full to overflowing from one extreme of the State to the other. In many cases the storage room was not sufficient for the crop, and it is no uncommon thing to see the overplus stacked outside the barns. There was more of the crop injured by wet than last year, though in this regard the score is better than the average. The amount is twenty-five per cent above an average in the State at large. The census of 1880, gave the total tons of hay in the State as 1,107,778. From this basis the present year's crop reaches 1,384,722 tons.

Corn is a hot weather crop. The season has not been favorable for the crop. Notwithstanding this there was a better crop than last year. On high lands, where unseasonable frosts did not reach, the yield was surprisingly heavy. This has proved one of our most reliable crops. When in so unfavorable years as 1882 and 1883, good crops can be grown, we may never expect a general failure of this most valuable crop. The census gave the crop of 1879, at 960,733 bushels. That was a crop under the average. Since that time the further introduction of the canning business has supplanted, in some localities, a measure of the area in yellow corn with sweet corn. Meanwhile the total average of corn has been yearly on the increase. The total amount raised in the State the present year is fully 1,000,000 bushels.

The area devoted to sweet corn is still on the increase. The yield this year was twenty per cent better than last year. The total number of cans put up in the State is estimated at ten millions strong. Generally speaking, the business of raising corn for the

canning factories is quite satisfactory to those engaged in it. The contract price for the corn was three and one-quarter cents per can of twenty-six ounces. Should the present demand continue and the present price prevail, the business will still increase. The fodder coming from the crop is now being estimated of high value for stock.

The crop of potatoes was one of the largest in many years, and with the exception of the northern border was of the highest quality. In Piscataquis, northern Penobscot and Aroostook counties, there was some rust which reduced the acreable yield about twenty per cent, and affected the quality to about the same extent. In all other sections of the State the yield was thirty-three per cent above the average, and perfect in quality. The average in Aroostook county is annually on the increase, so that the reduction in yield per acre did not cut down the total crop for the county more than ten per cent below that of the year previous.

The census gave the total crop 7,999,625 bushels, and the crop in Aroostook county at 2,248,594 bushels. The total crop of the State the present year must have reached full 12,000,000 bushels.

The cool weather so favorable to the potato crop was alike favorable to the grain crop. Oats were twenty-five per cent better than an average and reached a total of full 3,000,000 bushels. Wheat was twenty per cent better than average and reached 800,000 bushels. Barley maintained the same ratio and amounted to 300,000 bushels.

The apple crop was not over one-third of an average through the State at large. In some limited localities, and in an occasional orchard, nearly or quite an average crop was harvested. There is no reliable data from which to estimate the total for the State.

In live stock productions there has been no essential change from the year before, except that slightly lower prices have prevailed in all except cheese. In Androscoggin and Kennebec counties, and in a section of Aroostook county, dairying is on the increase, but in all the rest of the State the number of cows kept is not on the increase, if indeed it has not declined. Some few small cheese factories which have heretofore operated, did not this year open, and two new ones, one at Readfield and one at Leeds, have been put in operation. The business has had a successful season. The milk supply has been about an average, and prices have been satisfactory. The price has run at the several factories from eleven

to twelve and a half cents a pound, according to the season when sold.

Butter making by the factory system has been introduced during the year. A factory was started in Wales in June, and has met satisfactory success. Another was built at New Gloucester and commenced to make butter in November. Still another has been built and equipped at Machias, and will begin work in the spring. One at Winthrop began work in December and one at Turner will begin work in January, 1884. Other factories are in contemplation. Under careful business management these factories promise good results.

Beef has ruled lower than in 1882, the ruling price for fat oxen running from eight to nine dollars per hundred, dressed weight. The sales have not reached the amount of a year ago by about ten per cent. The transactions in young stock have been still less. The large crop of hay enables farmers to winter more than usual, while the same cause has sent many buyers on the market. The amount of stock being carried through the winter is larger than the average by fifteen per cent.

The breeding and growing of horses is still gradually and surely increasing, and the quality of the stock is as surely improving. The money received annually for horse stock sold out of the State aggregates a large amount. The business is on a safer and surer basis than formerly was the case.

The numbers of sheep on the farms have no more than held their own, and probably have fallen off. Wool has been slightly lower than a year ago, medium unwashed selling for twenty-three cents a pound with Merino a trifle higher. Lambs and fat sheep have sold lower, following the tendency of other meats. These low priees have had a tendency to weaken confidence in the business, and transactions, other than with the butcher, have been light.

The pork crop was something less than a year ago, and was sold without profit to the feeders, the price running from six and a half to seven cents per pound. Were it not for the belief that such an extreme cannot long be maintained, the low prices would largely reduce the stock. As it is, there will not be the usual amount fed for spring killing by twenty-five per cent.

The shipping of hay is still going on at an alarming rate, although prices rule low. The immense crop has had a tendency to increase sales. The prevailing price for good hay, pressed and

delivered to shipping points, is ten to eleven dollars per ton. Were the shipping of hay confined to grass lands located near the cities, where they can be fertilized from city manures, the business would not be open to objections; but when it extends to country towns and is followed any considerable time, a serious reduction of productive capacity follows. Instead, we need more stock in the State. The stock carrying capacity of the farms of this State is much greater than the stock now found upon them. Stock husbandry in its various forms is the basis of prosperity among an agricultural community, and that prosperity surely rises or falls as the flocks and herds are increased or diminished. Those sections of the State where the selling of hay has become a leading practice are not prosperous above those other sections where the entire crop is fed to stock on the farm.

The agricultural societies, as will be seen by the statistics and reports appended, have been doing a good work the past year. A full measure of interest in the exhibitions has been manifested, and fully the usual amount of money has been raised and disbursed. Some of the societies are weak from narrow limits and limited means, yet they are doing a good work, notwithstanding.

The State Pomological Society is earnestly and faithfully at work promoting our fruit industry. The arrangement of holding its annual fruit and floral exhibition in connection with the State Agricultural Society is meeting the general approval of the public, and is entirely satisfactory to both societies. A report of the proceedings of the winter meeting held at Brunswick is appended.

The work of the Board in holding Farmers' Institutes has been carried on in the usual manner. The appreciation of this work by those for whom it is more directly intended is gratifying in a high degree. The lectures and discussions have been upon topics selected in the main by those who were instrumental in securing the institutes, and pertain to specialties in which the locality is interested. As an educational means among the farming community these institutes have great force. It has been the aim to carry with them an appreciation of our own surroundings as a State, and especially of our agricultural advantages.

Since the adoption by the Board of our present methods of institute work, several other States have introduced the same system, and in every case with the highest estimate of its efficiency.

The inauguration of an inspection of fertilizers in the State is

meeting general approval. Although the inspection has been limited in extent on account of the limited means at disposal for the purpose, yet from it can be learned what may be secured by a rigid inspection thoroughly enforced. The use of commercial fertilizers is on the increase, and their inspection cannot be too rigidly enforced.

The following census statistics relating to the agriculture of the State are here given as a matter of convenient reference.

CENSUS STATISTICS.

Number of Persons engaged in Agriculture.

Agricultural laborers, 21,868; farmers and planters, 59,884; gardeners, nurserymen and vine-growers, 279; stock raisers, drovers and herders, 40; others in agriculture, 59; total, 82,130.

Number of Farms, Different Decades; also Acreage of Farms 1880.

Total farms 1880	64,309	Total farms, 10 to 20 acres	3,132
" 1870	59,804	" 20 to 50 acres	11,489
" 1860	55,698	" 50 to 100 acres	22,025
" 1850	46,760	" 100 to 500 acres	25,035
" under 3 acres	95	" 500 to 1,000 acres	378
" 3 to 10 acres	2,039	" 1,000 acres and over	116

Farm Areas and Farm Values—1880.

	Number of farms.	Improved land—acres.	Value of farms, including land, fences and buildings.	Value of farming implements and machinery.	Value of live stock.(a)	Cost of building and repairing fences, 1879.	Cost of fertilizers purchased, 1879.	Estimated value of all farm productions (sold, consumed, or on hand) for 1879.
The State	64,309	3,484,908	$102,357,615	$4,948,048	$16,499,376	$663,358	$212,135	$21,945,489
Counties.								
Androscoggin	2,981	159,937	6,119,332	286,974	798,415	32,756	10,723	1,207,634
Aroostook	5,802	270,442	5,151,151	348,179	1,164,090	52,474	6,672	1,826,346
Cumberland	5,415	245,538	11,694,327	431,722	1,250,239	67,680	45,795	2,027,891
Franklin	2,529	209,188	4,006,791	188,713	1,039,885	34,700	8,418	1,102,953
Hancock	4,078	138,101	4,653,572	184,810	690,411	33,327	5,949	881,488
Kennebec	5,431	333,354	11,049,219	512,997	1,584,922	63,036	27,295	2,301,683
Knox	2,457	99,888	3,896,276	174,265	526,079	18,108	3,503	717,386
Lincoln	3,213	146,480	4,430,985	201,618	591,711	28,120	3,077	759,560
Oxford	4,689	311,716	7,035,327	308,063	1,443,737	41,075	10,059	1,703,566
Penobscot	7,256	384,686	10,543,092	610,241	1,962,996	67,897	20,447	2,349,744
Piscataquis	2,114	148,182	2,789,845	183,611	633,159	26,734	4,353	706,521
Sagadahoc	1,336	73,488	2,851,180	203,746	348,563	17,351	6,491	455,024
Somerset	4,664	322,141	7,358,992	379,874	1,633,091	57,054	18,378	1,742,920
Waldo	4,277	245,333	6,308,675	392,556	1,068,469	41,830	11,541	1,472,028
Washington	3,062	147,008	3,267,767	150,048	588,681	28,260	9,441	850,045
York	5,005	249,426	11,201,084	390,631	1,174,928	52,956	19,993	1,840,698

a On farms, June 1, 1880.

Principal Vegetable Productons.

	Barley.	Buck-wheat.	Indian corn.	Oats.	Rye.	Wheat.	Value of orchard products.	Hay.	Hops.	Potatoes.	Tobacco.
	Bushels.	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*	*Bushels.*		*Tons.*	*Pounds.*	*Bushels.*	*Pounds.*
The State	242,185	382,701	960,633	2,265,575	26,398	665,714	$1,112,026	1,107,788	48,214	7,999,625	250
COUNTIES.											
Androscoggin	9,057	2,074	79,778	99,523	1,152	14,795	95,188	50,574	4,529	245,696	–
Aroostook	15,777	296,793	382	628,435	10,894	138,236	7,227	80,316	4,520	2,248,594	–
Cumberland	17,624	809	93,619	87,940	1,125	20,531	115,312	83,430	–	381,410	–
Franklin	7,331	3,382	51,754	133,549	556	38,704	51,095	67,554	2,400	219,784	–
Hancock	6,737	392	5,468	29,893	–	32,718	22,863	43,483	–	286,376	–
Kennebec	39,389	2,708	121,394	186,547	1,586	47,006	186,827	108,734	–	381,161	–
Knox	5,384	456	17,457	14,328	542	23,396	31,030	35,521	–	126,706	–
Lincoln	22,147	157	32,359	35,126	515	13,075	26,692	44,178	–	149,541	–
Oxford	2,392	14,832	149,572	152,924	3,935	48,306	102,370	83,143	29,423	538,191	–
Penobscot	29,367	28,394	71,137	320,174	2,583	107,351	95,108	136,446	–	1,104,329	–
Piscataquis	9,515	4,821	30,402	98,544	–	29,186	23,171	43,809	–	325,599	250
Sagadahoc	9,961	81	15,962	19,936	161	6,964	23,938	25,161	–	78,330	–
Somerset	33,991	13,469	92,545	273,438	1,226	46,846	75,674	105,381	4,600	580,259	–
Waldo	9,340	2,623	45,496	104,263	895	54,394	88,902	86,881	1,030	448,550	–
Washington	6,827	10,941	675	46,091	–	28,736	7,390	40,473		506,646	–
York	17,382	769	152,633	34,864	841	15,470	159,239	72,704	1,712	378,453	–

Live Stock and its Productions.

	Horses.	Mules and asses.	Working oxen.	Milch cows.	Other cattle.	Sheep.	Swine.	Wool.	Milk.	Butter.	Cheese.
	Number.	*Number.*	*Number.*	*Number.*	*Number.*	*Number.*	*Number.*	*Pounds.*	*Gallons.*	*Pounds.*	*Pounds.*
The State	87,848	298	43,049	150,845	140,527	565,918	74,369	2,776,407	3,720,783	14,103,966	1,167,730
Counties.											
Androscoggin	4,236	3	1,869	8,733	5,907	13,160	5,191	65,297	519,163	776,062	149,069
Aroostook	9,054	21	2,252	12,461	14,031	39,615	6,638	190,636	140,351	917,645	23,933
Cumberland	7,087	47	2,916	13,590	7,682	11,799	6,040	61,366	831,859	1,341,304	51,139
Franklin	4,201	–	3,161	6,391	8,913	77,547	3,056	372,536	55,829	525,201	90,694
Hancock	3,154	8	2,079	7,312	5,214	23,525	2,402	110,444	39,525	757,769	5,333
Kennebec	8,407	25	3,275	13,718	10,600	43,940	7,430	215,655	302,538	1,466,144	181,618
Knox	2,704	4	1,502	5,399	3,231	11,336	2,368	62,550	146,108	624,454	16,475
Lincoln	2,894	15	2,698	6,070	4,428	10,580	2,832	53,486	24,071	615,208	9,787
Oxford	6,886	9	5,296	12,620	19,349	99,371	5,239	176,221	251,013	1,006,914	240,373
Penobscot	11,116	71	3,205	17,172	17,634	72,596	9,205	374,498	630,300	1,681,467	99,679
Piscataquis	3,372	16	1,282	5,027	5,389	35,192	3,388	177,342	53,767	439,004	53,241
Sagadahoc	1,755	6	1,008	3,143	2,586	6,722	1,454	34,171	102,257	317,356	3,070
Somerset	7,987	9	3,911	10,429	12,259	116,910	5,599	574,988	53,685	874,439	188,757
Waldo	5,821	28	2,636	8,763	8,333	38,417	4,924	189,151	122,105	862,997	37,098
Washington	3,186	20	1,270	7,379	6,582	15,019	2,547	67,817	45,570	729,811	1,237
York	5,988	16	4,689	12,638	8,329	10,189	6,056	50,249	402,642	1,168,191	16,227

Farmers' Institutes.

PENOBSCOT COUNTY.

The season's work of holding Farmers' Institutes opened in Penobscot county with an Institute at the town hall in Lee, October 11, by invitation of Forest Grange of that town. There were present of the members of the Board, Messrs. Goodridge of Piscataquis, Cobb of Androscoggin and Bennoch of Penobscot; and also, as an additional assistant, Mr. H. L. Leland of Sangerville.

The leading subject for consideration was, "Butter Making by the Factory System," and was suggested by a desire on the part of the locality to know more of the details of the system, that a correct judgment might be made up of its adaptability to that locality. In all the past, the practice has prevailed of raising crops for sale, largely, and it is now plainly seen that, in order to make their farming profitable in the future, a different husbandry must prevail. Stock feeding and the making of manure to replenish the fertility carried off, must take the place of cropping. The question then is, What shall it be? This Institute was assembled to cast its light upon the situation.

The meeting was called to order by the local member, Mr. Bennoch, who called Mr. CHARLES M. TUCK to preside. After the preliminary exercises, the first topic bearing on the general subject was, "Prerequisites to a Butter Factory," by H. L. LELAND of Sangerville, who claimed in opening that the basis of successful farming is stock husbandry, which comes from a necessity existing all over the State for fertilizing material with which to keep up or replenish the productive capacity of the soil.

Our lands, as a rule, are adapted to grass production, and, therefore, to dairying. The requisites to success in this business are:

1st. The farms must be stocked up with cows.

2d. It must be pursued as a business and as a special feature of the farm.

3d. Cows are the most profitable stock a farmer can keep.

4th. The demand for choice butter and cheese can never be oversupplied.

5th. If one is to go into this business as a specialty, the number of cows must be increased.

6th. To do this, whether their product be devoted to cheese or butter, there must be association in its manufacture.

7th. One of the difficulties attending associated effort for this purpose is, the reluctance of farmers to coöperate for mutual benefit.

A free discussion followed the lecture of Mr. Leland, participated in by several of the farmers of the vicinity.

Mr. Tuck said the subject under consideration had been before the people there for some time, and they were anxious for information on the matter. If the surroundings were such that it cannot be encouraged, they wanted to know it.

Secretary Gilbert explained the system of factory butter making at length, and showed how the business could be adjusted to meet the conditions of any locality.

In the afternoon, "Feeding of Cows and Income of Same," was discussed by Mr. Cobb, who opened by saying that he considered the question one of the most important that could come before a community of farmers. If farming is a business worthy of our attention, we must enter upon it in a manner to secure something out of it. To make dairy farming successful, there must be milk in plentiful supply. This comes from feed in plentiful supply and from care attentively given. Liberal feed and generous care are required, and without these it is useless to look for profitable results. Dairying is no business for a lazy man. The liberal flow of milk comes from constant care and liberal feed continuously given.

Mr. Goodridge. The conditions prevailing here are very similar to what they are in his own town. He had looked the matter up somewhat, and had found that very few know anything about what they are doing. Here and there a man could be found who had given some attention to the matter, and such ones had invariably been led to a better course of feeding, which in turn led to good results.

Mr. Leland. We have a cheese factory in Sangerville. Several of our farmers have given me the figures of the amount received for

the three items of calves, cheese and butter, and it reaches an average of sixty-two dollars to a cow, and it was done at a cost of forty dollars average.

The evening was given to the subject of "Fruits for the Family,' by Mr. BENNOCH.

Institute at Newport.

A second Institute for the county was held at Newport, Oct. 26, at which the leading topic was:

THE GRASS CROP AND WHAT TO DO WITH IT.

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

Mr. Chairman and Gentlemen: We have no labored formalities to introduce this morning. It is not necessary for us to preface our work with any illustrations of what it is to be. The work of this Board of Agriculture now is well understood by the farmers of our State, and needs no formal introduction to any audience of farmers wherever assembled. It may be well enough, perhaps, in opening the exercises to speak of the topics which have been announced in the programme. These topics were suggested by farmers of this vicinity, and were introduced into the programme at their request. The central thought of the meeting is the "Grass Crop and what to do with it."

Without question, grass is the king of crops in Maine agriculture. This bare statement, perhaps, needs no qualification. The market value of the grass crop is greater than all other crop products of our farms combined. Further than that, our mixed agriculture, as we find it here in the state, is dependent, from a prosperous standpoint, more upon the grass crop than upon any other — in fact, all our other crops combined. Prosperity among the farmers of the State and throughout the State at large, in a large measure is graduated by the height of the hay-mows. When the grass crop is light, farmers are not prosperous; when the farmers are not prospering the State at large does not feel that measure of prosperity which it does under more favorable conditions. We had a striking illustra-

tration of this in 1870 and 1871. You will call to mind the fact that our grass crop was a failure in those two years. Previous to that time the farms were well stocked up with farm animals; in consequence of the shortness of the hay crop a large percentage of the stock of this State was sacrificed — sold for ruinously low prices, the farmers realizing but little. Practically it was a sacrifice of a large part of the stock of the State, and what was the result? For years the prosperity of the State was crippled. Farmers were not prosperous. It took several years for them to recover; it took several years for the farmers to re-stock their farms, and during those years business was depressed in consequence. Farmers were receiving but a limited income, and that limited income required the strictest enonomy of expenditure. This was exercised in the direction of labor applied to the farm. There was not the means at hand to employ outside labor, and the consequence was but little labor was put upon the farms. Small incomes were realized from the farms, and a general depression of business — hard times we called it, followed it. In the course of time farmers gradually recovered from this condition of things, and for the few past years our farms have been up to their former productive capacity, our hay-mows are filled, our farms are all stocked up to a goodly carrying capacity, and the result is that farmers are prospering. Never, probably, in the history of the State, has the agriculture of our State put on more prosperous conditions than during the three past years. This happily holds good to-day.

The past year has rewarded the farmers of the State of Maine with the most bountiful grass crop ever harvested in the State, and it is in our barns to-day. What shall be done with this hay crop now stored in our barns is then a great question. It is a great question from the fact first, that there is a vast amount of money value in this hay crop, and, secondly, it is of great importance from its relation to the other conditions of the farm. The practice has been extending over our State of marketing the hay crop in the form of the raw product, by selling directly. This of late years, since the easier, better and cheaper communication with the interior of the State through the railroads, and other means, has been rapidly on the increase, so much so that it has attracted the attention of many of our most thoughtful men, and they see in it a practice which they do not feel can be encouraged.

The selling of raw products from the farms as a chief reliance is an accompaniment of primitive agriculture, and the first settlement

of a section. It is then a necessity to the settlers, from the fact that they have not the means to stock up, and the system governing the agriculture of such localities at such times does not admit of any other course. Further than that, lands in that condition contain rich stores of fertility which may be drawn upon without serious detriment to the soil.

We are apt to look upon the growing of potatoes to the extent that it is now being done in Aroostook county, and for the purpose of realizing a money income, as a source of income somewhat questionable; and the best farmers of Aroostook and those from outside who are looking on are considering that it is a system which should not be encouraged, for the reason that it is a selling off of those stores of fertility which are now stored up in those soils without a return of the same in any form. Hay selling is a parallel with the potato raising of Aroostook county. If anything, it is not so profitable an operation, and does not carry with it so much of commendation as does the growing of potatoes in Aroostook, or in any other locality, from the fact that the acreable returns from the hay crop are not nearly up to the acreble returns from the potato crop. If we must sell the fertility of the farms on the market, we ought of course, as business men, to sell that fertility at the highest possible price. Hay selling in the form of the raw products will not do it.

In connection with this central idea there was the question presented of the renovation of the soil. This section, in common with other sections which have been cropped, is in possession of many acres of soil where the fertility has been considerably reduced by long continued croppings without a full return of fertilizing material to the soil. If I mistake not, hay has been one of those crops. It is then here a proper question, and an important one for consideration in any community of farmers, for in nearly every section of the State this cropping in some form has, in some time in the past, been carried on at the expense of the fertility of the soil. Happily, certain locations in our State have rectified that in a measure, and are looking forward with methods and means to still further correct this work in the future.

We are brought in this opening exercise to the subject of the renovation of the soil, and to fully understand this it is necessary to go into first principles, in a measure. It is well for us, even in agricultural affairs, in crop production, to go down to first principles.

We are laboring to cast abroad to the farmers of the State something of information coming out of these meetings, and it is well for us to go down to first principles and see the subject laid out bare, and by so doing understand better the work we have in hand. The prospective physician and surgeon dissects his subject that he may understand all the parts of the system, not only the location of the different organs, but also the office which they perform; so let us dissect this subject in a measure and examine its different parts.

In the first place the work of renovation presupposes that there has been exhaustion, and if the soils of this vicinity are in a condition which need renovation, there has been from some cause an exhaustion of a measure of the fertilizing material which formerly was found in these soils. This exhaustion, as before hinted, has been caused by repeated cropping without returning fertilizing material in sufficient quantity to the soil again. This has caused the exhaustion. A ton of grass, for instance, taken from the soil, has removed a certain amount of material which existed in the soil before the ton of grass or hay was grown and removed from it. This material has been transferred into a new material.

Let us inquire for a moment what this long continued cropping has really done for the soil. We say it is exhausted. What do we mean by this exhaustion? What is the difference between an exhausted soil and a productive soil? In order to understand that fully, we must consider the plant a moment. An agricultural plant is made up of certain elementary substances. This holds good of all plants of whatever name. There are thirteen of these elementary substances found in agricultural plants. It is not necessary here to attempt to enumerate all of them; the matter can be illustrated in the manner in which it is proposed to do it as well without naming the entire list of these elements. We are considering the grass crop at present. Hay is simply grass minus a portion of its water. This hay is made up of thirteen elementary substances. The difference between a stalk of timothy and a stalk of corn, chemically speaking, is simply that the elementary substances are found in different proportions in the stalk of timothy from what they are found in the stalk of corn. A portion of these elementary substances come from the air, but the mineral elements and the nitrogenous material come through the medium of the soil. Those elements which come from the air, the farmer has nothing to do with—the soil has nothing to do with directly, because nature

supplies those to the growing plant. Those which come from the soil we have to consider. All of the elementary substances which are taken from the soil must of course come out of the soil. They exist in the soil as part and parcel of that soil, and by the growing plant are taken from that soil, and when the plant is carried from the field those materials go with it. Thus with every crop a certain amount of exhaustion is carried on; a certain amount of these materials is removed from the soil with every crop that is carried off. Of course, unless there is an unlimited store of these elements in the soil, exhaustion sooner or later must follow that course. A repeated draft without returning an equivalent for the same, sooner or later exhausts the soil, and we find our old fields in the condition that many of them are to-day as a result of carrying off these elements in the crop. This is the philosophy, so to speak, of soil exhaustion.

Experiment has proved, and it is now accepted without question, that with our ordinary agricultural soils only three of the thirteen plant elements are liable to become exhausted — the others being found in sufficient supply for all demands made upon them. Those which are frequently exhausted are *nitrogen*, *phosphoric acid*, and *potash*. These three elements, then, are the materials which the farmer must furnish to the soil or the production of that soil will sooner or later be reduced to an unprofitable condition.

Practically then, agriculturally speaking, soil exhaustion means the exhaustion of phospheric acid, potash and nitrogen to the extent that there is no longer a sufficient supply within the reach of plants for the profitable production of crops. But strictly speaking, there is no such thing as total exhaustion. We reduce the soil to the condition in which it is not capable of producing profitable crops, but still there is a rich store of this valuable material remaining in the soil, nevertheless.

In your old fields which have been reduced to a low condition, and without liberal manuring will not respond to cultivation and give you paying crops, there is still a rich store of this material left, but it is not in a form which the plant can avail itself of. The soil has been exhausted of its available phosphoric acid, nitrogen and potash, but there is an abundance in an insoluble form which still remains in the soil. The plant takes up its nourishment, takes up its supply of plant food through its roots, and in order for a plant to absorb this material by means of its roots the material

must be in solution in the soil; if the elementary materials out of which a plant is constructed are not in that condition, then the plant cannot avail itself of this food, and therefore will not grow. Hence there may be such a thing as an abundance of these materials round and about the roots of the plant, and yet the plant be unable to avail itself of them, and consequently will refuse to grow. The available plant food, then, may be exhausted, and still enough of that which is insoluble remain in the soil, unavailable for the production of crops for an unlimited number of years. Take your exhausted fields here, those which have been reduced to the lowest degree of production, and there is still nitrogen enough for a bountiful crop of wheat for a hundred successive years; there is still phosphoric acid enough for its hundred bountiful crops, but if they are insoluble — unavailable — they are as absolutely sealed up from the benefit of these crops as if they did not exist there. Practically, then, the soil is exhausted, actually it is not.

Taking a soil found in that condition — and this is the condition of much of the agricultural soils among us—there are two methods of restoration open to us. Stirring and manipulating the soil was advocated years ago by that early investigator Jethro Tull as the one thing needful to the continuous productiveness of a soil. While in the light of to-day this is hardly recognized as enough for the full supply, yet it is well known that the stirring and the pulverization of a soil, whereby its particles are exposed to the influences of the sunshine, the rain and the frost, break down the insoluble forms in which these elements are stored and puts them into available forms, and thus contributes to the productive capacity of the soil, and in practical effect is equivalent to manuring. Practically, "tillage is manure."

This is an important matter, yet it is not proposed to dwell upon it at this time at such length as its importance demands, as there is other work mapped out. Rest to a soil has an effect to restore its fertility, from the fact that a soil at rest is acted upon in a measure by the atmosphere, by the frost, by the rain, by the sunshine, and in that action this material existing in the soil is rendered soluble and therefore available to the plants; and if the farmer with his tools and his teams goes to work and aids in this process by working the soil, then the work is more rapidly performed. Plowing, pulverizing, stirring, turning over and exposing the particles of the soil to the influence of the atmosphere and these other agencies have

an effect in this direction. The more frequently it is stirred, the more of these particles will be exposed to these agencies and therefore the more rapidly is this renovation of the soil carried on.

Many of our most successful crop producers are placing full as much stress upon this manipulation of the soil as they do upon the manuring of the soil. Practically, they end in the same results —the one renders the plant food in the soil available to the plant, the manure contributes plant food to the soil from outside sources. Jethro Tull claimed that all that was necessary to continue the fertility of the soil indefinitely was to give it this thorough and repeated working. Others following later, learned that while this would give great results, yet it was not sufficient, and it became necessary to give the land a rest from time to time in order that stores of fertility could be accumulated for future crops. From that arose the practice of summer fallowing, years ago advocated very strenuously by many of our best farmers in this country, especially the wheat growers. These two agencies, the one of working the soil and the other of allowing it to rest meanwhile, each contribute in this direction, and when the two work together, a short time only was found necessary to render the land again productive. But in our haste to carry on productive farming and to produce crops, the practice of summer fallowing has passed into disrepute somewhat, and now we find very few of our agricultural thinkers advocating a fallow. Instead, they now advocate, in addition to the working of the soil as a contribution to its restoration, an application of manures in place of the summer fallow.

So we come to the second method of restoration of the soil which is by the application of manures to the soil. A fertilizer, a barn manure contributes to the soil these same elements which the plant takes from it. The plant carries from the soil these elementary substances which have been spoken of, the barn manure restores them in a measure. The fertilizers which you buy on the markets and apply to the soil restore this exhausted material. Manures are valuable for just that purpose, that is, for the carrying back to the soil and mingling with it those same materials which have passed out and have been carried away by the removal of the crop from the soil.

There are these two methods of renovation and they work best in conjunction. Neither can do its most profitable work alone. Our best farmers, at the present time, are placing full as much stress on

the matter of working the soil as they do on the matter of manuring the soil, and they should go in our agriculture hand in hand.

As I investigate the most successful practice throughout the State, and study the reasons for results that are found in these practices, I am surprised myself at what can be accomplished in the way of production where the highest type of both of these methods of restoration are put in practice. Where thorough tillage is practiced surprising results may be reached with even scant fertilization. Of course the utilizing of this stored-up material in the soil is in a measure exhaustive, but as long as there are unlimited amounts stored in the soil, we may still continue to draw from them, regardless of any alarming results which may follow. We never can be able, by our best practices, with our best implements, with our most diligent efforts, to render the soil barren by a continued draft upon this stored-up material in the soil. All conscientious scruples in that direction may be cast aside and we may do our level best to get what we are able out of the soil in these directions, and still the soil will be left on our hands valuable.

While I would not overlook the consideration of commercial fertilizers as a means of adding to the fertility of the soil, I propose here only to refer to the matter of barn manures. These farm manures, as we all understand, come from the crops which have been produced on the soil. In these manures are found the very same material which the crops in their removal from the soil extracted from that soil and took away when they were removed. So we have a continuous round.

It is an interesting fact for us to study that there is no such thing as destruction in this direction; you may produce a crop from the soil and remove a certain amount of these elements from the soil, carry them off, do what you please with that crop, yet those elements are not destroyed, and never can be destroyed. The phosphoric acid found in your Timothy hay, carried and fed to your stock, digested by the animal system, assimilated through that system and stored up in the bone structure of the animal is nevertheless phosphoric acid still. Not one iota of it has been destroyed. When that animal is utilized as human food, none of the phosphoric acid found in that animal can be destroyed; if consumed as human food, it is still the same substance; if cast aside in the form of bones and waste material it is still the same mineral. In that bone exists the same phosphoric acid that existed in the soil before the

plant took it out, and somewhere on this round all of it is represented. You may take the bone to your fire, even, and burn it, crush it and dissolve it, and not one particle of its mineral portions have been destroyed or can be destroyed. You cannot burn up the mineral parts of a plant, you cannot burn up the mineral parts of an animal, they still remain to be transferred to the soil if you will. There is no such thing as destruction.

The ability to fertilize the soil from the barn manures comes from the fact that in feeding our fodders to the farm animals only a small percentage of that material is retained in the animal economy. The rest of it is voided by the animal and is available for the continued enrichment of the soil. A ton of hay, for instance, contains thirty-one pounds of nitrogen, eight pounds of phosphoric acid, twenty-six pounds of potash, approximately. Now you feed that ton of hay to the farm animal and only a small percentage of that nitrogen, phosphoric acid and potash is retained by the animal economy, the larger percentage being available for the continued fertilization of the soil. Of course there is a variation as to the exact amount which the animals utilize to their own purposes—varying with the different animals and the different purposes for which the material is fed. The different kinds of animals take from fifteen to twenty per cent of this fertilizing material which is utilized or retained by the animal. In some cases it is considerably less than fifteen per cent, in other cases it is a little more than twenty per cent, but it is near enough for an intelligent comprehension of the matter to say that on an average, of these three materials, fed for the various purposes to the various farm animals, from fifteen to twenty per cent is retained by the animal and from eighty to eighty-five per cent is left for the farmer to return to the soil if he acts his part well. So the importance of stock husbandry and stock feeding to the fertility of the soil is plainly seen. It is easy for a farmer to make up this fifteen or twenty per cent of fertility which is retained by the animal by the other method of working the soil, thus fully making up the reduction which the animals make in their use of the food. It does not take any marked degree of skill on the part of the farmer to make up in full all of the reduction which the consumption of the fodder on the farm requires. This is an interesting fact and is closely related to the necessity for stock husbandry on the farm.

We are well aware that this presentation is landing our subject into a topic which has been introduced into our agricultural meetings over and over again, but it never can be set aside as exhausted, never can be set aside as of secondary importance so long as our soils are susceptible of exhaustion, or so long as we are obliged or may desire to carry on farm operations among us.

I have now covered the ground to the extent that I think it necessary in order to get at a clear comprehension of what we want to illustrate in opening this meeting.

Question. From the manipulation of the soil and the application of the manure combined, does it not call for a more liberal application of dressing to bring forth the result of a bigger crop; and is there not consequently quicker exhaustion?

SEC. GILBERT. That is what we are after. A crop means exhaustion. A bountiful crop is a greater exhaustion than a limited crop, and a bountiful crop, ordinarily speaking, is the most profitable for us. What we are laboring for is a transfer of the richness of the soil to the grain bins and the hay-mow, and the more of it we can get out in one year the better it suits us and the more profitable the operation.

Through this manipulation of the soil you are enabled to avail yourself immediately of more of the plant food existing in your manures than you otherwise would. For instance, in a given application of barn manures there is the ability to produce a certain amount of crops; if you can get that certain amount of crops, all of it, the first year, it is more profitable to you than it is to take half of it the first year, and distribute the other half through five future years.

There is another consideration in the application of these materials to the soil. A farmer never yet has been able to find every pound of his application represented in his crops taken from it.

Question. Some of our soils are very moist; is it not absolutely necessary to do away with the greater part of that water by subsoiling and draining in order to get the best results?

SEC. GILBERT. Where an excess of water exists in the soil it is absolutely impossible for a fertilizer to testify in that soil. That comes from the fact that a saturated soil cannot be penetrated by the heat to any extent. The water must be thrown off out of the way before the soil can become warm.

Question. Is it necessary in restoring our soils by harrowing, etc., to cut down deeper than we have been in the habit of plowing; Do we get any better results?

SEC. GILBERT. If I was to answer the question without qualification, I should say yes. With that deeper culture, must come thorough manipulation of the soil, because the elements existing in this deeper stratum of the soil may be in an insoluble condition from the fact that they never have been exposed and worked. If you take to the surface a large proportion of that inert material, it is possible to work an injury because the material is inactive and possibly crops will not grow in it. By a thorough working, and a frequent working continued for a considerable time before the crop is put into the soil, you overcome that, and thus bring to the use of the crop a greater proportion of plant food than you would with a shallow working of the soil. In many seasons, with certain soils, a deep working is better because you secure a better drainage. It is impossible for thorough under draining of a wet tract of land to have its best possible results without a deep working of the soil.

We have another class of soils that it is not necessary for us to work thus deep, from the fact that the under stratum of soil is already in a porous condition and is susceptible to the influence of the elements, and is at the same time so mellow and porous that the roots of the plant can penetrate into it. Therefore these different kinds of soil require a different system, and this very fact requires the highest application of our intelligence to the whole matter.

AFTERNOON.

STOCK HUSBANDRY AND ITS RELATIONS TO FERTILITY.

MR. HOLBROOK. Our subject this afternoon is but a continuation, it seems, of the subject which we had under consideration this forenoon. By the fertility of the farms we can judge of the prosperity of any community. You can judge of the prosperity of a nation by the quantity of soil it cultivates. Look over a single farm and you can judge of the prosperity of its owner by the soil which he cultivates, and the manner in which he does it. We like to find fault with the manners and customs of those who have preceded us. Those who cultivated the soil before us, the pioneers of the State, have acted almost the part of vandals, in robbing the soil of its fertility — cropping it without compensation. The law of debt and

credit holds good in this. If you violate a physical law there is a penalty attached to it; so in the cultivation of the soil, if you rob it of its fertility you are subject to the penalty attached. We find ourselves occupying farms with the soil partially robbed of its fertility, and it becomes us as farmers desiring to build up this important industry to devise means and measures whereby we may restore the fertility of the soil.

This brings us to the question of stock husbandry. The earliest tillers of the soil practiced it; we pursue it under different circumstances. Is it not the most practicable way to build up the fertility of our farms? In pursuing this course of husbandry it is important that we start aright, with the right stock. The kind of soil makes all the difference in the world. You may have the same natural ability and your circumstances may be no more favorable than mine, but if I am farming upon a poor soil and you upon a good one you will prosper while I shall not. I would advise a young man to study carefully the conditions of the soil on which he is to locate. In starting right in stock husbandry, one should study the location in which he is situated. If we are going to raise stock for beef, what kind of stock shall we keep for that? If we are going to follow dairying, what kind of stock shall be kept for that?

The great object of stock keeping should be to build up the fertility of the soil. That way which will prove the most judicious, the most economical, we should follow. The law of compensation holds good on the farm. Is it not the proper way to build up our farms to feed our hay crop? The hay crop of the State of Maine amounts to about twelve hundred thousand tons a year, and we are sending out of the State about two hundred thousand tons a year; we retain enough to feed our stock. Would it not be better to keep that portion of hay we are sending out of the State and feed that also to the right kind of stock? A large portion of the hay is fed to such stock that it yields but a small return. Our hay, which is barely paying us $7.00 or $8.00 a ton, should pay us $15.00. If the twelve hundred thousand tons of hay which is raised in Maine was paying $15.00 a ton, instead of $8.00, there would be a vast difference to the farmers of the State. If we are to feed to cows let us keep the best of cows. If you wish to start a woolen mill, a cotton factory, or any branch of industry which requires machinery, you get the best machinery to be had, you cannot afford to run with old fashioned machinery. Success will hinge upon that. I cannot tell how much

money we are sending out of the State of Maine annually to buy commercial fertilizers, but it is hundreds of thousands of dollars. Is not there a cheaper way for us to buy than in the shape of phosphates? Why not buy it in the shape of cotton seed meal, or wheat bran, feed it and get a double profit? Then we should get the material with which to fertilize and build up the fertility of our farm in the cheapest way. There is a system adopted by some, and with me it finds favor, and that is what we call the soiling system. We can keep more stock, we can keep them better and there is more profit in doing it. We get more fertilizing material, more fertilizing material means better crops, and it means better farming.

When we start any branch of industry an important question for us is whether there is room, whether the business is overdone. Drive a yoke of fatted Hereford oxen into the Brighton market and see if the business is overdone; carry your working oxen or steers or any cattle into the market and if they are A 1 you will find a market, and at a paying price. The selling of hay means the selling of your farm by piecemeal. A ton of hay sold off the farm carries with it six dollars worth of fertilizing material or that which would cost us six dollars if we go into the market for it.

In no way can the farms be made so profitable as by following stock husbandry in a judicious manner.

J. E. SHAW. In the first place, is the hay fed at a profit by the farmers? I think as a general thing that we farmers do not feed our hay at a profit for the reason that we do not feed it to the most profitable stock, and so do not realize the income from it that we should. If we expect to feed our hay at a profit it must invariably be fed to good stock, with good care. Then I think it can be fed at a profit here in Maine as well as anywhere. We have one of the best States to produce hay in that there is, and if we feed to the right kind of stock I think it can be made more profitable than selling hay. Selling hay is injurious to every farmer. For the time being he may get some money out of it, perhaps more than he would in feeding to stock, but where is his farm? With every ton of hay sold, we sell six dollars' worth of fertilizer. If there is six dollars' worth of fertilizer in each ton, and we reckon the expense of cutting the hay, curing it, pressing it, hauling and delivering, how much will there be left for profit? If we intend to keep up the fertility of our farms, therefore, we have got to depend on stock husbandry in some form, and consume the hay on the

farm. In the fertility of our farms lies our success in farming.

Can we feed our hay to beef stock and make it profitable? There has been the time that it could be done, perhaps. With some of the best stock it may be done at the present time; but we have got the West to compete with, and we cannot expect prices to rule as high as they did in war times. At present we have got to put it into the market at the price of western beef, and if we intend to compete with western stock raisers, whether we make it profitable in feeding our hay is a question that each man must decide for himself. Take the ordinary common stock we find through the State, and it is impossible to feed it for beef at a profit. If we cannot raise beef at a profit and compete with the west, what shall we do? I think that the dairy offers the best outlet for feeding hay to a profit, of any branch of stock husbandry that we have. We know there is a great deal of competition, but the competition is coming to that point where the best grades of butter and cheese are to be appreciated.

In regard to feeding hay to a butter dairy, I know that it can be made profitable; but we have got to make a different quality of butter from the generality of what goes into the market. We have got to produce a gilt edge butter that steps out of the range of oleomargarine and these artificial butters in the market.

I consider that hay fed to a good dairy cow, making fancy butter, will give from $25 to $40 profit yearly to any and every farmer who has a mind to make a specialty of it. It cannot be done in a slip-shod manner as too much of it is, but it must be entered upon as a business with the intention of succeeding in it. From a good cow you can derive an income of seventy-five to one hundred dollars a year, the cost of keeping that cow will be from $45 to $55. The price of hay and the price of the provender fed to her will vary the cost somewhat. The profit of feeding the hay to a cow is in the grain that is fed with it. If we feed a first quality of hay to a dairy cow we can get a good income without the grain, but by feeding the grain we can work in a portion of our coarse fodder, and thereby get as good results and at less expense than we could if we fed all good hay. Therefore it looks to me that dairying should be an object to the farmer who wished to feed his hay to a profit.

Within the past few years every farmer here knows that the demand for cows for supplying the Massachusetts milkmen has greatly increased. This makes an outlet for all the surplus cows

that farmers may have. These I think can be raised at a profit. We should take all these things into consideration; we must consider our circumstances and feed to that which will pay the best, and I think we must take the dairy cow as the standard. It is only some ten years ago that the cows that were carried from this State to Massachusetts would bring somewhere in the neighborhood of $30. Now they will bring in the neighborhood of $50; the same class of cows. The income that we can receive from these cows from the time they come into milk until we sell them, will pay a profit, and then they can be sold at a profit. It looks to me that this feeding of hay is the only way that we can keep up the fertility of our farms and make agriculture a paying business. We all know that the success of every farmer and every community lies in their stock husbandry. The successful farmer has been, is now and always will be, the one who feeds his hay to stock.

W. W. HARRIS. Our secretary was very kind to have this road opened for me, and the work principally done before calling me up. The subject matter of the forenoon and the question of the afternoon come very near to the same thing. I have had some experience in renovating an old farm, yet I could not lay down any rule by which a man could go to work and renovate a farm to the best advantage, because the man himself is the most competent to judge. So many different circumstances surround him that it is hard to lay down any fixed rule that will apply to all cases.

Most every farmer has a portion of land so wet as to be unproductive, not bearing any crops. That is the portion that he may well take hold of and underdrain, take the water out of it, and let the sun and air work upon it. He can raise a few crops from that land without any fertilizers better than he can with a moderate portion of fertilizers upon his other worn out lands. We want to see how we can raise a paying crop upon some portion of our land, and at the same time improve the land. A necessary investment, as has been stated here, is the raising of stock of some kind. The kind of stock for a man to keep will, of course, depend upon his taste somewhat. If a man has a particular liking for either cows, oxen, sheep or horses, that is the thing for him to take up—working moderately and surely every time to grade up higher, and to keep that stock, whatever it is, with an eye to economy—still to improve his stock and at the same time improve his farm; they go hand in hand. When you find a man who is capable of taking any kind of stock

and handling it to improve it, you never knew it to fail but he improved his farm; they are so closely allied that it is impossible to separate the two.

The hay crop is equal to all others, as has been stated here, and yet my idea is that a man to be most successful with his hay crop has got to know how to raise other crops; that may be what he is aiming for, and yet in the preparation of his ground he has to raise other crops before he gets to the grass, and in doing that, if he is careful and does it intelligently, every one of those crops that he is raising previous to coming to his grass is going to pay him. Then the question is, when you get to the grass crop, what are you going to do with it? That we are all interested in.

I see in the crowd an acquaintance of mine who is short of help, his boys don't stay with him, he has the work to do himself, he has a good grass farm, and he proposes to sell the hay; the query with me is whether my friend would not do better to be a gentleman himself, boss the thing and hire some good nice labor to supplement the labor of his own hands upon the farm. A farmer with his own hands unaided by any other help, supports himself and his family from his farm, and comes out at the end of the year even, or a little better. If that is true of one man's labor, taking into account that aside from the second man's wages and board, the expense of teams and of implements is the same for one man as two, if he can cultivate twice as much land, why is he not making something out of a hired man?

The question is frequently asked in these meetings if a farmer can afford to hire help. The idea seems to be prevalent with many farmers that they must get along with what they can do themselves. I know of a farmer that has run his farm some years past entirely by hired labor. He thinks that the farm has paid its way, and it has certainly improved in its production very largely in the time. If that is so, others can do the same thing. The grand central thought with a farmer should be to so plan and arrange his matters, so provide himself with the means of handling his soil, as to do everything in time, and do it to the best advantage. That is almost the entire secret of the success of farming.

Coming to the hay crop, what will you do with that? I know that I am getting to-day $15 a ton for the hay I am feeding to my cows, and I do not believe any of you can sell your hay in the market for that. I am getting $15 a ton without taking the manure into con-

sideration. I sell my butter by the year to a wholesale grocer, at 33 cts. Any of you can do the same thing who makes good butter, and all of you can make good butter, if you will. I formerly was selling milk and had an Ayershire herd; since I changed over I have some thoroughbred Jersey, but my stock is mostly a cross of Jersey and Ayershire. A man who has a creamery and the facilities for keeping his milk as it is necessary to do to obtain his price for butter, has something left after his cream is taken off that answers very well to feed calves, and it is a capital thing to feed pigs, and a man can keep as many pigs as he keeps cows, with a little additional feed. I have been able to grow a pretty good sized pig on skim milk with a little middlings thrown in, finishing up with good corn meal. If you can feed your hay and have your butter pay for it, then you can have your skim milk and the voidings of your stock for your trouble of looking after the thing, and it seems to me you get a good thing out of it.

MR. L. L. LUCAS. It is well settled that all the productions of the farm originally come from the soil. The change from the products of the farm to stock, butter, cheese, milk, wool, mutton, etc. is the exchange arising from the food grown from the soil. This change is where we sustain our great loss. We are accustomed to feed a great deal of stock that is worthless when we begin to feed it, and it remains so as long as we feed it. Many are accustomed to keep their cattle in very uncomfortable quarters so far as the winter season is concerned; their surroundings are not of that character favorable for making them grow, or to keeping them in the best condition for any purpose for which we keep them. Then we lose from one-quarter to one-half of the manures made by our cattle by not properly storing them.

We have listened to lectures from our most experienced men in regard to the conditions necessary to make first-class butter, butter that will bring the highest price in the market. They assume when they are telling us that, that we have cows to make butter with, they assume that we are giving those cows all the food that is necessary, they assume that we are giving those cows comfortable quarters; they are simply telling us how to make the best class of butter, the most of it, and how to get the most money for it. We are not doing it.

Several years ago a brother of mine, in New Hampshire, had a pair of oxen to fatten and a pair of calves to winter, and he fed the

oxen what meal they could bear to fatten them, and he fed the calves what meal he thought was good for them to make them grow; he estimated the value of the oxen before and after fattening, and he said he learned that the meal he fed to the calves was worth $2.00 a bushel, and the meal he fed to the oxen was not worth 50 cents. If meal will pay $2.00 fed to calves, and 50 cents fed to oxen it better be fed to calves. Never keep a calf till it is more than six weeks old, unless it shows it is going to be worth raising. It is the good animals from the calves to the cows and oxen that are always easy to sell and always bring the highest price. Even when stock is down, that class of stock always sells high because there is a demand for it. If you can grow your steers up to dress ten hundred pounds when they are two and one-half years old, and experience proves that it can easily be done and cost but a trifle more than the way you now keep them, you save two or three years' feed. It takes about so much food to support our animals and keep them in a normal condition; every mouthful of food over and above that, which we can make them take, digest, and assimilate, becomes the food of production. The more of the food of production they can be made to take and make proper use of in proportion to the food of support, the more profitable that food is. It is not how cheap you can keep an animal, it is how much you can make that animal eat and properly digest and assimilate, that is where your profit comes in. By keeping our stables warm we shall save a quarter of our feed, in the amount necessary to feed to those animals.

In relation to the different kinds of stock we should keep, I have no particular opinion to express, but don't let us keep any more stock for any purpose unless the prospect is favorable when this animal starts of becoming a good one for whatever purpose we can raise it.

Economy in farming means good farming, good farming means keeping good stock and taking good care of it; it means draining wet land when it is too wet to produce a crop without it; it means doing everything well.

I think to make our business a success we should be obliged to adopt a rotation of crops; we ought to know how much we are going to cultivate to this crop, and how much to that, never mowing a piece of ground more than two years without plowing it. The sod turned under and allowed to rot as often as once in two years, is equivalent to an ordinary coat of manure. There are farmers

close to the cities that can sell their hay at the highest market price and purchase manure, and perhaps it is for their interest to do that, but the large majority of farmers cannot do so, and the sooner the whole matter of selling is abandoned, and the hay fed to a good class of stock the better for us.

MR. HOLBROOK. *Mr. Chairman*, the question of the renovation of our soils has an important bearing other than that of a financial bearing, it has an important bearing upon the whole community. Riding through the country, you pass a farm where everything bears the appearance of thrift and intelligence, the buildings and all the surroundings testify to that fact. You inquire and nine times out of ten you will find that that man keeps a large stock of cattle. Passing to the next farm you will see one cow standing shivering beside the barn, and one horse is kept in the barn, and I will warrant the assertion that the boys have left the farm, and "gone west;" they did not like the management of that farm, and have left it for more lucrative business. Stock husbandry means a denser population; it gives employment to the boys, it educates them, and refines the whole community. It gives the female portion of the family something to do, and keeps them in the country and on the farm, where they find a more healthful employment than in the shops or in the city.

MR. MURRAY. What I have to say will be a little bit of my experience. In 1876, I moved on to a farm, in connection with which I was in possession of some twenty or thirty acres of meadow land. I found growing on that land an amount of meadow grass such as commonly grows on wet land. It was quite an expense to clear it up so that I could mow it, and I did not like to see it as it was. I went to work, and pretty soon I found I had some ten or fifteen tons of meadow hay, and when it came housing time I had eight two year old steers, and I put them on to this meadow hay, and kept them there for sixty days. The first day of February, I found they had shrunk in girth, from one to three inches in the pair, and were looking rough. That did not satisfy me, I had to give them a little meal and some English hay to get them up again. I began to think I had made a poor investment in clearing up my meadow land.

The next year I cut my hay again, and I found instead of raising ten or fifteen tons, I had twenty. I had about the same number of steers. I commenced feeding my steers the first day of December,

and I fed to them in addition to the meadow hay one quart of cotton seed meal a day, and I found the first day of February, they had gained from one to four inches. Since then I value my meadow hay as worth about two-thirds as much as my English hay, when fed in connection with cotton seed meal.

Meadow hay will not pay me but $5.00 a ton to sell; English hay is worth from $10 to $12. Take two tons of meadow hay and $5.00 worth of cotton seed meal, and I think it is worth to me as much as two tons of English hay. I save $5.00 by feeding my coarse fodder.

We are in competition with the western market. They will take a carload of dressed beef at Chicago, and in about three days will put it down here in our cities very much cheaper than we can produce it. But there is a class of stock we can compete with them in. That is our cows. Every year the demand is increasing; if we will keep more heifers I think we can feed out our hay to a better profit. When we are selling our hay we are disposing of a certain amount of real estate. If we are not laying up something somewhere else, we are living on that real estate and sooner or later it will be reduced in value.

Mr. Harris. *Mr. Chairman*, I think the farmer that has a large amount of what we call the coarse fodder — rough fodders of the farm — is the last man in the world, to sell good hay. By feeding intelligently his good hay in connection with his coarser fodders he enhances the value of his coarser fodders very much, and in that way of feeding he makes his hay worth more to him than it is to feed it without coarse fodders.

Mr. Lucas. My experience is that a flock of good sheep intelligently fed and properly handled pays a better profit than any other stock kept upon the farm. I am strongly inclined to the opinion that the finer breeds are the most profitable; they will herd in very much larger flocks and maintain their condition. They can be kept upon less feed in proportion to their weight than the coarser breeds.

Mr. Holbrook. I have had some experience in renovating an old worn out farm, and I sowed it largely to clover, and I find it one of the best plants which I can cultivate, not only to feed to stock, but as a renovator of the soil. Farmers as a general thing neglect this important plant, I understand, and it is given to us by the most careful investigation, that if you have a crop of

clover which will yield in the neighborhood of three tons to the acre, you have left in the soil, in the form of roots, 180 pounds of nitrogen, 77 of potash and 71 of phosphoric acid, giving you a vast amount of plant food, and left almost entirely available for other plants to take up.

MR. STEWART. The subject of coarse fodder interests us all. When I took my farm I had a piece of land where a heavy growth of cedar and ash trees had fallen and laid about 60 years, and I did not like the looks of it. I went to work and cleared it up, and raised about the same quality of hay that Mr. Murray did, of all sorts of grass. I mowed it a number of years, getting on an average about one ton to an acre. I always had to mow it by hand, and rake it by hand. It was very expensive getting it off. This piece of land lies where it has had the wash of the hill since the creation of the world, flowing down from the hill into a brook which runs along my farm, then spread all over this piece; consequently the soil had washed in a number of feet deep. When I got to the point where I thought I was able I attacked this piece.

It took 200 rods of drain to drain it. I have drains to carry the water off from the piece so that it shall not remain on it during the winter. Then I have a number of under drains which makes it thoroughly dry. I drained about six acres; that I dare say will produce two tons of hay to the acre.

EVENING.

SMALL FRUITS.

By J. E. BENNOCH, Member for Penobscot County.

The raising of small fruits for a few years past, and at the present time, is engaging the attention of many, and for many reasons improvements are continually going on in all the branches of agriculture, horticulture, floriculture, arboriculture and pomology. In all these directions knowledge is becoming widely spread to the many thousands that are ready to become students to these pleasant and healthful occupations of life. And as the seasons come round you will see more and more engaging themselves in the work of setting out plots of the small fruits. These fruits have really become not only a want but a necessity, and those having but small plats of ground are finding it for their interest to plant out beds of

the small fruits for the families' use. Only a very small plat is required for a family. The first on the list, no doubt, is the well known and ever welcome fruit, the strawberry, well known and always appreciated. Beautiful in appearance, luscious to the taste and smell, satisfying to the appetite, when there are plenty on the table to draw from. No better fruit can be placed before us than a dish of good ripe strawberries swimming in cream and sugar. Many are the varieties of the strawberry one will observe in looking over the catalogues that are annually sent out. Each one describes one more new seedling that fairly surpasses any one preceding it as to size, time of ripening, prolificness and beauty, and in fact all other merits. Some cannot be praised too highly, while many are a failure. Among the scores of novelties offered in the strawberry line, I will speak of a few approved varieties that are of promise. The Wilson's Albany is one of our long tested varieties and is also one of the most profitable varieties, it is one that produces generously of good solid, high flavored fruit of good quality. It is a variety that fertilizes itself, and has never yet shown any tendency to run out. Another is the Monarch of the West, and still another, the Colonel Cheeny, with some of the characteristics of the Monarch. Both are of the very best type and of great value to the market raiser, as they are of the most showy appearance and command a ready sale. The Bidwell is one of the newer sorts of great promise. It has been tried long enough to become a fixed variety, possessing all or nearly all of the good qualities. It takes kindly to all variety of soils, and produces heavy crops. It is a perfect flowered variety, stands drouth wonderfully and holds its foliage through severe dry seasons persistently. Three varieties of strawberries are enough for anyone to undertake to raise, and in our State the Wilson's Albany should in my opinion take the lead as I have shown forth its merits. If you choose other varieties you can rest assured that the Wilson's will be one of the best fertilizing varieties to be set in plats near by other sorts. The soil for the strawberry should be of a moist nature, but drained, that no stagnant water may remain about their roots. The ground should be well enriched, to produce large and abundant crops. Hog dressing is one of the very best dressings that I have ever used. In garden culture I should try the matted plan, by making a bed about three feet wide with a narrow walk between. Some set in rows two and one-half feet apart with plants set from twelve to fifteen inches in

the row. For field culture I should set my rows three feet apart with plants twelve inches. In this case I should use a French's cultivator to cultivate them. There can be a short cutter bolted to each wing outside, that will cut the runners to perfection. I claim no other cultivator can do the work of cultivating as well. These cultivators can be had of the Ames Plow Company, of Boston. To produce good crops, the ground must be kept mellow and free from weeds by cultivation. The pistillate varieties must be fertilized as they will not bear when standing alone, thus requiring a staminate variety to be set near by.

Among other small fruits, the raspberry is the next in the list. The Clarke and Curthburt are among the best. They should be set in rows at about the same distances as the strawberry. Some cultivators in garden culture let them run into beds. They should be cut back in the fall a few inches to insure safety. The two varieties named, have with me been perfectly hardy. Manner of dressing, about the same as with the strawberry. Of blackberries, if I were to raise any, the variety would be the Snider, in place of all others.

After a free discussion of the above subject, the meeting adjourned.

PISCATAQUIS COUNTY.

Institute at Guilford.

A successful Institute was held at Guilford Town Hall, October 16. There was a large gathering of the farmers from that and the adjoining towns. Many came long distances to have part in the meeting. The resident member of the board, O. T. Goodridge, called to order, and called on Mr. S. H. Whittier of Guilford to preside. On taking the chair Mr. Whittier expressed the pleasure of the people of the town at being able to meet together, and cordially welcomed all to the place and the occasion

Mr. H. L. Leland, of Sangerville, expressed the pleasure felt at so large a representation of the farmers of the county, and said that generally the occupants of the farms were contented and proposed to stay where they are and occupy their farms, and they were desirous of learning the methods through which the best results are realized.

The topics of the day were "Thorough Cultivation," by O. T. Goodridge; "Stock Husbandry in Successful Agriculture," by S. L. Holbrook; "Fruits for the County," by J. E. Bennoch; and "Special Farming," by the Secretary of the Board.

A choir of singers enlivened the occasion with good music. The ladies spread a bountiful collation at the hall for all present. Free entertainment was furnished to all from a distance. No report of the exercises is here given.

A second Institute was held at Milo, October 17th, at which a similar programme was repeated.

AROOSTOOK COUNTY.

Institute at Caribou.

An Institute was held at Caribou Grange Hall, November 7th. The interest manifested was creditable to the enterprise and the public spirit of the citizens of the locality, and brought together a large attendance and from a wide circuit.

The local member, Edward Wiggin, of Presque Isle, called to order and invited E. S. Brown of Caribou to preside. J. D. Teague, Esq., in a most cordial and happy manner, in behalf of the Caribou Grange, welcomed the representatives of the board, the members of the press and visiting friends to the locality and to the hospitalities of its people, assuring them that they watched with a lively interest the work being done by the Board of Agriculture, and were most glad to have a chapter of that work opened directly to them.

Refreshments were laid in bounty by the members of the grange at their dining hall, where all were made welcome to the plenty always abounding with those who are diligent in tilling their soil.

The central thought for the meeting was "Soil Exhaustion and the means and methods of averting it," and the lectures and discussions for the day were designed to show the important relation of stock husbandry to the fertility of a soil.

SOIL EXHAUSTION AND HOW TO PREVENT IT.

By EDWARD WIGGIN, Member for Aroostook County.

It is a trite old maxim, no less true as regards agriculture than other matters, that "an ounce of prevention is worth a pound of cure." It is vastly easier by proper cultivation and timely precautions to retain in our soil its original fertility, than it is to restore it to anything like its former strength and richness after it has once been exhausted by improper and careless management. Though our soil is rich and fertile, and produces abundantly, still it is not too early to sound the note of alarm, and to call the attention of our farmers to the necessity of guarding by every means against its ex-

haustion. By discussing this question and inquiring into the nature of the soil we cultivate, by considering what it is, and its relation to plant growth, an interest in the subject may be awakened, and the attention of our farmers directed more particularly to this most important matter. To assist in awakening this interest and to induce farmers to go to work diligently to study this question for themselves, to give some hints which may possibly aid them somewhat in solving the problem, is the object of this paper, rather than to lay down any set rules or to answer the question authoritatively myself. In order to cultivate the soil intelligently it is necessary for us to know something at least of what it is. No man can successfully operate any machine unless he first understands how it is put together and how its parts should be properly arranged. Without going to any extent into the discussion of the chemical composition of the soil, we may say that all soils, that is to say all fertile soils, are composed of earthy matter and organic or atmospheric matter. The earthy matter in the soil is nothing but the crumbling or erasion of the rock brought about by natural causes which are going on all the time around us. The organic matter is simply made up of deposits of decayed vegetables and animals.

It would be an interesting study for any farmer to trace in detail the different stages in the formation of our soil, and the various changes it has undergone from the primitive rock to its present composite character and consequent fertility; to go back to the commencement of signs of vegetable life upon our planet and follow up in detail the successive changes and promotions from a lower to a higher type of plant life, until the comparatively very recent time when the soil was capable of growing the plants necessary to the sustenance of man. It seems to me that studies of this kind cannot help giving us an increased interest in the soil we cultivate, as we are generally most interested in those things with which we are best acquainted. At the risk then, of seeming somewhat out of place in a meeting of this kind, and disclaiming all pretensions to being "scientific" or deeply learned in these matters, let us briefly look back and follow up the different developments of plant life. Passing over that long, dreary, lifeless period after the cooling of the planet's crust, "when the earth was without form and void, and darkness was upon the face of the deep," we find that this original crust of rock, worn by the action of the water, was gradually borne away and deposited in the beds of seas and oceans, and thus assumed the

form of the stratified rocks which are known to us. Thus the ledges which we see cropping out in our fields, and which we observe to be composed of layers and to have a "rift" as we call it, were once but the worn particles of the original rock deposited in strata or layers at the bottom of some large body of water. Passing down through the ages, and through the different stages of the earth's existence, we come at last to what is known to geologists as the Devonian or Old Red Sandstone period. Here we find the first well defined specimens of plant life, that is of plants growing upon the face of the earth, as a type of marine plants, or those growing under water, is found in the period preceding. But in the Old Red Sandstone we find only plants of the lowest order, as ferns, sedges, rushes and similar plants natural to marshy ground. Following this stage, we come to the grand Coal period, where we find vast forests or thickets of vegetation, still of a lower order, and partaking of the ern character, but growing to huge dimensions. The great coal beds which we find beneath the surface of the earth are but the remains of this rank growth of vegetation of the carboniferous period. Luxuriant as this vegetation was, it was still unfitted for the maintenance of animal life; and these vast forests were but dark moist gloomy thickets destitute of bloom or color, and their dark silence unenlivened by the music of birds. Still they were performing an important office in the grand economy of nature, and were breathing in through their huge broad leaves vast quantities of carbonic acid and other noxious gases hostile to animal life, and storing them up in a form to be of use to subsequent ages. Passing on through the Coal we come down to the Middle period of geologic time. There we find plants of a higher order, and also for the first time animals that breathe air and have back bones until, along in the great Chalk period, we find traces of trees which bore cones like our pines and others of that species.

Leaving this period we come into the recent life period of the earth's formation. Through the different epochs of this period we find the order of vegetation assuming a higher and higher type as we progress. The immense tree ferns of the Coal period have disappeared or shrunk to the dimensions of the ferns we now have, and trees which grow by putting on continuous layers on the outside are found. Through successive ages we come to visit the great Drift period, when for thousands of years (how many thousands cannot be known) all the northern portion of this

continent was submerged beneath the waters, and when mighty masses of ice came floating down from the north, pounding against the northern sides of our mountains and bringing along with them great fragments of rock, grinding over the solid rocks as they passed along, pushing before them masses of sand and gravel and depositing them over vast areas as they came farther south and gradually melted. Then the waters passed away and the land in this northern region was again elevated and thus we find in some places enormous boulders, in others smaller fragments of rock scattered promiscuously over the surface, and in still others beds of sand or of gravel occupying large areas and extending to considerable depths. This seems to mark the last of the great geologic changes which have taken place upon the surface of our planet, and brings us to the present distribution of land and water, with the exception of course of local changes and the accumulations and deposits of an alluvial nature which are continually going on. We have now briefly traced the gradations of plant life and the soil changes from the earliest period of the existence of vegetation down to the time when the earth was fitted to produce plants capable of sustaining human life, and here we find the first evidences of the existence of man in these very alluvial deposits of what is known as the recent period or epoch. Generation after generation of different orders of plants have lived and died, decayed and passed into what we call the soil. Type after type of animals have existed and had their day, and their shells and bones have gone to make up our vast cliffs and quarries of chalk and lime. Upheavals and submergencies have taken place, grindings and wearings and washings have been going on, all this to make for us our present fertile soil, and fit it for the production of the vegetation necessary to sustain human life. Shall we then for whom all these agencies have been so long at work, we for whom for so many countless ages all these mighty changes and processes have been going on, shall we, I say, by our carelessness or criminal inattention to the plain laws of nature in the short space of our little life, so abuse this rich gift as to render it incapable or even less capable of the grand object for which it was intended, that of providing the materials necessary for the comfort and happiness of our race? This brings us back to the practical question under discussion. The simple problem is this: Given, a soil containing all the elements necessary to sustain plant life and to produce abundant crops, so to cultivate it as to

make the business a profitable one and still retain the original fertility of the soil. The plants we raise are composed of different constituents or forms of matter. Now the sum of matter existing in the beginning (if indeed there ever was a beginning) is precisely the same as the sum existing at the present time. No atom is ever destroyed, nor is any additional atom created. Plants, in that subtle process we call growth, merely arrange the atoms of matter necessary for their formation. These atoms of matter must be gathered together from some source. We find by observation and investigation that some are gathered from the atmosphere and some from the soil. Now if the ingredients necessary for the formation of a certain plant are not present in the soil, it is very evident that a perfect plant of that variety cannot be produced. We find that our virgin soil, as we call it, contains all the elements necessary for the production of the forms of vegetation natural to this climate and latitude. But we find also, that by certain systems of cultivation, or more properly speaking, of want of cultivation, some of their ingredients may be used up, so that in time there are none of them for the plant in its growth to gather up and assimilate, and for this reason we find our crops a failure to a greater or less extent. For instance, our soil may contain a large amount of potash. Now if we raise year after year upon the same soil plants which are drawing heavily upon this supply, we can easily see that in time our potash will be all exhausted, and consequently our plants cannot grow. If we have an amount of money deposited in a bank, and keep drawing against it year after year without making any additional deposit, our balance, however large, will in time become exhausted, and our drafts will cease to be honored. To the question then, of how this exhaustion shall be prevented, the plain and simple answer would seem to be, to return to the soil an amount of the several ingredients equivalent to that used up or drawn out by the crop in its growth. How can we do this? I think I can at least tell how we *cannot* do it. We cannot do it by raising successive crops year after year of hay, grain or potatoes and hauling them away to the depot, the store or the starch factory. Our soil may be so rich in plant food as to stand this drain for some time without exhibiting any alarming signs of failure, but just so sure as effect follows cause will the time come when this system will exhaust our fertile fields and we or our children will be brought to the thankless task of renovating a worn out farm or of abandoning it for another. We

think we are safe in asserting that no system of farming can long be a success and retain the soil in a fertile condition which makes a specialty of raising crops of any kind to sell off the farm. We may of course sell off grain, hay and potatoes to a limited extent, with comparative safety, but the only system which is not really suicidal is to make the manure heap the specialty. To this one point all our efforts must tend if we are to retain the fertility of our soil and transmit it unimpaired to those who shall come after us. This of course brings us to stock raising which in some of its forms is the true vocation of the Aroostook farmer. It is only by this means that we can return to the soil the elements which we have taken from it. If chemical analysis would tell us truly just what particular elements of plant food we are drawing most largely from our soil, and just what it is most deficient in after a succession of crops, we might perhaps supply the defect by artificial fertilizers containing just the required ingredient. But soil analysis for practical purposes is really of very little value from the fact that while the analysis may show the soil to be rich in certain necessary elements, still the fact may be that although they are there, they may be present in such form as not to be available for plant food and so as far as any immediate advantage to the crop is concerned, might just as well not be there at all. But in barnyard manure we have as nearly as may be a complete fertilizer, and by a sufficiently liberal application of it to our fields and crops we may have little fear of exhausting the fertility of our soils. In order to obtain this fertilizer we must feed what we raise. That is, we must make that the rule and the selling of crops the exception. While the starch factories have undoubtedly been a great benefit to our farmers in the past, and the raising of potatoes may still, to a limited extent, be profitably carried on without danger to the soil, yet if farmers persist in raising large breadths of potatoes, going over the same fields again and again with this crop without the application of manure, it requires no prophet's ken to predict with certainty the ultimate exhaustion of their farms, and that at no distant date. What is true of potatoes is no less true of any other crop raised to sell off the farm. We may make these crops an incidental part of our farming operations, but the end and aim of all good farming is the grass crop, and that raised not to sell, but to feed and return again to the soil. In addition to the grass crop a vast amount of fodder is and may be raised upon our farms, which might be utilized by

keeping more stock and feeding it out so as to increase the amount of valuable fertilizers. Go through this country in any direction and see the huge piles of nice bright straw thrown out and suffered to go to waste when it might profitably be fed to stock, and a vast amount of fertilizing material thus saved. I say it is not too early to sound the note of alarm in this matter. Because our soil is naturally so rich that it will stand considerable abuse without showing it, we may be led to think that there is no danger of exhausting it, but now, while it is rich in plant food and capable of producing the material for its own continued fertilization, is the time to consider these things, and to take timely precautions against the evils which have fallen upon other localities. It is vastly easier to keep up than to catch up, a lesson which many farmers have learned too late for their own comfort and profit. The question here begins to assume larger proportions and to branch off in many directions; such as the kinds of stock most profitable to keep; the manner of feeding and caring for farm animals; dairying either as a specialty or in connection with stock raising; the care of manures and time and manner of application, all of which questions are of the utmost importance and must be carefully studied by the farmer. But it is not my purpose to discuss them in detail at this time. Some of them will come up under the topic of Stock Husbandry to be discussed later, and I have no doubt will be ably presented. But there is one subject to which I wish to call your attention, as an important aid in preventing the exhaustion of our soil, and that is the matter of rotation of crops. This is a subject to which we Aroostook farmers have as yet paid very little attention, but I think it is one which we should study with care, and experiment upon, each for himself. On small farms in the vicinity of cities where what is called high farming is carried on, and where the facilities for obtaining fertilizers of all kinds are ample, this may not be a matter of moment. But situated as we are here in Aroostook, where land is comparatively cheap and naturally fertile, where large breadths of crops are depended on rather than smaller tracts with high cultivation, rotation may come to be a necessity with us, in order to maintain the fertility of our farms. What particular system we shall adopt must be determined largely by experiment, each one for himself, but good authorities upon this subject assure us that there are certain principles which should be taken into account and largely

govern us in any system of rotation, and that one of the most important is that a crop of forage plants should follow a crop of grain. That is, that crops which mature quickly and ripen seed should be followed by crops which are of slower growth and are cut before the seed is formed. Our own experience tells us that clover and herds grass do well after wheat, and it is safe to say that in whatever system of rotation we adopt clover must be made to play a leading part. The fertilizing power of clover has been so fully established both by analysis and by actual experiment as to be really beyond a doubt. Farmers who have had experience in renovating old worn out farms tell us that if they can by any means get a piece of land to bear a crop of clover they are sure of bringing it to. Many farmers of experience and careful observation maintain that the most valuable part of a clover crop is under ground, and I think it has been demonstrated by actual test that the average weight of the roots of a clover crop is fully one half the weight of the tops. By this we see the immense importance of clover in a system of rotation, as even after cutting the tops for hay we have still left in the ground fully half as much as we have removed, which when plowed and incorporated with the soil makes a most valuable fertilizer. With our present list of prominent crops in this county, I would recommend as a good system of rotation the following, which I do not claim to be perfect or free from criticism, but which I think is worthy of trial, and if strictly pursued would be attended with good results: Plow up the sod and sow to peas and oats, the second year plant to potatoes, the third year sow to wheat and seed down with plenty of clover seed mixing in of course enough of herds grass to make a good quality of hay. I would let it remain in clover two years, and then if I wished to adhere strictly to a system I would plow again and go through the same course. By allowing the clover to remain the second year the roots get a growth which they will not acquire the first year and will therefore afford more fertilizing matter when plowed up. Some reasons for deciding upon this course of rotation may here be given. If we are to raise stock we need something besides hay to feed them. Peas and oats ground together make one of the best of feeds and the crop leaves the soil light and in good condition and is much less exhaustive than oats alone. If harvested with care and in good condition the straw is one of the most valuable of our coarse fodders, especially for sheep. I have practiced sowing

the peas at least a week earlier than the oats, and if the ground is not too rough sow on the furrows before harrowing. By following with potatoes thoroughly cultivated we clean our land of the weeds which are helping to sap our soil and cheat us out of our profits. Our soil is now in the best order for a crop of wheat, which is most naturally followed by clover and the mixed grasses.

You will see that in this course I have made no mention of manure or any other fertilizer, but this must by no means be left out of the course. We must apply all the manure we can possibly save and be careful to save as large an amount as possible. As we could hardly manure the same piece of ground more than once during the course, I must not take upon myself to say with authority when that should be as there are various opinions and practices among good farmers. I would however venture this much, that I would apply the manure either to the potatoes or the clover, rather than to the peas and oats or the wheat. At what time, or in what manner, to apply the manure from the barnyard I leave as a matter for a separate discussion. Besides the barnyard manure I would also use plaster. In regard to the time and manner of its application there are also various opinions among farmers of experience, and this may arise in some degree from its different effects upon different soils. But from what experience I have had I should sow it at least twice in the course, once on the potatoes and once on the clover, I think the second year in the spring. I have seen it recommended to sow a coat of plaster upon the young clover immediately after cutting the wheat crop, which those who have tried it say will quicken the growth of the clover plants and give them a good strong set for winter. This I think worthy of trial as plaster is comparatively of small cost and can be easily experimented with. It may be objected to this course of rotation or to any particular course that it does not include all the crops we wish to raise, and that we do not always wish to raise so large breadths of some crops each year as this would call for. My reply to this would be that the whole farm need not be included in the rotation at any one time, as in this section we seldom have permanent pastures, and upon a part of the farm we could alternate with tilling, mowing, and pasturing, and thus help to keep up the fertility of the soil. This is a matter upon which each must exercise his own judgment, and be governed somewhat by circumstances. But I would strongly recommend to every farmer to

set apart a portion of his farm to a systematic rotation of crops as a valuable aid in the prevention of soil exhaustion.

There are various other matters which would legitimately come into a discussion of this kind, but I will speak of but one of them and of that but briefly, and that is the matter of *under draining*. While it is doubtless true that very much of the land in this section is naturally under drained by the underlying ledge of porous limestone, still it is equally true that there is on very many farms a good portion of the soil which can never be cultivated to the highest advantage without being artificially under drained. Any piece of land upon which water accumulates and stands for any considerable time to be removed only or for the most part by evaporation will amply pay for the expense of a good under drain. This is a matter which has not yet received much attention in this section, but as the country grows older and our farms become cleared, it will be known as a necessity on many farms. We can in this way use up the surface stone which we now are obliged to pile up in unsightly heaps in our fields, and at the same time very much increase the fertility of our soil. The advantages of under draining are many and I will not take time to enumerate them here, as I merely wish to introduce this subject in order to set you to thinking upon it, and investigating the matter for yourselves. One great advantage which will be patent to all is that under draining will render soils naturally wet much earlier, which in our short seasons is a matter of vital importance. It is also evident that in the process of removing the water by evaporation, a large amount of heat is abstracted from the soil, which is in fact a part of its fertility, and is needed for the rapid and healthy growth of the plants. Again, when the surface of the soil is covered with stagnant water or its particles completely saturated to a considerable depth, the refreshing showers cannot enter the soil and carry with them the fertilizing gases which are contained in the falling rain. I assure you this matter is worthy of your earnest thought, and careful study and investigation. I have thus, brother farmers, but casually, and I am aware in a very hasty and superficial manner, touched upon a few of the points which are worthy our attention in regard to keeping up the fertility of our soils. It is a matter which the farmers of this rich Aroostook valley cannot too soon consider, and no subject which we can discuss or experiment upon is of greater importance. It is not only a question which relates to

our financial success as farmers, but it is also a moral question. No man has a moral right to take a portion of this rich and fertile soil and attempt to gain a living out of it during his short lifetime by draining the last drop of life blood out of it, and leaving it worn out and exhausted for those who shall come after him. But if we proceed with a generous and intelligent system of cultivation, giving to the soil liberally in return for its bountiful gifts to us, we shall not only be abundantly awarded while dwelling upon the earth, but gratefully remembered when we are quietly reposing in its bosom.

SOIL EXHAUSTION.

By WALTER BALENTINE, Professor of Agriculture at State College.

The universal experience of farmers in all lands through all time has been and is to-day, that continued cropping without making any return to the soil of the materials taken from it always results in diminished crops and worn out fields.

It is true that it has been claimed that the wheat fields of Minnesota and Dakota are inexhaustible It is also true that the same claim was made for the lands of the Genesee valley, and for a large portion of the country lying between the Appalachian mountains and the Mississippi river. Nature did wonders for these soils, and for years they withstood the abuse heaped upon them in the way of cropping, but finally proved no exception to the general rule.

A few years ago Aroostook county was believed by many to furnish a practically inexhaustible soil, but the bountiful crops of potatoes, oats and wheat taken from those new lands have made such a draft on their native fertility, that many of her farmers are fain to supply deficiencies by the use of commercial fertilizers.

The problem of preventing soil exhaustion and restoring the fertility of worn out fields is, therefore, one desiring the consideration of all progressive farmers.

While it is not the object of this paper to present new and original ideas, or to prescribe a universal panacea for all the ills of farming lands, there will be an attempt to enforce well ascertained facts and principles that may aid those who choose to avail themselves of them in improving their methods of farming.

Until a comparatively recent date little or nothing was known on the subject of plant nutrition. Within the last thirty or forty years however vast strides have been made in acquiring knowledge in this direction; and though there remains much to be learned, what is already known may aid greatly in the practical cultivation of crops.

Chemical analyses teach us that agricultural plants always contain the following elements: carbon, hydrogen, oxygen, nitrogen, chlorine, sulphur, silicon, phosphorus, potassium, sodium, calcium, magnesium and iron.

Experiments in the artificial cultivation of plants indicate the probable source of the above named elements to be as follows: Carbon, from the carbonic acid of the atmosphere, taken in through the leaves of the plant. Hydrogen and oxygen from the water falling upon the soil and taken up through the roots. Doubtless, the original source of nitrogen to plants is the nitrogen of the air. Experiment indicates however that the free nitrogen of the air is not assimilated, but that all supplies must enter the plant in the form of combined nitrogen through the roots. Each year considerable quantities of free nitrogen of the air is converted into nitric acid, nitrous acid and ammonia, and is washed into the soil by the rains. This, with the combined nitrogen stored up in the soil, is the only source of nitrogen to the plant of which we have positive knowledge. Carbon, hydrogen, oxygen and nitrogen form 95–99 per cent of the plant and are the portions that pass off into the air on burning.

The chlorine, sulphur, silicon, phosphorus, potassium, sodium, calcium, magnesium and iron are furnished by the mineral matter of the soil, and enter the plant in solution through the roots in the form of chlorides, sulphates, silicates and phosphates of potash, soda, lime, magnesia and iron, and make up that portion of the plant known as the ash.

Experiments in artificial cultivation of plants teach further that all of the above named substances are necessary to the life and growth of plants, with the exception of silicon and soda and, perhaps, in some cases chlorine But it is a question if all are not useful. This means simply that if the soil and atmosphere fail to furnish any single element to a plant that plant must stop growing and eventually perish. For example, if the soil fails to furnish phosphorus in the form of phosphoric acid, the plant must die; if

potash be lacking in the soil the plant cannot live though all of the other elements be present in abundance.

As an illustration of this point the building of a house or barn is sometimes taken, and this illustration is good so far as it goes. When the nails or lumber give out the builder stops work, but not necessarily; for wooden pegs may take the place of the nails, and brick and mortar may take the place of the lumber in construction.

Not so however with the plant, there is no substitute for potash and phosphoric acid in plant nutrition. When these fail, the building of the plant must absolutely cease.

Thus far we have seen that a portion of the food of plants is derived from the atmosphere and a portion from the soil, and that both are essential to the development of plants.

The question may occur to some, since that portion derived from the atmosphere makes up 95–99 per cent and that derived from the soil only 1–5 per cent, why confine ourselves to the discussion of soil exhaustion, and give no attention to that medium which furnishes by far the larger portion of the material that goes to make up the plant? The answer is, that the supply of carbonic acid in the atmosphere is always sufficient for the use of the plant.

Though vast quantities are yearly taken from the air, equal quantities are yearly returned through the decomposition of vegetable matter.

Plants are consumed by animals and broken up in the body, a portion to be exhaled as carbonic acid from the lungs. The wood and coal burned in our stoves and furnaces give carbonic acid as one of the products of combustion which passes off into the air. Finally, slowly decaying vegetable matter on the surface of the earth yields carbonic acid to the atmosphere. The supply from these various sources seems to be equal to the amount taken up by vegetation; and were it not, it would be impracticable to fertilize the atmosphere on account of its mobile character. The gas intended for the crop of one field would be carried away by the first gentle breeze to neighboring fields. Then again on account of the diffusive character of gasses, or their tendency to mix, it would be necessary to introduce large quantities of any gas into the atmosphere in order to bring a small quantity in contact with the growing crop. In other words it is impracticable to increase the quantity of atmospheric plant food.

The soil is to a greater or less extent under control; and, it is to this, we must confine our efforts to increase the profits of farming. The more thoroughly we understand the nature of our soils and the various agencies that aid in making them productive, the greater the influence we are able to exert over the growing crops.

Geology teaches that the earth was once a mass of liquid matter, of melted rock. Through the cooling of this liquid mass, a crust of solid rock was formed. Various agencies acting upon this crust through long periods of time, have disintegrated it and given us our soil. As many of these agencies are still at work bringing into use plant food that has hitherto been locked up, as it were, and unavailable in crop production, it may be well to give a brief outline of the process of the formation of soils from the rocks.

Perhaps the most active agents in pulverizing the rock are moving water and ice. As an illustration of the power of running water in this direction we have the famous gorges of the Colorado region.

The Grand Canon of the Colorado river, 300 miles long and in some places 6000 feet deep, was cut through the ledge by the waters of this rapidly flowing river.

We have illustrations of the wearing action of moving waters on rocks nearer home, which though less grand than the one already cited are not less instructive. If we examine the pebbles in the beds of our brooks and rivers, it will be seen that they present no sharp corners; their surfaces are quite smooth and sometimes polished, presenting an entirely different appearance from a piece of rock broken from a granite boulder with a hammer. These same pebbles once presented as rough and angular an appearance as the piece broken from the boulder. They have been brought to their present rounded and polished condition through the action of the water running over them and rubbing them against each other. Bits of brick are sometimes found among the pebbles presenting the same rounded surfaces; we know that these, before they fell into the brook, must have been rough and angular though now smooth and rounded.

Where a stream usually runs with great rapidity over a ledge one will often find during a drought round holes in the bed rock, sometimes of considerable size and depth, at the bottom of which will be seen smooth stones of varying size. These holes have been formed by the grinding action of these stones, whirled round and round by the water running over the ledge. The fine particles

worn away by the water are carried along in suspension until the current slackens, when they are deposited on the bottom as silt or mud.

Other illustrations might be drawn, but those already cited are sufficient for our purpose.

Moving ice has been spoken of as one of the agencies that has assisted in converting the rocks into soil. This action is illustrated in the glaciers of the Alps. These glaciers are formed near the line of perpetual snow. The snow thaws during the day and freezes during the night and thus becomes solidified to a mass of ice. This ice moves slowly down the valleys of the mountain until it reaches a point where the temperature is high enough to melt it as fast as it moves downward. As the ice moves along pieces of stone are detached from the bed and sides of its course and accumulate in large quantities between the glacier and the bed, thus forming a layer on which the glacier rests The ice presses this layer heavily against the the bottom of the valley through which it passes and carries it along with itself. This mixture of rock and sand moving along with the enormous weight of ice above exerts a powerful influence to wear away the bed rock and convert it into the fine material from which our soils are made.

The glaciers accumulate much rubbish on their surfaces from the crumbling of overhanging rocks and the stones and by other material rolling on them from the sides of the mountains. This debris is transported to the lower levels of the glaciers and accumulating at the point where the ice melts form what are known as terminal moraines.

Evidences of this glacial action are found in the polished and grooved bed rocks throughout New England and other portions of North America and Europe. In the scientific survey of Maine, published in the Reports of the Board of Agriculture for 1860 and 1861, are mentioned many places where they are to be found in this State.

Water has other and for us to-day more important actions than the mechanical processes just described.

There is probably not a mineral in existence that is not soluble in pure water, and while this solvent action on some is so small as to be scarcely perceptible, others are readily dissolved by it.

When pure water becomes impregnated with carbonic acid its solvent power is greatly increased. Again the presence of

various salts in water increases its solvent power. The saline waters acting together with the carbonic acid and oxygen of the air are capable of breaking down the hardest and most refractory of our rocks in the course of time. Take for example our granite which contains, among its constituent elements, potash and iron. The carbonic acid, in solution in the water, attacks the potash and dissolves it, the crystal containing the potash crumbles and leaves a hole in the rock for the water to enter, which, freezing during the winter, expands and breaks off small fragments, as the water in a pitcher bursts the vessel on freezing.

The readiness with which oxygen attacks iron is shown by the rusting of iron tools when exposed to moist air. The plow that was turned out of the furrow at night bright and glistening is found coated with a yellow substance in the morning. If the finger is drawn across the mould board a yellow powder will adhere to it. The oxygen has combined with the iron and converted it into a finer powder than can be made by any mechanical means known to man. In the same way oxygen attacks iron in the rocks causing the crystals containing it to crumble and allow the water entrance to the rock. On account of the tendency of some stones to crumble on exposure to the combined influence of air and water, they are rejected for building purposes.

Plants may be looked upon as one of the geological agents in reducing rocks to soil. Those who have examined old marble monuments have often found them covered with moss; when this is removed it will be found that the surface of the marble has lost its polish.

The moss during its growth has dissolved a portion of the marble and used it in building its own structure.

Again, in digging up a tree or vine in the garden, we often find a mass of rootlets adhering to the surface of an old bone with such tenacity as to leave little doubt in the mind of the observer that those rootlets are able to obtain nutriment from the slowly soluble bone phosphate.

When these plants decay the mineral matter they have appropriated from the minerals of the soil, is left in a condition readily available for plants that follow, while the decomposing vegetable matter acts to render more mineral matter available.

In giving this brief outline of how, and from what, soils are formed, no attempt has been made to enumerate all of the agencies

working to this end, as such a discussion would be out of place in a paper of this kind. The object has been simply to give a conception of the origin of soils and to show how some of the agencies that have been active in the past in producing them may be made to contribute to their present and future fertility.

We have seen that the soil was formed from the rocks of the earth's crust. It follows that the soil can contain only such mineral matter as is found in the rock from which it is formed. The following analysis shows the composition of two common rocks which are taken as representatives of two different classes:

	Granite.	Syenite
Silica	72.0 per cent.	59.8 per cent.
Alumina	16.0 "	16.8 "
Oxide of Iron	1.5 "	7.0 "
Lime	1.5 "	4.5 "
Magnesia	0.5 "	2.6 "
Potash	6.0 "	6.6 "
Soda	2.5 "	1.3 "
Phosphoric Acid	Trace	Trace
Sulphur	"	"
Manganese	"	"
Water	———	1.4 per cent.

It will be seen that these rocks contain all of the mineral elements necessary to plant life, besides some that are not essential. It will be noticed, also, that they contain these elements in varying proportions. The potash, for instance, stands high, while phosphoric acid is represented by a trace. During the process of conversion into soil, however, the larger portion of the potash is washed away. This element is seldom present in rich soils in quantities above two per cent, and often is represented by a fraction of one per cent.

If we examine next the composition of the ash of some of our agricultural plants we shall see that the draught of the plant on the soil falls especially heavily on the potash and phosphoric acid and renders them more liable to become exhausted.

The following table shows the average composition of the grain of some of the cereals:

	Wheat.	Rye.	Oats.	Maize.
Potash	31.4 per cent.	28.8 per cent.	15.6 per cent.	27.8 per cent.
Soda	3.2 "	4.3 "	2.5 "	3.9 "
Magnesia	12.3 "	11.6 "	7.2 "	15.0 "
Lime	3.5 "	3.9 "	3.7 "	2.5 "
Oxide of Iron	0.8 "	-	0.5 "	0.8 "
Phosphoric Acid	45.0 "	45.6 "	21.3 "	46.8 "
Sulphuric Acid	0.5 "	-	1.5 "	1.5 "
Silica	3.0 "	2.6 "	46.4 "	1.6 "
Chlorine	0.4 "	-	0.4 "	-

To bring out this idea still clearer it may be well to compare the composition of the ash of these grains with the composition of an actual soil. The following table shows the composition of a good loam:

Potash	0.80 per cent.
Soda	1.50 "
Lime	1.28 "
Magnesia	1.12 "
Peroxide of iron	3.41 "
Alumina	3.58 "
Phosphoric acid	0.38 "
Sulphuric acid	0.09 "
Insoluble silica (clay), Insoluble silica (sand),	81.26 "
Organic matter	2.43 "
Water or loss	3.23 "

Though all soils do not have the same composition as the one represented by the analysis, this one will serve for illustration.

The per cent of phosphoric acid and potash though small in this soil as compared to the other elements taken up by wheat, rye,

oats and maize, and though the draught of these grains on these substances is greatest, there would still be sufficient for a large number of crops were it all available for plants.

An acre of such soil to the depth of one foot has been estimated to weigh 3,600,000 pounds and would contain 28,800 pounds of potash and about half as much phosphoric acid. This, with that contained in the sub-soil would be sufficient to supply a wheat crop at the rate of 25 or 30 bushels per acre for many hundred years. There is, however, but a small proportion of this material at the immediate disposal of the plant; the remainder is locked up in compounds that are difficultly soluble.

Some of the agencies that were active in disintegrating the rocks are still active in rendering this dormant plant food available, namely: carbonic acid, oxygen and water. These attack the difficultly soluble minerals in the soil and convert them into more available forms, but this process goes on slowly in soils when left entirely to nature.

The farmer, however, can aid nature greatly in this operation by cultivation and drainage.

Ordinary soils are more or less impregnated with decaying vegetable matter or humus, which is one of the sources of carbonic acid to the soil; but for converting the humus into carbonic acid, oxygen is necessary. If the soil be saturated with water the oxygen of the air is prevented from coming in contact with the humus, and oxydation does not take place.

Though a moderate amount of water is beneficial in its action on the dormant plant food, when water is present in excess it is detrimental to the attainment of the best results.

By thorough drainage, then, the farmer can aid nature in increasing the fertility of the soil.

Thorough cultivation exposes the soil more to atmospheric influences, and aids in bringing the latent plant food into active crop production.

The benefit derived from allowing land to lie fallow is due to increasing the quantity of available plant food through the weathering of the minerals in which it has been locked up.

An exhausted soil is not a soil from which all of the elements of fertility have been exhausted, but one from which only the immediately available elements have been used up, which are by far the smaller portion of those present in the soil.

It is doubtful if under the most approved methods of drainage and cultivation the farmer can bring a sufficient quantity of dormant matter into activity to supply the fertilizing material for a profitable crop each year. As soon as the available plant food is exhausted, manuring must be resorted to in order to obtain the most satisfactory results in crop production.

Though little attention has been given thus far to the nitrogen supply of the soil in this paper, it must not be inferred that nitrogen is of but little consequence in manuring; for the amount of conbined nitrogen washed into the soil from year to year from the atmosphere is less than the amount necessary for the production of a good crop. And though a large number of experiments have been made which indicate that many of our American soils contain a large supply of this material and that plants have sources of nitrogen of which we have no knowledge, it would not be wise to neglect this substance in manuring; for European farmers have found that in practice it has been necessary to supply it in some of its combinations.

We must add, then, to phosphoric acid and potash, nitrogen as one of the elements to be taken into consideration in manuring.

The chief sources of manure to the farmer are the excrement of domestic animals, and commercial fertilizers. Of these the first named is by far the most important. It is often claimed that stable manure is a perfect manure. Stable manure, however, is a variable article; its value depending first upon the material from which it is manufactured, second upon the method of preserving it, third upon the use made of it.

If stable manure made from English hay carrying 31 lbs. of nitrogen, 8 lbs. of phosphoric acid and 26 lbs. of potash per ton is a perfect manure, then that from beans with 81 lbs. nitrogen, 24 lbs. phosphoric acid and 26 lbs. potash per ton cannot be considered perfect. If stable manure made under the most favorable circumstances, where all of the solid and liquid excrement is preserved, is a perfect manure, then that so exposed to the weather as to lose three-fourths of its commercial value could not be called a perfect manure.

The ash of the wheat kernel yields on an average about 31 per cent potash and 46 per cent phosphoric acid. A perfect manure for this crop then, would contain about 31 parts of potash to 46 parts of phosphoric acid. Buckwheat contains in its ash on an average

about 18 per cent potash and 48 per cent phosphoric acid, and a perfect manure for this crop based on what the crop takes from the soil would not be a perfect manure for a wheat crop.

Nevertheless, stable manure well cared for is the most reliable and cheapest fertilizer at the disposal of the farmer. The reason for this is that it furnishes all the different kinds of plant food in an available form, or in a form that soon becomes available by the decay of the plant, though perhaps not in the proportion in which they are taken up by the crop to which they are applied.

Aside from the plant food that stable manures furnish directly to the soil, they have another value that should not be overlooked. By the decomposition of the nitrogenous matter they contain, carbonate of ammonia is formed, which has a solvent action on the insoluble phosphate of lime.

They introduce a large quantity of vegetable matter into the soil which, decaying, furnishes humus. The humus by its slow decomposition gives off carbonic acid, which decomposes the insoluble potash compounds of the soil.

The various acids found in humus combine chemically with potash and ammonia, forming compounds more or less insoluble, and rendering them less liable to be washed out of the soil by the rains.

The addition of large quantities of vegetable matter to our heavy clay soils has a tendency to better their mechanical condition, making them lighter and less liable to bake during the drought of summer. The dark color that decaying organic matter imparts to soils has a tendency to make them warmer. Dark colors absorb heat more readily than light colors. If a piece of black cloth be placed on the snow in the sun beside a piece of white cloth, the black will settle down into the snow faster than the white because the greater quantity of heat absorbed by the black cloth melts the snow beneath it faster.

For the same reason, dark clothing is better adapted to the winter season than light clothing, and light clothing better adapted to summer wearing.

Humus formed from the decay of vegetable matter has the greatest power of absorbing and retaining water of any substance found in the soil; hence stable manure would have on light sandy soils a beneficial influence in making them more retentive of moisture, and better fitted to withstand the drought of summer.

Such are some of the reasons why stable manures are often found to produce better results than the same amount of plant food applied in the form of commercial fertilizers.

Commercial fertilizers containing nitrogen, phosphoric acid and potash, cannot be expected to do much else than furnish these substances to the soil.

A theory has prevailed to some extent that the fertility of the soil could be maintained by returning to the soil in the form of commercial fertilizers the elements taken from it by a given crop. This theory looks plausible enough at first sight, but in practice it does not work.

A ton of good English hay will take from the soil about 30 lbs. of nitrogen, 8 lbs. of phosphoric acid and 26 lbs. of potash, which, at the prevailing prices for these substances in commercial fertilizers, would cost about eight dollars. This, together with interest on land and taxes, would leave the farmer a very small margin to pay for his labor in cultivating the crop.

Though the hay takes more from the soil in proportion to its market value than most any other crop produced on the farm, still there are few crops produced in Maine that can be profitably cultivated by returning to the soil the full measure of plant food they take from it, in the form of commercial fertilizers.

These remarks are not intended, however, to discourage the use of commercial fertilizers, for when judiciously used they often bring large returns for the money expended for them.

Soils vary greatly in their composition as has already been stated. An analysis of a rich clay soil showed 2.8 per cent of potash with 0.24 per cent of phosphoric acid. An analysis of a good loam showed 0.8 per cent of potash with 0.38 per cent of phosphoric acid. The nitrogen was not given in either of these analyses.

Here we have a very large per cent of potash with less phosphoric acid than is contained in another soil containing about one-third as much potash. Though these analyses do not show how much of the potash and phosphoric acid was available in either case, they indicate that soils may vary quite as much in the available matter they contain. Some soils may, and experience says they do, contain enough available potash and nitrogen for the immediate use of crops while deficient in phosphoric acid; others are lacking in potash and do not respond to any manuring which fails to supply this substance.

Soils in this condition might be termed one-sided. And in balancing up soils of this kind, commercial fertilizers may be made very profitable when the farmer has learned by experience what his soil fails to supply. It must be remembered, however, that a one-sided course of manuring only assists in exhausting the soil of the elements of fertility it contains naturally; and while it may be profitable for the present, provisions should be made for pursuing a different course later. For instance, suppose a soil to contain an excess of nitrogen and phosphoric acid but deficient in potash. When potash is applied good crops are produced, but the excess of phosphoric acid and nitrogen is constantly being reduced by the amount taken away in the crop. Instances are known when phosphoric acid has been applied until a further application produced no increase in the crop. The soil had become exhausted of some other plant food and until this was supplied a crop could not be expected. One-sided manuring is profitable because it enables the farmer to utilize material that would otherwise lie idle.

Commercial fertilizers are found profitable in practice in connection with stable manure. The majority of our agricultural plants send out roots in such a manner as to form a complete net-work through the ground occupied by the crop. The bulk of the fertilizers should, therefore, be applied broadcast and be in position to supply these roots. It is desirable to have readily available fertilizing material in the vicinity of the seed to force the young plants along during the early stages of their growth or until they become well rooted and are able to reach out for the manure that has been applied broadcast. For this purpose commercial fertilizers are eminently fitted.

For preventing soil exhaustion and restoring fertility to worn out fields, stable manure must ever be looked to as the principal source of fertilizing material. More of it must be produced on the farm and more care given to its preservation than at present before farmers in general can make any great improvement in this direction To this end stock husbandry must be more thoroughly adopted by the farmers and all coarse products of the farm consumed at home, and all leaks from the manure heap stopped.

It is safe to say that the majority of the farmers of this State lose more than half of the manure made on their farms under the present management; for one-half of the money value of stable manure is in the liquid excrement which with the majority of farmers is allowed to

run to waste. The solid excrement is left exposed to the action of snow, sun and rain for some time before applying to the soil, thus suffering considerable loss.

It has been demonstrated by farmers in this State, that the hay and grain produced on the farm can be fed to animals and converted into beef, mutton, wool, milk, butter and cheese, and as good or better prices realized for the hay and grain thus consumed as when these products are sold from the farm direct, and have the manure left to assist in the production of future crops.

The best results in this direction have usually been attained in connection with purchased feeds, such as cotton seed meal, wheat bran and corn. At the present prices of commercial fertilizers, each ton of cotton seed meal consumed on the farm adds sixteen dollars' worth of fertilizing material to the manure heap. Each ton of wheat bran adds eleven dollars and each ton of corn about six dollars. These materials when properly fed pay for themselves in increased production of beef, mutton, wool or dairy products. The extra fertilizing material brought to the farm through purchased feeds under the best system of stock husbandry, more than compensates for the plant food carried away through the sale of animals, wool, milk, butter and cheese, so that a constant increase in fertility may be expected without the use of other manures.

The afternoon and evening were devoted to a discussion of the subject of "Stock Husbandry," and the means of making it profitable, carried on by members of the Board and the farmers of the county.

An exchange of courtesies closed a successful Institute.

Institute at Linneus.

A second Institute was held in the southern part of the county, under the auspices of the patrons of the Nickerson cheese factory, at Linneus, November 9th, at which "Dairy Husbandry" was selected as the leading subject for the meeting.

The Nickerson cheese factory, owned and operated by Francis Barnes of Houlton, receives the patronage of a large number of

dairymen in the town of Linneus. A warm welcome and a generous hospitality were extended to the Board of Agriculture and to all others in attendance. Dinner for all was served in a hall near by the place of meeting. An excellent choir furnished music appropriate to the occasion.

After the opening exercises the subject of the day was opened by the reading of a paper on the subject of the

PROFITS OF DAIRYING.

By J. K. HAMMOND, Member from Oxford.

We are told in the western part of the State, that your county is the garden of Maine; that your crops grow luxuriantly; that you have only to prepare the ground and plant the seed to reap a bountiful harvest.

Many of our farms in the western part of the State have been cropped for a century, and we are forced to have two objects in view in all our farm operations. First, the profits which we wish to receive; and second, to increase the fertility of the farm. These objects are best reached through the business of dairying.

The advantages of dairying arise from the fact that dairy products have become, not merely articles of luxury, but staple articles of consumption that the people cannot or will not do without, cost what they may. This causes a permanency of demand which, again coupled with the fact that the supply of fine butter and the finer grades of cheese have never equaled the demand, becomes a source of continuous income for the farmer which has no parallel in other agricultural industries. There is no danger of rivalry in foreign countries, for the enlarging of dairy areas abroad is not likely. The annual extension into new channels of consumption abroad and an increased home demand, all can be counted as advantages.

Then dairying can be made continuous the year round, winter as well as summer, thus furnishing to the dairymen an income at all seasons. As prices may be said to correspond with the cost of production, the farmer may be said to be making a profit at the average run of quotations.

Under the new order of farming dairying has become, with the aid of co-operation in butter and cheese factories, or both combined, one of the chores rather than the chief labor of the farm. The milking is done at morning and evening, and does not usually inter-

fere to any great extent with the farm work. As the revenue thus gained is likely to be nearly as much as all the other farm operations combined, the advantages of dairying can be readily seen.

According to the census the number of cows returned in the State was, for

1860	147,314
1870	139,259
1880	150,845

The average number of pounds of butter per cow, after reducing the milk and cheese to butter, was,

in 1870	98 pounds.
1880	106 "

The accuracy of these figures is not vouched for, and are referred to only for what they are worth.

Some examples of Oxford county dairying are here given to show that the business affords a fair income to those who will give their attention to to it as a strong feature of their farming.

Statement of Benjamin Tucker, Norway.

My herd consisted of thirty cows in winter and twenty-five after June 1st. Two of them were two-year-old heifers. Average was twenty-five in milk. All came in during the year.

The amount of milk sold, 61,614 qts. for	$3,210.62
" used in the family, 1,225 "	50.00
	$3,260.62

DR.

Cost of feed bought	$1,064.55
Hay and fodder equal 70 tons of hay	700.00
1 man and team at $2 per day marketing	730.00
Interest on cows	54.00
Loss, 3 per cent of sales	96.32
Pasturing 25 cows at $5	125.00
	$2,769.87

Leaving a balance as profit of $490.75.

Manner of Feeding. My average feed for cows in milk and at the barn is one quart corn meal, one quart oil meal and two pounds

wheat bran twice a day and fed dry. From the last of May to the 15th of July fed one quart corn meal, one quart oil meal once a day. After July 15th to Oct. 1st, the same quantity of meal and two pounds of bran and second crop clover or cobs from the corn factory. I feed and water twice per day in winter.

Statement of F. A. Danforth, Norway, Maine—Twelve Cows from Jan. 1st to Nov. 1st, 1883.

CR.

Amount of milk sold	$445.62
" butter made 1,094 lbs., 28c.	306.32
2 calves sold	10.50
2 " raised	20.00
Estimated value of skimmed milk	50.00
	$832.44

DR.

16 tons hay, $12.00	$192.00	
10 " corn stover, 5.00	50.00	
Corn meal, cotton seed and bran	151.69	
Pasturing 12 cows	60.00	
		$453.69
Balance, $31.56 per cow		$378.75

Statement of O. G. Curtis, Paris, for the Year Ending Oct. 31, 1883.—Average Seven Cows.

1882.	Pounds of Butter Made.					
Nov.,	175½	lbs.,	average price,	33	cents,	$57.92
Dec.,	114½	"	"	32½	"	37.21
1883.						
Jan.,	115	"	"	27½	"	31.63
Feb.,	112	"	"	23½	"	25.76
Mar.,	118	"	"	23	"	27.14
Apr.,	180	"	"	23	"	41.40
May,	121	"	"	21 1-5	"	25.64
June,	112	"	"	22	"	24.64
July,	134½	"	"	21	"	27.25
Aug.,	64	"	"	20	"	12.80
Sept.	138½	"	"	26½	"	36.70
Oct.,	135	"	"	28	"	37.80
Used,	132	"	"	26½	"	34.98
	1652 lbs.					$420.87

CR.

Mr. Carter, butter sold	$420.87
7 calves, $8	56.00
Skim milk	40.00
Profit on 3 cows sold	35.00
	$551.87

DR.

14 tons hay, $12	$168.00	
Pasturing 7 cows, $5	35.00	
Grain feed	135.00	
		$338.50
Leaving a profit of		$213.37
Average per cow		$30.48

Let us make a comparison of butter making with making cheese, and take the statement of Mr. Curtis for a comparison. We find he made 1625 pounds of butter. If the milk it took to make that amount of butter had been made into cheese he would have had 4130 pounds of cheese, which at 12 cents per pound amounts to $495.60. Leaving a balance of $74.73 in favor of cheese making.

By referring to the books of the North Paris Dairying Association, I find the following amounts of milk credited to the patrons:

	No. of Cows.	Pounds of Milk.	Amount received on cheese.	Milk worth made into butter.	Balance in favor of cheese.
Paris Town Farm	10	14,816	$177 72	$136 39	$41 33
D. N. True	6	6,892	82 68	57 96	24 72
P. C. Mason	5	7,772	93 36	65 52	27 84
A. S. Thayer	6	9,424	113 04	79 17	33 87

I will make a comparison of butter and cheese making versus beef, and quote from the National Live Stock Journal.

To make a just comparison, we must take the product in food produced by the cow and the steer for the time it takes to grow a steer for market. The cow, on an average, will produce 400 pounds of cheese per year, and this cheese, according to the best estimates made by chemists has a food value double that of dressed beef, which would show the product of the cow in cheese, for one year to be equal in food to the carcass of a steer dressing 800 pounds. To

grow this steer requires, ordinarily, three to four years, say three and one-half years on an average. It will thus be seen that the cow is greatly superior to the beef animal in the production of human food during a given time. It appears that during lactation the cow is able to assimilate a larger amount of food, and to utilize it more completely, than she can do in taking on flesh when not in milk.

It is quite easy to see that, if the cow can produce as much human food in cheese in one year, as she can produce in flesh in three and one-half years, then the production of milk is much more economical than the production of meat. It is true that the cow, during lactation, will consume more food than the average consumption of the steer during the same time, yet not as much more as the product is increased.

We have only considered the cow's product in cheese. Let us take the butter product, and the use of the skimmed milk. An average cow will produce 150 pounds of butter per year. The skimmed milk will produce 200 pounds of pork, and about the same weight of flesh upon the calf. If this estimate of 200 pounds of pork from the refuse milk of a cow be correct, it presents the singular result of growing as much meat as is produced in the average growth of a steer, that is, 200 pounds per year, as the steer only produces 800 pounds of beef in four years. This fact alone shows most forcibly the greater economy of producing milk than beef. If the cow can supply the waste of her own system and produce 150 pounds of butter, and then 200 pounds of pork can be made from the refuse milk, that settles the question of comparative economy, unless the food required by the cow is as much greater proportionally. The cow does consume more food than a beef animal of the same weight, but not as much in proportion to product.

We can give some facts in reference to the value of skimmed milk for the production of pork and the growth of calves. Experiments show that skimmed milk fed to pigs between four and ten weeks old produces, on an average, one pound of live weight to ten pounds of milk; between ten and sixteen weeks old, one pound live weight to 14 pounds of milk; between sixteen and twenty-four weeks old 18 pounds of milk are required to make one pound of live weight; and between twenty-four and thirty-six weeks old 22 pounds of milk to one pound of live weight; making an average of about 16 pounds of milk to one pound of live weight if

the pigs are not kept beyond thirty-six weeks old; and after deducting 20 per cent for shrinkage in drenching, will show an average of slightly less than 20 pounds of skimmed milk for one pound of dressed pork. The experiments in feeding young pigs, at Michigan Agricultural College, on skimmed milk, gave six results similar.

It is reasonable, then, to assume that a cow giving 4,000 pounds of milk in a season, will make 150 pounds of butter and furnish food for 200 pounds of pork. It is safe to say that 20 pounds of skimmed milk will make a pound of live weight upon calves to the age of three months; so that the refuse milk would produce 200 pounds of flesh upon calves. We might show the value of the skimmed milk to make into cheese, which would make a better exhibit of profit.

It remains for us to sum up the statement of the milk and beef product respectively: First, if cheese is made the ordinary cow will produce 1600 pounds in four years, which at 12 cents per pound will amount to $192. If butter is made 600 pounds will be the product of four years, which at 30 cents will amount to $180, and 800 pounds of pork to $64 more, making the income from an ordinary cow for four years, in butter and pork, $240. Now if we estimate that it costs $10 more in labor to milk the cow and work up the product than to take care of the steer, we must deduct from the product of the cow $60, reducing the cheese product to $152 and the butter and pork product to $200. Now the steer dressing 800 pounds will weigh 1400 pounds on foot, and sell say at 6 cents, or $84, thus giving a cash product of less than half of the butter product of the cow.

After the reading of the above paper the remaining time was devoted to a further discussion of the same subject.

The afternoon was devoted to a lecture on "Profits of Good Feeding," by C. H. Cobb, member from Androscoggin, in which he took the ground that the most profitable results come from good and liberal feeding.

During the recess between the afternoon and evening meetings, the members of the board and representatives of the press visited the farm and dairy of Mr. A. P. Bennett of Linneus, a brief description of which is here given.

In the evening Prof. Balentine repeated the lecture given at Caribou, after which, and after answering several questions which had been handed in, an adjournment was made.

Private Dairy of A. P. Bennett, Linneus.

To Mr. A. P. Bennett, of Linneus, belongs the credit of having established the first butter factory in the State, thoroughly equipped with all the modern appliances known to the business. This is a private butter factory, not a co-operative one.

Mr. Bennett is a self-made dairyman. He did not gain his appreciation of the business through association. There had been no marked examples round about him, or in the county even, for him to study, and from which to gain an appreciation or an understanding of the business. Neither has he been outside the county to study either the business or the example of others. He had been an attentive reader of some of the best agricultural journals of the day and from them alone has he gained his appreciation of the business and a knowledge of its requirements. With an intuition quite remarkable he seemed to comprehend at once the indispensable requirements in the business. As a result of this intuitive conception he has been able to keep clear of false steps. Whatever he has done has been done right the first time. This cannot be said of all who have assayed to work in untried fields.

The first thing, of course, was a good warm barn in which to stable his cows, and economy demanded that it should be convenient in its arrangements, and well adapted to the purposes of a dairy barn. The result was the erection of one of the best arranged and most complete barns to be found in the State. It is one hundred and ten feet in length, by forty-eight in breadth, and twenty feet posted. It is double boarded throughout, and battened over the cracks. This secures warmth and durability without the great cost of a nice finish or expensive painting. One hundred twenty-five thousand feet of lumber was used in its erection. In it are stalls for fifty-six cattle and four horses. Those for the cows are each four feet in width, and arranged after the most approved manner, with trench for droppings, ten inches deep, double windows for winter, and an arrangement for tieing the cattle, invented by himself, which admits of the greatest ease and freedom whether feeding or lying down. At present he has thirty-five cows, a pair of horses, and twenty young cattle.

There is a cellar under the entire barn. We have examined most of the celebrated barns in the State, but nowhere else have we found a cellar so complete in all its arrangements as this. The

granite wall on the two sides and one end is laid in cement in a most exact and finished manner. A frost proof root cellar, in the center of one end of the cellar, is built of the same material. The floor is cemented throughout, thus forming an absolutely water-tight cellar under the whole barn.

A large number of pens for pigs are conveniently arranged in the space not needed for manure, and some forty or more thoroughbred White Chester pigs, of all sizes, are to be found at all times in the pens. No frost ever enters either the cellars or the stalls above. The accumulated liquid is drawn off into a tank mounted on wheels and taken to the fields where wanted.

Five years ago Mr. Bennett built a dairy house over a spring of water located at some distance from his buildings. In this house was arranged a full line of approved butter making apparatus, this being the specialty he had decided to pursue. The cream was raised in the Jewett pan, and the churning was done by horse power. After getting all in good working order it took fire and was burned down. A dairy house was then built near his dwelling, with engine room, working room, and ice house all in the same building. In the engine room was placed a new two and a half horse power Baxter engine, costing $250. The working room is supplied with a Reid Creamer, A Ried Butter Worker, Stoddard churn and the I. X. L. Self-Gauging Butter Print. The engine furnishes the power for churning, and the boiler heats the water for scalding the apparatus in use. One hundred pounds of butter are churned at a churning. Everything about the rooms and apparatus is kept scrupulously clean and in good order. An intelligent lady who fully understands all the requirements is employed to have charge of the department, and well does she perform her part. The butter is pressed into one pound prints by the machine mentioned above. This is a useful appliance to the dairy room where butter is put up in prints. After being adjusted it accurately gauges every print to the desired weight. It is operated by a short lever, and so easily that any one can use it. The butter is all sold in Bangor. During the season of low prices, for two years, his butter has been packed in packages of his own invention, and in a manner originated by himself, and has been held till the higher prices of autumn, when it has gone on the market in superior condition, and has commanded a good price.

From the engine room an iron water pipe is laid to a spring of water twenty-seven rods distant and twenty-five feet below the

level of the buildings. A pump is attached to the engine and the water is drawn from the spring to the engine and dairy room, thence thrown to the house; and from there pipes are laid to the barn, and just beneath the flooring, under every feeding manger in the barn. From this main pipe, branch pipes are projected upward through the floor into a small cast iron tank placed in each animal's feeding box. These cast iron boxes are lined with cement to prevent rusting, and are supplied with a lid or cover to prevent getting filled with chaff. A waste pipe carries off any overflow, and empties the tanks if wanted. So every animal is supplied with spring water, pure and clear, when wanted. There is power enough to carry the churn and the pump at the same time. Twenty-two hundred dollars' worth of butter was sold last year; this year the sales will exceed those of last year. Last year the average butter yield was two hundred pounds on the thirty-five cows kept. He has been raising the average each year.

Mr. Bennett's cows, and all his stock, are fed and cared for after the most approved methods now in practice by our best dairymen and stock feeders. As we were shown around among his cows and pigs, not a cow was disturbed by our presence, not a pig squealed, not a suckling ran at our approach. All the premises were in order, and all the animals clean.

Cotton seed meal and wheat bran are bought by the car load and liberally fed. The rich manures from the stock so fed, supplemented by that from his large stock of pigs, and all saved in a water-tight cellar, when applied to the already strong soils of Aroostook, give testimony in bountiful crops of wheat and other grains, potatoes and hay.

It would have been comparatively easy perhaps for a man with abundant means to have accomplished what Mr. Bennett has done. Mr. Bennett, however, began with a small income, and for much of the time has had to carry heavy debts at high rates of interest, till his business relieved him of them. His example is a striking instance of what may be accomplished when a well defined purpose is kept in view, and is pursued with an energy that knows no faltering.

CUMBERLAND COUNTY.

Institute at Gorham.

An Institute was held at Gorham Grange Hall, November 21st. The interest manifested in the meeting called together an earnest and enthusiastic audience of the farmers of the vicinity. A cordial greeting and free entertainment were tendered to all present. The subject of "Associated Dairying" was selected for the forenoon.

MORNING SESSION.

Mr. Charles W. Deering called the meeting to order and said:

Mr. Secretary and Members of the Board, Strangers from Abroad: In behalf of the Gorham Grange, and in behalf of the citizens of Gorham and vicinity, I bid you a cordial welcome to our town, our hall and our homes.

We feel grateful to our State in providing a Board of Agriculture to investigate not only our errors, but our successes as well, and to make report of them in so able a manner as it has been done. We realize that oft'times we make failures, for all we bend our energies so zealously and labor so arduously, at other times we think we solve the problem and see the mistake. Sometimes we are almost forced to the conclusion that it is the hand of Providence against us, when, if we better understood the facts of the case, we should see that our failure is the result of our own shortcomings. Therefore we feel grateful that the Board of Agriculture should come and meet with us, to tell us, perhaps, some of our mistakes, and yet, may be, to encourage us to leave the old ruts, the old traveled paths, and start upon the new way; there may be in this case, as in some other cases, a royal road on which we may travel, and, perhaps, shorten the distance and reach better results.

We feel to thank you that you have come in with us. We very much regret that our brother (Governor Robie), whose picture hangs upon the wall, is called away, and is unable to be with us to-day. He regrets it as much as we do; he would enjoy it very much if he could be here; but he is away at his post, looking out for the welfare of the farmers, we trust.

As it is the hour for us to commence, I will say that we should all much prefer to listen to you who have come here from abroad than to talk ourselves. I will call to the chair the master of our grange, brother Fogg.

Mr. Fogg, in taking the chair, said:

We are very thankful that our brothers have come to help us. We must admit that we are entirely selfish in this. We hope that they will instruct us in a better way.

The subject for this morning is, I believe, "Associated Dairying." We will hear from Secretary Gilbert.

ASSOCIATED DAIRYING.

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

Mr. Chairman and Ladies and Gentlemen: It is pleasant for the Board of Agriculture to be assured that they have fallen among friends, that they have fallen among those who have an appreciation of the work which is attempted by the Board. It is always gratifying to us, on meeting an assembly of farmers, to be assured of this fact, and furthermore, it is gratifying to us to hear an expression from any community of farmers that they are desirous of obtaining information in regard to the business in which we are engaged. We can work with a better confidence when we know that our work, such as it may be, is fully appreciated, and that our efforts are falling among those who are seeking knowledge.

There is much in our business to learn; there is absolutely no limit to the search for knowledge in this business of agriculture. It has been but comparatively a few years that any systematic effort has been made to study out its secrets and lay them before the practical farmer. In this short time some progress has been made. Of course the work is open to the criticism that the progress is slow; yet if we look back a decade only we shall find that there has been marked progress in practical agriculture among us. It is like all educational matters—for the development of practical agriculture is a matter of education as much as any other branch—it is a fact, I say, connected with all educational matters, that the fruits of the efforts which are put forth are not perceptible to the generation working them; time must elapse before the results of those works are made apparent. So if we essay to censure any institution of learning because we cannot point to actual results coming from it, we should say, have patience; wait a term of years, wait many

years if need be, and see then if we cannot look back and point to some tangible results from its work. So in the pursuit of information in regard to agriculture; look back through the years, and compare the present time with the past, and see if there hasn't been progress made; look further and see if we cannot point to some facts which have become fixed in agriculture. Many as are the demands for facts now, there have been some which have become well established through the efforts made in years past. We hope to accomplish such results more rapidly in the future. There are great obstacles to this progress. It is not necessary, possibly it is not best, at an agricultural meeting, to spend our time in pointing out what these obstacles are, and lamenting over the fact that obstacles are in the way. We must take it for granted that there are obstacles in the way of everything which we wish to forward. We are to overcome these obstacles; we are to do our work faithfully, regardless of them, and gradually and surely, one by one, will these obstacles be removed and the work advanced. So let us work on faithfully, earnestly, diligently, and good, we hope, we know, will come out of it, and good will come out of it in such measure as those who are engaged in the work are interested in it. It is gratifying to us, let me say again, to be assured of the fact that you are here interested in the work of progressive agriculture.

We are apt to hear our State spoken of as a thrifty, prosperous State. In speaking of our industries, you will almost always find that our public speakers allude to our immense water powers, and to our great forests of timber, our summer boarders and our sporting travel, and finally, if they do not forget it, will tamely allude to our agriculture.

I want, as a member of the Board of Agriculture, and I want our Board of Agriculture to do its work under the consciousness that agriculture in the State of Maine stands to the front among the important industries of the State. We recognize the close relations of the lumber interests, and especially of the manufacturing interests, with agriculture, but above them all stands this interest of agriculture. When we go critically to work and examine, we shall find that our agriculture, in the several counties specially devoted to it, outweighs in importance either of our other great industries here. So I say, let us put our agriculture to the front, and speak of these other industries as of secondary importance to it.

In regard to the necessity for investigation into agricultural matters, I may say that our knowledge must always be in advance of our practice, but we should certainly try to keep our practices well up to the best knowledge of the time.

To study our agriculture aright we must exercise the most critical care in interpreting results aright; if results are not interpreted aright we are led into error. As much as we may study agriculture, as much as we may study the different branches of science as applicable to agriculture, still, successful agriculture to-day is the result of practical knowledge. So comes the necessity, if we would establish ourselves in correct practice, of drawing correct conclusions from the results of practice. Here comes in a matter of the greatest importance. If you draw an incorrect conclusion from your practice, you certainly are basing operations upon an error, and errors, as a rule, lead towards unprofitable results.

So I say we must if possible search out the true causes of results if we would improve our practice. We cannot give these matters too careful attention. We are hardly aware, many times, how loosely we draw conclusions.

We come before you to-day with our work not so well mapped out as we would desire. We know that this locality has long been famous as an agricultural section; Cumberland county is favorably located, and certainly is favored with as good a soil as any county in the State. Having the advantage of a good market for so many years past, and the certainty of the same for the future, and having the advantage of a considerable accumulation of wealth, this county certainly has superior advantages. We accord to you all of these advantages. I have made diligent inquiry since this meeting was appointed to learn something more definite in regard to your practices. I am aware that this town and this vicinity are well adapted to the grass crop; I am well aware that this crop has been a special feature of your farming for a long while.

It is one of the facts which has been fully established in practice —I am sorry to say the fact is not accepted by all the farmers throughout the State—that, in every locality well adapted to grass production, stock husbandry is the safest, the surest, and the most profitable industry that can be introduced into the farming of that locality. I say this is established beyond question to those who have studied the matter, and have investigated it from a practical stand point. Cumberland county long ago introduced the practice of raising

hay and putting it upon the market as a raw product. That practice has gradually extended into the adjoining counties, and to the State at large, until to-day it is one of the alarming features of the agriculture of the State of Maine; it is one of the worst stumbling blocks to the progress and prosperity of our business that we have to contend with. Go where you will, in those communities of farmers who, instead of selling their hay as a raw product, have stocked up their farms with good stock and have adopted the best practices in relation to it, and have realized their income from the product of the stock, and I say it, gentlemen, without fear of successful contradiction, that those communities have invariably built up the greatest wealth; you will find there the more substantial evidences of that wealth; you will find that those farmers have built up around them more of the conveniences, they have supplied themselves with more of the luxuries of life, and those farmers have a larger bank account.

I might go into an analysis of this condition of things and show, as I claim I am fully able to show, the plain reasons for this condition of things. At this time I will only say there is a better way for the farmers of a community to market their hay than to sell it as a raw product; there is a way for farmers to get more income out of their farms through a system of stock husbandry. We have many farmers who see this; we have many farmers who have been in the practice of selling their hay who are now seeing the error of that practice, and are changing. As with all old time methods, it is slow work and many times a difficult matter to make the change.

You here have had an advantage over many other localities in the matter of income from the selling of hay, because you have been able to sell at a higher price, but I could point you to localities which have copied from you, where, a year ago this winter, thousands of tons of hay were put upon the market, pressed and delivered to the station or wharf, for eight, nine, and ten dollars a ton, and where at the present time cargo after cargo and car load after car load is being shipped from those stations and those wharves for from seven to nine dollars per ton, pressed and delivered. Every one of you who will sit down one of these evenings and commence a system of figuring upon such prices as these will see that there is hardly a living out of a good farm from this practice. Stock that farm up to the capacity of its production and out of that comes a gross income which leaves some possibility of success.

These possibilities are carried out in practice wherever a system of stock husbandry is introduced. If this Board of Agriculture had no other business and did no other work than to correct this tendency to the selling of hay, it certainly would do a good work for the State of Maine.

The subject of associated dairying assigned for this forenoon is so broad that it is impossible to discuss it in all its bearings in a single session. We must confine ourselves to some of the special features which are especially exercising the community in which the meeting is held. While I have laid down the proposition that stock husbandry is to be commended in every community where the farms are well adapted to the production of hay as a speciality, we claim further, and lay down this proposition emphatically, that among the various branches of stock husbandry, dairying may be set down confidently as one promising as good results, to say the least, as any branch of stock husbandry. We might go on and spend the forenoon in bringing out proof of this proposition, but it is not proposed to do so, neither would the subject call for it. This proposition is laid down in the full confidence that it cannot be successfully disputed, and I would say, from my limited knowledge of this town and this locality, that nowhere can it be more successfully prosecuted than in this immediate vicinity. If any of you here, interested in this meeting, will indicate just what you want brought out in regard to this subject of associated dairying I shall be pleased to act upon that suggestion.

THE CHAIRMAN. I hardly know what our committee intended to be brought out; but I know that I want to know, how we can make our farms afford us a fixed income from some source and especially from dairying as a specialty.

MR C. W. DEERING It seems to me the first thing we want to know is as to the practicability of establishing a butter factory. A few of us that have had the pleasure of reading your excellent reports have seen some accounts of the work in Massachusetts, at Hatfield, at East Hampton and other places, but many of the others present have not had the privilege, and perhaps you could tell us something about the cost of a factory and the cost of gathering the cream. We have spoken about this subject with some of our neighbors and they think it cannot be done, that men cannot get around to bring the cream to the factories. There are a great many bugbears and old ruts that we want to know if we

can get away from and we should be pleased to have you speak in regard to these points.

SEC. GILBERT. I have laid down two propositions and I hope every man here has fixed them in his mind. I will now lay down a third one: Any of these branches, taken hold of and made a special feature of your farming operations, pushed with the intelligence that you are in possession of, will secure you that income. You may be, possibly, in your surroundings better adapted to one branch than another, but still after all, there is more in this straightforward working for an object than there is in special adaptation or in any other conditions. The fact is, adaptation amounts to nothing unless you push in the direction of some fixed object. So, having concluded that something is to be done, what shall it be? After that question is answered let that special object of your work be reached for with your utmost efforts.

It is of no use to urge the matter of dairying to any community of farmers under the old methods of individual work. It is no use to dabble with a small dairy and expect to secure any considerable income from it; you may get your daily bread and butter and cheese, and your milk, and you may possibly support a family out of a small dairy; but if you, as a business man, are looking for an income you have got to do a considerable business, and if you do a considerable business, you have got to take it out of the hands of your family. This is another proposition that you may note down and fix in your minds.

Are the farmers of Gorham and vicinity prepared to-day to go to work and extend this business of dairying as a special feature of the agriculture of this region? If you are only prepared to-day to keep a few cows, possibly three, four, five or six or such a matter, and if there is not an earnest desire and a determination on your part to do something that will secure you a better income, you would not succeed in an effort to establish associated dairying. There must be a desire on the part of the farmers, which shall amount to a determination to accomplish something, then they will go into it with an earnestness, with an effort, which will bring in the end some results. You have farms enough here in this town, you have wealth enough among you, you have hay enough grown, you have other products enough grown in the town, and you are within easy enough reach of such as you do not grow, to establish here in this town one of the most successful enterprises in dairying

that can be found anywhere in New England. I say you have the possibilities right here in these farms that you now possess, and I am confident you can devote these farms to no other purpose that will bring you as a community so large returns, so satisfactory results, and at the same time leave your farms in so good condition, as will this business of dairying, in its associated form.

This leads to the matter, as I understand it, of the practicability of butter factories. I would not lose sight of the fact that associated cheese making is successful. It is a lamentable fact that we have had a large number of miserable failures in associated cheese making in the State of Maine. The conclusion might be drawn that the business is not adapted to the State of Maine, yet that would be an error. The cause of those failures is not found in the fact that our State is not adapted to the business of associated dairying; every one of those failures can be traced to other causes outside of the want of adaptation. We have in operation to-day a considerable number of successful cheese factories, and in those communities the farmers are well satisfied with the results. The business among them is extending, they are increasing the number of cows, and from their example other successful industries of the kind are being established The business to-day, where it is being prosecuted, is in very successful condition. It is a mooted question whether the cheese making or the butter making would be the better branch to establish; we have not yet worked long enough in associated butter making to prove whether it shall be more profitable than the cheese making is. My opinion, if you will pardon me for expressing it, has been rather in favor of associated butter making instead of cheese making. While I would say to this community that the establishment of butter factories perhaps promises better, yet it is no reflection upon those cheese factories that are already established.

The Board of Agriculture has been in a measure instrumental in starting the business of associated butter making in our State, and I feel that in starting the butter factories which are now operating it has been a public benefactor. I have that faith in the business.

The first associated butter factory of the State of Maine was started in the town of Wales. It was not started under especially favorable conditions; the farmers especially interested were somewhat limited in numbers, since a considerable number of the lead-

ing farmers within easy reach of them had been in the practice of selling their hay in the Lewiston market and drawing manure from the same city to replenish the fertility of the farm. A few individuals, feeling it a necessity, went to work, got what information they could, and started the business. It was put into operation last June, the most unfavorable season of the year to start an enterprise of that kind. It has been constantly growing in favor every day since it was opened, up to the present time.

I presume that you here are familiar with the methods required in associated butter making. This matter has long attracted my attention, and the idea of collecting the whole milk and taking it to the factory as a common center for its manufacture into butter appeared to me impracticable here in our State; therefore I saw no opening whatever for a butter factory, until this method of what is known as the cream gathering plan was invented and arranged. This obviates many of the difficulties. It renders it possible to draw from a wider area of farms than would otherwise be the case. An associated enterprise necessitates that it be an enterprise of some considerable dimensions, that a considerable amount of business be done in order to make the associated enterprise possible. A business enterprise conducted by an individual may be large or small as he sees fit to make it, his business is adjusted to its dimensions, and he as a private individual is all right. It is practically an impossibility to adjust a corporate enterprise in that way. Business enough must be done so that the individuals employed in the business shall have something to do, because they cannot be employed without a satisfactory salary, and if they are a a portion of the time without work of course they are not earning their salary, and the expense of manufacturing is largely increased.

The cream gathering plan is arranged on the supposition that the milk is set at the farms. The cream is gathered at the expense of the factory and without trouble to the farmer; thus the question of transportation, so far as the individual farmer is concerned, is done away with. The man located five miles from the factory is equally well convened with the man who is located close by. This plan is entirely equitable in that regard. It necessitates that the milk should be set in a uniform manner or else the individual will not get his dues; it is practicably an impossibility to cheat the factory, but the individual will not get his just dues unless his milk is set in the proper manner. The cream gatherer

starts out from the factory, goes out upon one road and back upon another, collecting the cream as he travels, and returns to the factory. Each man is credited with his amount of cream. The butter is made, put up, and sold at the factory. Thus the farmer is relieved from every care about the business except the making of the milk and the setting of it. Every other care and responsibility is taken from him. It simplifies the whole business; and it relieves it of all the embarrassments which have been heretofore insurmountable in private dairying.

C. W. DEERING. Please give us the expense of gathering the cream from four or five hundred cows ordinarily.

SEC. GILBERT. That would be an impossibility, as it would vary in different localities. I can give the expense of manufacturing the butter. The Wales factory has been manufacturing butter during the summer season and doing only a small business; and, by the way, understand that this is the initiative in this State, and that they had no precedents to go by, that they have had to go ahead on their own hook, so to speak — yet they have manufactured butter there during the summer for four cents a pound. That covers the entire cost — the interest on the capital invested, the cost of collecting the cream, and making the butter. Every item of cost is included in this four cents a pound. With such a factory in a community of farms such as are found here in the town of Gorham, the cost of doing the same thing should be less than four cents a pound if well managed. I may say that if your business was well started and well handled, and you did a considerable amount of it, that you might confidently expect to reduce the cost in the course of a year after you had started, to three cents a pound.

C. W. DEERING. Can you give us the cost of starting a factory?

SEC. GILBERT. In speaking on that point I wish to throw out a caution. Some of our communities of farmers are making the same mistake in regard to butter factories that was made in regard to cheese factories. The greatest stumbling block in the cheese factory industry was the cost of the factory. A small community of farmers went to work and organized a corporation and established the business of associated cheese making with an invested capital expended of from three to four thousand dollars. Just think of it; it was absolute ruin to such an enterprise to start with. No business of that amount could stand such an investment as that.

So it becomes necessary to keep this investment down to the lowest possible figure. Our modern cheese factories have started in on a different basis. We have one in my own vicinity to which I have contributed my milk, the entire cost of which up to the time of making the first cheese did not exceed $1400. You see there was a possibility of a prosperous enterprise, while four thousand would have swamped them the first year. So in these butter factory enterprises, the most careful scrutiny should be exercised in order to keep the expense down. All that is needed for a butter factory, for room, is a room for the power, a working room, and a small storage room for the storage of butter during the brief time that it remains on hand. You don't want to make butter in a two-story building; all you want for that operation is a basement. You see the folly of a great expenditure for the sake of that basement room; after it is erected the interest on its cost must be paid whether it brings you any income or not. It certainly cannot contribute to that naked business of butter making. Possibly it may be rented for certain purposes and thus pay the interest on its cost; but look out for that before you build the structure. A room 8 by 20 feet is sufficient for the power room. Another room 14 by 20, or 12 by 24, as might be the case, is sufficient for a working room. The storage room would be of insignificant dimensions of course; it might be of any convenient size desired. I say it is proper that these be basement rooms because such may be more easily kept cool. You can shut out the outside temperature more easily than you can from rooms constructed above the surface of the ground. A basement that is open upon one wall is the most convenient structure, with the bank rising to the entire height of the room on the other side. There are many opportunities for securing this room at small cost, under buildings already erected; if not it can be secured under a roof of very small cost. This room above the basement avails nothing as a butter factory, and it should not cost more than it is worth.

For apparatus there must be cans in which to gather the cream from the farms, and the number will correspond to the number of teams sent out, and that will depend on the amount of business done. These cans will cost eight dollars each. Of course the wagon and the team may be owned by the factory or hired at a stipulated price by the factory. A churn large enough to churn 100 pounds of butter at a time will cost about twenty-five dollars. A butter

worker large enough to work this butter will cost about fifteen dollars. There must be vessels also in which to keep the cream after it is brought to the factory. These are simply tin tanks so arranged that the temperature can be kept under control. The cost will depend on the style of tank used. A tank of one hundred and fifty gallons capacity, fitted with space for hot or cold water, will cost $50. These equipments you see are simple and not expensive. Then comes in the question of power to drive the churn. One good stout man will churn 100 pounds of butter in two hours. If you have only 100 pounds of butter to churn can you afford to lay out three hundred dollars for an engine, and supply it with fuel to save that two hours' work of a man? You can figure it out. Don't think if you are going to establish a small business that it is necessary to buy a great engine, because it is going to cost you more than you will get out of it; the butter has got to pay the bills; and the net income from the butter must always be kept in view. If you are to establish a business large enough to warrant the investment, then one would be justified in getting a steam engine to drive the churn. I was looking at an engine a few days ago in a private butter factory, a new two and a half horse power Baxter engine, modern make, perfect in all its parts, costing only $250, boiler and all. The interest on that is only $15 a year and that certainly is not very expensive. The piping and setting up should not cost any considerable amount. There is another advantage of an engine, you can heat water for use in the work room, and with the spare steam from the boiler you can do all the scalding of the apparatus used in the factory.

There is another item, the cost of the conveniences on the farm. It has come to be one of the requirements in butter making that we must get complete control of the temperature of the milk. The milk must know no summer and no winter, no dog days and no zero. We must have absolute control of the temperature of the milk in butter making at the present time, whether in the associated form or as a private industry. So it becomes necessary to supply ourselves with the proper apparatus for setting the milk. In this cream gathering plan the system adopted is to set in deep cans, by the cold setting method. And let me say in passing that even in private dairying this system of setting the milk is a great advance over our former practice. The milk must be set in uniform cans because each man receives his cream by measure, and

if the cans are all of a uniform size then the accounts are kept by the depth of the cream in the can; every man is credited with the number of inches or spaces of cream found on the top of his can when the cream gatherer passes on his daily round; there is a can which was invented by the originator of this system, known as the Fairlamb can, which was first introduced into the butter factory. It is a very good arrangement for creaming the milk, but later practice has introduced a plain 8-inch can, 20 inches deep with a glass panel in the side of the can through which the depth of the cream can be read. The cost of these cans will depend on the kind of can you obtain.

In the deep setting plan of creaming milk it becomes necessary to set these cans in cold water; and a tank must be supplied to set the cans in. The agents of the different cream-gathering appliances of course would tell a community of farmers like this, that their patent creamery is the one thing that they want, and in all probability, if you listen to their arguments, they will make you believe it; at any rate they have been quite successful in doing so in those enterprises which have just been started in this State. It is not necessary for a farmer, having from 12 to 20 cows, to pay out forty fo fifty dollars for a patent creamer, painted, striped and varnished up in the nicest manner, in order to drive the cream to the top of his milk.

Ice of course is a necessity; all good farmers and all good dairymen put that up on their own farms now. and you will only have to put in a still larger supply if you go into this business. The matter of temperature must be under control.

Question. Don't you need ice for the factory also?

SEC. GILBERT. The factory if possible should be located near a good spring of cold water, the cooler the better, because just to the extent that you can do your cooling by the running water, will you reduce the amount of ice required. The use of ice at the factory is principally confined to holding the cream at the proper temperature, and not a large amount is required for that purpose if you have cold water. You can do it with cold water wholly provided it is cold enough, otherwise an amount of ice must be added to it sufficient to secure the required temperature.

MR. HARRIS. Perhaps you had better state your opinion about what the expense would be for a complete fit-out sufficient to take care of the product of 250 or 300 cows.

SEC. GILBERT. Of course that would be subject to many considerations which would vary the figure considerably in different localities. If you have a building made new entirely, excavation and all, it will cost more than if a suitable room could be secured in a building already erected; with good management carried throughout, with the selection of a favorable locality and the erection of a no more expensive building than would be required in the business, supplying a steam engine for the power, the investment need not exceed $1500. That amount would equip for a business of at least 300 pounds a day, and if you want to enlarge the business the cost would be trifling because it would only be necessary to increase the number of cans for collecting the cream and the number of tanks for holding the cream after it is in the factory.

Question. Are the cans to be kept entirely under water?

SEC. GILBERT. No, simply surrounded by water; the cream wants to be exposed to the air all that you can possibly allow it to be, after it is taken to the factory. The supposition is that your surroundings are entirely clean and sweet, and if that is the case, the more the cream is exposed to the air, the more quickly it will ripen and the higher flavor it will have.

Question. Are the tanks to be covered?

SEC. GILBERT. They should be covered, but not air tight. The practice of shutting warm milk up air tight for the purpose of creaming is an erroneous practice. It is better to leave the milk open till it cools down to the temperature of the water. The practice of covering milk absolutely air tight as soon as it is drawn from the cow is objectionable.

Question. How does the price of factory butter compare with that from private dairies?

SEC. GILBERT. As to that we can only judge from the past. Ever since the introduction of factory butter it has led in price right straight along the year through, year after year. You will find that the best factory butter has led in price the best private dairy butter in the markets by several cents a pound. If you will take the pains to look over the quotations of factory butter for the last five years you will find that it has ruled more than enough higher than private dairy butter to defray the entire expense of making and selling.

MR. HARRIS. Is not that the history of the working of all the factories with which you are acquainted?

SEC. GILBERT. Certainly it is, and it has been so with cheese making ever since cheese factories have been introduced. The product of the cheese factories of this State during the last year has outsold the private makes of cheese.

Question. Should not the man that runs the factory have control of the manner of keeping the cows?

SEC. GILBERT. In regard to that, it belongs to the association to establish rules and regulations. It is absolutely necessary, if you are going to make a good product, whether by associated methods or in a private capacity, to have cleanliness in every department; the cream must be taken to the factory in perfect condition or it must be rejected. The individual who collects the cream should be a responsible individual, and a judge of cream, and should be a judge of purity and cleanliness. He should be instructed by the corporation, whenever cream does not come up to the requirements to reject it; he should be an inspector as well as a collector. That becomes necessary at our cheese factories; if any can of milk is presented at the window of a cheese factory which is unsound, the operator at the factory must reject it, because he should not be allowed to jeopardize the whole day's milk by taking from a careless individual a can of milk which is unsound or in an unfit condition to use. Just so with cream, it must be all right. Why should it not be?

Question. Would not the feed have some influence on the quality of the cream—cotton seed meal for instance?

SEC. GILBERT That is one of those nice points that would come in later on possibly, but there need not be any fear in that direction. There is a shade of difference of flavors of milk from difference in feeds.

Question. How much help is needed at a factory using the cream of 250 or 300 cows, for collecting the cream and all?

SEC. GILBERT. The matter of collecting the cream you will see must differ in different localities, because it depends on the territory traversed; if you have to traverse a wide circuit it will require more help than if contributors are located conveniently near the factory. You can make the computation, if you see fit, of the time that would be required for the cream gatherer to travel out on one road and back on another. One man at the factory would be able to take care of, and do all the work of manufacturing the cream from that number of cows. You may think that I am a little over-cautious in

these matters, but I do not want to give this butter making business any sort of a send-off here in this State that will not be justified by the results in practice. I do not want to see a single mistake in the establishment of a butter factory here, and there need not be, if due caution be exercised. I would say, then, that the idea of sending off and hiring an expert butter maker, at an exorbitant salary, to come in and take charge of a factory would not be wise. Every principle involved in butter making at the factory is involved in butter making at private dairies; there is not one single thing that is to be done differently at the factory from what is done at home. That woman or that man who is master of the business and can put on the market a first quality of butter from a private dairy every day in the year can take charge of a factory and do the same thing there. The process is precisely the same. You take the cream and you cure it to the same degree of ripeness and acidity, and when it comes to that condition you churn it in just precisely the same manner that you do in the private dairy; you wash the butter; you take it from the churn and salt it to the degree that the market demands, and in every process it is just the same as you do it at home. Now why would you be warranted in sending off for a man, at a salary of a thousand dollars, to do that work that you know how to do just as well as he does?

Question. Do you run the factory all through the winter?

SEC. GILBERT. Most certainly. That is one of the advantages of a butter factory over a cheese factory. In the town of Winthrop and in the town of Turner, where the cheese factories have been flourishing and where they are so popular, at the close of the cheese factory season, in the month of October, the farmers find themselves with the milk of possibly twenty-five, thirty or forty cows on the hands of the family, and without proper conveniences for handling it to the best advantage. So far in this State we have not run any cheese factories over five months in the year. There are still remaining five months' milk from that herd of cows to be cared for. If it is cared for in the family it burdens the family. Many of those farmers want to increase their herds of cows, but they cannot do it, because it would impose an increased burden on their families to take care of the milk while the factory does not take it. Hence they are restricted in their operations; they cannot enlarge their business as they would like; the result is that these very farmers in the towns of Winthrop and Turner have gone to work and established a butter

factory for the purpose of caring for their milk when the cheese factory is not running. Further than that the butter sells for a much higher price in the winter season.

MR. HARRIS. Before we adjourn I want to say a word, although this question will be brought up indirectly in discussing the subject assigned for this afternoon. I wish to endorse every word the Secretary has said in regard to the matter. You cannot imagine the benefit it would be to the agriculture of this town, you cannot imagine what a benefit it would be to the farmers of this section, to take up this business. Here is a point to which he alluded, but perhaps it is not fixed in your minds thoroughly. You ask what would be the expense of gathering the cream. It does not matter what it is, so long as the factory pays all these expenses and gives you more for your cream than you can get from it by churning it yourself. That has been invariably the fact in all cases where these factories have been in operation. I have no fears of that sort. In every instance where this thing has been tried the fact of making a uniform grade of butter, and bringing it all up to the same standard has made the thing a success. Here, for instance, are twenty private individuals who are making butter, each on his own hook; it may all be good butter, yet one man's butter may be a little too salt to suit some customers, the next man may not salt his quite enough, and the butter of another may be a little off in color; in these twenty private dairies you have got twenty different kinds, although it is all good butter. Here is the disadvantage you labor under in selling. By associating yourselves together in the manufacture of butter you bring yourselves all up to the highest standard, your butter is all uniform in quality; the butter you produce to-day is precisely the same as that which you produced any day last week or that which you will produce any day next week; you are able to put a large amount of butter of a uniform quality on the market and thus obtain a price enough higher than either of you, as individual producers, would be able to get, to pay the entire cost of making and selling the product; and not only that, but you save the women of the house from all the drudgery of making it. Although really the women of the house to-day, with the new appliances for handling cream and making butter, can as well take care of the product of twelve cows as they could of four under the old system.

SEC. GILBERT. There is just one point further that I will allude to, and that is in regard to this matter of collecting the cream. It occurs to me that you here are situated so that you might avail yourselves of the dairy products of some remote sections; you can go upon the line of the railroad and collect the cream from a community of farmers and put it upon the train and bring it to your factory in that way, and thus these remote farmers may avail themselves of the advantages of your factory and you avail yourselves of the advantages of an enlarged business. That is entirely practical anywhere on the line of the road.

Question. How is this butter sold?

SEC. GILBERT. It is sold in the market to the best advantage. Sometimes there is a certain line of customers that will take it, but generally it will not be found profitable, in doing so large a business, for the factory to deliver to the consumers directly; it will be better to allow the retailers to take the responsibility of delivering to consumers.

AFTERNOON.

FORAGE CROPS AND HOW TO DISPOSE OF THEM.

DISCUSSION.

MR. HOLBROOK, Member from Sagadahoc.

We are getting down to business now, for this question is one which is of vital importance in the business of farming. It is, too, a question which has long been under discussion. The farmer who is to dispose of his forage in the most advantageous manner must take upon himself the responsibility of transacting the business of manufacturing. What we shall raise is a question which is always before the farmer. In the State of Maine hay will probably always form the basis of our calculations in considering the matter of the feeding of our domestic animals. And certainly there is no crop better adapted to the State of Maine. We have other plants which we cultivate, such as corn, grain, roots, etc., which come into the question of forage crops, and which may be used to supplement the hay crop. There is a difference in the value of different kinds of hay. The clover plant is one of our most valuable forage crops. There is a kind of grass which I have never seen any analysis of in our schedules, but which I consider one of our most valuable

plants for hay, and that is our red top. It will stand exposure better than any of our other grasses. The value of hay depends somewhat upon its cultivation; hay from fields newly seeded to grass, say within one, two or three years, is much more valuable than that from old fields; you will find that so in feeding it to your stock, and it is proved to be so by analysis.

I do not think the value of clover is always appreciated; farmers are apt to neglect its cultivation and to their own loss. There is no way that we can renovate our farms so easily and so cheaply as by the raising of clover. The results from feeding it are very satisfactory, and the excrement from it is much more valuable than that from any of the grasses. The farmer who has in view the building up of the fertility of his soil will find it of great value in that respect. It is of special value in two ways—as a feed for our stock, and a means of renovating the soil. Very few of us appreciate the manurial value of clover roots to the soil. It has been carefully estimated by our best authorities that an acre of clover which will cut in the neighborhood of three tons will contribute an equal weight of material to the soil in the roots. Clover sown on a heavy clay field rotating with corn and wheat, will improve immensely the texture and fertility of the soil.

I say hay should form the basis of our calculations for feed. Of course we supplement hay by corn fodder and by straw; we can feed these out in connection with concentrated food, and get almost as valuable returns as we can by feeding good hay. An acre of stover, or of corn fodder as we call it, after we have removed perhaps fifty bushels of corn from the land, is about as valuable to feed to our stock as an acre of grass. Consequently corn is a valuable plant to raise. You have your corn to feed to your stock and your stover also, and you are getting more from the acre than if it was in grass.

The question often arises, how to keep the boys on the farm. A smart boy is not going to stay on a farm if his father raises an acre of corn and half an acre of potatoes and keeps a cow and a pig, and nothing more; there isn't enterprise enough there for the boy; he has got to be where he can enlarge, where he can branch out. But you cultivate ten, fifteen or twenty acres and there will be something to do, something to develop his enterprise, and the boy is going to stay on the farm. Give him a chance to develop his energies and his enterprise at home and you will keep him.

It used to be the practice on our New England farms to raise roots to a considerable extent for feed. We had to abandon that. It has been demonstrated by careful practical operations by our most careful farmers, that it will not pay to raise roots to feed stock in the State of Maine. Corn is a better crop for the purpose. As a food crop the raising of roots is not to be encouraged at all.

The question in regard to the respective values of ripe and unripe hay has been under discussion for the last ten years. I used to think that early cut hay was the best. I got the impression that it was more palatable. But it has been proved conclusively by our most careful investigators that there is more nourishment in hay that has arrived at a certain state of maturity than in that which has been cut so very green; there is more butter in it and more fat in it. It has been proved by practical feeding experiments.

MR. HARRIS. I hardly know what I can say upon this matter, although there is a great deal that may be said. The question of what forage plants to raise, and to what extent to raise them, depends in a large measure upon what the farmer wants to feed to, and for what purpose. We have been talking upon the subject of dairying this forenoon, and perhaps for a few moments we may as well look at this question in the light of what the farmer should raise for the feeding of dairy cows. The grass crop is considered the king of crops in this State, and that is what we are after; but to raise the grass crop we ordinarily, and, as I think, necessarily raise other crops. You have, for instance, a piece of what we call worn out grass land that is not producing a ton to an acre. The kind of a mowing machine that you want to put into that field, in my judgment, is a plow to turn over and prepare it for a future crop. In doing that there are various ways. One man will turn the ground over and fertilize it, and pulverize it, and sow it back to grass seed, that is a short cut to get back to a good growth of grass without as much labor as would be required by some other methods. The ordinary course among good farmers is rotation — a crop of corn or potatoes, and then some kind of grain, and so around from one crop to another. That is accepted as correct practice among good farmers — we know one crop should succeed another of a different kind while wheat, corn, potatoes or any particular crop, will grow well one year, it takes from the soil elements that go to make up that crop. Another crop which

does not call for the same elements in like proportions will best succeed it. In deciding what he shall raise, a man wants to take into account what he wants the crop for, and what kind of stock he is going to keep. If he is in the dairy business it depends a good deal on the character of his farm how he shall treat it. If the farm is all susceptible of being plowed and cultivated, then it is a question for him to determine whether he will let his stock "cut their own fodder" entirely or whether he will supply it partially, by soiling. If a portion of the farm is of that character that it cannot be cultivated, of course that can be devoted to grazing; it is the only use you can make of it, but with what we call tillage land, which is capable of being cultivated, my own opinion is that soiling, partially at least, for the dairy, is the best way. I think I have demonstrated to my mind very plainly that I can carry two head of cows upon my farm under that system where I could one under the other; and the income from the dairy is very much larger than where you rely upon all grass land.

Question. I would like to ask you if you have had any experience in the raising of Hungarian.

MR. HARRIS. I was going to remark that I have now some half dozen acres of winter rye, sowed some six weeks ago. A large part of that I expect to feed to my cows in the green state, and by the tenth or fifteenth of June I expect to take the rye all off the ground that has not been previously fed, and cure it for hay, and follow upon the same ground with sweet corn for fodder, or with Hungarian. I have done both. If the ground is in good condition you can take off a heavy crop of rye and still later in the season take off a heavy burden of Hungarian. I like Hungarian as a renovating crop. People ask me frequently when they see it growing, a rank and heavy crop, if it is not exhaustive to the soil. That is the kind of a crop I like to raise; I like to raise these exhausting crops that require something to boom them. When you fertilize so as to raise these big crops you are going to get something from the soil. In that way you get two large crops off the same land if it is in good condition.

Question. What is your method of fertilizing where you get two crops?

MR. HARRIS. The foundation of my fertilizers is barn yard manure. Invariably I apply it on the furrow and cultivate in. My cultivation would be perhaps deeper than the old style of doing it.

The harrow runs pretty deep and mixes the manure with four or five inches of the surface soil.

Question. How do you apply your barn yard manure?

MR. HARRIS. I never intend to handle it but once. If quite early in the spring, and the men have nothing else to do, they take it and spread it directly upon the land. I have been in the habit of doing my plowing in the fall where I am going to have crops requiring fertilizers, and in the spring I have it spread from the cart as fast as it is hauled out. I find that the labor account is a very serious one, and I make it a point to utilize to the best advantage the labor of my men; and, instead of handling this over so many times as many of our farmers do, I take it from the carts which carry it from the cellar and spread it directly upon the furrows in the fall, winter or spring, as I haul it out. I incorporate it with the soil in the spring when I come to cultivate.

SEC. GILBERT. You speak of Hungarian as a forage crop; what amount of that may be secured per acre?

MR. HARRIS. It is not a very difficult matter to raise three tons of cured hay. I want to say that a ton of Hungarian hay, cut at the proper time, and well preserved, as you preserve your early cut hay, is as good a ton of hay as I get into my barn. In my judgment, the proper time to cut it is after it is fairly headed and before it begins to seed. There is nothing that my cows like better than this hay, and there is no kind of hay that gives better returns in the milk pail. It is valuable feed in the green state for cows. It is one of the best fodders I raise.

Question. What would be your opinion as to how we should dispose of these crops, whether they should be put upon the market in the crude state or converted into beef or dairy products?

MR. HARRIS. I should answer most emphatically, that it is wrong to sell hay from the farm. I would say, as a rule, that a farmer should never sell a ton of hay from his farm. If he does it, he wants to live where he can return a sufficient amount of fertilizers to offset it from outside of his farm. But my observation has been, that where a man sells hay, no matter where he lives, his farm very soon shows what he is doing; he forgets to put the money that he gets for his hay into fertilizers to go back to his land. The consequence is, he is year by year selling his farm. A farmer should make it a point to manufacture all the crops of his farm into some finer form, in the shape of butter, cheese, pork, beef or something

of the kind, and never sell the raw material. If you ask what I would feed them to, my answer would be this: That entirely depends upon the man, and upon his location. One man may be situated so that he can run a private dairy to advantage. I name that first, because I believe it is the best branch of our business that any farmer in this section can take up. He can put all the products of his farm into the concentrated form of butter, and carry nothing away from his farm in the shape of fertility. Butter carries away practically none of the fertility of the soil. A man selling milk must remember that he is carrying away something that he must return an equivalent for to keep up the fertility of the farm. When that man feeds largely on cotton seed meal or shorts, he may return an equivalent or more for what he carries off, but if he does not, in some way, return an equivalent, he is eating his farm up by his mistake. My advice to a man in this locality would be, if he cannot have the advantages of an associated dairy, to have a private one. Butter making now, with the conveniences that may be had for doing the work, is very different from what it was a few years ago. The work of the woman of the house is very much abridged. In fact, you can run a private dairy, really, without the women doing anything about it, and that is the case in many private dairies at the present time. In my own practice the men milk, and they handle the cream entirely. The milk is set in deep cans and drawn off, so there is no lifting about it. My advice is, if a man is situated so he can run a private dairy, that he should make a specialty of that, bearing in mind that the best is half sold when it is made; first class butter will sell without drumming up customers.

THE CHAIRMAN. I see Mr. Alonzo Libby of Saccarappa, is present; he has had some experience in silos and we should like to hear from him on that question.

MR. LIBBY. My experience has been very satisfactory thus far. I built my silo in 1879. This is the fourth year I have had it. I was very much pleased with it the first winter, better pleased the next winter, and last winter I was better pleased than I was before, because I knew better how to preserve the ensilage. I do not think it would be so profitable for a man with four or five cows; but a man with fifteen or twenty head of cattle will find it very much to his advantage to ensilage corn fodder. I feed hay morning and night and ensilage at noon. I have scales right by my bin and feed just forty pounds to each cow in full milk, every noon, and less to young stock

and dry cows. Where I used to feed four to six quarts of shorts, or two or three quarts of meal, I cut that down one-half.

Question. To what extent do you think it would be well to feed ensilage?

MR. LIBBY. I feed about one-third ensilage and two-thirds hay, and I would not advise to feed any more ensilage than that, although I have seen nothing to indicate any evil results from a larger proportion. I put in about 150 tons of ensilage, and I think it saves me from thirty to forty tons of hay; that has been my estimate, though I have never tested it exactly; but to my mind it takes the place of grain to a considerable extent, and there is where the great advantage comes in. And it takes the place of roots. In the old country they raise great crops of turnips and mangel-wurzel, but I find it too much work and too expensive to raise roots for stock.

Question. How much does your ensilage cost you, packed in your silo?

MR. LIBBY. I have never figured it out fully, going into the details, but I estimate that it costs me $2.50 per ton, and I think three tons of it are worth one ton of hay; I don't go right along with it as I do with hay, but take it leisurely.

MR. I. N. DEERING of Waterboro'. I came here to hear and not to speak; but will tell you my experience in silos. My building is on the side of a hill, so that although I go in on the front side on a level with the ground, the sill on the back side is some six feet above the ground. The silo is 30 feet long, 14 wide and 12 deep. I set my horse power and cutter in the building and let the ensilage fall into the silo as it is cut. I tread this in with horses, putting on two horses and one man. My experience is that the closer it is trodden the better. When I get this nearly full I put the stone on for weights. I take the ensilage all out upon the back side. The cost of it is about $2.50 a ton. I feed two small fodderings of hay and the rest ensilage. Last winter I fed it to my cows, and I fed four yearlings and a pair of three year old steers on it part of the winter. When I began to feed it I kept an account of the milk I was getting. I had seventeen cows then, and they increased three cans of milk in a week.

EZEKIEL DEERING. For some years past I have been trying to learn of others. There is hardly any stock but what will pay, but I find it pays to select good stock and feed it well. I can

afford to buy hay at ten dollars a ton to feed to my stock; I can get my money back besides the manure. I have been thinking of putting in a silo, but I want to learn whether on the whole it is profitable or not; they seem to all recommend it, but I want to be sure whether it will pay. I know twenty years ago it was commonly believed that cutting hay up fine would save it; but that has gone out of practice. I want to wait and see whether this silo will stand the test of experience. I don't want to discourage it, but I want it proved, and if it proves on the whole to be a good thing I want the benefit of it.

THE CHAIRMAN. I see the Johnson brothers are present; they have recently opened a silo, and we would like to hear how they like their ensilage.

MR. FRANK JOHNSON. Ensilage with us is satisfactory. I shouldn't know how to get along without it now. Our cows will eat it in preference to hay every time. I feed it once a day, about one-third, the same as Mr. Libby does, and I do not feed so much grain as I did without it by two quarts.

SEC. GILBERT said:

Mr. Chairman: Before this question is finally laid aside, I wish to call attention to one or two points. One gentleman says that this question seems to be all one way. I beg leave to differ from such a conclusion. Another gentleman says that he wants to know the whole of this question of feeding; so does the world, but it is not known yet. This whole subject of feeding stock is involved in mysteries which are not yet fathomed. We are just beginning to study critically the subject of feeding. The subject of ensilage is well worthy of the most careful attention. There are principles involved in it, as in the feeding question in general, which are not understood as yet. The men who never fed ensilage have been proscribed from the right to express opinions on the subject. Now I would not anywhere or at any time press an opinion of my own upon the attention of anybody; we have too much of opinion and too little of facts, and the facts are what we are after—the principle involved rather than the simple matter of opinion. As to the economy of the silo in the hands of many of the men who are practicing that system of feeding there is not the slightest question; it is established beyond the limits of question. So, too, has it been in the hands of the men who have spoken here; no one would question the correctness of their conclusion that they are finding it

a profitable fodder, and that they are getting good results out of it. Yet that does not by any means prove that it would be the highest economy for the general farmer to adopt the silo. There is one error that we have allowed to go on altogether too much in regard to the matter of feeding, and that is, that our country dairymen engaged in butter and cheese making have been accepting the methods and practices of the milk men as the law of feeding for the community at large. It is all an error. The highest economy for the milk men may not be the highest economy for the butter and cheese men. I formerly supposed that their practices were applicable to the community at large and were entirely reliable; but a system of experimentation was one of the greatest surprises to me that I ever encountered. There is no question but that a milk man finds the greater economy in feeding the early cut fodder, as compared with the late cut fodder, because it gives a larger flow of milk, and milk which passes in the market for good milk, and is entirely satisfactory to his customers. When the butter and cheese dairymen take that same fodder and compare it with the fodder which has been discarded by the milk dairymen he finds that his amount of butter and cheese increases on the fodder where the milk dairymen's quantity of milk decreases. The butter dairyman is after butter, and the milk dairyman is after milk. One is based on the solid contents, the butter contents of the milk, and the other is based upon the quantity of milk. There comes in the difference of their work, and we must not allow the milk men to make our doctrine for us.

The falling off in the milk, as spoken of in practice where the hay fodder was substituted for the silo fodder, may not be a falling off in the solid contents of the milk by any means. One of the facts that we have established in butter and cheese dairying is that when our fodders are in the most succulent condition, we get our largest flow of milk, but at that time it takes very much more of that milk to make a pound of cheese or butter than it does later in the season. Our cheese factories the past season have required in some cases, in some localities, more than ten pounds of milk to make a pound of green cheese, while in the month of October a pound of green cheese has been made from a very small fraction over seven pounds of milk. The reason of that is that in the month of June the cows feed on food of a succulent character, and while a larger flow of milk is realized, it does not contain so large a per cent of casine and the butter fats as it does later in the season, when the feed is maturer and of a dryer nature.

Another thing; when we first began to look up this question of butter making, and study it carefully and critically, the supposition was that the root crop, especially the beet and mangel-wurzel, promised the most profitable returns. We read English works and found that English farmers were raising 40, 50, 60 and even 75 tons of mangel-wurzel beets to the acre. If mangel-wurzel beets, grown in anything like that quantity to the acre, could be fed to cows, and from that feed butter could be made and put upon the market at the fancy prices which our best dairymen were receiving for it, it was simply unlocking a mine of wealth to farmers. Beet fields began to multiply among our butter makers. There was to be realized a golden harvest never before known. What was the result? The feeding of beets had no appreciable effect on the quantity of butter made, and one, and in a few instances two, years' experience in the matter of attempting to make butter from roots was sufficient to cancel the great expectations of the butter makers. So the beet fields have disappeared forever from the agriculture of the State where butter dairying is pursued, as a fodder to be relied upon for that business. The same holds good with all roots.

Ensilage is simply fodder preserved in the green state. There is no question but it has been preserved in the forms which have been stated, and the results stated secured from its feeding. But no one claims that there is any more feeding value in fodder preserved in the silo than fodder in the same condition as taken from the field; it adds nothing to put it into the silo; it simply preserves it in its green and succulent condition. The better the methods adopted for its preservation, the better the condition in which it comes out and the better the results coming from it. This matter which has been dwelt upon, of the necessity of care in packing and pressing, is all reliable and is based upon scientific principles; the air must, as far as possible, be excluded from it, and the heavier the pressure, the better is the fodder, because fermentation is arrested.

There has been some allusion to figures. As a means of storing and preserving fodder corn, it would seem that the economy of the silo at this time must be accepted by all. It may however be questioned whether for general adoption here in this State the fodder-corn crop can be recommended as of the highest economy. A crop of corn grown for the grain — yellow corn or sweet corn — furnishes the resulting fodder without cost, and it would seem, then, that as a method of obtaining fodder of this kind this is the method

to command attention. This in no way conflicts with the economy of the silo, for green corn stover can be preserved in this manner as well as fodder-corn.

One comparison further: Is it settled that fodder-corn is a cheaper fodder for the general farmers than hay? It is estimated that three tons of ensilage will take the place of a ton of hay. These three tons of ensilage at $2.50 per ton will cost $7.50. Now I ask you who own these good grass lands in the town of Gorham and the other towns of Cumberland county, what does a ton of hay cost you? Not what is it worth in the market. It is one of the laws of mathematics that a comparison must always be between like numbers. You must not take your ensilage at cost, and your hay at the market price, because there can be no comparison drawn there. If you take your ensilage at cost you must take your hay at cost. Of course the subject of the cost of a ton of hay is a broad one, and there is not time to investigate it here, but there will be time enough for you to investigate it at your own firesides, and during the winter at some of the farmers' meetings.

So, while the silo has its value, it is certainly a question whether it can be recommended to the general farmer who is engaged in butter and cheese dairying in a State where hay is no higher than it is in the State of Maine. I would not cast one single reflection upon the conclusion that is drawn by these gentlemen. There is no question about the correctness of their statements. There is no question about the utility of the silo under certain conditions, but there is a question about its general utility. With these large farms all through this State is it an object to concentrate crops upon a limited area, unless you can raise them at a less cost thereby. If it costs us less to raise a forage crop on two acres than to raise the same on one acre, and we have an abundance of acres, why should we concentrate upon one acre?

ALONZO LIBBY. The Secretary has spoken of beets. Nothing in my experience that I have fed makes poorer milk than beets fed in large quantities to cows.

EZEKIEL DEERING. I asked one of my neighbors if he fed shorts, and he said no, he would rather raise beets than to buy shorts. In my experience I have found it better to feed milch cows and young stock shorts than beets; I would rather put the money that it would cost to raise beets into shorts.

I. N. DEERING. I have been in the habit of raising some roots. Some years I have raised two thousand bushels. I got a large amount of milk when I fed a large amount of beets, but I guess it was pretty thin. I keep a lot of young cattle, steers and heifers and dry cows that you might call store cattle, and I have some pretty poor quality of hay that I feed fifteen or twenty head on, and they generally come out looking very well by the addition of turnips and beets; I find those roots a profitable crop to raise for them. The cost of my turnips is only five cents a bushel in my root cellar, and my beets about eleven cents.

The evening was devoted to the subject of fruit, and George B. Sawyer, of Wiscasset, Secretary of the State Pomological Society, spoke on the subject of "Fruits for the Farm," after which the meeting adjourned.

Institute at New Gloucester.

A second Institute for the county was held at New Gloucester Lower Corner, January 17, by invitation of the citizens of the town. There was a large attendance throughout the day and evening. The hospitality of the people was extended to all present, and every possible effort was made to make the occasion both pleasant and profitable. It was a model Institute. A large and well trained choir led by Mr. Nicholas Rideout, Mrs. A. L. Richards presiding at the piano, furnished excellent music for each of the three sessions.

The town is specially adapted to two of our staple products, hay and fruit. So a session was arranged for each. The subject for the forenoon was, "Cultivation of Bearing Fruit Trees," and W. P. Atherton of Hallowell, was the leading speaker, assisted in the discussion by the fruit growers of the county.

The afternoon was devoted to a lecture on

HOLSTEIN CATTLE.

By ALONZO BRADLEY, Lee, Mass.

There is no subject of greater interest to the farmer, at the present time, than that of dairy husbandry. During the last few years, there have been long and spirited discussions with reference

to the comparative merits of the various breeds of imported cattle. One breed is advocated on account of its merits for the dairy, another for the production of beef, another for butter, and still another for general purposes. Is it to be wondered at, that beginners have confused ideas in regard to the matter? The result of these controversies is in the concession, that each class possesses peculiar and distinct excellence, which gives it a particular character of its own. I do not propose at this time to discuss the character of the different breeds. They each have their representatives here. But to give some views and facts, in connection with the history and quality of the Holstein or Dutch breed of cattle, gathered from years of observation and experience. This will be done with no feeling of hostility toward the other breeds.

The manufacturer is not satisfied with the slow process of a quarter of a century ago, but now, for bone and muscle, substitutes the one hundred horse power steam engine, capable of driving the machinery, day and night, at double the former rate of speed. The enterprising farmer, also, in this age of progress, will not be satisfied to accomplish just what his father accomplished and no more, but requires all the modern improvements in farm machinery, and in the dairy business he demands a cow of double capacity and endurance, a living machine, that will convert his farm products into milk and beef, an animal that will economically assimilate the largest amount of raw material in a given time. This animal or breed is the most valuable, and will always be in the greatest demand.

Advancement is the order of the day in the arts and sciences, and is no less so in matters pertaining to the interests of the dairy — a consideration of the different breeds, which particular breed is the best adapted to our changeable north-east climate, our hilly, dry pastures. Then follows the all important question — What cow or breed, possesses the largest number of points which go to make up an animal so constituted as to best meet the requirements of the farm for all purposes? Only a few years ago the idea was scouted, and is by many at the present day, of having a breed for general purposes, that is, milk, beef and butter, united in the same animal. The fact is, that this combination is more common than is generally supposed. This prejudice, under existing circumstances, is fast giving way. The last ten years has developed great changes and improvements in the right direction — in dairy husbandry.

Efforts have been made, and with decided success, to raise the standard of our dairy stock by importations of high bred animals from other countries. The importation of Holstein or Dutch cattle was made in 1625, but after a few years breeding they were so mixed with the native cattle that the purity of blood was lost. In 1810 there was another importation of a bull and two cows. The pure breeding of these was also lost through carelessness and negligence. Mr. W. W. Chenery of Boston, in 1852, made an importation of one cow. The extraordinary good qualities possessed by this cow led to a further importation, in 1857, of a bull and two cows. Then followed other importations by different individuals during the following years up to 1878, at which time there were two hundred and thirty-four thoroughbred females in the United States. This included all the imported ones and their progeny. Since then the importations have nearly doubled each year. These cattle have attracted unusual attention, partly owing to their real merits, and also to a certain extent, owing to the large stories told, and fabulous statements made of their enormous products.

The question was asked, "Does this breed possess the qualities claimed?" I will here give a few statements which have been made in support of their claims. Lucien B. Trow, dairy farmer of Hardwick, Mass., says: "After an experience of over forty years in stock breeding, I am compelled to express the conviction that the Holsteins are the best cattle for all purposes I have ever known." Mr. Miller of Peterboro', N. Y., informed me that "at the time he was attending the Agricultural Academy at Eldena, Europe, they were making a series of experiments in feeding milking cows. Exact records were kept for the summer season of six months. It was found that the average yield for the Ayrshires was 2247 quarts per cow, equal to twelve and a half quarts per day. The Holsteins' average was 4437 quarts per cow, equal to twenty quarts per day, or nearly double that of the Ayrshires'. With the Ayrshires it took nine pounds of hay for a quart of milk; the Holsteins five pounds. The Ayrshires consumed three and three-tenths pounds of hay to the 100 pounds live weight, the Holsteins two and eight-tenths pounds. Similar experiments were made with other breeds as compared with the Holsteins with nearly the same results.

About this time there appeared in the "Country Gentleman," a statement made by L. S. Hardin, as follows;

The Short-Horn dairy of Harris Lewis for one year, yielded, on an average, 252½ pounds of butter per cow.

E. T. Miles' Ayrshire dairy yielded .....273 lbs. per cow.
E. Burnett's Jersey " .....281 " "
O. Bronson's Native " ....302 " "
H. C. Hoffman's Holstein " .....350 " "

This gives the Holsteins ninety-eight pounds of butter per cow more than the Short-Horns. These dairies consisted of not less than ten cows each. He further says, "The Holsteins have amazed me."

The Holsteins have not only maintained their former reputation, but have continually gained in popularity by their increased products from year to year, and also in demonstrating their adaptability to surrounding circumstances, and their capacity to meet the requirements as a first-class animal for general purposes. Some of the statements made of the recent tests show to what extent the breed is capable of producing.

Mr. Cary R. Smith, of Iowa City, made to me this statement in regard to his Holstein cow Mink: "During ten days she made 29 lbs. and 6 oz. butter. Her highest milk record for one day, was ninety-one and a half lbs. Her year's milk record was 16,629 lbs." This gives an average of 27 qts. per day, for ten months, the usual time a cow is in milk. F. C. Stevens, of Attica, N. Y., states that "his Holstein cow Echo, gave in 365 days, 18,120½ lbs. of milk," an average of 25 qts. per day, for the year. The Holstein cow *Mercedes, owned by Thos. B. Wales, of Iowa City, during her recent trial of 30 days, produced 99 lbs. and 6 oz. of unsalted butter. Holstein butter from the dairy of Smiths & Powell took the first prize at the New York State Fair. It was entered under an assumed name to prevent the possibility of partiality or prejudice. In my herd I aim to test every cow for my own satisfaction. The result of my last year's test of a lot of two-year-old heifers was all that could be desired. There was only one but what made at the rate of ten lbs. and over of butter per week. Their cream was so firm that with the thumb and two fingers, the whole could be lifted from the pan at once. Before turning out to grass my dairy was reduced to three cows that were four years old and over. One, a four-year-old, made 2½ lbs. of butter per day, her highest milk record being 72½ lbs. Another four-year-old gave 66½ lbs. of milk per day. I anticipate from her an easy record of 75 lbs. this coming season. A six-year-old cow gave 82 lbs. of milk. Most of the time since last

* Since deceased.

spring, I have set my milk for the creamery in twenty quart cans, that stand in ice water, the night's milk for twelve hours, and the morning's for twenty-four hours. My dairy was mostly heifers. The cream collector stated that my dairy of Holsteins had a record of greater depth of cream than any other dairy in his route, except one dairy of Holsteins. By actual test it made more butter per inch by 1-16 than the average dairies of the creamery, and produced per cow more than double the quantity of milk. Owing to the jealousies and prejudices of the owners of other breeds, as they have seen their successful rival in the Holsteins, they have almost compelled the owners to prove their cattle by the most severe tests, in every particular where they claimed superiority, and I am pleased to say, they have proved themselves equal to the demand, and in many respects have exceeded the anticipation of their owners, and to the great annoyance of their opponents.

Mr. Conrad Wilson, in "The Dairyman," says: "The marvelous development and progress of the dairy interests of the country within the last few years well deserves the attention it has attracted here and abroad. There is no other industry of the same magnitude that has more elements of importance, in a national view, or that fore-shadows more valuable results to farmers. In the United States, there are 12,500,000 cows. Rating the annual yield per cow at 5,000 lbs., equal to eight qts. per day, for ten months, will give a total of more than 37,000,000 tons of milk each year." There are other facts that have made the American dairy what it is to-day, one of the greatest marvels of our food production. The point of interest that is just now, perhaps, more than usually prominent in dairy husbandry is the question of breed, and especially in regard to the highest results attainable in milk and butter. However the opinions of practical men may differ on this question, one point at least is conceded—that the Holsteins clearly out rank all others in milk. A few figures will make this plain, and will tend to show what miracles of production are possible when the right conditions are made sure. The following are a few of the best yearly rates of production for the Holsteins, and fairly indicate their relative capacity, as compared with other breeds. Smiths & Powell's cow Aaggie, has a year's record of 18,004 lbs., equal to 30 qts. per day, for ten months.

Aaggie 2d, with her first calf, has a record of 16,564 lbs. per year, equal to 22 qts. per day. Yeomans & Sons report a yield of

17,746 lbs. for a heifer with her first calf. This is equal to 29 qts. per day.

14,164 lbs. is reported as the average for Smiths & Powell's herd, equal to 23 qts. per day. The average of all the above is 26 qts. per day. Now for the records of other breeds.

The highest record for Short-Horns is 12,870 lbs., equal to 21 qts. per day, for ten months.

The Devons' highest record is 11,960 lbs. for one year, equal to 20 qts. per day.

The Ayrshires record 11,654 lbs., equal to 19 qts. per day.
The Natives " 10,950 " " 16 " "
The Jerseys " 9,528 " " 15 " "

The average of the above is 18 qts. per day.

Showing a difference of 8 qts. per day, in favor of the Holsteins.

I have given only a small portion of the numerous facts and figures, but sufficient to show the possibility of the modern dairy cow, and also to prove conclusively the value of the Holstein to the farmer and dairyman. They cannot help being interested in such facts, and I hope it may wake them up to a greater sense of improvement. It is a lamentable fact that most of the dairies of the average farmer are far below that standard of excellence which can be easily attained by a little extra effort and attention rightly applied. It is one of the first considerations to select foundation stock from the right breed of cattle—those that will be the most profitable under existing circumstances, always keeping in view the desired improvement. Get good blood, give a dry warm stable, feed and care for it well, and it will yield a pecuniary return, which the common stock or natives have not given and never will give.

Probably there never was a time, when such energy and enterprise was shown for improving dairy stock, as at the present. Enterprising breeders throughout the New England States, who possess the means, are fast working into thoroughbred Holstein stock. Others of less means are using a full blood bull for producing grades to supersede the multitude of scrubs, representing almost every shape, size, variety of color, and horns, from the longest, down to no horns at all—just as fast as the common farmer proves their economy and greater profit. The use of a thoroughbred bull for common or native cows produces wonderful results, the influence of the male being so much greater than that of the female. The bull in nearly every case will stamp his progeny completely with the characteristics

of his breed. Indeed, this very marked result has tended to prevent, instead of to stimulate the further attempt at improvement, by encouraging farmers to breed directly from half or three-fourths blood bulls, claiming that in every respect they are as good, and some would say even better than their sires. The bull should be chosen from a family of decided good milkers, and for fresh blood a continued resort to the thoroughbred bull of the same breed will be attended with a great improvement of the progeny, in each successive generation. The desirable qualities of the male will become hereditary in proportion to the frequency of the repetition. I would without hesitation, and in fact prefer, to use a male with his own progeny and would advise using a thoroughbred bull with his dam under certain circumstances, provided they were healthful and free from any hereditary taint. By following a few simple rules, an intelligent breeder will never be in doubt as to what the offspring of certain parents will be. We have a climate, soil, and feed capable of producing as fine dairy animals as are found in any part of the world, and there seems to be nothing lacking but a greater dissemination of well bred animals that are adapted to our circumstances, and a practical knowledge of the principles of breeding, to make our cattle sought for at remunerative prices for breeding purposes. I will acknowledge, that from various causes there have been failures, but these are easily accounted for. One reason is, the system of breeding is so often conducted in such a loose and unscientific manner that it is impossible to establish and keep up the reputation of the herd to a high standard. But perhaps the greatest obstacle in the way of success is the lack of perseverance and close attention to the subject in its details. This applies as well to all departments of agriculture. On the other hand, in almost every instance where an intelligent and wide-awake farmer has undertaken this business, success has followed. To-day our breeders can show the finest dairy stock in the world, and for general purposes, it is a proven fact, that the Holsteins stand supreme.

The larger portion of our cattle have been, and will always continue to be, raised by farmers of moderate means engaged in mixed farming. They require an animal that will bring them the largest returns for the feed consumed. Upon this subject Judge Jones of London, Ohio, in an article on "The Cow of the Future" in the "American Dairyman," says: "First of all, a farmer wants milk and butter. He must have both. But if a breed be found

that will yield a larger amount of milk than any other, such a breed would not be chosen if the individuals were unprofitable as beef producers, because the average farmer, in the grass and grain growing districts of the United States, who rears cattle at all, must have a sort that will yield a fair profit as a butcher's stock, and this for the reason that one-half the progeny will be males that must be sacrificed, if they cannot be profitably grazed and fed for slaughter; and also for the reason that this branch of his business is necessary to the maintenance of the fertility of his land. Hence intelligent farmers select their cattle with reference to their excellence for both these purposes. They want cows that will yield a profitable supply of milk, and at the same time of such form that they may be profitably fed for beef. For the prevailing breed of the future in this country it is obvious that excellence for both these purposes must be assured as the standard of merit."

We often hear it said that the dairyman does not care for carcass and flesh. This is an erroneous assumption. The man who keeps cows to supply milk for market, is not, and cannot afford to be unmindful of the returns his cow will make when sold to the grazier or butcher when no longer profitable for the dairy. This is indeed a most important item to be considered in the profits of the dairy business. The revival of the dairy interest during the last few years is a hopeful sign for the farmers, and is surely stimulating the raising of superior dairy stock to meet the constantly increasing demand. There has been and always will be a desire among farmers to own cows of superior milking qualities, as they are well aware that only through this line can be accomplished the most profitable and economical results. The cow being the most important factor in the success of the farm has never been appreciated according to her full value, neither has the farmer given that care and attention to her breeding and qualifications which he should. Improvement in stock stimulates a corresponding improvement in the different departments of the farm, and it usually follows, other things being equal, that these will keep pace with the care and quality of the stock.

I have stated what I think of great advantage in dollars and cents. The farmers as a class are naturally slow in adopting improvements, even in the economy of labor. Since the mowing machine was introduced, a whole generation has passed away, and

in many cases it is left for the children to grasp this improvement which the fathers, owing to the lack of enterprise or through prejudice, would not. This applies to other improvements as well. For an illustration of this, one need not go outside of his own county. To speak plainly, the farmers, as business men, are a slow and doubting class in reference to any improvement for their benefit, while on the other hand the manufacturer spends a fortune annually in order to increase production and economize labor. I do not fear for any farmer who prudently takes risks to meet the demands of the day. The risk is more in not being equal to the demand. If we are not wide-awake and improving, we shall be left. Alas, how many are left! One farmer sows bountifully and also reaps bountifully, while his neighbor sows sparingly and reaps sparingly. This is the law of Him who formed the universe and changes not.

Perhaps it will not be uninteresting to give an outline of the country in which the Holstein cattle are bred and reared. This will give a better knowledge of the circumstances and influences which for hundreds of years was brought to bear in building up and establishing the character of this wonderful breed. Landing at the lower extremity of Holland I had occasion to take the train through its entire length. The whole country has the appearance of having been redeemed from a quagmire, and in North Holland — the land of the Holsteins — by the persevering efforts of the people, the ocean has been driven back by means of dykes or dams, and their country reclaimed to one of great beauty, resembling an immense grazing farm, or fine large park. Nearly every residence has its neatly kept walks and borders ornamented with a profusion of shrubs and flowers artistically arranged. The houses of North Holland are all similar in style, one story high, and built of hard burnt brick, with an average foundation of fifty feet square, and the four sides of the roof coming to a point, forming a steeple-like appearance forty feet high. This building is a combination of tenement, barn, stable, carriage-house, creamery and cheese factory, and is well adapted to the use for which it was built. The cattle industry is the leading one, and is better for the community than a gold mine. The energies of the whole household, from the little three-year old up, are centered in their cattle. In fact they have more attention shown them than the children of the family. During

the year 1882 there were seven thousand cattle shipped to foreign countries for breeding purposes. These cattle were taken from a territory of about five miles wide, and fifteen long, in the Province of Friesland, North Holland. These were sent principally to Germany, Russia, Italy, South America, Africa and a small portion, only about one in twelve, to the United States.

When in the stable, the cattle invariably stand with their heads to the wall, on a brick platform raised two feet. In front of the cattle in place of the manger, is a shallow trough made in the brick work for water. By taking up a brick in the floor and making a hole, a never failing well of water is formed. The cattle are carded and brushed each day and petted like the house dog. There is a cord over the cows, running from beam to beam the entire length of the stable, and from this another cord for each cow, extending down and fastened to the bushy part of the tail. This prevents the tail from getting into the filth. While milking, the cow's hind legs are always tied together, and every precaution is taken in order to carry out the idea of neatness and cleanliness about the dairy. A gentleman's sitting-room is no more tidy than their stables. These are often used for cooking room, living room and sleeping room. When the cattle are taken from the pasture in the fall, they remain in the stable during the entire winter, and when they leave in the spring for the pasture, it is for the whole season. Owing to the chilling winds and frequent fogs and rains during the spring and autumn, there is good reason for the practice of blanketing their cows. It is not uncommon to find dairies that will make during the best of the season six pounds of cheese per cow. This cheese is pressed into balls weighing four pounds each. I saw hundreds of them placed on shelves behind the cows. Agents are through the country every week buying their cheese and butter for the London, Paris and Liverpool markets, where it brings the highest prices, in competition with the best products of the most noted dairy districts of other countries, not excepting the Channel Islands butter. I examined a large number of dairies and found the butter of remarkable uniformity in appearance. It was rich in color and unequaled in fine flavor. This is the "Standard butter for all the large markets." The Hollanders breed from the offspring of their best milkers, and such as do not suit them for the dairy are fattened for market. The result of this system, followed for more than two hundred years, has been to

fix those desirable qualities which are unequaled by any other breed.

The land is divided into sections from two to twenty rods wide, by canals running parallel. Every road and street has its parallel canal. The land is perfectly level and barren of fences, weeds, bushes and trees, except those planted for shade and ornament. The canals answer the purpose of drainage, boundary lines, roads and fences. They are a sure prevention against unruly cattle. The American cow, I fear, would hardly be confined by this boundary, but, possessing the genuine progressive spirit of our people, would go through if drowned in the attempt. The soil is a dark clay-loam deposit, the accumulation of ages, and not a stone in all North Holland large enough for a boy to throw at a squirrel. Haarlem lake, which but a few years ago covered an area of 56,000 acres, has been pumped into the sea and now this territory of rich deposit is converted into valuable farms. The Zuyder Zee, which covers an area of 500,000 acres, I was told is to be dammed at a point where it is only fifteen miles wide, then pumped dry and converted into arable land. North Holland is a land of dykes, ditches, canals and pumps. These pumps are worked principally by windmills. From a single point of observation I counted over one hundred. The country's very existence depends upon the faithful, persevering use of these instruments in throwing the constantly accumulating water into the sea which is dammed by an embankment twenty feet high. In driving on the top of this embankment or dyke, the great ocean dotted with vessels lies off nearly level on one hand while on the other the farms lie twenty feet below, and a stone could be easily dropped into the chimney top if one was at hand. I enquired, "What is your protection in a military point of view? As you are surrounded by sea and ocean, you are constantly exposed." The reply was "When the enemy got well into the country, we would open the dykes and let the sea drown them!"

It has been well said that "Holland is a Paradise for cows," and if to have plenty to eat, water always convenient to drink, luxuriant pastures in summer, warm housing in winter, with kind and tender treatment from their owners, constitute a paradise, then they certainly have it in Holland. Where can we find a country in the whole world, that affords such advantages for the full development of a dairy cow, and where they have been kept for generations under these same circumstances? Can it be wondered at, that this

remarkable development of docility in the disposition, has become inherent? This is one of the most valuable qualities in a superior dairy cow. If the facts were known, I think we would find that it requires more food to sustain the nervous energy of a cow, than it does her life. I had an opportunity of visiting the dairies of a large portion of this country, which is less than 1000 square miles, where the Holsteins are natives, and saw the cattle under the different systems of management. Those dairies that were best fed, including the young stock, showed remarkable development in growth, and beef qualities, putting on flesh and fat equal to the Durhams. In the fall of 1881, I imported a yearling Holstein bull. After my cattle were released from quarantine he was weighed, and during a trial of sixty days, showed a uniform weekly gain. The whole amount gained was 455 pounds, equal to seven and one-half pounds per day, and five pounds to spare. "Experiments without number have proven that Holsteins take on more flesh with the same food, than any other breed of corresponding weight." In regard to their dairy qualities, I am satisfied from observation as well as experience, that the cows have no superiors. First, they are good feeders, and have the power of assimilating their food when in milk, for the making of milk, and when dry, for flesh and fat. Second, their superiority as to quantity and quality of milk needs no further recital of facts or figures from me. It has already been established, and is a conceded fact among dairymen. Then, again, their vigorous constitution adapts them to the varied circumstances which a dairy cow is obliged to experience. The size and symmetry of form is no small item in their favor. These are capable of development to a degree that is surprising. Experience has convinced me that one of the essentials for a first-class dairy cow, is size (medium size). However much the idea is derided, it remains a fact still. The idea is quite prevalent, also, among farmers, that a large cow consumes a proportionately large amount of food. This is a mistake, as has been proven by facts and statistics drawn from accurate experiments. And from further experiment it has been proved, that from a given quantity of food the Holsteins will produce larger quantities of milk, butter, cheese and beef, than any other breed. The idea that a cow cannot be profitably used for all these purposes will soon be exploded, and it must be universally acknowledged that the Holsteins are possessed of qualities fitting them for yielding the highest profit, both at the shambles and in the dairy. The sum of the whole

matter seems to be this: The coming cow for the farmer and dairyman should combine the following characteristics: Quantity and quality of milk, size, beauty of form, and a mild, quiet disposition. The Hollanders claim that they have produced just such an animal, and the facts seem to bear them out in their claim. The Holstein cattle have been in this country a dozen or more years, and have proved themselves well adapted to all the variations of our climate, soil and circumstances, and during their few years of trial here have gained ground more rapidly than any other breed on its first introduction. The time has now come, when the other breeds are gradually giving way to make place for the Holsteins. I hope some of us may see the time when every farm shall be ornamented with fine specimens of these wonderful cattle.

The lecture was followed by a full discussion of the subject by the many dairymen present, and many questions were asked in regard to the characteristics of this breed of dairy stock, and their adaptation to the prevailing conditions among us. Much further information of great value was brought out.

In the evening the Secretary of the Board repeated the lecture given in Androscoggin county on "Comparative Profits of Butter Making and Milk Selling," after which an adjournment was declared.

OXFORD COUNTY.

Institute at Peru.

The first Institute for Oxford county was called to meet at Rockomeka Grange Hall, Peru, December 11. The Board has never before held an Institute in that part of the county, and was at this time invited there by the members of the Grange, who assumed the local responsibilities of the meeting. The weather was unfavorable, but notwithstanding this there was a creditable attendance throughout. Orchestral music was furnished day and evening. Free entertainment was provided for all. Mr. A. P. Walker presided. Of the members of the board there were present Messrs. Hammond of Oxford, Holbrook of Sagadahoc, Wiggin of Aroostook, and also, as assistant lecturer, Mr. Francis Barnes of Houlton.

MACHINERY IN CORN GROWING.

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

Every succeeding year is showing more plainly than before that corn growing outside of Aroostook and Washington counties is an important industry to our State. Rapidly from year to year is its area extending, as farmers are learning from their experience the profits of the crop. Twenty years ago the idea took possession of many of our most successful cultivators that the crop was costing more than it was worth; or rather that it was costing more to raise it upon the farm than its cost in the market. Acting from this conclusion the area devoted to it fell off for quite a number of years. Persevering farmers, however, having strong faith in the utility of the crop, and knowing well its value as a preparatory crop for others to follow, still held to it, and claimed they could not afford to let it drop out of the list of farm crops. Meanwhile new methods and improved practices came into notice. Those thoughtful farmers who are ever on the alert for all new methods bringing greater profits through reduced cost caught at every improvement, and put it in practice. Others seeing the good works of their more confident and persevering neighbors

caught the spirit of improvement, and followed the example set. The growing of corn was again gaining in favor, and the area devoted to the crop began to expand. The State Board of Agriculture, whose recorded transactions prove that it has in all the past been active in bringing about advanced steps in our agriculture, in 1877— see volume for that year — introduced the subject of "Indian Corn" as a special topic to engage the attention at the annual winter meeting held at Newport. The subject was treated at some length by several members of the board. Although this treatise was by no means exhaustive of the subject, yet it has been widely read both in and out of the State, and has contributed much to the high appreciation abroad of the character and the value of the work of our board. The wide discussion the subject then had, and the more deliberate reading it afterwards received by those interested in the subject, have had a wide influence on corn culture among us. The result is that corn growing in Maine has been revolutionized in the past fifteen or twenty years — revolutionized in its methods, revolutionized in its profits, and revolutionized in its appreciation as a profitable and an indispensable farm crop. The old methods of manuring, the old methods of cultivation, and the old methods of harvesting have all gone with the flax brake and the hatchel to be remembered as things that were. With those old methods have been laid away the old-time cost of the crop which brought it into disrepute.

Under the old system the actual cost of growing corn in our State was from seventy-five cents to one dollar per bushel. While an occasional farmer would secure an accidental crop below the cost of the smaller sum named, there were many of our good farmers who claimed its cost fully one dollar the bushel. Now, with our present knowledge, the average cost from year to year, throughout the corn-growing sections of the State, is below fifty cents per bushel. In our most favorable seasons some of our most successful growers are producing it at a cost of but a trifle more than half of the figures I have named as the average. J. E Shaw of Hampden, an ex-member of the board, in the year 1878, kept an accurate account of the cost of his crop, in every item of expense, and found it to be thirty-two and one-half cents per bushel. This low cost represents the extreme of successful corn culture, and is not referred to on the supposition that others attempting to reach like success should be disappointed if their crop should figure a trifle higher. Still, we

have many farmers who are now reducing the cost of their crop close down to that of Mr. Shaw's.

In the spring of 1881 the Turner Patrons of Husbandry instituted a set of experiments among the brotherhood in town. Among them was an experiment in growing corn with an accurate itemized account of cost to be kept by the operator. Henry Turner, Esq., ex-County Commissioner for Androscoggin county, and L. H. Blossom, one of the Trustees of the Androscoggin Agricultural Society, entered the list. Mr. Turner's crop was grown under the unfavorable conditions of a small area, hard, rocky soil not well adapted to the crop, hand work throughout, and some of the old-time methods of manuring. Also he had not been a very warm advocate of the profits of corn growing. To his great surprise the cost of the crop was only forty-three and one-half cents per bushel. Since that time Mr. Turner has been an advocate of corn growing in Maine. Mr. Blossom's crop cost fifty-three and one-third cents per bushel. These statements are entirely reliable.

These illustrations are introduced only to show that even under unfavorable conditions the cost of corn grown on our farms is less than its cost in the market. Where grown in large area and by modern methods and practices, a handsome margin between cost and value is secured.

The reduction in the cost of raising corn as compared with former times is due, in good measure, to the introduction of implements calculated to work by team power. In the work of the Board of Agriculture in 1877, before alluded to, machinery in corn growing received but little attention. In fact, up to that time the greater success attending efforts in this direction were chiefly traceable to more careful culture and higher manuring which secured more reliable and larger crops, rather than to a reduction of cost through machinery. Only six years ago the machines and implements used at the present time by our extensive and most successful corn growers had attracted so little attention, that we find only one of them mentioned in the papers read, and in the discussions following, at the meeting at Newport. Machinery is now so inseparably connected with the business that it is proposed to examine some of the different patterns of implements with a view to a better understanding of our wants on the one hand, and a better knowledge of where and how those wants may be supplied on the other hand.

Pulverizers.

The importance of good ploughing as effecting the further preparation of the land is recognized more at the present time than at any former period, although with all the attention given to the improvement of the plow by mechanics in the last twenty years, it is a question whether a plow is now made which is doing *better work* than some of the best made at that time. There is no doubt but there are more good plows made at the present time, and less poor ones used, than formerly.

It is in the pulverization and thorough working of the soil in preparation for seeding, where great improvement has recently been made. The importance of thorough work in this direction is now generally appreciated by the better class of farmers. Consult our more intelligent farmers at this time as to the essential requisites to successful cropping, and invariably they will include, "Thorough working of the soil." Many a time have I been surprised in interviewing farmers, at the uniform stress laid upon this preparatory work. Without dwelling upon the philosophy of this we will pass to consider the implements with which to do the work.

It is a fortunate thing for farmers that inventors and mechanics are ever on the alert to supply our needs. Hardly do we ourselves become aware that there is a deficiency existing, before a score of inventors are vieing with each other to furnish the best possible implement for the work. Indeed, our prospective wants, even, seem to be anticipated, and when we have become educated to the fact that we need the work, there stands the implement, already made, with which to do it. In no field of invention has there been greater activity than in pulverizers for the preparation of plowed lands for seeding.

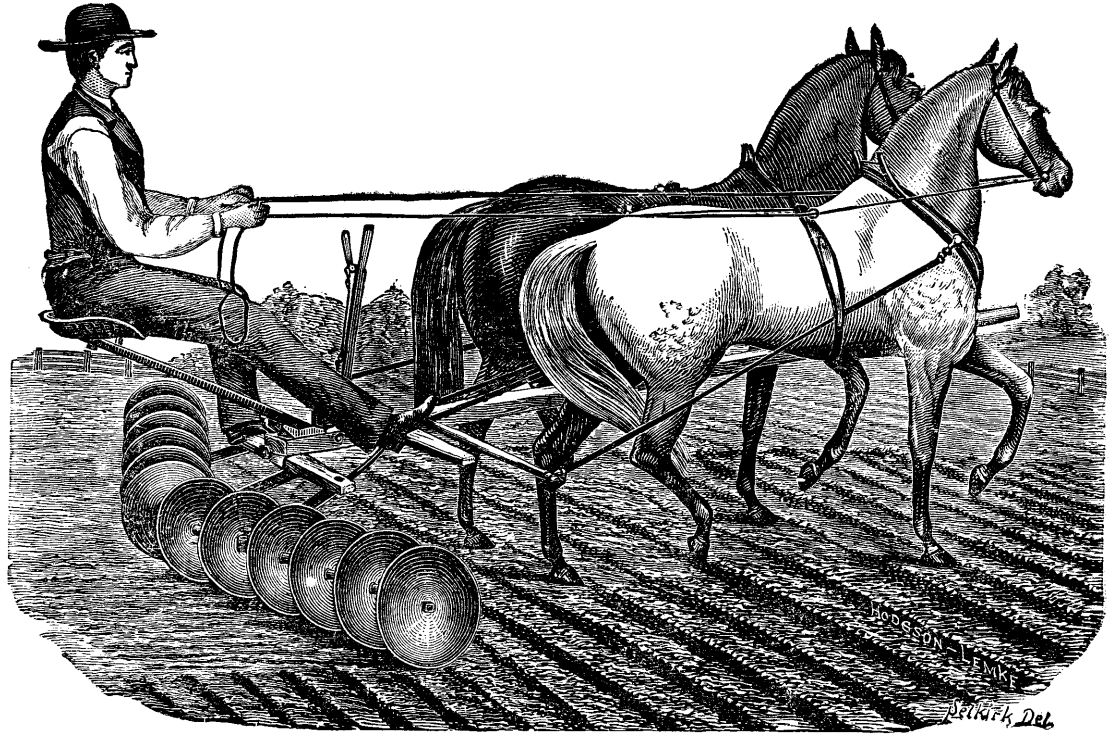
In doing this kind of work there are three distinct operations called for:

1. A *loosening* of the overturned and compacted furrow to the full depth called for by the character of the soil, and allowed by the depth of soil turned by the plow.

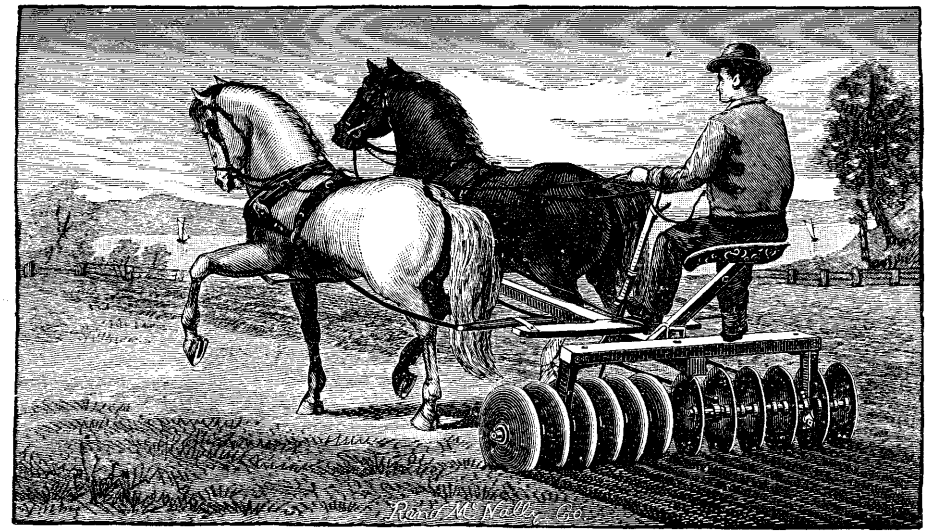
2. A *pulverization* of this mass of loosened soil to the finest possible condition.

3. A *levelling* of the surface.

It would doubtless be desirable to do all this with one operation and with one implement, but up to the present time it has not been found practicable. The implement has not yet been invented which



LA DOW DISK HARROW. (See Page 119)



CORBIN DISK HARROW. (See Page 119.)

can do the best possible work in each of these several directions with one operation. The difficulties in the way of this it is not proposed to discuss here ;—we are now dealing with implements.

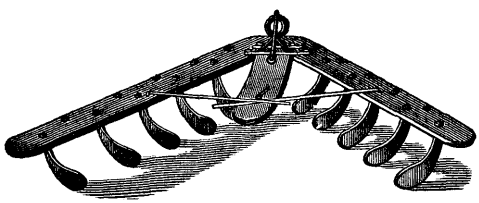
For loosening the soil there have been inventions almost without number, and most of them possessing some merit. To do this work effectually there must be, not only a power to penetrate the furrows, but on compact and possibly moist soils there must be a lifting movement. This is indispensable to a good pulverizer. All that do not possess this principle may as well be left untouched ;—there are better implements in the field.

The disk harrow, either in the form of La Dow, the Randall, or the Corbin, possesses the power of loosening, in all kinds of soil — moist, compact or sandy, in a remarkable degree. For the work of penetrating, lifting, loosening and stirring the soil, it stands unrivalled. A sixteen inch steel disk harrow will do more work of this kind in a compacted soil with the same draft, than any other implement ever taken to the field. The movement of the pulverizers through the soil, being the revolution of a disk, the draft is lighter with the same depth of work than is that of any of the "cultivators," so called, whose "teeth" are drawn through the soil. The disks running on an angle, not only lift the soil, but also throw it over after the manner of a seed plow. This makes it a most excellent implement for mixing manure with the soil and covering it beneath the surface.

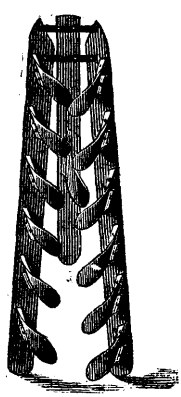
But the disk harrow is not a perfect implement — that is, it will not do everything that is wanted in fitting land for seed. *It is not a leveler*, and *it does not crush a lumpy soil* so fine as is desirable. It is not enough to loosen and stir a soil ; farmers have now learned that it should be made fine, and we have always known that it was desirable to have it smooth. So a good smoothing harrow must needs follow the disk harrow wherever it is used.

As to the comparative merits of different makes of the disk harrows, perhaps some farmers may think there should be something said that may be taken as a guide to purchasers. Admitting that this Board of Agriculture aims to instruct and inform the farming public, yet if any individual member of it should undertake to say which of the three harrows named was the best, you would rightly conclude that he is not reliable. The loosening and pulverizing power of each is precisely alike. If then a farmer buys either, he has a good implement, and he need not give himself trouble about the others.

There are other competitors for favor in this class of implements. Among the many pulverizers of the cultivator class which are now offered for sale, the Fillebrown Cultivator is now taking the lead.

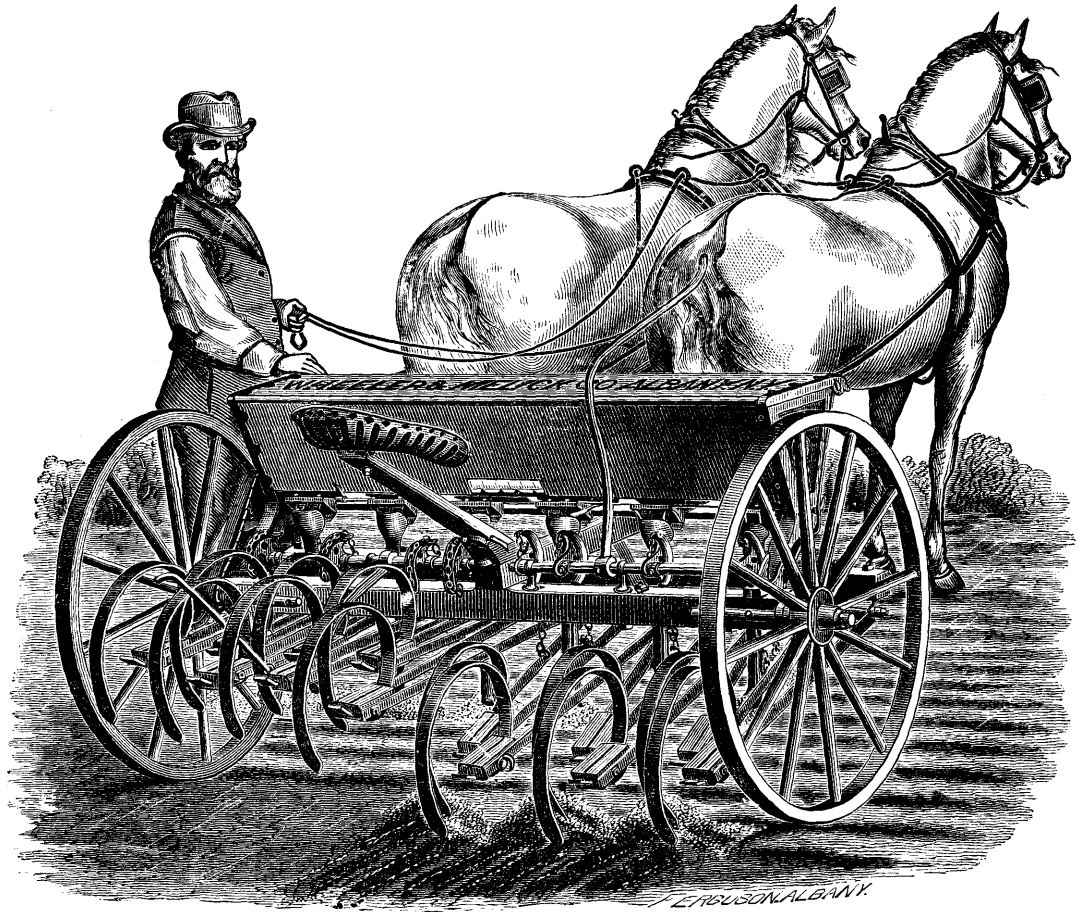


The principle involved in the construction of the pulverizing teeth does not differ essentially from that of the Shares Cultivator and others of that class which have long been in use. While the others have been made of cast iron, these are cut and shaped from thin steel plate, and are light and strong. Like all pulverizers of this class, however, they are low posted and will not work so deep as the disk harrows; and are more liable to have the soil adhere to them if driven through moist places, as sometimes is necessary. They are light to handle and can be closed up into a narrow compass when not wanted for use. Also, they are a low cost implement. They are manufactured by several different parties in the State.



For two years past farmers have had urged upon their attention a spring tooth pulverizer known as the Perry Spring Tooth Harrow.

The teeth are made of tempered steel, one and a half inches wide, and turned in the form of a half circle, with one end pointed to enter the ground. It has been introduced quite extensively into different sections of the State, and diligent inquiry has shown that it has been doing good work. Many farmers are enthusiastic in praise of its work. Its action is entirely different from the disk harrow. The curve of the teeth causes it to draw into or "crave the ground" as it is familiarly termed, while the springing motion shakes, pulverizes, and levels the surface. It is thus more complete in its work than the disk, but that it is better as a deep-working loosener of the soil is not claimed. It is also a heavy draft implement.



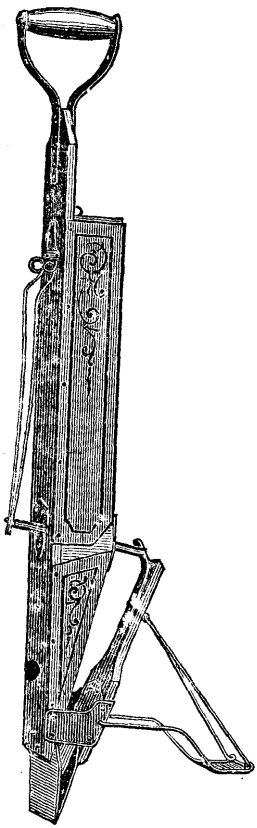
EUREKA SPRING-TOOTH HARROW. With Broadcast Seeder Attachment. (See Page 121.)

In the spring of 1883 this harrow was presented in a modified form, mounted on twenty inch trucks with a seat for the driver. This better satisfied the popular demand for something to ride, but the work could have been no better. Last autumn it was shown at the fairs by T. Frank Davis, of Portland, for the manufacturers, in still another form and mounted on forty inch wheels, and an independent action for each tooth. In this form it is known as the Eureka Spring Tooth Harrow. It appears to be a better tool for work than in its original form of simply a drag harrow. But it should always be remembered that the proof of an implement is in the field. This appears so well that I have arranged to give it a test in my own fields, after which I can speak of it more confidently. Certain I am that it will be valuable to follow the disk harrow, and complete what that is unable to do.

The Acme Harrow with cuts of which our agricultural papers have been so long ornamented, has never been used to any extent in our State, and has seldom been seen among us in a more tangible form than as a picture. In the few cases where it has been tried, it has been laid aside, and the parties have not great recommendation for it. There is no doubt but it will do good work as a surface clod crusher and leveler, where that alone is wanted.

The Whipple Spring-Troth Sulky Harrow manufactured in New York and sold by Whitmore Bros., Boston, seems to be a cross between the Acme and Eureka. It is of easy draft, and at the State Fair in 1883, did good work as a leveler and a surface pulverizer.

I have dwelt thus much upon pulverizers and harrows for the reason of their great importance in the round of implements used in corn raising. It is no use to undertake to carry on the growing of corn through the use of machinery alone unless one begins aright. Beginning right means a thorough and complete loosening and fining of the soil before planting the seed. Slack, imperfect work here means defeat all the way through. Good work can only be economically done with good tools.



PLANTERS.

An improvement over the former methods of hand dropping and hand covering is found in the Automatic Hand Corn Planter. This little planter would find favor with those boys and girls who have found it so dull work to drop corn by hand day after day through the planting season. The metallic jaws, holding enough corn for a hill, at the foot of the machine, are plunged into the mellow earth where the hill is wanted and, tipping it forward, the attached foot strikes the ground and opens the jaws, allowing the corn to drop out and remain in the hole made by the machine. Lifting it to carry forward to the next hill the mellow earth falls in and covers the corn. The working of this little machine is all that is claimed for it. Its objections are at once apparent—it is a hand planter.

Horse Power Planters.

With the fields smoothed for the mower and other implements, why do we longer plant corn by hand? The old-time "manuring in the hill" has gradually given way to the broadcast application of the barn manures, till what was once thought indispensable to success is now practiced in a few isolated cases only. So hand planting is going with it, and still the corn grows and brings forth the full corn in the ear as bountifully and as surely as before. It is now being learned that corn can be planted with a horse-power machine better than by hand planting; it is planted evener, and comes up evener and better. This may sound strange to some of our old corn planters who have been so careful all these long years to cover all the corn themselves because they could not trust the work to hired help. There's the rub! You can't trust it to hired help, and be sure of its being well done by hand; but you can trust it to a machine and have the work done alike all through. You have to properly adjust the machine, when you may send it to the field in the hands of others, or go yourself as you like.

Ross' Corn-Planter.

The Ross Horse-Planter has been in use in the State for several years, but to a limited extent till within the three past years. It is manufactured by Ross & Co., Northfield, Mass. It is cheaply made, and thrown together in rough shape, and sometimes with the working parts badly adjusted. It is an imposition upon farmers to offer so roughly made a machine upon their favor. Farmers like to have a well finished implement or tool of any kind, and they are willing to pay for it. But this machine does its work well. The first corn-planter brought into the State, so far as I can learn, was of this pattern, and was bought by Peter Lane, Esq., of Leeds, Androscoggin county, some years ago, and has planted large fields of corn on his farm each year since. It is still "as good as new." The machine furrows, drops the corn, and a fertilizer too, if you want, covers and rolls it, all in one operation and as fast as a horse can travel; and will plant an acre, doing all the work, in an hour to an hour and a half. The furrower opens a furrow two inches deep, and is prevented by a guard from opening it any deeper. It is a rotary planter and drops the corn into the furrow eleven, twenty-two or forty-four inches apart at your pleasure, distributing the corn as all rotary planters do through perhaps six inches in the hill. A pair of adjustable wings gather the earth back over the furrow, covering the corn, and a roller at the rear rolls it down. The fertilizer is dropped from a hopper at the same time, and is covered with the corn. There is no difficulty from its coming in contact with the corn. The fertilizer used must be fine and dry or it will not deliver evenly and freely. If you have a damp fertilizer to apply it must be dried by spreading and airing; if coarse, it must be sifted. In my own planting I have used both the Cumberland and Bradley's without difficulty. This difficulty attaches to all planters alike, and the reason of it is apparent. The fertilizer is discharged through a small aperture, and must be if you would be limited to a small amount. If the fertilizer has coarse bits mingled with it, of course it will not flow through evenly. If it is moist it soon adheres to the aperture and chokes it up. A knowledge of this, however, will enable one to forelay so there need be no difficulty. Corn planted in this way will come up evener and better than with ordinary hand planting. In my own practice I first go over the field with a marker taking four rows at a time, which requires but a few minutes'

time to the acre. Running the planter on these markings gives the rows equi-distant.

From the example of Mr. Lane, machine corn planting has extended, till a large part of the corn in the vicinity is planted in that way, and with the Ross planter. One planter does the work for a whole neighborhood, the owner going out and planting by the acre. Seventy-five cents an acre is the usual price for doing the whole work.

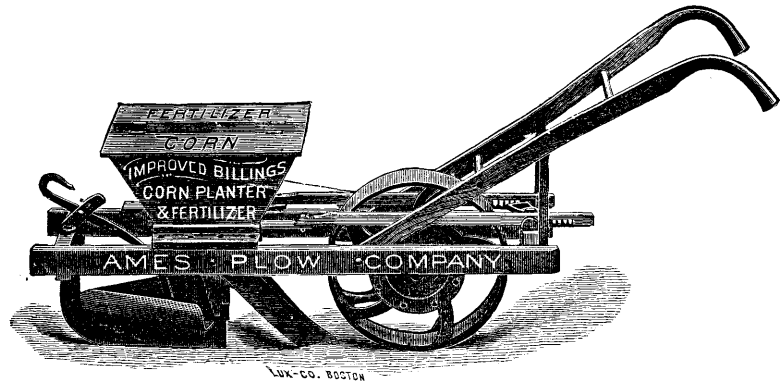
Another planter which has been sold in this State is known as the Billings' Planter. George B. Haskell, Lewiston, sold fifteen of this pattern in the spring of 1883. It is made by the Ames Plow Company, Boston. The working of this machine is very similar to the Ross in its several parts of furrower, dropper, coverer and roller. It also drops a fertilizer with the seed. It is substantially made, well finished, and sells at the very reasonable price of fifteen dollars.

J. M. Allen, Turner, who bought one of these planters last spring, writes as follows: "I planted about 30 acres of corn with the Billings planter last spring. It planted the corn evenly, and it came up and grew as well as if covered by hand. I used several different kinds of superphosphates with the machine, but all of them packed around the slides which do the dropping, causing it to miss many hills and do uneven work. I was afraid the fertilizer coming in contact with the corn in the hill would kill it, but I never saw any corn injured from this cause. I intend next year to use all my barn manure broadcast, and plant to corn with the planter, sowing the fertilizer on the drill by hand after the corn is up.

I have not only given you my own opinion in regard to the planter, but it is also that of nearly all the farmers in this vicinity. They like the way it plants the corn, but all agree that the fertilizer side of the machine must lie idle till it can be made to do its work more reliably."

Mr. C. H. Cobb, Poland, says: "The Billings planter bought last spring is a perfect corn dropper and planter. It did not miss a single hill on six acres. But it does not drop superphosphate as well;— it will clog some and it drops the fertilizer too near the corn. I planted half of mine without fertilizer and put it on after the corn came up."

J. O. Kyes, North Jay, an ex-member of the board, has used a Ross planter two years and writes as follows:



BILLINGS' CORN PLANTER. (See Page 124.)

"The first year I used a Ross planter I planted my own corn and that of two or three of my neighbors. It gave perfect satisfaction both on rocky land and land free from rocks.

The present year, the second I have used it, I have had all I wanted to do with it; and those for whom I have planted all say that it will plant better than they can plant by hand. It drops the corn in drills, and does it very evenly. It dropped the fertilizer well last year. This year I had to repair it before it would work. The wire attached to the valve which drops the fertilizer is too weak and did not hold the valve in its place. Also the spring at the top of the fertilizer hopper is too weak and does not hold the valve firmly enough. With those two parts repaired it worked well again.

If the planter were made in a workman-like manner I think it would be one of the best there is in the market, for it is simple in its construction and does its work equal to the best."

There are several other patterns of corn planters shown by implement dealers, but so far as I can learn they are making no headway with sales among the farmers of this State. The Farmers' Friend planter offered by T. B. Everett & Co., Boston, is wanting in several essential points possessed by the others, hence no space or time need be taken in describing it.

The Keystone planter plants in hills, and two rows at a time. It takes a pair of horses to draw it and a man and boy to operate it. Since we have learned it is better to plant corn in drills we do not want a check-row planter.

There are still other planters that might be described, but nothing will be lost from this omission.

Cultivators.

In the hoeing of the corn after it is up, machinery is equally important if we would raise cheap corn. The many weary days of hand hoeing must be set aside for the quicker and less expensive, but equally efficacious, methods of team culture. That pat expression so long in use, "Hoe your own row," has already driven boys enough from the farm and now no longer applies.

For the early stirring of the surface the Thomas smoothing harrow is now being used quite generally where corn is planted with a horse planter. This is a harrow made with a large number of small, round-pointed steel teeth, set inclined backward. When at its work

it stirs or scarifies the surface, never running deep. As soon as the young weeds start, and before they get deeply rooted, this harrow is run over the field lightly the same as if no corn was there. The corn being planted two inches deep and a little below the surface, as it usually is when planted with a machine, is not disturbed by the harrow, while all the young weeds are destroyed by this surface stirring. This harrowing may be repeated till the corn is five or six inches high.

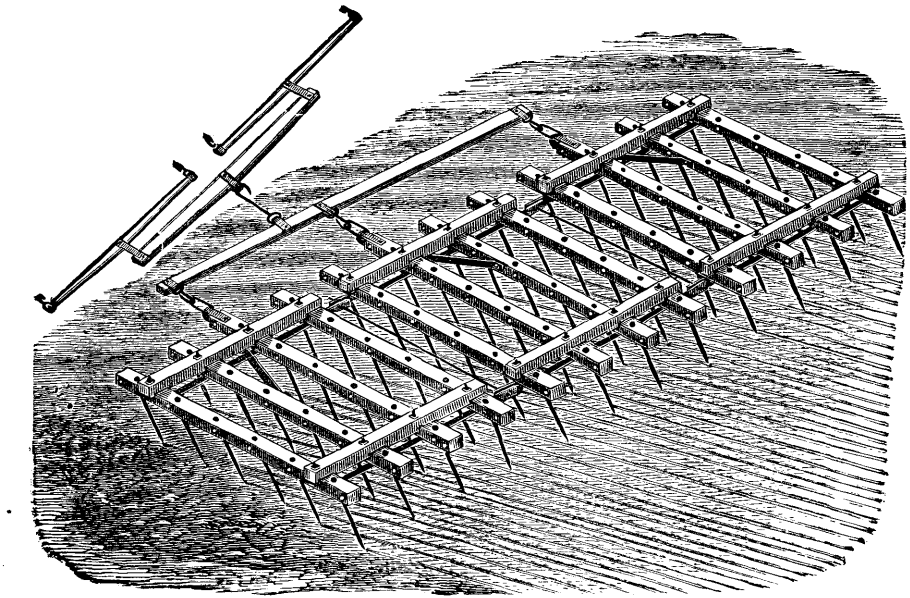
This treatment will not answer where the land was not previously well prepared. It must be passably well smoothed, the rocks so large that the harrow would drag them over the corn must be picked up, and the plowing so well done that no large sods are left upon the surface to choke the harrow and drag down the corn.

Following the use of the smoothing harrow a good horse cultivator is needed to run between the rows of corn. It is not a seriously expensive work to depend entirely on the small cultivator. Especially where the fields are small it may be found quite as well to leave the broadcast harrow out altogether. A cultivator with a wheel to gauge the depth both forward and at the rear, may be run so steadily that it can be guided entirely up to the line of corn, and where done on either side, there is nothing left for a hand hoe to do. The Ross cultivator, made to accompany the Ross planter, is a good implement for this purpose. Where the land was thoroughly prepared before planting, only surface working is wanted. Most of the many cultivators are objectionable in that they are constructed to dig, and that deeply, and the teeth are too broad and do too coarse work. Fine and shallow and all over the surface, is the kind of work called for in modern methods of corn hoeing. Most of the cultivators in common use, if gauged by wheels so they would run even and steady, would do passable work, but would do better still with finer teeth and more of them. There are many makes and the work of all is nearly alike.

There is, however, a recent innovation, in the form of an adjustment of the Perry spring tooth to a cultivator for work of this kind. Up to the present time they have been tried only by a few individuals, but such testimony as we have is highly in their favor.

Corn Husker.

One implement further is wanted—a corn husker. Here it seems our wants have not been anticipated. With the press of other work in the autumn days it is an expensive job to husk the large



THOMAS SMOOTHING HARROW. (See Page 125.)

crops of corn that are now grown. This work cannot be delayed till winter, as in the West, but must be done in season.

There are parties now at work perfecting a machine for doing this work, and with good promise of final success. With machinery to do the work all through, and with commercial fertilizers to extend the barn manures, the production of corn is destined to still further increase among us.

Institute at South Paris.

A second Institute for the county was held, by arrangement with the Oxford County Agricultural Society, at South Paris Grange Hall, December 12. The attendance was large, and the interest manifested indicated that the farmers of that section of the county are wide-awake to every instrumentality offering assistance in advancing the interests of practical agriculture. Free entertainment was furnished to all in attendance.

Ex-Governor Sidney Perham presided, and on taking the chair expressed the deep interest he still feels in agricultural affairs, and especially in the prosperity of the agriculture of his native county of Oxford; and gave some reminiscences of his own experience in farming, including a financial exhibit which was complimentary to farming as a business, and to his early industry and his tact and skill as a farmer.

HOW TO MAKE POULTRY PROFITABLE.

By Dr. G. M. Twitchell, Fairfield.

Let me ask your attention for a little while to the question of "Practical Poultry Raising, or How to Make Poultry Profitable." Fifteen years' experience, during which time an itemized account has been kept of all receipts and expenses, has satisfied me that there is no one branch of stock breeding so profitable, if rightly conducted, as this of poultry raising for eggs and market.

Perhaps some may say my account is faulty, in that I have bred what is sometimes called "fancy stock," but bear this in mind, that in what I have to say to-day we will strike that out of the account and base our calculations entirely on market prices, prices which

anyone can realize. Before entering upon the discussion of the question in detail, I want to call attention to the importance of keeping an itemized account of receipts and expenditures, for this, as I hope to show, plays an important part in deciding the question of profit or loss. By it many a man would be saved from ruin and bankruptcy. At first it seems a burden, but soon becomes a habit, and the task a pleasure.

In farm operations, as everywhere, we find chronic grumblers, declaring that this and that branch of agriculture is attended only with loss, simply because they do not realize what comes in, and remember only what goes out. Keeping no account they spend beyond their income, and so declare that farming means ruin. One of the great causes of failure has been this seemingly little thing of which I am now speaking, and I dwell upon it, and would emphasize it, because it is of but little use to engage in poultry raising, expecting to realize the profit that is so easily obtained, unless there is kept an accurate account of receipts and expenses. Keep an account with each department. Let there be a horse, cattle, sheep, pork and poultry account, and charge in each what is paid out for each, and credit the receipts. Farming in this way would soon become a systematized business, and the farmer as thorough an accountant as the merchant. They would then be brought into closer contact with business circles and be better buyers and sellers in market.

So first of all I would lay down as necessary to success in poultry raising, the keeping of an accurate account which could be balanced at least twice a year, and the summary of the several items examined to see wherein there was chance for greater saving. We must remember that we are now dealing with a question which has not so much to do with the dollars as with the cents, and the saving of a few here and there tells the story at the year's end.

We forget how great is the revenue derived from eggs and poultry in this country and overlook the details of a business which in the aggregate is so large.

The Cincinnati Enquirer says: Statistics for 1882 show that the value of the poultry produced in America exceeds the value of either hay, wheat, cotton, or dairy products. The figures for that year are: Wheat, $488,000,000; hay, $436,000,000; cotton, $410,000,000; dairy products, $254,000,000; poultry, $560,000,000. Notwithstanding these large figures, poultry is about the only pro-

duct we do not send abroad, but find a market for it entirely at home. France and England send large quantities of eggs to this country, for which there is always a ready market. In 1882 we received 13,000,000 dozen from foreign countries, and still we are not satisfied. Let the hen be respected."

Mr. A. M. Halstead, as good authority as we have, in an address before the Indiana State Poultry Association, last winter, gave the following statistics:

In the State of New York, according to the last census — 1875 — the value of the poultry owned in the State was in round numbers.... .... $3,000,000
Value of poultry sold in 1875 1,800,000
Value of eggs sold in 1874. 2,500,000

New York City alone now consumes over 20,000 car loads of live and dressed poultry yearly. The capacity of a freight car is about ten tons; to be within bounds, allow only one-half that amount to a car load—five tons; and we have a total of 100,000 tons, which at ten cents per pound (another low estimate) gives us $20,000,000 as the valuation of the poultry consumed every year in New York City alone.

It also consumes over 300,000,000 of eggs, the value of the latter at average New York prices being $8,000,000.

The number of eggs produced yearly in the whole of the United States is upward of 9,000,000,000, valued at $240,000,000.

The value of the poultry consumed in the United States is estimated at $300,000,000 per year. The total of the two items is $540,000,000 per year, representing the value of the poultry and eggs consumed yearly by the people of the United States.

It is with the details of this business that we have to deal, and being all producers or consumers, we are interested to know how we can produce the most with the least expense.

Let us consider the steps necessary to success, and which bring failure if neglected, trusting that something may be said which will provoke discussion, and further the interest of the meeting.

I said a few minutes ago that it was only by giving attention to the details that profit could be realized, and this leads to a consideration of these details, which surely underlie all success.

The past ten years have witnessed a marked improvement in the market prices of eggs and poultry, and also in the quality produced. Here is one result attending or following the "hen fever." A re-

sult in which all reap the benefits. The small, inferior looking, blue-meated poultry has disappeared from our gaze, and, in its place, we find that which makes the sourest dyspeptic laugh with joyous anticipation. Because of this, prices have improved, and breeders are starting up, on the right hand and the left, anxious to know how they may reap a part of the harvest of gain.

To meet as far as I am able these inquiries, I am here to-day, so please bear with me if I deal with seemingly little things.

1st. Shelter for our fowl is an important matter and demands attention. Warm, dry, roomy quarters must be provided. Build these and don't allow your hens the free range of barn, stable and dooryard. Let them have their place and know it. Not only failure but disgust will be yours if they are allowed, as in too many cases in the past, to roost in hog-pen or carriage-house, on beams in the barn or over the cattle in the lean-to, or to roam at will over hay-mow, cellar and doorstep. If any are guilty of such practices let them end now for decency's sake, and hereafter provide pleasant quarters for your poultry. As eggs in winter are what are wanted, warm pens must be provided. Artificial heat is not necessary, though it can be made profitable. Build cheap houses, sheltered on the north and west, and open to the sun on the south. Make them warm, and by this I mean where the temperature will not fall below freezing point. These buildings need not be expensive. Fifty dollars will build and equip a house for one hundred hens. If you can build on the south side of barn or shed so much the better, as greater protection is secured against the west winds. In our climate it is necessary that we provide against extremes, and secure an even temperature so that the egg basket be always well filled. The increased expense of dividing your poultry into flocks of twenty will be more than compensated by the eggs produced. Arrange roosts so that all the droppings can be removed daily. A very few minutes' time with broom and pail will clean the floorings, and this, saved in barrels, and covered to prevent loss by evaporation, becomes one of our strongest and best fertilizers. Hundreds of dollars are paid out annually by the farmers of this State for commercial manures, when they have, drying up and wasting away, a more valuable compound in and about their own buildings.

For summer, build light buildings capable of housing twenty to thirty, and move them about the field or pasture as you desire, buildings that two persons can easily move where they please.

2d. The care we give our flocks will determine the question of profit or loss. Cleanliness must be observed first, last and all the time. The importance of this cannot be over-estimated. Fowls will not thrive in crowded pens, or with impure air.

Attention must be given to this in order that we may protect against vermin. These parasites must not have a lodging place in crack or crevice, on floor or in laying boxes. Good health is necessary to productiveness, and this cannot be secured or maintained in filthy, crowded pens. Whitewash often, change the hay or straw in your laying boxes frequently. Wash down your roosts with kerosene, and sprinkle sulphur over your hens. Provide plenty of dirt for dust baths, and so drive away the enemies that otherwise will steal the profits and leave you penniless.

3d. Of course the all important question is feeding. To feed enough and not waste, to sustain and increase the unnatural condition which produces so many eggs, and provide against the danger of fattening, requires skill and judgment, a judgment gained only by experience and a careful attention to our flocks. One fact must be borne in mind — that the present egg producing qualities of the several varieties, are the result of long years of careful breeding, and that we have only to neglect the laws by which these results have been obtained, in order for our fowls to revert to their original state. The past has shown us that we may do almost what we will with the animals under our care. The speed of our horses has been increared until "Two-forty" seems tame, and we begin to predict that the coming horse will trot in two minutes, A cow that would make a pound of butter a day was a wonder in my boyhood days, yet systematic breeding has so developed the milking qualities that two and three pounds a day is no uncommon thing. The size of our beef cattle and hogs has also been proportionately increased, and more rapid growth secured.

Our poultry breeders are keeping pace with the steady, forward march of the line. Size, shape, symmetry, beauty, all these have been secured, and the productiveness sustained, yes increased.

These improved conditions, so essential to our prosperity, are the result of years of patient study and judicious breeding. The habits of the animals, the peculiar qualities inherent in each, and the kind of feed best to develop the desired traits, these have been subjects of careful study.

Observe, then, the habits of the poultry, and feed to increase and improve, rather than diminish the desirable points wherein the greatest profit is to be found.

4th. If it be true that it is the "early bird that catches the worm," it is surely the early chick that sweeps the market, and this leads to the question of hatching. If your fowl have received attention, are healthy and vigorous, your pens warm and comfortable, the early spring months will find you ready for business. Nests must be provided. Sitting hens must have a pen by themselves where they can come and go as they please. Fresh water, corn and oats, and a good dust bath should be within reach, whenever they leave the nests. These nests should be constructed so that the hens can leave or enter without danger of breaking the eggs. Every few days they should be examined, and, if any eggs are broken, the remainder must be carefully washed in tepid water.

On the tenth day test all the eggs, and remove the sterile ones. These, saved, form one of the very best articles of food for young chicks. It is well to sit three or four hens at a time, for usually enough eggs will be removed, so that the remainder can be given to two or three, and the others receive a fresh supply. Within the past few years hatching machines, or incubators, have been coming into use, and, as now perfected, are capable of rendering great service. With these one need not wait the whims or fancies of the hens, but has a servant always ready to do his bidding. With moderately warm quarters and an even temperature they will hatch from seventy-five to ninety per cent of all the fertile eggs. They will not run themselves, but demand intelligent attention, without which one does not deserve success. All properly constructed incubators have automatic regulators attached, some worked by a battery, others by a metallic bar, which opens or closes the ventilator, and so secures an even temperature within. The expense of running one is very slight, and no more time is required than should be given the sitting hens. With these a greater number of chicks can be hatched, and they can be brought out at any season of the year.

I have dwelt upon this point because of its importance, and the fact that so many are asking information in relation to the matter. One thing must be borne in mind, that it is much easier to hatch chicks than to care for them after they are hatched.

If an incubator is used, and you have not an artificial mother, put the eggs into the incubator at the same time you sit a number

of hens. This secures a brooder at the proper time, the eggs under the hens hatching at the same time as those in the incubator. There are many machines advertised, some of which are good, and of service, and some are cheats. It does not always pay to buy an article because it is cheap. Examine well the merits of each before your purchasing and thus secure the best.

If chicks are hatched artificially, brooding covers must be provided under which they may nestle and find warmth. If hatched out of season, or before spring opens, green food must be provided, and this, too, must be grown under cover. Oats, rye or lettuce may be started in boxes, and so supply the food necessary for health and growth.

A gentleman in Waldo county told me a short time ago that he commenced hatching in February, and shipping in April, when ten to twelve weeks old, that he grew oats and lettuce for green food, and that his earliest chicks brought him 49 cents a pound net,—weighing from two and a half to three pounds each. The secret of this early growth lies in warm quarters, freedom from vermin, nourishing food, and green food daily. Without these failure is certain.

From the first day out of the nest, until brought to the block, there must be no neglect in this respect. The early chicks need nourishing and stimulating food. You have this in your sour milk —one of the very best and cheapest articles of food—your bread crumbs and hard boiled eggs, which have been saved from the sterile ones alluded to. These with green food must form the bulk of feed until old enough to take care of cooked food and grain. Feed often and a little at a time. Let nothing remain to sour in the feed boxes. We cannot over-estimate the value of green food for old and young. Cabbages, turnips, apples, onions, chopped fine, all these play an important part in promoting the health and growth of your flocks. Separate the chicks when three months old, and feed the males more generously of corn or meal that they may hasten to take on fat.

5th. The dressing of poultry is of more importance than one would at first imagine, and sufficiently so for us to consider a few minutes. In the larger markets, prices vary according to the looks, as well as the quality of the article or thing sold, and this is especially true of our poultry. Then dress cleanly, pick thoroughly without disfiguring—let them hang until cold, pack in an attractive manner, and you will always secure prices above market quotations.

Some may say, if so much depends upon looks, what breed shall I keep, and this leads to a consideration of the claims of each, so that those interested may judge for themselves.

One fact should be borne in mind, that there is no one breed that possesses all the good qualities.

If one embarks upon the enterprise wishing eggs only, then by all means procure some of the smaller breeds, the Leghorns, Polish, Hamburgs, Spanish or Houdans, for as long as eggs are sold by count — a most unfair law for both seller and buyer — so long will it be profitable to keep the smaller breeds. But if poultry is wanted as well as eggs, then procure the Brahmas, Cochins or Plymouth Rocks. It is claimed by those who are considered authority that a Brahma or Cochin hen will lay about 155 eggs annually, a Plymouth Rock 165, and a Leghorn, Hamburg or Polish, 185.

The Brahmas and Cochins when fully matured, are perhaps a little heavier than the Plymouth Rocks, but they do not mature as rapidly. They must be killed before three, or not until after six months old, in order to be in good condition, while the Plymouth Rocks grow rapidly, mature early, and are always in marketable shape, while the waste in dressing is less than with any other variety. The smaller breeds being more active are not so reliable to take on fat, and so may be fed with greater freedom than any of the larger varieties.

The question of hardiness, freedom from disease, expense of yarding and inclination to scratch, will help turn the balance in favor of the larger breeds, while the objection to the sitting propensities, is, as I have before shown, as much the fault of the breeder as the breed. Never dress chickens for the market until they have been confined from ten to twelve days, and fed liberally— and by this is meant all they will eat and no more—three or four times a day on cooked food, buckwheat and corn. The one pound that can easily be added to the weight of each chick will not only be satisfactory to the pocket, but the improved appearance of the dressed poultry will gratify the sight. If confined for a longer period they will lose rather than gain.

These things seem small and unworthy so much attention, but they underlie all success, and it is because they are neglected that they have been dwelt upon at such length. Breed for a purpose and let that be constantly kept in view. If it be eggs, then select the

non-sitters, and systematically breed to increase their productiveness. If it be poultry, then early hatched chicks, of the large and earliest maturing breeds, are what are wanted. Breed from those only who have the greatest breadth of body, and deepest, fullest breasts. Thus you will add to the weight without any increase of bone or waste.

Begin with small flocks, and gradually grow to the thousands. Many a man who has realized a handsome profit from one hundred, has signally failed with five hundred. Because the hens are comparatively small, so much the greater need that we guard against over-crowding our pens.

We cannot over-do the business. Poultry and eggs are necessaries of life. There is no chance for over-production The improved methods of breeding, hatching, feeding and fattening have but created a greater demand and increased prices. There need be no failure if business principles be applied here, as they should be everywhere. Any man can realize a profit of from two to three hundred per cent, if he will seek to know the business thoroughly.

Systematic breeding is one of the best educators. It quickens the sight, develops the reasoning powers, strengthens the judgment and makes a man more of a man than he would otherwise be. No matter then whether you breed Jerseys or poultry, have an aim in your breeding. Set your standard high so that there shall always be an incentive to labor and to think. It is not the occupation that makes the man, but it is what the man makes of his occupation that tells the story of his strength or weakness. While dollars and cents have seemed perhaps to be the one object aimed at in these remarks, yet back of these is the fact that in the earnest striving, in any of these branches of industry, where skill and judgment are necessary, there comes back a thousand fold, a reflex influence which lifts the man to a higher and a better manhood.

Educate the young people by giving them stock to feed and care for. Teach them the object to be gained and lead them on to success in their undertaking. Make the home and farm something more than drudgery, by showing them what there is to be found in the several channels of farm labor. If they want poultry, provide it, and then lead them to go to work systematically, as we all should do, and solve the problem, knowing that there is not only increased gain, but satisfaction and true contentment to be found in intelligent farming and stock breeding.

"All common things, each day's events,
That with the hour begin and end,
Our pleasures and our discontents,
Are rounds by which we may ascend."

The afternoon was devoted to a lecture by Francis Barnes, of Houlton, on "Our Dairy Interests," followed by a discussion.

In the evening the exercises opened with remarks by S. S. Holbrook, of Brunswick, on "Keeping the Boys on the Farm," after which the member from Aroostook repeated his lecture on "Aroostook for the Young Man."

An exchange of courtesies closed a profitable occasion.

LINCOLN COUNTY.

Institute At Boothbay.

By invitation of the Boothbay Farmers' Club a Farmers' Institute was held at Boothbay Town Hall, December 14, at which there were present E. W. Stetson, the local member, and Edward Wiggin, of Aroostook, assisted by Francis Barnes, and by George B. Sawyer, Esq., of Wiscasset.

The members of the Board were the guests of the club during their stay.

The Boothbay Farmers' Club has been organized thirteen years and has held regular meetings each year, through the autumn and winter months, and a cattle show and fair each fall. The exercises at their club meetings have been of a character to cultivate the mind as well as to improve the soil.

The forenoon was given to a discussion of the agricultural interests of Lincoln county, opened by Mr. Stetson, who said: Our country at large is astonishing the world with the extent of its agricultural products which are the basis of our unparalleled prosperity. The advantages secured by the country at large may be enjoyed by Lincoln county. It is true that agriculture has not been the leading interest of the locality. In the shore towns it is safe to say that seven-eighths of its inhabitants are interested in some way and connected in some way with navigation and the fisheries. Since the decline of the shipping interests, the results formerly secured from these sources have not been realized. This calls for more attention to the agricultural resources. These are ample when fully appreciated.

In the afternoon Mr. Barnes gave a lecture on "The Principles of Co-operation," which was followed by extended remarks by others present.

EVENING.

AROOSTOOK FOR THE YOUNG MAN.

By EDWARD WIGGIN, Member from Aroostook.

The laconic advice given by Horace Greeley to the young man who came to him for counsel and for aid in finding employment in

the great metropolis, was probably the best advice which he could have given him, all things being considered. "Go west, young man," said the old philosopher, and he spoke with a full appreciation of the hardships and discouragements in store for the average young man in his struggle for success amidst the keen competition and merciless jostling of a great city. In that new and almost boundless western country, with its fresh young life and active vigor, there are possibilities and opportunities for the young men of the older and more populous eastern section which the crowded cities and villages do not afford. While there is undoubtedly room at the west for all who wish to go there and make the battle with a determined zeal and manly courage, still we think that the young men of Maine, of its agricultural sections especially, would do well to consider before making the move whether there are not as good if not better opportunities offered them nearer home and within their own State. The old Pine Tree State, ice-bound and rock-ribbed though she be, is a pretty good State after all. Though the climate may be somewhat vigorous and the soil not so easy of cultivation as in some other sections of our land, though the sunny south, and the boundless west, and the fertile Pacific slope may each and all offer superior advantages in some respects, still we cannot help thinking that all things being considered, Maine is the best place for Maine men and Maine women. The Yankee is proverbially a roving animal, and the Maine specimen is by no means exempt from the general characteristic.

Men who are comparatively well fixed here at home, who to all appearance are prospering and adding every year to the value of their homes and possessions, become all at once affected by this spirit of restlessness, and, allured by the flattering hope of bettering their condition, sell, often at a great sacrifice, the fruits it may be of years of toil and of careful economy, and remove to the west to begin the struggle anew in a country to them new and strange, and where all the conditions are far different from what they have been accustomed to at home. In many cases it may be the change has been attended with fortunate results, but how many a Maine farmer who has gone west has found that in leaving Maine he has left home, and that his fond anticipations and flattering hopes of improving his fortunes in a short time and with little labor, have been far from realized in the event! But it is not my purpose to disparage any portion of our great country, or even to institute a

comparison between sections; but the object of this paper is to give you, in a plain and candid manner, some facts in regard to a portion of our own State which has received considerable attention of late, and to enumerate some of the inducements which Aroostook offers to the young men of the older counties. I say to the *young men*, for the reason that farmers who are well established on farms of their own, who have spent years it may be, in arranging their farms and buildings to suit their convenience and taste, and are now making a comfortable living for themselves and families, with an assured support in their declining years, would better remain where they are and enjoy the fruits of their years of toil. But there are many young men who have grown up upon these farms, and who upon arriving at the age of manhood find the old hive too small, and wishing to make for themselves homes of their own, to marry and plant their own roof-tree, see no satisfactory opening for them in their own vicinity. To this class especially, Aroostook offers inducements which they would do well carefully to consider and examine.

I am speaking now more particularly of young men of limited means, whose principal capital consists in sound health, abundant muscle, a willingness to work and a cheerful courage to tackle the knotty old problem of life, and to make the most and the best they can of it. "How much capital have you got sir?" asked a fond parent somewhat sternly of the young man who had presumed to ask for his daughter's hand. "Well, sir," was the plucky reply, "I haven't got much money, but I'm chuck full of day's works." This kind of capital can find a ready investment in Aroostook, and seldom fails to yield ample and generous returns. Many of the finest farms in that fertile county, farms whose broad fields are unbroken by stump or stone, and whose ample barns are now pressed full with one of the most bountiful crops ever harvested in that section, are owned by men who went there with nothing but a stout heart, a strong arm, and a good narrow axe, and courageously went to work to hew for themselves a home out of what was then almost a wilderness. Go through the towns of northern Aroostook (which is the newest portion of the county), look over the fine farms there with their comfortable and commodious and in many cases costly buildings, with their fine flocks and herds and implements of all descriptions, and you will find them occupied for the most part by men still in the prime of manhood, who had very little

capital in the way of money to start with, but who have by industry and economy become comparatively independent, and are now the solid men of the county. This has been done in the past, and can be done again, and the facilities are far greater now than when these men started in to make their farms. So much has been written in regard to Aroostook, of late, by tourists and newspaper correspondents, such glowing accounts have been given of its richness and beauty, of its enormous crops and wonderful resources, that some may have come to regard it as an El Dorado, where nature is so lavish of her gifts as to pour them almost unasked into the lap of anyone who will go there and be willing to receive them. It has been described as a land flowing with milk and honey, and abounding in scenery of surpassing beauty. All this may be true, but I assure you the milk does not flow spontaneously, nor is the honey to be gathered without labor and care; neither is beautiful scenery the only thing necessary to bring up a family on. In what I may have to say in regard to it I shall romance as little as possible, but try to confine myself to facts which you may be interested to know.

First a word as to the extent and area of the county, so that you may know there is room for all who wish to go without any present danger of being over-crowded. The eastern boundary of the county extends in a straight line due north and south one hundred miles from the northern border of Washington county, until the line strikes the St. John river in Hamlin plantation. You then follow up the St. John as the northern and north-eastern boundary of the county for some seventy miles to the mouth of the St. Francis river, which then becomes the boundary. Following up this river, you soon leave New Brunswick to the south, and find that Canada is your neighbor over the border. The boundary between New Brunswick and Canada strikes Aroostook away up in township 19, range 11. A young friend of mine assured me that while up there on a pleasure tour, he stood with one foot in Canada and the other in New Brunswick and caught a trout and threw it over into Aroostook for breakfast. You ascend the St. Francis thirty miles before you come to the northern-most point of Aroostook. In its extent from east to west, Aroostook spans the entire State. Start from the town of Easton, which joins New Brunswick on the east, and you can travel a due west course for more than a hundred miles to where the county joins the Province of Quebec on the west. It has four counties on its southern borders,

and embraces an area of 6800 square miles. Fifty years ago there were in all this vast region but a little more than 3000 souls. To-day there are 45,000 and more on the road. In 1860, only 23 years ago, the value of the estates in the whole county was but little more than a million dollars. To-day it is fully eight million and steadily increasing. This vast percentage of increase in population and valuation has been wholly due to the agricultural resources of the county. Covered all over as it originally was and as a great part of it is still with a magnificent growth of heavy timber, it possesses a soil which in strength, richness and fertility will compare favorably with any section of our land. Not only is the soil new and possessed of all its original fertility, but it is rich in the elements of plant food to such a degree as to render it (with proper cultivation) practically inexhaustible. In the valley of the Aroostook and its tributaries the soil is a deep rich mellow loam, the underlying ledge being of porous limestone. There are comparatively few surface stones and these are generally small and easily removed. Since the introduction of starch factories into that section and the consequent raising of large breadths of potatoes, much rough stumpy land has been made smooth and fitted for the working of machinery. The transformation of one of these old fields or pastures (as they have generally been turned out to pasture ever since they were first cleared) is really a matter of surprise to one unacquainted with the character of Aroostook soil. It may be that the farmer was a little slack about his clearing, as many farmers are apt to be, and that old knotty logs are lying here and there over the field. The remnants of many partially burned piles may be seen while the stumps stand thick over the whole surface, having now become pretty well rotted and quite easy of removal. These old "mortgages" could be found upon most every farm of any extent for the reason that the settlers in their anxiety to make as large an opening as possible were very apt to fall trees faster than they could properly clear the land.

Since the era of the factories, the practice has been to take up each year as much of this kind of land as the owner could comfortably handle, say five to ten acres. The first thing of course is to remove the stumps and logs, and haul them together into huge piles and burn them. This has been usually done in the fall when possible. Then haul off what few surface stones there may be. There are not enough for a wall so they are generally hauled together in one heap in the middle of the field. Now it is

ready to plow. Two good horses will break it up. The next spring after a good harrowing the field is planted to potatoes and is worked with the horse hoe and cultivator. The next year it is sown to wheat and seeded down, and the third year, on that stumpy, bushy, log-covered old mortgage of only three years ago, the farmer starts out on a fine July morning with his horses and mowing machine, and rides smoothly along with no impediment save the ample swath which is often so stout the first year as to require a man to follow the machine with a fork and pitch the swath away from the standing grass. This is no exaggeration, for I promised to give you facts. I have myself been dealing with these old "mortgages" for the past six years, for I bought my farm of a minister who didn't believe in future punishment. I had one field in particular of some eight acres which was so tangled with bushes and logs and stumps that it was almost impossible for a man to get through it on foot, and the second year I plowed it with a sulkey plow, and on the first seeding to grass I cut it with a machine and it has cut two tons of hay to the acre ever since. I mention these facts to give you an idea of the general character of the soil, which is usually so mellow and free from boulders and outcropping ledges that the smoothing harrow easily levels down the cradle knolls and uneven places, and very readily fits it for the working of machinery.

The original growth upon the higher ridges is principally birch and maple, with an occasional beech and often a huge cedar growing side by side with a towering rock maple. In the lower lands, or mixed growth, are hemlock, spruce, fir and cedar, with elm, hornbeam and black or brown ash; the birch and maple being also mixed through this growth. This kind of land, though harder to clear than the hard wood ridges, is really the stronger and will stand more cropping and is the very best of grass land. The soil in this low mixed growth is deep and black, not generally muck, but a deep rich turf or vegetable mold, which is easy of cultivation and produces abundantly. The staple crops of Aroostook are potatoes, wheat, oats, peas, beans, buckwheat, rye, barley and hay, which, though mentioned last, is really the most important of all. Corn can be raised and is to some extent by many farmers, but it hardly comes into the list of profitable crops. Vegetables of all kinds adapted to the latitude can be grown in abundance, and those which will bear transportation, especially onions, can be raised at a good profit by men who have a natural tact for the business. Strawberry culture can be made a

finely paying business by any man who is acquainted with it or is willing to learn it. Strawberries can be shipped from Presque Isle, Caribou or Fort Fairfield to Bangor in about twelve hours, and to Boston in twenty-four, and coming as they would just as the supply from other sources was failing, would command a ready sale at good prices. Aroostook honey is noted for its excellence, and those who have gone into bee culture to any extent have made it a very remunerative business. The vast tracts of fireweed upon the new lands make excellent pasturage for the bees, and the rich clover blossoms are full of the liquid sweetness. The raising of hops has received some attention within a few years, but I think the price has gone down just in time to check the rising fever. Had the price held up to last year's figures, many farmers might have been tempted to embark in this hardly legitimate branch of agriculture. I hope it may never be one of Aroostook's staples, for I would far rather our farmers would raise bread, beef and potatoes than *beer*. Dairying is receiving more and more attention each year from our best farmers, and cheese factories are already established in various places throughout the county. This together with stock husbandry is, and is to be the true vocation of the Aroostook farmer. As the country becomes older, and better methods of farming are beginning to prevail, more and more attention is yearly being given to stock raising and dairying. It is estimated upon good authority that fully $200,000 have been paid the past year for beef in Aroostook. The raising of crops to be sold from the farm is already beginning to be regarded by our best farmers as suicidal, and feeding instead of selling the raw product will one day be the rule instead of the exception. The advantages of Aroostook for stock raising are evident to any one at all conversant with the business. The grasses are there the richest and most luxuriant in the State. Pasturage is most excellent, and the scorching drouths of other sections are unknown there. As soon as the hay is cut upon the meadows the new crop begins to spring up, and in September, when the fields in other sections of the State are often parched and bare, Aroostook fields are covered with a rich verdure which affords abundant feed for cattle until late in the fall. The stock comes to the barn in excellent condition, and the ample haymows assure a plentiful ration during the winter campaign. Nowhere in Maine, and I think I may safely add in New England, can hay be raised and harvested so cheaply as in Aroostook, and I think I hazard nothing in saying that nowhere can

it be more profitably fed to stock. To-day hay in Presque Isle is $7.00 a ton, and milk in the village six cents a quart.

A large slaughtering establishment is now in operation in Houlton, where 600 sheep and lambs are killed daily and forwarded in refrigerator cars to the outside market. The business is to be extended to include the slaughtering and forwarding of beef, so that a ready home market will be at hand for all stock products. Sheep husbandry has been amply proved to be a success in Aroostook, and is a safe, profitable and pleasant business to one who has a taste for it.

Said Mr. Cobb, of the Board of Agriculture, at the Farmers' Institute at Caribou, "Your sheep brought from Aroostook to Androscoggin county soon run down and die off." He had been at a loss to account for this, but when he went up there and saw the feed that those sheep had been brought up on, he ceased to wonder at the effect of the change. The large-bodied coarse-wooled sheep have been chiefly raised, but the Merinoes have been introduced in some sections and take kindly to the green pastures, and are not unfavorably affected by Aroostook winters.

The climate of Aroostook is considered, by many who have never lived there, to be a serious objection. The winters are supposed to be fearfully cold, and the snow-drifts so formidable as to impede travel for half the year. Now I would not undertake to deny that we have some passably cold days during the winter months, and snow is usually a pretty safe crop to reckon on, yet despite all this, I do not hesitate to say that nowhere in Maine, all things considered, is the winter so pleasant and comfortable as in Aroostook. Our snows may come a little earlier, and remain somewhat later, but by this means we escape the long periods of mud, or of frozen ruts and ridges which often make winter travel so unpleasant in places nearer the seaboard.

Another advantage is that the snow usually covers the ground before it has frozen to any considerable depth, and when it goes off in the spring the frost is generally all out of the ground and the grass begins at once to spring up fresh and green, and we are ready to start the plow and the harrow. Indeed, the change from the white mantle of winter to the rich verdure of spring seems almost like the work of magic. There is hardly any interim. On the edge of the forest the poplars are budding and taking on their covering of leaves, while but a rod or two farther in, the ground is covered deep with the snow of winter. The spring sown grain has sent up

its strong green spike and has already begun to show a breadth of leaf and to wave a little in the passing breeze, while yet in the fence corners linger the remains of the winter's drift.

Frosts are, as a general thing, not a great source of annoyance or damage to the Aroostook farmer more than to his brother of the other counties, and this year I had sweet corn in my garden fresh and green, long after the papers had told us that autumn frost had harvested everything of a tender nature in the other counties. I do not wish to try to make it appear that Aroostook has a tropical climate by any means, but I do claim that both in summer and winter it will compare favorably with any part of Maine, and in some respects is much preferable. The season may be a little shorter in Aroostook than in some of the other counties. But I have left home after the crops were well in the ground and found the farmers of Cumberland and of Androscoggin plowing for spring seeding.

Some statistics selected from the columns of the census of 1880 may not be out of place in this connection. The population of Aroostook, as given in the census tables of 1880, was 41,700. It is to-day easily 45,000 in round numbers. The number of farms in Arocstook county in 1880 was 5,802. The number of acres of improved land was 270,442, which gave an average of but a fraction less than 50 acres of improved land to each farm. The value of these farms, including land, fences and buildings, is estimated at $5,151,151, or a shade less than $890 each on an average. Not a very high average value, you may think, but you must remember that Aroostook is still a new country, and on many a farm worth $1000 or over, the stumps of the trees that furnished lumber for the buildings, still stand thick upon the ground, some of them, it may be, in the very dooryard. Remember, too, that the $5,000,000 divided into farms of an average value of less than $900, represents a larger individual independence, a larger number of comfortable homes, than does $11,000,000 which in each of the counties of Cumberland, Kennebec and York is divided into farms of an average value of over $2000.

That the farmers of Aroostook do not work without tools is shown from the fact that the value of farming implements and machinery was in 1880 placed at $348,179. To-day it must be well up to $500,000. The value of the live stock in 1880 was $1,164,090 which was more than one-sixteenth of the value of all the live stock in the State. The amount of money expended in fertilizers in Aroostook

for the year 1879 was $6,672, while the estimated value of all farm productions sold, consumed, or on hand, was $1,826,348. A closer scrutiny of these figures reveals the interesting fact that while Aroostook produced one-twelfth of the total value of farm products of the State, she expended but one-thirty-second of the whole amount expended in the State for fertilizers during the same year. No other comment is needed on the fertility of Aroostook soil.

Of the several principal crops Aroostook raised 15,777 bushels of barley, which was more than one-sixteenth of all the barley raised in the State; 296,793 bushels of buckwheat, more than three-fourths of all the buckwheat raised in Maine. No danger of starving, you see, where the staff of life grows in such rich abundance. In the matter of corn we made a poor showing, being credited with only 382 bushels, but it wasn't much of a corn year. I remember that same year I fitted an acre of ground for corn, being encouraged thereto by the fact that the year before I raised a barrel of meal from a little patch planted for green corn. The season being rather backward I got discouraged about my corn and sowed my acre to oats and seeded it down to Alsike clover and herdsgrass. I harvested 95 bushels of clean oats, machine measure, from my measured acre and have cut an average of 2 tons of hay each year on it since. Not a very bad crop of corn that, either.

Of oats we raised 628,435 bushels, or nearly one-third of the total product of the State. Of rye we raised 10,894 bushels, considerably more than one-third of the total product. The value of orchard products of Aroostook makes also a poor show, but in this matter we are rapidly on the increase. There are many kinds of hardy apples which can be easily raised, and increased attention is being paid to the planting of orchards and to the caring for those already planted. The Duchess of Oldenburgh, the Alexander and the Fameuse take kindly to Aroostook and are raised without trouble wherever planted. The Wealthy apple is being planted to quite a large extent just now, and if it fulfils the promises made for it, it will become the Baldwin of Aroostook. The hay crop of Aroostook is placed at 80,316 tons, or more than one-fourteenth of the total product of the State. Of hops we raised in 1880, 4,520 pounds, or a little more than one-eleventh of the total product. Of potatoes Aroostook raised the same year 2,248,594 bushels, or in round numbers 2 1-4 millions out of a total of 8 millions raised in the State, largely more than one-fourth of all the potatoes raised in the State.

These are some of the figures of 1880. Now let us come a little nearer and look at some of the figures for the present year. These figures come from the Custom House and railroad books and of course only relate to exports. Fort Fairfield is the outlet of Northern Aroostook, and the exports shown by the Custom House books there represent the exports of the Aroostook valley. During the year ending Oct. 1st, 1883, the following shipments were made from Fort Fairfield, viz.: Starch, 2,692 tons, to make which required the consumption of 670,500 bushels of potatoes; potatoes, 241,355 bushels; hardwood lumber, 179,900 feet; shingles, 84,767,355; clapboards, 2,335,577; sleepers, 26,235; hay, 750 tons; wool, 43,000 pounds; cheese, 71,200 pounds; hops, 143 bales; honey, 6 tons; raspberries, 93 tons; blueberries, 75 crates. Large numbers of cattle, horses, sheep and lambs also appear on the books, but much of this class of exports is driven to Houlton and shipped from there. We have also among the shipments from Fort Fairfield 1,284 cases of eggs containing about 64,000 dozens, besides large amounts of other minor articles too numerous to mention. From Houlton there were shipped during the same time, 240,000 bushels potatoes, 8,500 sleepers, 42,000,000 shingles, 700 tons starch, 3,700 barrels tan extract, 520,000 pounds leather, 3,000 tons hay 30,000 sheep and lambs, 1,500,000 feet lumber, besides large numbers of cattle and horses and much general merchandise. These figures, considered in connection with the fact of the comparatively small part of Aroostook land as yet under cultivation, will give some idea of the possibilities in the future for this young and growing county.

A word here in regard to the religious, social and educational advantages of Aroostook would not seem out of place. A Maine man in removing to a distant State is often obliged to leave behind him all his dear old home customs and associations, and finds himself generally in a new atmosphere whose elements are for the most part foreign to that to which he has been accustomed. This is a great sacrifice, and to many it is one for which no advantage will compensate. Though we are not all saints in Maine, yet our good old forefathers and foremothers have handed down to us certain customs and practices which it were well for us sacredly to cherish. And although it has become somewhat common in some latitudes to sneer at New England Puritanism, yet we think the outcome of that same Puritanic education toned down by the gentle hand of Time, and by the

influences of liberal ideas, has been to raise a pretty staunch, solid and respectable class of men and women. These distinctive customs and practices are not lost or left behind when the Maine man leaves his old home in one of the older counties for a new one in Aroostook. Whatever may be his religious belief he may be sure of finding brothers and sisters of the same faith in his new home. Even in the most remote and sparsely settled sections of the county, religious meetings of some kind are held at stated intervals, while in all the villages and larger settlements the neat, white church with its graceful spire pointing trustingly heavenward attests the fact that the teaching of the fathers has not been forgotten in this new country. In the matter of education the young county is not to be left behind her sister counties, and nowhere in the State is more interest taken in education by the rural population than in Aroostook. Everywhere throughout the length and breadth of the county, upon every back road and in every remote settlement where a half dozen or more sturdy pioneers have commenced to hew them a home out of the greenwood, the school-house, the pride and hope of our land, may be seen nestled in among the trees; modest and unpretentious though it may often be, and rude in its architecture and findings, yet it shows the value placed by the people upon the education of the youth of the land. Not bad influences these for a boy or girl to grow up among. Said, or sang rather, David Barker, Maine's truest poet:

"Had I this tough old world to rule,
My cannon, sword and mallet
Should be the dear old district school,
God's Bible and the ballot."

The importance of these agencies are duly appreciated by the people of Aroostook, and besides the common district school there is at Houlton, and will in a few months be at Presque Isle, a higher grade of school or seminary at which any youth who is desirous of fitting for a college course can find ample facilities at a moderate expense. The social characteristics of Aroostook people are marked and noticed by all who visit the county. No warmer hearted people or better mixers can be found throughout the State. I think there is something in the atmosphere of a new country to bring people together and make them more cordial and warm blooded than in sections where the line fences have been established for a century. Among the pioneers of a section, this community of

interest and working together for the common good is a matter of necessity, and the influence of it remains long after each one has become comparatively independent of his neighbor's help. In Northern Aroostook more especially the grange has been a great help in the matter of social intercourse, and has been a grand educator of the people. There are eight live working granges in the valley of the Aroostoook which, meeting once a week, or once in two weeks as the case may be, and discussing questions relating to the farmers' calling, not only wears off the rust which isolated farmers are sure to encrust themselves in, but familiarizes them with public speaking, and the manner of carrying on the business of deliberative bodies, and gives them a new and more elevated idea of their life work and of the importance of the best methods in agricultural operations. The harvest feasts which are held at short intervals are occasions of rare social enjoyment, and cannot help making the participants better neighbors and therefore better citizens in every respect.

Besides the surbordinate granges, we have a county or Pomona grange, embracing a very large membership to which any member in good standing of a surbordinate grange is eligible. This grange meets by invitation with the different granges throughout the valley usually about once in two months, and thus the members from different sections get well acquainted with each other and an intimate, friendly and fraternal feeling is established. This organization also enables the farmers throughout that section to co-operate in many matters of buying and selling, and much money is often saved in this way. For the past two years the granges have massed their wool and appointed a committee to sell it in the lump, and thus a higher price has been realized than could have been obtained by separate and individual sales. In the article of grass seed also a large saving has been made by co-operation. We are now buying our apple trees by the car-load, and last year our trees cost us 50 per cent less than agents' prices. These things are not only in themselves matters of pecuniary benefit to our farmers, but beyond that they are serving to educate them in the ways of business, and are opening their eyes to the importance of securing all the profit possible from their productions, and of eliminating as far as may be the many middle profits coming in between the producer and the consumer. None of the granges as yet have stores of their own, but it is working up to that, and I think in the near future the principle of co-operation will be applied to a far greater extent than it has ever been in the past.

A matter of great and vital importance to a farmer settling in a new country is to be assured of a market for what he raises. The soil may be as fertile as can be desired and the crops raised yearly may be abundant and generous, but if there be no market for the crop after it has been raised and harvested the prospect for the farmer is certainly not very flattering. But in this respect the Aroostook farmer is fortunately well provided. From the wild berry which grows in the fields and woodlands to the fat steer which he has fed with so much care and pride, there is nothing on the whole list of farm productions but finds a ready market and for cash. This has not always been the case with us. Time was when very few of the products of the farm could be sold for cash, and no permanent cash market could be counted on for any of them. The trading was formerly largely done by barter, and the credit system prevailed to a great exent. The farmer got his goods on credit at the store during the whole summer, and in the fall as soon as his grain was harvested he was obliged to carry it in and deliver it at the trading price. For potatoes there was no market at all beyond the comparatively few that were wanted for consumption in the villages. It was the same with many other articles of farm production. They could be raised in abundance and at a comparatively small expense, but there was no call for them after they were raised, and so the Aroostook farmer was cut off from many sources of revenue and was practically limited to the market created by the lumbering operations which was at best a capricious and untrustworthy dependence. It was far better than no market to be sure, and was a great help to the county in its pioneer days, and is yet to many of the remote lying districts, but the advent of the railroads has changed the face of matters very materially as regards market facilities, and now buyers of all sorts of farm produce are not only located at the railroad stations, but their agents visit the farmer at his home and buy his surplus products, and competition is generally so lively that the price paid is usually pretty well up to what can be realized in the larger markets after the intervening expenses are paid. With the railroad came the starch factories, which have made a home market for all the potatoes that can be raised at prices which have proved to be remunerative, and many a farmer who either bought his farm partly on time, giving a mortgage for the remainder, or who by bad luck or bad management had become involved, has by the aid of the starch factories paid off all his indebtedness, burned up the hated parchment which with its

canker-like interest was eating away all his profits and blistering all his efforts toward prosperity, and now free from debt he walks forth the most independent man on God's green earth, the undisputed possessor of the land he tills. Not only at the factories can the potatoes be disposed of, but buyers are always on hand to pay cash in hand for merchantable potatoes at prices governed of course by the outside market. And so with every other article the farmer may have to dispose of. His eggs are taken at the door, his poultry is bought alive and taken at the barn and the money put into his hands.

Cheese factories during their season consume the milk of those dairies situated within a convenient distance, and the cheese is sold at the factory in the fall for cash. For most of the grain raised there is a market for home consumption in the villages and in the lumber woods. Hay is shipped now from Northern Aroostook to Boston. Even rye straw is an article of merchandise and has a ready sale for cash, for shipment to Boston, and last of all, and most unexpected of all, has come the man with a pocket full of money to buy *cedar bark* to ship away to be manufactured into paper. What will be the next Aroostook product to be sought for by outside capital it is hard to predict.

In the matter of roads for transportation and inter-communication Aroostook is well supplied. The character of the soil is such as to render road building comparatively easy, and for so new a country the roods are certainly remarkably good. As in the old Roman empire all roads led to Rome, so in the valley of the Aroostook all roads lead to some one of the three villages of Presque Isle, Caribou or Fort Fairfield, each one of which is a railroad station and the centre of a fertile and thriving agricultural district. A drive in the vicinity of either one of these villages will take you among beautiful farms with large, comfortable and costly buildings, with smooth, rich and well tilled fields stretching away to the woods, and in many places so level that a field of hundreds of acres could be enclosed, in which an animal feeding upon any part of it could be seen from either fence. And still there are men now living who can remember the time when the land where these fine and fertile farms now are, was an unbroken forest, and when even the sites of these flourishing villages with their noisy wheels and hum of busy life was an almost trackless wilderness. Men are living who came to that now fertile valley when there was not a road in all that section upon which a

vehicle of any kind could be drawn, and when the "blaze," or line of spotted trees, was the only guide to the adventurous pioneer. To any one riding through that county now, and looking out upon the happy homes of so large a population, this would seem scarcely credible, and still it is a fact. I talked but a short time ago with a hale, hearty old gentleman who came up the Aroostook river and drove his stake down in what is now the thriving village of Caribou, when hardly a tree had been cut on the whole township. A few settled in together and made their clearing. The river was their only highway, and it was many a mile to Tobique on the St. John river where the nearest store and mill was situated. What a change had this man lived to see! The wilderness whose trackless depths resounded with the blows of the pioneer's axe has truly been made to blossom as the rose, and on the spot where this man saw the first tree cut to build the settler's cabin, is now a thriving, bustling village, with its railroad and telegraph, its mills run both by water and steam, the largest starch factory in the world, large blocks of stores and fine residences, its churches, school-houses and public halls. The same may in substance be said of all the other villages in the valley. And still this growth has been the effect of no sudden excitement, as of the discovery of a gold or silver mine; it has not been the mushroom growth of the western railroad town, which springs up as it were in a day, and as quickly disappears when the road moves farther on. Mines of wealth are hidden indeed in these fertile acres, but it is the wealth which comes from the husbandman's toil, and the "watered stock" of these claims brings no unhealthy fever of speculation.

But perhaps enough has been said in description of the country and its resources. And now some may be asking the questions: "How, when and where shall we go, and how shall we obtain possession of some of this fertile land and make for ourselves homes in this garden county, as others have done in the past?" These questions I will try to answer fairly and candidly, making no statements which will not wash, and holding out no inducements which are not warranted by facts. Of course these questions would be answered differently to different individuals, that is, to persons of different pecuniary circumstances. But in the first place, we will suppose the person to be a young man with no dependencies, with good health and no other capital than his muscle and his wits. My advice to such a young man would be to scrape together what money he can this winter by working where he can earn the best wages. Next

spring, say along the last of April, start for Aroostook. Go to Presque Isle, Caribou, or Fort Fairfield by rail. Then strike out among the farmers. Some one will want you to work on a farm next summer, and you will receive for six months' work, say $120. It may be a little more and perhaps a little less, according to your experience and ability. By working during the season for some good farmer you will get somewhat acquainted with the country and the people, with the soil and the crops, as well as the methods and practices among the farmers of that section. You will also have time and opportunity to enquire particularly where the best land can be found and at what price, and can form some more definite idea as to where you would prefer to locate. By the time your six months have expired, say by the first of November, you will begin to feel quite at home. The hills round about will begin to look familiar to you, and you will not feel so much like a stranger in a strange land. Now take a week or two and prospect. You will have heard by this time of different localities where wild land can be bought at reasonable rates. Go and look at these places. If you have now made up your mind to buy a new lot, and make a farm for yourself from the forest, take a little time in making a selection and look the property over pretty thoroughly before purchasing. The lot you want is one which has a road running to it or near it, or one where a road is to be made in the near future. Select a well watered lot. Don't pick for a lot that is all clear hard wood. A mixed growth on a part of the lot is no matter of objection, as there you will find your strongest land after it is cleared. I think you can find a lot to suit you, say 160 acres (that's enough) for about $2.00 per acre. It will not be within a stone's throw of a village, but remember that those who settled where the villages are now, were much farther from a village, or a settlement even, than you can get now if you try. You can buy your land by paying a part down and letting the rest remain until you can earn it or make it from the land. Now you have got your land and it is perhaps nearly the middle of November. What next? Well, you must now be governed in a great measure by circumstances.

It won't do to lay down too many rules at this distance, or to lay out the work too far ahead, but like Josh Billings' rules for counting, just get the thing well under way and then "let it kinder run itself." If you have paid one hundred dollars down on your land you may be (after buying a few clothes needed for winter) getting pretty near the

bottom of your pile, and will have to fall back on your reserved capital, to wit: your day's work for more money. You may prefer to work on a farm for the winter if you can hit a favorable opening, if not the lumbermen want you and in ordinary seasons will pay you fair wages for a winter's work.

Now I have got you well started and located on a good lot of Aroostook land, now let's see how much sand you've got in you. If you mean business and have got the right sort of stuff in you, you are bound to succeed. If these requisites are wholly lacking, no amount of advice or counsel from me will help you much, either in Aroostook or anywhere else. In regard to localities where wild land suitable for farming can be bought, I would say that in nearly all of the towns already settled there are some lots which can still be obtained. Mapleton, Castle Hill and Chapman are towns abounding in good settling land still covered with its original forest growth. In each of these towns there are many fine farms which have been made from the forest within a few years, and made too by just the class of men of whom I have been speaking.

Adjoining the town of Washburn there are tracts of fine settling land in what is called Dumstown or Wade plantation. These tracts lie along the Aroostook river, and are beautiful areas of forest land. Along the line of the new county road which is now being opened from Caribou to Fort Kent, there is in township 16, range 4, some excellent settling land in desirable locations.

Now let me speak a word or two to another class of persons who may be desirous of going to Aroostook and making themselves a home. You are a man with a wife and growing family and may be able to pull together a few hundred dollars to start with. "Where, you ask, are you going to place me?" Well, my friend, we have just the place for you exactly. If you have but a very small capital, say two or three hundred dollars when you land in Aroostook, you can find in the town of Perham (a good town named for a good Oxford man) farms with small clearings already made, with a small house and barn perhaps ready built and which will do until you can build better, which you can buy for a comparatively small advance from the price of wild land. These openings can be found in other towns, but I instance this town because I happened to be talking with a resident not long since who spoke of quite a number of farms of this description which could be bought at a very reasonable rate. Perham was a State town and the land was sold to actual settlers at

fifty cents per acre to be paid in road labor in making roads to their own lots. The State required a house to be erected and a certain amount of land to be cleared and seeded before a deed could be given. These farms which I speak of as now being for sale are farms which were taken up by settlers and the requisite settling duties performed, and then for some reason the owner chose to remove to some other locality. Perhaps in some instances he had not the requisite grit to stay and fight the battle through. It may be that sickness or death in the family decided his removal, but be that as it may, those farms are there and can be bought for small money, and some resolute men with small means are going in there and take up some of them and make fine comfortable homes for themselves and their children. You will observe I am placing you upon farms which your present means will pretty nearly pay for, or where the remaining debt will be comparatively small. I have done this because I have a horror of debt. I can point you to farms here and there throughout Aroostook, farms worth $800, $1000 or $1500, which you can buy by paying $200 or $300 down and giving notes and mortgage for the balance. But my advice would be, don't do it. It is a hard, worrisome, up-hill job for a poor man to take such a farm, supply himself with even a small stock and the necessary farm implements, feed and clothe his family, pay his taxes and from $50 to $100 interest every year. It will turn his hair gray and wrinkle his brow far sooner than felling trees and clearing land on a new farm, every foot of which is his, away down to the centre of the earth. A mortgage on a farm is worse than Canada thistles or burr weed, and far harder to eradicate. My advice, then, is, buy within your means, or let the lap be as small as possible. If you have not the means to buy a farm ready-made, then buy a good wild lot and have the satisfaction of making one for yourself, and of owning it when you get it made. There are those whose means will enable them to buy these farms and nearly pay for them, and a few hundred dollars' debt on a farm worth $1000 or $1500 is no great terror to a resolute man.

I have addressed myself mainly in these crude remarks to men of small means, for the reason that men who have capital to invest are able to go and look the situation over for themselves. And I repeat what I said at the beginning, that to young men especially, who have their own energy, courage and muscle to rely on, Aroostook offers superior inducements. And I think that ten years of honest labor

and frugal economy on an Aroostook lot which can be purchased to day for from two hundred dollars to three hundred dollars will provide a man with a better home, and surround him with more of the comforts of life than will, (on the average,) ten years at any other business he can embark in.

Let me give you a few figures from the actual experience of one of my neighbors. He gave me the items but last week. Something over twenty years ago he set foot in Presque Isle with just five dollars and sixty cents in his pocket, which was all he had in the world to start on. He went to work in April for sixteen dollars a month and worked till he earned a little over sixty dollars. He then bought a settler's improvement on a State lot on which the settler had fallen 14 acres of trees. He gave him sixty dollars for his claim having the State still to pay. That fall he cleared up 8 acres of the 14, and then went into the woods and worked all winter for $80. In the spring he bought a yoke of steers, paying part down and giving note and bill of sale for rest. He went on to his lot and cleared up the other six acres and put the whole 14 into wheat and oats. As soon as he got his crop in he went to work out on a farm and earned enough to pay for some help in harvesting, and did the rest of it himself alone after his money gave out. He raised 183 bushels of wheat, for which he got $240, and 380 bushels of oats which brought him $190, making in all for his crop $430, and all his own except what he owed on his steers. After harvest he took a job on the road from the land agent and paid for his farm. He then went to work and got out lumber and built him a barn and then sold out for $600 in cash. He then commenced on another improved farm and to-day he has one of the best farms in Maysville, some 300 acres of land, a fine two story house, barn 50x100 and is one of the independent farmers of the county. Another of my neighbors bought the farm on which he now lives about twenty years ago. It was a 160 acre lot and there were 10 acres cleared off ready for the harrow. It had a little log house, the remains of which were to be seen but a year or two ago, and no barn. He paid $350 which was all the money he had. He went to work clearing land and raising crops. After a few years he bought another lot of 120 acres adjoining his. He sold this lot the other day for $1600 in cash, and on his home lot he has about 100 acres cleared, has one of the best barns in the county, a house good enough for any one, a fine stock of cattle and to-day is one of the foremost citizens of the county.

Another one of my neighbors who came to Maysville just after the war, having been a soldier in the Union army, told me that after paying for his farm, on which there was a small clearing, he had just a five dollar bill left. He has now one of the best farms on the road, good buildings and stock and is independent. Instances like these might be multiplied, but I fear I am already wearying your patience. Let me, however, as an illustration of the profit in clearing new land, give you just one example, the figures of which were given me the other day, by Columbus Hayford, Esq., one of the leading farmers of Aroostook. He cleared last year 10 acres of new land, as he did not get a first rate burn he plowed or as we say, rooted over a part of it in the spring. These are his figures:

DR.

Clearing land, 10 acres	$100.00
Plowing	12.00
Harrowing	8.00
36 bush. seed potatoes., .25	9.00
Planting 5 acres	20.00
Seed oats, 12 bush., .60	7.20
Sowing 1 acre turnips	2.00
Harvesting oats	15.00
Digging potatoes	41.00
Hauling potatoes to factory	30.00
Harvesting turnips	5.00
	$249.20

CR.

1050 bush. potatoes, .25	$262.50
240 " oats, .40	96.00
200 " turnips, .15	30.00
	$388.50
	249.20
	$139.30

A profit of $13.93 per acre (after paying for clearing the land) on the first crop. Of course it would not be fair to charge the whole expense of clearing to this crop, but I have done so to show the profit on clearing good land.

But I forbear. I told you I would give you facts; I have done so. I have not done as the newspaper correspondents often do, who hearing of an exceptionally large crop which some Aroostook farmer has raised immediately give that as the average. I have carefully refrained from anything of the kind, but have given you a fair, candid, uncolored statement of the inducements which Aroostook offers to settlers. Let any good honest man who is able and willing to work and make a home for himself, thereby increasing his own comfort and adding to the material wealth of the county and State, go to Aroostook, and he will be sure of a cordial welcome, all the more cordial if he take a good honest woman along with him. But we want workers. Of professional gentlemen we have a full supply, and no loafers are wanted on any account. The future in store for Aroostook promises to be bright. With direct railroad communication with the rest of the State, which is sure to come in time, it will yet become one of the most populous, as it is now one of the most fertile sections of New England.

ANDROSCOGGIN COUNTY.

Institute at Poland.

The Androscoggin County Farmers' Institute was held at Excelsior Grange Hall, Poland, December 28. Free entertainment was furnished to all in attendance. A good choir furnished excellent music for the day and evening. The weather was unfavorable in the extreme.

The meeting was called to order by C. H. Cobb, member of the Board from Androscoggin county.

MR. COBB. *Ladies and Gentlemen*: The occasion which has called us together at this time is one of importance to an agricultural community. We are sorry, indeed, that we meet under so unfavorable circumstances in regard to the inclemency of the weather, but as none of us has any influence over it we must simply make the best of it. Under the circumstances we make no apologies or excuses, but will attend to the business assigned for the day. I will take the liberty to call upon the worthy chaplain of the grange to deliver an address of welcome.

MR. B. H. NOBLE, of Poland. *Mr. Chairman, and Ladies and Gentlemen*: I regret that some one abler than myself had not been called upon at this time, for I feel that the best words that I can utter will but faintly give expression to the gratitude and the pleasure we feel at being honored by your presence, and to the warm welcome that we extend to you. True, the weather and the traveling are unpropitious, but yet we are pleased to see so many here. The object which has drawn you here is one of no little importance, and the benefit to be derived therefrom I have no doubt will be great. The frequency of these gatherings and the interest manifested therein have proven to us that we, as cultivators of the soil, in the prosecution of a business upon which all other pursuits depend, are awaking to this one great fact, that knowledge is power. I say we are the foundation of society, and that fact is being recognized and expressed more to-day than ever before. Stones taken from this bed rock are capable of being garnished and beautified until, in moral excellence and intellectual ability, they are surpassed by

none. And may it not be true, that as we go more into nature's immediate presence than others, and hear more of her voice and learn more from her teaching, that we work more in conformity with her laws, and therefore reap better results than those who have not these privileges?

There is a sense of gratitude arising in our hearts, a sense of joy, that we have lived to see this time when we, who have formerly been considered of the lower stratum of society, have risen to a higher rank—the position to which we belong. These things point to something more than a few more dollars and cents; they point to a broader range of thought, to more culture, to more refinement, to better homes; they point to a calling which shall be honored by all, and to which our sons and daughters may aspire, as being one in which they may feel with confidence that they may rise to the highest and proudest positions in the land.

Then, too, here are awakened some of the highest sentiments of our nature. Friendships are formed and strengthened which are more enduring and more valuable than the purest gold.

I have just shadowed some of the benefits arising from these occasions; and I say it is a cause of congratulation, and a cause of joy, and we feel grateful to those who have spent so many years laboring zealously for our cause. We feel a sense of gratitude to-day, and we welcome them and assure them of our warm appreciation. And not to them alone do we extend our welcome; we extend it to all of you who have favored us with your presence. I wish I could find words with greater depth of meaning to express our feelings when I say that to all these pleasures, to all these privileges, to all the hospitality we can offer you, to the warm friendship of our hearts and our homes, we bid you a most cordial welcome.

Mr. Cobb. I will call upon the Secretary of the Board of Agriculture to respond.

Sec. Gilbert said: *Ladies and Gentlemen*: Being called upon to make a response to this most hearty welcome which we have received, I will say that I must be brief, although the words of welcome, so fitly spoken, have suggested trains of thought which it certainly would be a pleasure to elaborate. But, having a definite program here to-day to work out, a further consideration of the ideas presented here is not admissible. Let me say, however, in behalf of the Board, and also of myself, that it is certainly most gratifying to us to be thus assured that our welcome is not worn out here among

the farmers of this county and especially of this vicinity, where many of us are so well acquainted and where we have so frequently been present in meetings for the consideration of agricultural topics, and in gatherings for social purposes.

You have in your midst many representative farmers, many of whom we are glad to see present to-day. The agriculture of this immediate locality has been advanced to a very creditable extent as compared with the agriculture of other sections of the State. It, too, is in the same measure, in a very creditable condition as regards its prosperity, evidences of which are seen everywhere about you, all through the town and vicinity. This is proof positive of the advantages of the business. Purely agricultural as you are, such success as has been met in the vicinity is a success earned through agricultural pursuits, through the business of your farm operations.

We have come here to-day with a theme which has not yet been much elaborated in our agricultural meetings, the subject of "Business Principles in Agriculture." There is, we fully believe, a lack of appreciation of the business possibilities of our agriculture. This comes largely from the fact that we have not, to the extent which we ought, looked at the business from a business stand point. You are all aware that farming, in the first place, is pursued for the purpose of supporting ourselves and those dependent upon us. Out of that early idea of farming continues the present aspect of the business. But it is well for us to step out of that somewhat old-fashioned idea, and look at it from a different stand point, especially for the benefit of the younger members of the community. We have among us still, we are most happy to know, a few young men who have an appreciation of the farm, and an appreciation of the advantages of New England life and New England society as it is found here among us in the State of Maine. We like to hold out to these young men the business aspects, the possibilities of farming in its true light, letting modern ideas illuminate them—looking at it from the present aspect of the situation rather than from the past; and thus see if we cannot disclose to these young men, who are seeking opportunities for the development of their energies, a more hopeful aspect of the business than has heretofore been presented to them or they have even dared to hope for.

I wish that we might give some further and more emphatic expression of our pleasure at the words of welcome and appreciation which have been addressed to us; but without further formality in

this direction, we would have you understand that we fully appreciate the full measure of this welcome, and again would say we are heartily glad to receive it.

APPLICATION OF BUSINESS PRINCIPLES TO FARMING.

By SAMUEL BELL, of Falmouth.

Mr. Chairman, Brother Farmers, and Ladies: The first question that came up to me, when I received the notice of this meeting was, What are business principles? Upon what basis does the business man operate? In getting at the answer to this question let us take an illustration. A man attempts to start out in life in a pursuit that is called "business;" it is supposed he is going into the pursuit of buying or manufacturing and selling articles of merchandise for gain. That is what is generally called "business." Farming would never for a moment enter the mind of a person who was talking of "going into business." The first thought that enters his mind generally is, what business am I adapted to? He may make a mistake in answering that question, but that is the first thought. Then comes the question of where to locate for such business as he chooses. Most of the business in cities and the larger villages is transacted upon a different basis from that of the country store. Some particular branch of business is selected, rather than a general trading business. Hence he locates himself as best he can for the business which he is to pursue. Then comes a consideration of the capital which he has to invest, and then the purchase of such goods as he sees fit to make use of in his traffic. In doing this a knowledge of the market value of the goods he intends to purchase is necessary that he may be able to purchase them on such a basis as will enable him to compete with all that may be in like business. He must be able to sell his goods at such a price that his neighbor, dealing in the same articles, cannot undersell him. This knowledge may be obtained by consulting the various prints which will give him a knowledge of the market value of the goods which he is to purchase. He is now to set up in trade, with his stock in store. What next? Such help as he may feel it necessary to procure to assist him, and above all, if the business would long stand, there must be a set of books and a good book-keeper, that he may know how he buys and how he sells, and whether his goods are sold at a profit sufficient to support his business. It is very necessary that he should buy well in order

to sell well. His book-keeper, being possessed of the knowledge requisite for such a situation, keeps a correct account of all the goods bought and all the goods sold; and at the end of the month, or quarter, or year, as the case may be, a correct statement of all his accounts is made, his balance struck, and he knows then, by a comparison of the purchases upon the one hand, and the sales upon the other, whether his business is profitable and whether he can continue, however imperfect his start may be. As he progresses in life his experience teaches him of the necessity, from time to time, of improvements in his methods of business, to make it more successful, and thus he travels often through his business career.

This is a very brief statement of what seems to be requisite to a business man in starting in life. Is there anything that would seem to indicate to us that the farmer should pursue any such a course? From past experience we might all say that these ideas have but little application to the farmer. You know the farmer operates upon a different system. This is a subject that is very rarely presented to the farmer in the light that this program places it before you. Too often when the farmer goes forth the thought of what it costs him for plowing his ground, or for the fertilizer placed thereon, or the seed that is cast forth, the cost of cutting his hay or producing his grain, never is a consideration with him. It is a mere matter of course thus to pursue his vocation, and thus he lives year after year. If at the close of the year he has enough left to pay his taxes and a little more he feels happy; if not, he seeks the coming year to do a little more, that he may be able to meet the loss he met with the year before. This is not the right way; this is not the proper way for success.

If it is necessary that the business man should look well to selecting the right kind of business, the business that he is adapted to, and if he should see to it that he buys his goods well that he may sell them well; and that he knows the difference between the cost of buying and the returns from selling—I say, if it is necessary for the business man to do all these things, it is necessary for the farmer to pursue a similar course if he would attain the greatest success.

How often we start from home with a load of produce, without a particle of knowledge as to what it is really worth; and because we have never estimated its cost. There are but few of us that know what a gallon of milk costs, or a dozen of eggs, or a pound of butter, or a ton of hay, because we fail to apply business principles

to our farming. We do not keep the accounts, the debt and credit, with our farms; we have forgotten all about it if we ever did such a thing; and, from the fact that we never were taught it, very few of us ever did it. For a trader, some such steps as I have suggested to you are necessary to his success. If for a trader, the same for a farmer.

It seems to me fortunate that this meeting was called at this season of the year, when we are just about to enter upon a new year, a season when we are all apt to be making resolutions to improve upon the past in our moral, physical and mental lives. There never was a time when it was more requisite that we should begin to apply business principles to our farming operations than the present. Let us each get a set of books and open an account with our farms, if we have not already done so, and with our household expenses; and let us understand at the close of the coming season what every product of our farm costs us, then we shall understand what we ought to receive for them. If we are not able to obtain a price sufficient to remunerate us for our labor, we will be able to charge off to profit and loss, what every good business man does, and seek to make up the loss by profit in the future.

The course which I have recommended is an advantageous one to pursue for more reasons than one. In the first place it is an intelligent course. It would be an advantage in this point of view if every farmer would keep a set of books, in his own way, even if unintelligible to every one else, so that he may know whether he is doing a profitable business or not.

We hire a mechanic to do a job of work upon our buildings, and we find him always ready to give us his price. He bases his price upon the value of the material used and the time spent, and why? because he has a price for his time and a price for his material. Not so with the farmer, as a rule, when he is at work upon his own farm at least. We do not say our time is worth $1.50 a day and base our proceedings upon that ground. If this was the case I think we should more intelligently dispose of our products than we do. This illustrates the importance of applying business principles to our farming.

A few weeks ago I employed a neighbor to hold a plow. I paid him for it $1.25 per day. I wanted a little house carpentering done, and I employed the same man to do it, with a few very poor tools, and I paid him $2 a day. I was quite as well satisfied with the

price at $2 per day as with the price at $1.25, from the very fact that this seems to be the condition of things. The price of a farmer's time and labor is but small; when you come to employ a mechanic or a professional man it is a different thing altogether. It appears to me that our want of a systematic business way of doing our farm work is why we underestimate our labor as much as we do. If we pursued the course of the business man we should certainly understand what the real value of our labor is, as well as the professional man, the mechanic or the ordinary laboring man. How often we are met with the statement that the farmer is getting rich, made by men who make ten dollars to the farmer's one. You go to market with a lot of butter and ask a man thirty or thirty-five cents a pound, and you are met with the remark, "Ha! you farmers are getting rich. Thirty-five cents a pound for butter!" Hardly any of us are able to meet that remark with a statement of how much the butter cost. If we could, as the man of business would, we could give the thing a very different aspect. I was talking with a man a few days ago in regard to my price for butter, and I asked him how much butter he thought a cow would make in a year. He didn't know; but I did know something about it, and I was able to give him some little idea of what my butter cost me, and after I laid the whole matter out before him, and showed him that there was only ten or fifteen dollars income over and above the cost of keeping the cow and the interest on the money, he hung his head and said, "All the farmers don't do as you do;" and that was all the reply he had to make. That was simply because I was able to meet his argument and show at once that he didn't understand what the farmer had to do, and how little remuneration he received for his toil from day to day. We should understand ourselves and our business. How can we do this? I have already answered that question in part. We should avail ourselves, each and every one of us, of the information that we can obtain from the public prints. Papers are now published cheap enough so that all farmers can afford to supply themselves with them, and then they can understand the condition of the market, and get a better understanding of many things connected with their occupation. They can also be prepared to reply when they are asked the worth of the article which they offer for sale. Every man should fortify himself with a sufficiency of the public prints to enable him to understand the worth of his products, in order to be successful in his farming.

There are other means besides the public prints, of obtaining information which will benefit us in our business. Such assemblies as this, where we mingle with each other in social intercourse, and interchange ideas and experiences, are of great value in this direction. There are organizations within the reach of most farmers now that will be of advantage, and will help in understanding better about our business transactions.

It is well for us in every point of view, to avail ourselves of the privileges of studying well what our farms are adapted to that we may not undertake to produce thereon that which they are not fitted for. Those of us who have farms adapted to fruit raising or to any other specific crop, which will prove especially profitable to us, should understand that fact and act upon it, and not attempt to produce that which our farms are not adapted to. Let us adapt our products to our farms rather than undertake to adapt our farms to certain products.

It seems to me that the progress of the farmer is certain, that there never was a time when we had more reason to rejoice and to feel that the time is coming when we will be looked upon as on a level with men in other pursuits of life than the present; and I believe that the organization of Patrons of Husbandry is one of the most important means to bring about this desired end.

SEC. GILBERT. I have been interested in the presentation of the topic by the speaker, and only regret that he has failed to elaborate his position still more. There are points in this connection which we, as farmers, have failed to appreciate. I believe that I know something of the ideas which force themselves upon the minds of the farmers as they are mapping out their business and striving to bring out of it a measure of success which shall be in some degree satisfactory. Having been engaged with these questions which have been continually pressing themselves upon the minds of the farmers, I think I may be able to put myself into just such position as the younger members of our farming fraternity find themselves in when they are starting out in the business of farming. There is a point where they fail to comprehend aright their position, and that is in the matter of an investment. A man in other business than farming puts a certain amount of capital into that business, and out of that investment he looks to recieve a certain percentage of income, and from that percentage he derives his accumulation. How many young men are able to look at this business of farming in that light? Too

many of us expect too great a return, and that, too, at once, from this investment. Many farmers are reluctant to erect a new barn, or to construct a new cellar to the old barn, from the fact that there is a certain investment there, the amount of which is not to be immediately realized through the income. This is not to be expected. Looking at farming as a business operation we need not expect to realize the full investment at once. A reasonable percentage on that investment annually should be entirely satisfactory. Many farmers are reluctant to undertake the drainage of a field from the fact that the increased productiveness of the field would not in its first crop return to them the amount of the outlay. This is not business. We ought to be satisfied with a goodly interest on that outlay, annually, and consider the investment permanent. Let us see how this operates in business circles. Lewiston and Auburn would not be riding in horse cars to-day were the income of the road to pay the cost of construction. The road itself is never to be paid for. Those gentlemen who went into that enterprise never have looked for a return of their capital through the income of the business; all they ask for is a reasonable percentage on that capital, annually, letting the investment lie there as a permanency. The farmer should not expect to recieve in the benefits from the barn cellar which he has constructed the full measure of the investment at once, but should be satisfied with the interest on it. The drainage of the field may be a profitable investment, although it returns to the farmer only six, eight or ten per cent of the cost. Farming as a business must be looked at in this light all the way through. We invest in improved stock, for instance. It must not be expected that improved stock is going to return at once the full amount of its cost. If it returns increased income enough to cancel the interest on the investment, then it is a profitable investment. In buying a farm, we need not expect that we are going to get from that land immediately the full measure of the investment, but if this purchased land returns a good rate of interest on the capital and at the same time defrays the expense of carrying it on, then there is a business investment which is, in the sense of a business operation, a paying investment, and therefore profitable. If we look at these things in this light it may be an encouragement to young men to start out in farming as a business. Can a man, in this view of the subject, invest in farm property and carry it on as a business investment profitably? There is but one answer to this question, and it is em-

phatically in the affirmative. Public sentiment among us does not encourage a young man a great deal in running in debt in establishing himself in the business of farming. I believe we are a little at fault in that, for there is hardly a business man that can be named who is not paying interest in some form or other. They do not hold actual capital sufficient to carry on their business without relying upon the banks for aid. We need not expect that farming is going to be an entire exception in every respect to every other kind of business.

It may be well for a person purchasing farm property as an investment, to do as other business men are obliged to do, look well to the investment's being judiciously made, that the property shall not cost more than it is worth and more than its prospective value in the market. When an investment is well made, although one becomes indebted for the outlay, he is all right, because when he wishes to change that investment to cash he can do it, as he could do with stocks or bonds—put it on the market and realize the money for it. But care must be taken that the property does not cost too much in the first place. When that care is exercised there is no danger from a limited indebtedness on the part of a farmer. There is nothing there to frighten a young man. I would not by any means encourage hazardous adventures in this direction. It is a good thing to have all your property paid for and everything under your complete control. Unfortunately we are not all able to be in that situation; especially it is not expected that a young man can be so favorably situated when first starting out in the world. So I say we ought to give some encouragement to a young man who is willing to assume some indebtedness in this direction. It was only a few days ago that I listened to a statement from a distinguished State official, a man who has held high official positions in this State, in regard to this very matter of an investment in farm property and the results coming from it. He made the statement that when he became of age he ran in debt for the entire value of a farm property, and started out in the business of farming with that debt resting over him. The idea generally prevails that it is simply impossible for a man to start in that way and succeed. If there is any profit, from a business stand point, in this business of farming, certainly it holds good that a man can succeed even with that kind of a start. In the case of the gentleman I have mentioned there was an exemplification of the truth of what is claimed, for he succeeded, and in the course of a few years, not

only secured a sufficient income to pay his running expenses, but also gradually reduced his indebtedness, and finally became the sole owner of a handsome property, and from the income of that farm property alone. A young man starting out at the present time has advantages in this direction more promising, more certain, than at any time in the past. When be puts that same degree of attention and care into the debts and credits of his business, that same careful regard, which has been recommended by the speaker, to the keeping of his accounts, so that he may know where he is, he is on safe ground. There is an opening in this direction for ambitious young men, that they may enter upon with confidence of success. But it requires care, industry aud economy, without which success in any business is not to be looked for.

MR. COBB. I wish to call upon a worthy gentleman from Kennebec county, who will further continue the discussion of this question, Mr. Keith.

WM. H. KEITH, of Winthrop. This question seems to imply doubt in regrad to business principles being applied to farming. I don't know as anybody here takes that implication. Mr. Bell and Secretary Gilbert have placed those of us who may make any remarks here, upon a basis that we may start out on and not go over their ground. Mr. Bell has shown us that it is necessary to have the stock of goods well bought to get started in business, and Mr. Gilbert has shown us that a wise investment in the purchase of the farm is the beginning of success in farming. It matters not to me whether a man has a farm and has it paid for to start out in business or not; the application of business principles is the same, and is as necessary in one case as in the other. I am going to accept Mr. Bell's statement that it is necessary in business matters to have a salesman and a book-keeper and have things done in a business way, that one may know how everything is going. Farmers say they cannot afford that. But we can look after the management of the selling and the book-keeping ourselves. Suppose we want to raise a crop of corn, how can we apply ourselves to the business in order to understand whether we are raising that crop profitably or not? In the first place we have to break the sod; what is that going to cost? Every one of us can figure that. We can easily reckon the expense of preparing the ground. Then comes the matter of fertilizers to be applied to the land to produce the crop of corn. We ought to know how much manure we put upon that land per

acre to produce our corn and what its value is, whether it be barnyard manure or purchased fertilizers. After we apply the fertilizers we go on with the cultivation of the crop. Isn't it just as easy a matter for farmers to keep the run of the expense of that as it is for a man who is in any kind of business to know what his expenses are? Here is the way that we can make business principles applicable to farming. Trace this right through from the beginning of the breaking of the soil till the harvesting of the corn, and it is an easy matter to keep an account of all the items of cost. This would be applying business principles to farming in that one direction. To do this as Mr. Bell has said, we must have some books to begin with. It is easy for any of us to do this. Suppose we are raising any kind of stock and desire to know what our profit is in raising that stock, or the product from that stock; for instance, we are growing a lot of swine for the market and we want to know what they are costing us. We begin with the cost of the pig, in the first place, and trace it along. If we feed our own products from the farm to the hogs it is just as easy for us to know what the cost of it is as if we bought it. A great many farmers don't know any more what their pork costs them than if they never had seen a hog. The reason is that we do not apply any business principles to it.

With dairy stock is another chance where we can apply business principles. You can tell from day to day whether the milk is increasing or diminishing. Those of us who contribute to butter factories are going to know just how many inches of cream we get on our milk from day to day. Here is a chance to apply business principles. So we may go through with the whole list of the products of our farms and apply the same methods. There is not an intelligent farmer but can tell to-day, approximately, how much corn he can produce per acre. Here again is where we may apply business principles to our farming.

I have had some experience in manufacturing. Most manufacturing has got down now to a point that no manufacturer can make any money unless he knows just what his manufactured goods cost him; and the competition is so close in some kinds of manufacturing that he has got to know within a few mills of what they cost him; if he does not he is just as likely to run behind as he is to accumulate. It is a much easier matter for a man that is engaged in trade and keeps right after his business, to know whether he is making or losing than it is for a manufacturer. In the business of

farming I believe it is as difficult to know whether we are making or losing as in any business among us. Therefore is it not especially important that we should apply these business principles to all branches of our farming operations? It seems to me so.

I wish to read a short extract from the Rural New Yorker. It says:

"There is no class for whom the future holds so much social and intellectual advancement, so much assured prosperity, and so much rational happiness, as for those engaged in the various departments of agriculture; and in no country in the world are the farmers so well prepared as in this, by intelligence, energy, enterprise, and political as well as natural conditions, to pluck the earliest benefits from the treasures of the future."

The American Farmer says:

"There is no need of seeking for a wider or a deeper field of intellectual culture than a well directed farm life affords." And it further says, "If the sons of farmers would strive to excel in farming, strive to increase the annual average yield of the staple crops best adapted to the locality where they live, be thorough in whatever they undertake, be able to give the reason why they pursue a given system of rotation of crops and manuring, why they breed certain kinds of stock, and why they find it more profitable to pursue one system of farming than another, they would find farm work more interesting and attractive."

There is in that something encouraging to the farmer if he will only take a right view of it. I admit that a man has got to have love for, and adaptability to, any kind of business, in order to succeed in it, but I don't know as it necessarily follows that we are to be tied up to any one particular thing. If we find that our dairy is not paying us a profit, after applying these business principles, let us drop it and go to growing beef, raising small fruits, or anything that we can pursue successfully.

MR. H. L. LELAND of Piscataquis county. I will attempt nothing further than to elucidate a single point which was suggested by the gentleman who opened the discussion, and that is in regard to the farmer's pay. He compared the wages charged him by the man who held the plow and the man who performed the mechanical work, and showed the advantage to be very much in favor of the mechanical laborer. As a mere wage laborer the farmer is generally paid less than those engaged in other pursuits. But what does the farmer,

in general, get for his labor? We will suppose a man to have a small farm and have his own hands only, that is, he be the only laborer, with the exception, perhaps, of his wife. From that farm we know that he can raise up a large family of children, and can clothe them, educate them, on a small farm with a single pair of hands, with the addition of such help as he will get from the children as they grow old enough. In what other pursuit can the same amount of capital invested and the same amount of labor performed produce so satisfactory results? I don't feel quite satisfied with the impression that would be left from the remarks of Mr. Bell, not intentionally, I think, but because he did not continue the subject far enough to explain.

Now what is the margin of profit in farming? I claim that the margin of profit in farming, when intelligently pursued, is as large or larger than that in any other business, with the same intelligence applied, the same capital invested, and the same amount of labor performed. There are farmers among us who reason in this way: the manufacturer, who employs a large number of men and uses a very large capital in his business, is getting rich, while the poor farmer, working harder than he, is simply getting a living. How does the manufacturer get rich? Simply by making a profit on the labor of others and getting a profit from the capital employed. Let the farmer employ capital and labor and see what his margin and profit will be. I say, then, that we ask too much of the farm sometimes. Secretary Gilbert has shown you that there is a strong probability, at least, of a profit on capital invested in agriculture, and that, with certain conditions, it would be safe for a young man to get in debt to pursue farming as a business, and that he may make a profit beyond all cost.

What are the conditions of success in farming? There must be intelligence; there must be industry; there must be economy; and these will always receive their compensation. If our boys are willing to be mere wage laborers; if they don't care to put intelligence, if they don't care to put their brains into the work; let them work on the farm or in the factory, or wherever they may, and they will receive an amount of compensation in accordance with the skill and the intelligence that they put into their work. Just so with the physician; he has put study and thought and intelligence and time into his profession and he is paid for it. We are willing to pay for it, and, generally, we are willing to pay for what we get, and no more.

If our young men are to go into the business of farming, they want to learn the business of farming, just as the carpenter learns his trade; just as the clerk goes into a store and starts at the bottom and works himself up, learning the business all the way, and then they will probably succeed. The wonder is that we succeed as well as we do, without more thought, without more intelligence, without more brain work in our labor.

I was very much pleased with the presentation of the subject by Mr. Bell, from the fact that he made it simple. I recollect that heretofore when this subject of book-keeping has been presented at our farmers' meetings the subject has been made intricate, with single entry and double entry, and this and that, so that we have gone home perplexed and with no courage to attempt to keep any books. But he has shown us that we may keep them in our own way, and that it is enough if we understand them ourselves. I assure you, from some little experience and observation, there is nothing so valuable to us as keeping an account with our farms, such an account as shall give us a knowledge of what we are doing, and what the cost is of that which we are putting onto our farms. When we do this we shall be much better satisfied at the end of the year. If there is a young man within the hearing of my voice who ever expects to be a farmer, I would say to him, study it as a business and pursue it as a business; give it your thought; make it worthy of your consideration; and consider yourself as doing as high work, as intelligent work, and as profitable work as those engaged in any other calling whatever.

DANIEL FIELDS, of Auburn. I came here very hungry for information in this direction. I wanted to hear something about business matters applied to farmers, and I have listened to Mr. Bell, and the Secretary, with a great deal of interest, and I wish the gentleman who opened this discussion would continue to ring his "bell" in the ears of every farmer in the State of Maine.

You let a young man buy a good piece of land anywhere in the State of Maine and let him go to work and use his brains, his common sense, and his muscle, and he is not going to spend a day's work without getting good pay for it.

MR. L. K. LITCHFIELD, of Winthrop. The subject of the discussion this forenoon is one which ought to, and probably does, interest every one present. Most of the ground has been well gone over, and in such a manner that we can all receive benefit from the

discussion. But there are some points, of course, that have not been touched upon. There is one thing, in addition to what has already been said, which I wish to say a few words upon, and that is in regard to the information which a young man should have before embarking in any business. I think this may well be said to be a principle: before he attempts to be a farmer he should know whether he is adapted to that business; before he attempts to be a trader he should know whether he is adapted to that business; before he attempts to be a horse jockey he should know whether he is adapted to that business. Upon his adaptability to his business depends largely his success. One speaker has said that one should adapt his farm operations to the location in which he is situated. If he is so situated that he can raise fruit let him raise fruit; if he is so situated that he can manage a dairy let him manage a dairy. While I accept that, I believe that a man should be adapted to his business, whatever it is, whether it is orcharding or dairying; and when he has found out whether he is adapted to the business let him pursue it intelligently and in a business way, applying these business principles to that branch of agriculture. I am somewhat of a specialist in farming. I don't believe in a man's having brains enough to carry on all branches of farming with his own hands and his own intellect. He may take one branch and pursue it successfully, whereas, if he attempted more than one he might fail in all. I came to this conclusion more especially from my own experience in farming, not having been raised a farmer's boy, but from my love of the business having engaged in it. From my failures in certain branches of that business, not being adapted to them, I have found out what I am adapted to, and that I am pursuing; and I believe this should be the case with all young farmers. I have no experience to give the older farmers, but what I have learned I would recommend to the younger farmers, and that is, to pursue that part of the business to which they are adapted and gain all the information upon it that it is possible to do.

Mr. Bell. This suggestion of the importance of a man's choosing that branch of the business to which he feels himself adapted is a wise one. The suggestion I made was, that having become the owner of a farm we should choose those products which are adapted to it, rather than to attempt to adapt the farm to certain products. For instance, my farm is a clayey soil, heavy, without rocks, without anything to lighten it except what the plow and other farm utensils

will do. My farm is better adapted to grass, perhaps, than to any other crop, and I have settled down satisfied with raising that as a principal crop, and have found it the most profitable crop that I can raise. It would be useless for me to attempt fruit raising. I have attempted it; I have expended a large amount in buying trees and making an effort to raise fruit, but I have been unsuccessful in that every time. The soil is so heavy that the roots cannot work in it. The trees will live for a short time, while they feed upon the surface, and then die. Hence I would have a farmer know what his farm is adapted to and not waste his time and money and labor in trying to raise crops that his farm is not fitted for.

Two of the cows were fresh in milk the last of August, 1882, and one the last of January, 1883. Feed given to cows daily when in condition, two quarts of cotton seed meal and four quarts of bran, and all the good hay they would eat up clean. I say "feed given when in condition," because it is not always that cows are in condition to feed meal to, for instance, immediately after they are fresh in milk.

Now this is business. If we can tell what they will do in a week we can tell what they will do in a month or in a year. I made another report; that from four cows in twelve months, the number of pounds of butter was one thousand one hundred sixty-two and one-half pounds from all the milk except that used in the family.

There need be no guess work about the matter. We can know what our cows are doing; we can know just what it costs for a gallon of milk, a pound of butter, a pound of flesh, a fleece of wool, a dozen of eggs, or anything of the kind; let each department be charged and credited with the amounts paid out and the amounts received. It is just as easy as it is to keep books in any mercantile business. At the close of the year we can know how many days' work we have done, and estimate the worth of it. We can understand how much we have paid out for each and every product, the hay crop, the potato crop and every other product. Let us every night repair to the desk and put down what has been expended and what has been received; and with this debt and credit system, when we come to the close of the year we may understand just exactly what we have been paid for our labor. There is no need of guess work in the matter. The advantage in the way of improvement to ourselves will be great; it not only fits us to keep

an account of farm work, but it will be useful training in fitting us for any other branch of business of a like nature.

SEC. GILBERT. There is one point I wish to enforce further. One of the greatest stumbling blocks that we find all the way through in our farming here in the State of Maine is the disposition on the part of the farmers to curtail their business instead of increasing it. They are afraid to plow up yonder field because it is going to require some expenditure for labor to carry on the operation; they are afraid to extend their business because more help is going to be required; they are afraid to extend in any direction because it is going to require a greater expense. But they may rest assured that in farming, as in everything else, if they are going to do something they must put out something. If a farmer expects an income from his business he must put out something in the first instance in order to secure that income. A cautious individual who has got a little light upon this matter made the remark to me a few days since, "It is no use, you can't do anything on a farm unless you put out some money for it." He had found out that he could not on his farm make any money out of it unless he put something into it. It is so with every branch of business. Another said to me, "I am putting out more money annually for feed to bring to my farm now than my entire income used to be, and yet the profits on my farming operation, under the present plan, are greater than my entire income from it used to be." That is an illustration of the point I wish to make. If one wants to secure an income from this business of farming he must put out some money in the form of labor and in other ways in order that it shall bring back a profit on the investment.

MR. BELL. Just one word. I want to clinch, if possible, the rivet that the Secretary has just placed into this point of the discussion, by his reference to the course pursued by the farmer as contrasted with that of the merchant. He says the farmer seems to be constantly striving to diminish rather than to increase his business. The merchant, the business man, on the other hand, is constantly striving to enlarge, thus taking precisely the opposite course from the ordinary farmer. When we look over the business world and see what single individuals are doing in the way of business we are astonished. Every business man is seeking to extend his business, and his expenditures, of course, and this is the way he expects to accumulate wealth. Can the farmer, by pursuing the

directly opposite course expect to get rich? If it is true that the way for a business man to get rich is to increase his business to the fullest extent of his ability, intellectually, physically and financially, it seems to me there can be no doubt that the farmer should follow his example and strive to increase his business.

AFTERNOON SESSION.

COMPARATIVE PROFITS OF BUTTER MAKING AND SELLING MILK.

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

Mr. Chairman, Ladies and Gentlemen: Let me say, as a preface, that this question seems to be very closely allied to the general subject for the day, being a branch of our farm operations, and especially one assuming somewhat of a business aspect. Hence it is introduced very properly in connection with this general topic. Furthermore I will say that it was by request of certain interested parties that the question was brought in here at this time, there being some in the vicinity who are questioning in their minds whether it is better for them to engage in putting their milk on the market, or to work it up into butter. The invitation was extended to me to attempt to compare the business of selling milk with that of butter making, with the request that it should be impartially done, and that no effort should be made to establish preconceived opinions. Let me for a moment just hint at some of the difficulties in the way of this. Are you aware that it is not an easy matter to accept squarely the logic of facts? We all entertain some opinions, and it is human nature for us in examining a subject, especially if it be a favorite subject, to wink at those straws which point against our pet theories and magnify those which seem to support our own ideas, and it is almost — I hope it will not prove in this case quite — an impossibility for a man to stand up and accept the logic of facts.

Here are assembled this afternoon representative farmers. Some of you are selling milk; others are making butter. More or less or all of you are engaged in the dairying business. Let us see this afternoon if we cannot lay our heads together and talk over this matter of making milk and making butter, and gain some light upon the comparative advantages of these two kinds of business. Heretofore the opinion has prevailed, and to a certain extent it still prevails, that you who

are situated so that you can sell milk as a raw product, on the train or in the market, are more favorably situated than those of us who are located where that is out of the question. Who has examined the question carefully and critically so as to be able to substantially prove that the selling of milk is a better business than the manufacuring of it into other products? While attempting an investigation into the subject, I would wish to carry with it the idea of a candid examination, impartial in every respect, and further, that it be a critical one, and one which will "wash."

A comparison of these two forms of the dairy business cannot be made in all of their aspects with mathematical exactness. We can apply mathematics to the investigation in a great measure and can figure out the problem with a good degree of exactness in most directions, but there are other bearings which cannot be determined by such an examination. There are certain conditions bearing upon the buiness of selling milk which do not apply to the other, and we cannot apply the rule of dollars and cents to their measure.

First of all we will look at those features which may be examined with figures, and on which we are able to make calculation with a goodly degree of accuracy, and reach results which may be relied upon with a measure of confidence. Fortunately we have some farmers who have been keeping records, and have their figures to rely upon. We may resort to these figures as a basis of operations, and with confidence as to their correctness. For instance, a good cow —and it takes a good cow to do it—well fed and cared for the year through, will give 2600 quarts of milk in a year. There are a good many milkmen here, and I would appeal right here to your judgment in regard to the correctness of these figures. Is there any man here who has been able to get 2600 quarts of milk in a year from his cows, on an average? If some of you have exceeded this amount, as we know you have, you need not be bashful about admitting it. It is no discredit to a man if he has got more than 2600 quarts from a cow. I say it takes a good cow, and she must be cared for in the best manner in order to realize 2600 quarts of milk from her in a year. We do not claim that this is the average of an ordinary herd, by any means; this is only a representative cow. I could cite to examples larger than this, but they would be isolated cases.

Let us take this representative cow, giving 2600 quarts of milk, and follow her along. In ordinary practice you have, in the past,

been obliged to supply on the market two-thirds as much milk in the winter as you do in the summer. We will reckon it in that way. Possibly there has been a gradual and slight change in the direction of the use of more winter milk as compared with summer milk; but the summer demand for milk is somewhat larger than the winter demand. So you are required to make two-thirds as many quarts of milk, or two-fifths of the milk in the winter season, and three-fifths of it in the summer season. Of this 2600 quarts, two-fifths are to be credited to the winter. We cannot apply the retail business to this examination, from the fact that the man who peddles his milk in the city with his own team, and is fortunate enough to so collect his bills that he makes a handsome profit from it, is entitled to all the profit there is in it on account of the perplexities and expenses of the business.

As I understand it milk has been sold on contract this winter for four cents a quart, for the six winter months, and the milkmen are pretty well pleased at that. In years past the price has been somewhat less—some years considerably less; but we do not wish to split hairs in this examination, and so we will give the business the benefit of the best prices. It is always best to put things best side out, where you can do it as well as not.

The total yield of the cow we have placed at 2600 quarts. Two-fifths of that amount, or 1040 quarts, is winter milk; and at four cents per quart gives $41.60 for the winter milk.

The contract price of summer milk has lately been three cents per quart. Three-fifths of 2600 quarts is 1560, the amount of the summer milk. This quantity at three cents per quart gives $46.80 for the summer milk, and $88.40 as the total wholesale price of the annual yield of our representative cow giving 2600 quarts of milk.

Perhaps some of you may think this is figuring pretty fine, to make a division into summer and winter milk. Some of you are making even more milk in the winter season than in the summer; and I admire your wisdom in doing so, because you are selling your milk for a greater price in the winter. Still the former position would hold good, because if every one of you made more milk in the winter than in the summer you would overstock the milk market and bring the price down to summer figures.

While we claim that the division suggested is the only correct ground to reckon from, there is no sort of objection to making a new reckoning on the basis of an even yield of winter and summer

milk and fixing the average price for the twelve months at three and one-half cents per quart; or, if you prefer, we will reckon one-half of the 2600 quarts, or 1300 quarts, as winter milk, at four cents per quart, and 1300 quarts, as summer milk, at three cents per quart. By either of these methods we get $91.00 as the wholesale price of the annual yield of our representative cow, a little larger figure than was obtained by the former reckoning.

We care not which of these figures you take in the examination. We are supposed to be standing on results and not on our opinions.

Now let us compare it with butter making. There are two ways of making this comparison of the results of milk making and butter making. One way is to take this same milk and make it into butter, and this is what we will do first. The other way I will allude to further on. Perhaps, if this was an actual practical operation, instead of a paper presentation, some of these milkmen would be a little sensitive in regard to having their milk examined by the test of the churn; but we will do so at this point, and as long as this is paper farming, or paper churning, it may answer to examine sale milk. We will take this same milk and make it into butter. Of milk that is made to sell it will take twenty-five pounds for one pound of butter. If you do not think that is a generous figure to put down then put it to the test of the churn and see. As a matter of fact, on an average, the year through, with cows producing for the milk business, it will take more than 25 pounds of such milk to make one pound of butter.

Question. How much does this milk weigh to the quart?

SEC. GILBERT. A quart of milk, legal measure in this State, weighs 42 ounces. A quart wine measure, which is the legal milk quart in most if not all other States, is 34 ounces, or, as it is sometimes more conveniently expressed, 2.15 pounds. And, by the way, it is always better in speaking of milk anywhere, unless you are peddling it, to speak of it in pounds rather than in quarts; because the old saying that "a pint is a pound the world around" does not hold good in Maine. 2600 quarts of milk will weigh 6825 pounds. 25 pounds of this for one pound of butter will give, from this 2600 quarts of milk, 273 pounds of butter. Now, then, the man who can get 2600 quarts of milk from a cow can sell his butter for how much? We are reckoning now on representative work, and we will suppose that this representive work is going to be carried right though into the butter business, as well as in the making of the milk; and so we shall claim

the privilege of reckoning the price of this butter at a fair figure. I believe you will bear me out in the claim that there is no difficulty, or hasn't been for a good many years, in securing an average of thirty cents a pound the year round for butter of this kind, handled by a man of intelligence and business capacity. As a matter of fact I could cite you to a great many instances where it has exceeded that. This is a reasonable, candid, safe figure to reckon from. 273 pounds of butter at 30 cents a pound would bring $81.90.

Now comes in a point for consideration where so reliable mathematical calculations cannot be made. In this butter making business we have a side product in the form of skimmed milk and buttermilk. This is of some value. Who says how much? Come now, make your own figures; I don't want to make all of them.

A FARMER. A cent a quart.

MR. COBB. I think it would be fairer to give the skimmed milk for the trouble of making the butter and marketing it, against the making of milk and selling it.

SEC. GILBERT. We do not propose in this examination to set one thing off against another at all. We do too much of this offsetting of one thing against another and claiming that this is fair. The correct way to keep accounts is to put the credits into one column and the debits into the other, and strike a balance.

In the manipulation of this 2600 quarts of milk and working it into skimmed milk and buttermilk, there is a shrinkage; there will not be as many pounds of skimmed milk and buttermilk as there was of whole milk. Just how much that shrinkage is I do not know. I have made an allowance here of 2000 quarts of skimmed milk and buttermilk coming from 2600 quarts of milk, making the shrinkage 600 quarts; and I think this is safe ground. We will call the buttermilk of equal value with the skimmed milk, although the buttermilk probably is appeciated as of more value.

I have looked at this matter of the value of skimmed milk for several years with a view of compiling the views of different individuals all over the country connected with the dairy business, and the records of transactions, as they have been presented at the meetings of the dairy associations in the several States; and I have come to the conclusion that it is a safe estimate to place it at the figure named by the gentleman, one cent per quart on the farm, with this proviso, that you have got to handle skimmed milk intelligently to get a cent a quart out of it.

2000 quarts of skimmed milk and buttermilk, then, we will place in the account as of the value of $20. This added to the $81.90, the value of the 273 pounds of butter at thirty cents per pound, gives $101.90 as the total return from this representative cow, giving 2600 quarts of sale milk a year, when that milk is used to make butter.

I said there were two ways of making this comparison. If a man proposes to make butter instead of selling milk he prepares himself for making butter by selecting and using butter cows instead of milk cows. A butter dairy should differ from a milk dairy. With a milk dairy the object is to get a liberal flow of passably good milk, and when that is done everybody is satisfied. With a butter dairy the object is butter, and a large flow of milk is no object at all. Consequently, instead of selecting 2600-quart cows, for a butter dairy, we would select cows that will make a large amount of butter regardless of the quantity of milk. To do this business as well as the milkmen do theirs we must select cows as intelligently and carefully as they select theirs. As good a cow for butter making as a 2600-quart cow is for milk making, will make 300 pounds of butter in a year. Now don't go home and say that I said an average cow would make 300 pounds of butter. I haven't said any such thing. I would not take any extreme figures at all for comparisons. Even in the State of Maine we have cows that exceed 2600 quarts of milk and cows that exceed 300 pounds of butter.

Three hundred pounds of butter at 30 cents per pound brings $90. A cow making this amount of butter would give 6000 pounds of milk. You will bear in mind that I took the ground that she should not necessarily be a heavy milker, but the milk should be rich in butter. This 6000 pounds of milk, after the butter is made, will furnish 4500 pounds, or 1700 quarts of skimmed milk and buttermilk. At one cent per quart this would bring $17. Adding this to the $90, the value of the butter, and we have an aggregate of $107 as the annual return from the cow by making butter.

I do not claim that this is an average cow; but simply that this is a fair comparison of a three hundred pound butter cow with a two thousand six hundred quart milk cow.

One further comparison: We have been talking about first-class work. Now suppose we take ordinary work, for we want to look at this in all its aspects. What is the yield of milk from an ordinary cow, if you know what kind of a one that is? It is a sort of a

mythical animal anyway, but I have figured it on a basis of 1800 quarts a year. You who have been making money in the milk business never would have made so much as you have if you hadn't had better cows than that. This 1800 quarts of milk, at an average price of 3½ cents for the year, would bring $63.

This milk, on the same basis of calculation that we worked from before, would make 189 pounds of butter, reckoning 25 pounds of milk for one pound of butter. It is barely possible that some of you object to calling butter 30 cents a pound, and as we are now considing only ordinary work we will reckon this at 25 cents per pound, which gives $47.25. This 1800 quarts of milk will yield 1400 quarts of skimmed milk and buttermilk, worth as before, one cent a quart, or $14. This added to the price of the butter, $47.25, gives a total of $61.25 as a return from the ordinary cow, making butter at 25 cents per pound.

Let us now make the other comparison—an ordinary butter cow in place of an ordinary milk cow. An ordinary butter cow ought to make 200 pounds in a year. If she does not she had better be sold to the milkman and let him fatten her up for beef. The 200 pounds of butter at 25 cents per pound brings $50. The skimmed milk and buttermilk will amount to 1200 quarts, which, at one cent per quart, will bring $12. This gives a total return of $62 from the ordinary butter cow.

If we saw fit we might take cows of a still lower grade, but I have not cared to carry the comparison further. Of course we have those which do not give 1800 quarts of milk in a year nor make 200 pounds of butter; but if carried out the balance would be very nearly in the same proportion as we have found it in these cases.

So much for dollars and cents, but the comparison should not end here. There are still some further considerations which should be examined in connection with the subject on both sides. There is a question of the labor involved. The time has been when we could not enlarge the butter dairy business to any dimensions at all commensurate with our ambition, in consequence of the labor question. It has been the strong argument of the milkmen that they were not obliged to work up their milk in the family, and therefore the female portion were relieved from the severe and continuous labors of the dairy to a considerable extent, having, in fact, only the care of the cans left for them to look after. Happily for us now the butter factory opens a way to solve the labor problem connected with butter

making, so that a candid comparison of the labor involved in the two kinds of dairying places it in favor of the butter maker rather than the milk seller. The butter factory removes nearly all the labor formerly bearing so heavily upon the family, and settles the labor question involved in the business.

The labor involved in caring for the cans when the milk is marketed, is not a very burdensome matter; and, certainly, when the milk is set in the cans for creaming, and the skimming is done by the individual collecting the cream, and there remains for the family simply the washing, scalding and caring for the cans in which the milk is set, the labor involved is not great. As a less number of cans are needed there is certainly less labor than when the milk is marketed.

But neither of these branches of business will run itself; there is labor and care involved in the matter. It costs no more to feed the cows in one case than the other; it costs no more to care for the cows in one case than the other; it costs no more to do the milking in one case than in the other, and I do not know how to get at anything more accurate for a comparison of the labor involved than what has been said.

There is this further item which I want to consider, and it is one of some importance. There is a value in the skimmed milk, over and above its cash value as a feed. It is desirable, it is convenient and it is profitable for the dairyman to raise some of his best calves. If he has the best cows in the land, as he ought to have, he ought to raise some of the calves from those cows in order to perpetuate their kind. I would rather have a calf raised on skimmed milk than on whole milk. Further than that, one of the most profitable attachments to the dairy industry is the keeping of pigs on the farm. This raising of calves and keeping of pigs is not only a convenient attachment to the dairy business, but is a profitable one, and one that may well claim the attention of our farmers. Where the whole milk is sold from the farm it is not practicable to grow young pigs. I do not say it cannot be done, but it is done at something of a disadvantage, and cannot be so profitably done as by the feeding of skimmed milk.

There is another matter connected with the problem which never, here in our State, can be lost sight of, and never should be omitted from consideration, and that is the matter of the retention of the fertilizing material on the farm. In butter making and the feeding of

the skimmed milk on the farm, especially if fed to pigs, we get nearer an entire exemption from the exhaustion of the soil than in any other business carried on on the farm. In butter making the entire product carried from the farm is the butter itself. That butter represents no appreciable amount of fertilizing material. Not so with the milk. In a ton of whole milk there is about eleven pounds of nitrogen, three or four of phosphoric acid, and about the same of potash. This is carried from the farm with the milk.

So there is this advantage in butter making over milk selling. The same applies to cheese making; this same fertilizing material is carried off with the cheese, and to that extent the soil suffers a loss. There is a gradual and sure, though small reduction of fertility in this way. Thus we see that the advantages are, in a small way, in favor of the butter, when compared with the milk or the cheese. Further than that, if the milk is available to feed to pigs, in this work of pig growing we bring, also, concentrated foods from outside for the pigs, which return, through the value of the pork made, their money cost, and a profit besides; and at the same time leave behind in the pens a percentage of their fertilizing material as a contribution to the soil of the farm. There is, then, a double advantage in the pig operation—the profit on the pork sold, and also a contribution of fertilizing material to the soil from the feed purchased.

These are matters which never should be lost sight of, although they cannot be measured in dollars and cents. So long as the fertility of the soil has to be provided for, that system which best provides for it must have the preference. If our conclusions have been correctly drawn the supposed advantages of milk selling over butter dairying do not exist in fact. Heretofore the milk makers have been the best feeders, and through this better feeding, probably, has come the imagined advantages of the business. If these are facts, let them stand.

Question. Would not there be an increase of expense in feeding rich feeds?

SEC. GILBERT. Not necessarily so; some of our richest foods are actually the cheapest in the market at the present time; but that may not always be so.

One word upon the general subject of this business of dairying, before closing. The Board of Agriculture has been identified somewhat with the encouragement of the business of dairying here in

our State, as offering a business opportunity to our farmers which they are entirely capable of handling well. You here have surrounding you the facilities for carrying on this business to the manifest advantage of yourselves. As the business is developed I am more fully convinced of the adaptation of our situation here to the business, and I believe that to our young men especially here is an opening which offers to them an encouragement which certainly is worthy of their attention. If you want to do a business which will amount to something, and bring in an income of some account, all you have to do is to extend your business. It is entirely practicable as long as you manage in accordance with those business principles which we discussed this forenoon.

With such facts before you, why are the farmers here in the town of Poland and elsewhere in the State endeavoring to curtail their business and trying to get along in a small way and without employing help, fearing to spread out, and pay out more money for labor, more money for feed, and do a larger business? What reason have you for it with these possibilities within your reach? These are questions which I leave you to think of.

MR. BELL. I favor the arguments as produced in favor of butter making; but I would like to hear something on the other side of the question.

MR. D. W. PULSIFER, of Poland, said: I have had some experience in the business, but I have not prepared myself to tell it. There is one thing that comes into my mind that I will ask Mr. Gilbert about, and it is this: He reckoned the value of butter at thirty cents, which is a high price, a Boston price, but we have to depend upon our local price for milk. Another thing, we sell milk by large measure while in all the other States they sell by small measure. Of course this is a disadvantage to us; if we were selling at small measure it would make quite a difference in the balances.

SEC. GILBERT. The milk producers of Maine get a higher wholesale price for their milk per quart than the milk producers of Massachusetts do, on the average. Their milk quart is smaller than ours and their price is less.

MR. PULSIFER. Their retail price is higher.

SEC. GILBERT. Yes; but, as I said in opening, I do not know how to make comparisons on the basis of retail prices, because the services of the salesmen are such that they are entitled, certainly, to all they get out of that part of the business.

MR. COBB said. I do not wish to take up the time many minutes. I have been highly interested, as doubtless all of you have, in hearing this fair discussion. It was not to be expected that a gentleman who has made it his business all his life to make butter and cheese and sell it, should present this question in a light any less favorable to that business than it has been presented this afternoon; indeed, it has been presented in a much fairer manner than I expected. I have no fault to find in that direction, and I do not believe any of you have.

In opening the discussion this afternoon the speaker's statement as to the number of quarts of milk required to make a pound of butter was precisely my experience. My Saturday night's and Sunday morning's milk, three times during the fall and winter, has not been wanted in Portland, and it has been kept at home. It has been measured in the cans as accurately as we would measure it to send it to Portland, and set in shallow pans in a suitable place where all the cream could be raised. It has averaged ten quarts to one pound of butter, from a herd of twenty-eight cows. But bear in mind that these cows have been selected for making milk to sell, and there are but two Jersey cows in the whole herd. The result has varied but one or two ounces in three trials.

In reference to the market price of butter as it has been this fall and winter, I wish to say that I have not known of any butter being sold in the Lewiston market at wholesale for more than twenty-eight cents.

MR. LITCHFIELD. The butter of the Winthrop factory is sold for thirty-five cents a pound, and we are opening a market in Boston where we expect to get more.

EVENING.

The evening was devoted to a lecture by H. L. Leland, of Sangerville, on the subject "Our Boys and Girls," which will be found in full in connection with another meeting.

An expression of thanks for courtesies extended closed a profitable meeting.

YORK COUNTY.

Institute at Acton.

By invitation of the Shapleigh and Acton Agricultural Society, an Institute was held at Acton Corner, January 1, 1884. The day was stormy, but notwithstanding this there was a large attendance at the meeting both day and evening. The interest manifested by the people of the vicinity was an honor to the Board and a credit to the locality. A large and well trained choir furnished excellent music which formed a most acceptable accompaniment to the exercises. Horace Bodwell, Esq., the member for the county, called to order and presided through the day. Mr. Fred Bodwell, a young farmer of the town, gave a most fitting address of welcome to the Board and to the representative farmers there assembled.

No report of the forenoon exercises is here given. In the afternoon a paper was read on "Our Worn Lands," by J. W. Lang of Bowdoinham; which will be found in another place.

The evening was devoted to a lecture on

FARMERS' BOYS AND GIRLS.

By H. L. Leeland, Sangerville.

I purpose at this time to speak more specially of those interests that pertain to the youthful members of the home circle; to talk to and with the boys and girls of the opportunities, the advantages and the enjoyments of farm home life.

It is a vitally important duty of parents to train and educate their children in those things and in those ways that will best fit them to meet successfully the responsible duties of life; not only to map out plainly the road to success, but to point out to the youthful voyagers the temptations, the hidden rocks, the pitfalls that endanger life's pathway.

Farmers' children are not often wanting in energy and ambition, and early in life develop a manly independence and a desire to excel.

Rural homes, with their healthful surroundings and pure, moral influences, have been long regarded as the best training school for youth. Here in early life are learned those useful lessons of industry, economy and self reliance.

With these advantages, peculiar to rural homes, we cease to wonder that from the farm go out into the activities of life, those who wield the most potent influences for good, and who in the struggle reach the highest eminence, as statesmen, scholars, inventors and as those most successful in business pursuits.

Farmers' sons and daughters, with a thirst for knowledge will, often unaided save by that best aid, self-help, climb step by step, surmounting every obstacle, and, by persistent energy and industry, overcome all hindrances in their upward way, and finally gain the goal of their highest aspirations.

Some writer has truly said that "the world, though rough, is the best school-master, for it teaches us to rely upon our own resources, and we gain that mental strength, and practical knowledge and training, which no college or university can ever impart." These truths and lessons teach us that it cannot be too firmly impressed upon the minds of the young, that it is not so much helps, and facilities, as it is obstacles and difficulties, that make strong, educated men and women.

While encouraging the young to rely upon self efforts in gaining knowledge, I would not be understood as placing too little value upon our excellent school system; yet it has been too many times proven that our advanced schools, our colleges and seminaries with their classical courses of study, together with the influences and surroundings that give tone, character and bias to these schools, have led those connected therewith, and those being educated therein, to look with disdain upon manual labor and to regard industrial pursuits with aversion. There is evidence that the monastic system of the past is being supplanted by a more rational system—a system in which is taught less of theory and more that is practical and useful; less of classics and more of science.

That this change is in the line of progress we truly believe, and have the highest authority in proof.

Prof. Agassiz some years ago said: "We live in an age in which all education is changing; in which monastic and scholastic education is vanishing; in which even literary education is waning, to make room for more practical, more active, more scientific education." Quite recently the Hon. Charles Francis Adams has spoken clearly and emphatically in favor of a practical and a scientific education, an education qualifying its possessor for the active duties of business life. Agricultural colleges and technical schools have been the outgrowth of the demand for more practical knowledge.

While the educational work of these colleges and schools has been too brief to prove fully their value, yet what has thus far been accomplished leads to high hopes of future usefulness.

The educational need of the present is a practical and scientific training, bringing to view nature's laws, and giving the power to control her forces. Ignorance of these forces and a dependence upon muscle alone, will most assuredly fail in the sharp competition of the present. Developed mind is the controlling motive power of the age.

The steam engine, moving onward long trains of cars with the velocity of the wind, represents the empire of the mind; the weary traveller plodding along the highway with his pack upon his shoulders, the inefficiency of human strength.

The noble steamer, plowing the billows and scorning old ocean's power, is emblematic of high civilization; the birch canoe and dug-out, of barbarism and ignorance.

The telegraph, joining continent to continent and city to city, and flashing thought with lightning speed, in contrast with the bonfire that blazed from hilltop to hilltop in the past, reveals the marvelous ingenuity and progress of the mind.

The mowing machine and reaper mark the advancement of intelligence; the spade, sickle and hand-scythe remind us of the hard toil and drudgery of the past.

While but few farmers' boys and girls can avail themselves of the advantages offered in our advanced schools and colleges in gaining a liberal education, yet they need not despair. If they but set themselves resolutely to work to obtain knowledge, they will find the opportunities and the means within their reach.

Living and working amid nature's scenes, and brought in close contact with her forces, you have a rare opportunity to study and comprehend her laws. You are familiar from early childhood with plants, from the time the tiny seed is buried in the soil till the ripened fruit. You may learn useful lessons from the animals you care for and pet, and from all those useful and beautiful objects in nature by which you are surrounded.

Impressions and habits formed and strengthened by training and education in early life will be potent factors in determining and shaping future life-work. A judicious training of the young at home and upon the farm will do much to mould the tastes and beget a love for pastoral pursuits. Even when quite young, children can, by attention and encouragement, be taught to love the farm.

"'Tis education forms the common mind,
Just as the twig is bent the tree's inclined."

Give the children—the girls should share with the boys—a few lambs, a heifer calf, a yoke of steers, and fully as may be, place the care of them in their hands. If they love pets, and nearly all children do, the best of care will be given.

Give them the use of a bit of choice land and induce them to try their skill in growing crops. This will give them pleasant and useful employment, and while at work their thoughts will be busy about the disposal of the harvest, and in planning the many good things that can be purchased with the money.

In these ways children will be forming habits of industry and economy, and will early learn to appreciate the value of those things which they have labored for, and will be thoughtful as to their expenditures. Interest them in improvements about the home, in growing and training trees, vines, and flowers. The cultivation and care of fruit trees and the small fruits combine both pleasure and profit; and children usually delight in fruits and flowers, and will willingly aid in thus making the home pleasant. The refining influences of a home made attractive with fruit and shade trees, vines and flowers, will be silken cords to bind children to their happy childhood home.

While our children are thus being trained to love home, and are becoming skillful in manual labor, we must not neglect their social and intellectual needs. The young are ambitious to excel and to reach high positions in life, and if we are content to go on in ceaseless, cheerless toil, our children will, at the earliest opportunity, seek other and more uncertain employments. Bring knowledge to the home; provide useful and entertaining books; encourage the study of those sciences that most closely relate to agriculture, and we shall rarely need to send the children away from home to obtain an education. Do not neglect agricultural periodicals and newspapers, for they bring to the home much useful information together with all those transactions that make up the active, living present.

And, above all else, let us in our lives teach the dignity and honor of our calling; and our children will learn from our example to love and respect the noble profession of agriculture.

When our boys become old enough and strong enough to take an active part in the labors of the farm, they should be allowed to assume a share in the responsibilities of the business affairs. We

should consult with them about the work and the management of the farm. This will give employment to the mind, and do away with that drudgery that is always associated with unthinking manual toil.

The first element of success is to make a wise choice of an occupation. This fact we must not overlook, however well we love our calling and however desirous we may be to see our children filling our places. If our sons do not take kindly to farm labor, if they develop a capacity for, and a leading inclination towards some other employment, it is best to allow them the freest liberty in the choice of an occupation, at the same time counselling them to choose thoughtfully and intelligently, and not be controlled and led by a mere desire of change, or by prejudice, away from the certainties and substantial comforts of farm life.

I doubt not every young man and woman, in assuming the responsibilities of manhood and womanhood, resolve in their minds that they will win success, and feel well assured that they will be able to compass their desires.

What is the standard that you have placed before you, and through what efforts and means do you expect to reach it? I trust the standard is a noble one, and that you will pursue a manly, honest, straightforward course to reach it. There is much that is termed success that is false, and the methods of securing it are alike dishonest and demoralizing. I hope these baneful influences will not reach the farm to corrupt the morality and integrity of our youth. Truly, well deserved success is worth winning, is worth striving for, and it can be reached only through persistent, intelligent, long continued effort.

> "Better to stem with heart and hand
> The roaring tide of life, than lie
> Unmindful, on the flowery strand
> Of God's occasions drifting by."

I counsel you, if you hope to succeed, and if you regard your future well-being and happiness, to decide firmly and once for all, to engage in some useful employment, and to pursue it with diligence. Turn resolutely away from all favors and positions not honestly earned and well deserved; maintain a manly independence, and learn to rely upon your own manly efforts to win success.

If you have health, what right have you to live upon the labors of others. Bear in mind the words of Horace Greeley, who said, "It is the darkest hour in life when one makes up his mind to gain possession of wealth without honestly earning it."

Too often young people drift from one thing to another, with no fixed purpose or employment, and thus lose much precious time during the best years of life. Avoid this error, my young friends, by choosing early in life the occupation you desire to follow. You will thus have time and opportunity to become thoroughly familiar with the work, and gain a complete knowledge of its principles, and be prepared to pursue it with that skill and intelligence that is a guaranty of success. In choosing an occupation, I would not have the young disregard an aptitude for, or a strong inclination toward, some particular calling; but would impress upon their minds that of those who leave the farm it is but the few who succeed and who reach high positions, and the fiery ordeal through which they pass to gain and hold these positions is not generally comprehended, because the sharp competitions and wearying anxieties that meet them on every hand are not often duly regarded. A large majority of those who leave the farm become mere wage laborers in crowded factories and machine shops, and are forced to endure privations and hardships unknown and even impossible in farm life.

Alfred Wallace says: "Our vast manufacturing system, our gigantic commerce, our crowded towns and cities support and continually renew a mass of human misery absolutely greater than has ever existed before. They create and maintain in life-long labor, an ever increasing army, whose lot is the more hard to bear by contrast with the pleasures and comforts and the luxury which they see everywhere around them, but which they can never hope to enjoy; and who in this respect are worse off than the savage in the midst of his tribe."

A well known writer says: "one of the bad features of our American life is the growing disposition of our young men to get their living by their wits, and to leave manual labor. Bodily toil, except of the lightest kind, is becoming to young America more and more distasteful. The sons of our farmers no sooner become their own masters than they straightway throw down the hoe and the scythe and rush to the city to engage in weighing sugar, selling tape, or posting ledgers. And yet a few years ago Governor Briggs gave it as his deliberate opinion, after careful inquiry, that out of every hundred

young men who come from the country to seek their fortunes in the city, ninety-nine fail of success. But they fall singly and alone and are soon forgotten, while others from their country homes fill their places."

Dark pictures truly to contemplate by those who are only familiar with country life. But who shall say they are overdrawn? Certainly those will not who are acquainted with the wants and hardships, with the vices and moral degradation of the poorest classes in large manufacturing towns and cities.

My young friends, heed these warnings; be not tempted by the false promises of city life lest you learn too late your error, and your lives be passed in sorrow and bitter regrets. Why abandon the healthful pursuits of agriculture to become wage laborers in crowded factories or machine shops, or even to engage in the uncertainties of commercial business life?

I urge you to think long and earnestly ere you decide to leave your country homes and all the cherished associations of your childhood. Here you have true and loving friends to aid you in trouble, and to care for and nurse you in sickness. You should consider, also, the hopes and the wishes of your parents, who through all these years of struggle and of toil have cherished the happy thought that the home they were building and beautifying would be the home of their children when for them life's labors were over. Will you, heedless alike of your own well-being and their feelings, dash these hopes to earth? Will you compel them, when age and infirmities demand your care and support, to part with the old ancestral home, endeared to them by a thousand memories of life's joys and sorrows? Must they be compelled to see their home pass into the hands of strangers? Oh, if you could realize the anguish of their hearts you would not thus cause the evening of their life to be passed in gloom and sorrow. Why do you want to leave the farm? Does it not afford opportunities broad enough to satisfy a healthy ambition? Do you think there are no prizes worth striving for in agricultural pursuits? Many of the wisest and best men of our nation, in our past history and in the present, have found their truest success and greatest happiness in the tilling of the soil.

Where agriculture is pursued with intelligence, the rewards are invariably sure and remunerative, and in no other occupation is skill and industry so well paid as it is in farming.

You may say country life is dull and monotonous, that it does not offer the opportunities for social pleasures that city life affords. If you could but realize the longings of those whose lives are passed in crowded cities, for the freedom of the open country, and their soul-hunger for nature's works, you would not longer covet their seeming advantages or complain of your own situation.

Why do those who have the means leave their city homes each returning year and seek health and strength in the life-giving sunshine and the pure air of our hills and valleys? Why do those whose hearts are open to the miseries of the poor extend the hand of charity and send out from the polluted and crowded lanes and alleys the poor waifs of humanity to the open country? Why do our farmers take these city waifs into their homes of abundance, and give them the chance for a little time to feast on fruits and flowers? Is it not because the country gives health and strength and freedom not found in city homes?

Truly, "God made the country, man made the town." While our city friends can enjoy the freedom of the country and the beauties of nature for only a brief season, we may enjoy it from the opening buds of early spring till autumn's ripened fruit; and even stern winter is not without its charms.

In these lines, addressed to the lover of nature, the poet draws a charming picture of nature's scenes:

"For him the spring
Distils her dews, and from the silken gem
Its lucid leaves unfolds; for him the hand
Of autumn tinges every fertile branch
With blooming gold and blushes like the morn.
Each passing hour sheds tribute from her wings—
And still new beauties meet his lonely walk,
And loves unfelt attract him.
Not a breeze flies o'er the meadow, not a cloud imbibes
The setting sun's effulgence,—not a strain
From all the tenants of the warbling shade
Ascends, but whence his bosom can partake
Fresh pleasure unreproved!"

We know and admit that farm life in the past, and we fear there are too many examples at present, has not been made so pleasant and so attractive as it ought. The hours of labor have been too many, the opportunities for recreation and social pleasures too few,

while those influences that throw an indescribable charm about true home life and minister to the higher and finer sensibilities have been, too often, almost wholly neglected.

It is well to ask ourselves if this lack of taste and refinement manifested in farm homes has not had a marked influence in educating the young away from the farm.

It cannot be expected that children brought up under these adverse influences will imbibe a high appreciation for, or a love of, farm life. But is there need of this dull routine of labor that includes all the family and prevails month after month, year in and year out? If there be industry and economy, with an intelligent supervision, there will be time for mental culture, and for adorning the home, and also for recreation and social enjoyment.

Again, to the farmer there ought to be both encouragement and satisfaction in the thought that his labors are beneficial, that by his work the toiling millions are daily fed; the sick, yea, the proud and haughty have to ask of him those necessaries and luxuries so essential to their comfort. The true farmer is making the world better as the home for teeming millions. The knowledge that this is the true nature of his work ought to lead him to honor and appreciate his occupation, and if in usefulness there be found happiness, he will be a happy man — will be inspired with that self-respect that leads to true manliness and that will command the respect of others.

Progress upon the farm, as with other pursuits, is the key-note of the hour. Much that has in the past circumscribed our farm interests and confined the farmer within too narrow limits is giving way, and giving place to broader and more enlightened views and practices. For the farmer a brighter day is dawning. Applied science and intelligence are taking the place of human strength and brute force in the labors of the farm.

Study, aided by experimental work, is unfolding the laws of nature, and opening to view the grand possibilities of agriculture. Inventors and mechanics are perfecting farm implements and machinery, thereby economizing the farmer's time and increasing the profits of products.

An intelligent boy, scarcely in his teens, will guide the horses and handle the mowing machine, tedder, horse-rake and power pitchfork, and do the work of several strong men working with the hand implements of the past. The inventive genius of our people is not

exhausted. Still greater and more beneficial achievements await us in the future.

I would not this evening present to you an impossible Utopia. Full well I know the toil and the disappointment and the oft'times enforced economies of farm life. These, however, I feel assured are not greater than are common to other industrial pursuits; while in the possibility for a manly independence, and the certainty of possessing a home and procuring the means of support, the farm offers assurances far greater than can be found in any of the other occupations.

I have an abiding faith in the future of our agriculture. I hope in the near future to see those farms that are now abandoned re-occupied, and others that now present an appearance of neglect changed into fertile fields and wearing the appearance of thrift. I hope to see instead of the farmer toiling alone, young men cheerfully and lovingly engaged with their father in the management and labor of the farm, and our 64,000 farm homes made bright and cheerful, and the soil made fertile and productive, with the presence and industry of our sons and daughters.

Young people often regard farm life as monotonous, and they thirst for the social privileges of village and city society. While the social advantages of the country differ from those of the city, yet we do not admit that they are less enjoyable, and we are sure they are more healthful and natural if they do not possess so much of culture and refinement.

When the home training has been carefully attended to, children learn to mingle easily and pleasantly in the society of the intelligent and refined.

"It were well if more often
To rugged farm life came the gift
To harmonize and soften;
If more and more were found the truth
Of fact and fancy plighted,
And culture's charm and labor's strength
In rural homes united."

Farm boys often say they like farm work, and enjoy some special branches of it, but they cannot see how they are to get the means to purchase a farm, as it would take a long time to earn enough to buy and stock a farm, working for such wages as farmers can afford to pay. I have not the time to discuss this point, as I have nearly

reached the limits proposed for this paper, yet I cannot pass without offering a thought for your consideration.

By the census our farms number 64,000, and the total number set down as engaged in agricultural labor is 82,130. Is it possible, with an average of less than one and a half laborers to each farm, the full productive capacity of our farms can be reached? Observation and personal experience teach us that but comparatively few farmers employ sufficient working force to carry on their farms in the most profitable manner.

For the encouragement of the young let me say to you there are many special branches that might be pursued with a certainty of profit upon the home farm that would not require the purchase of additional land, and but a small outlay of capital at the start.

Among these specialities are the breeding of poultry, the keeping of bees, the growing of small fruit, the growing of nursery stock, market-gardening — these or such of them as are adapted to the locality might be carried in connection with general farming with but small additional capital, and if intelligently pursued would give both employment and profit to every member of the family circle.

I ask of you, intelligent farmers, why are there not oftener formed a copartnership between father and son in carrying on the business of agriculture? Is there any real cause why such business arrangements would not prove advantageous and profitable? Those engaged in trade and in manufacturing enterprises almost invariably carry forward their business in copartnership with other individuals. If this practice were introduced and made common in farming, would it not be an incentive with our children to stay at home? We leave this suggestion for your consideration and hasten to a close.

Once again, my young friends, let me entreat you that in the work of educating and preparing yourselves for the responsible duties of life, aim to qualify yourselves not only to become intelligent, successful farmers, but fit yourselves for the intelligent discharge of the responsibilities of citizenship. And do not harbor the erroneous idea that it is necessary to leave the farm and agricultural pursuits in order to comprehend the genius of our free institutions, or to qualify yourselves for the honorable and efficient discharge of the highest trusts and positions that may be conferred upon you.

Philanthropists and statesmen rest their hopes in the growth, prosperity and even the perpetuity of our government upon the integrity and intelligence of the rural population.

Boys and girls, cling to the farm; be your own employers; and with industry, economy, and a determined avoidance of debt, you will succeed. And when a financial crisis sweeps over the country, and mills and factories stop, throwing out of employment thousands of families dependent upon them for support, when failures and bankruptcy overwhelm commercial interests—when capitalists lock up their cash, and want and ruin come to thousands, you will be secure in the possession of your land and home.

With words of our farmer Governor I close: "Farmers be content with your vocation, for it is the most respectful and remunerative of all pursuits. Be mindful of all this, and let the good old farm, with its ancestral shade trees, its flowers and productive orchard trees, its rocks, valleys and hills, with a holy veneration, be handed down to your children."

Institute At Buxton.

A second Institute for the county was held at Buxton, by invitation of the Buxton and Hollis Agricultural Society, at their headquarters, Buxton Lower Corner, January 8. The members of the Board and visitors from abroad were the guests of the society. Refreshments for all were served at the society's hall. This society was incorporated by the Legislature of 1883, and held its first exhibition under its act of incorporation in the autumn of that year. It has taken hold of the work of advancing the interests of agriculture within its jurisdiction with an earnestness which promises good results.

There were present at the Institute, of the members of the Board, President M. C. Fernald of the State College, S. L. Holbrook and C. H. Cobb; also, J. W. Lang of Bowdoinham. No report is made of the forenoon meeting.

OUR WORN LANDS.

By J. W. LANG, Bowdoinham.

The great and vital question we are called upon to solve in these days, as practical farmers, is how to retain the present productiveness of our soil, and how to restore our worn lands to, at least, a paying

degree of fertility practically. It is generally conceded that it is easier to maintain fertility than to increase it, and much easier to deplete than maintain it.

There are tens of thousands of acres of land cultivated from year to year that do not yield a cent of profit. Many of these acres are tilled at an actual loss. This land might have been naturally good and fertile, but has become worn by unwise cultivation and cropping. How to restore it is a problem of great importance. If restored it must be by means within reach of the average farmer. Agriculture is not one of the exact sciences. There are so many conditions that no code of undeviating rules can be made to apply to all cases. There are, however, general principles running through it that are generally accepted under all circumstances. The farmer is often called to carry his crop through with too much or too little moisture, too much or too little heat, too much or too little plant food in the soil in available form.

It is reasonable and legitimate to suppose that all soils of average make-up, and none other ought to be farmed, were made expressly for plant growth, and being designed to produce vegetation the elements of plant food are present in abundant supply. This being true, then the only problem that would need solving is how to liberate and prepare just enough annually to supply food to our growing crops, at a practical cost. The thing to do would be to find the magic key to nature's storehouse — to aid her in her operations, for nature is all the while disintergrating the soil. Both mechanical and chemical action is going forward in everything pertaining to nature. It is legitimate to suppose that the soil contains, in abundant supply the elements, especially the mineral elements, of plant growth. These may not be in free and assimilable form. They may be locked up in the soil particles, and in this form be unavailable to the roots of plants until these particles are broken down, dissolved, disintergrated and rendered soluble. How shall we aid nature in unlocking this reserved force of fertility? If we can succeed in realizing just enough to feed our crops annually, there will be no loss. If by mechanical or chemical action or force, we liberate too much of the plant food there is likely to result a loss by its being evaporated or leached out by the soil, or carried beyond the reach of succeeding crops.

This breaking down process of the rock particles of the soil, and the decomposition of vegetable matter, or humus, incorporated

among them may be aided by thorough plowing, repeated harrowing and thorough pulverization. This preparation exposes more of the particles to the further breaking down process, and to the action of frost, of heat, of rain, of snow, and of the air; and it permits a fuller and freer permeation of the roots of the growing crops. Roots and their branching rootlets and terminating spongioles have considerable power in breaking down soil particles, and preparing them for their uses. How much food is required from the atmosphere, and how much is supplied will take care of itself, for the air is ever present in all places and is constantly moving and changing. If the soil is properly taken care of the air will do its designed office.

Now if we concede that the soil, in and of itself, contains all the needed elements of plant food, supplied by the hand of a wise and beneficent Providence in the beginning when "the earth was without form and void," it then only remains for us to hit upon the cheapest practical means to liberate a sufficient annual supply to feed our crops. And we believe in this theory of continuous and original fertility, for it has been pretty well established by long continued and carefully conducted experiments in the hands of recognized authorities. We then have in our soils an inexhaustible supply of plant food, for the soil, like the fabled Phœnix of old eternally renews its youth—rises from its ashes—under proper treatment and handling.

After years spent in the closest and deepest agricultural study and experiment, Dr. J. B. Lawes, of Rothamstead, England, says: "I may say that as far as I can see, there is hardly any operation connected with agriculture which does not result in more or less exhaustion of the soil. If I were asked to give a definition of the distinction between gardening and farming, I should say that the accumulation of fertility is the basis of the profitable cultivation of fruit and vegetables, while the exhaustion of the soil is the basis of profitable farming." Does not the wise and learned Dr. plainly intend us to understand that in farming we must depend on our soil rather than on our manure? That we must depend on so handling the soil as to get our crop mostly from it rather than from fertilizers applied?

On the other hand we have the theory, and the practice to correspond, that the soil is soon exhausted of its available fertility by cropping, and needs supplying with plant food, and fertilizers are used and relied upon to make the crop. Many work as though the

soil was simply a foundation to hold the growing plant, while everything the plant needs must be put into it. They regard the soil as they do a bank for the deposit of funds, and draw out their fertilizer deposits by crop drafts. They understand they must put in so much phosphoric acid, so much ammonia, and so much potash per acre before they plant their crop or expect a return. This might be termed the insurance method. The great fault with it is the insurance costs too much. There may already be a superabundance of potash, of phosporic acid, or of ammonia in the soil. The added amounts are not then required. How are we to know just what the soil is short of in available form unless we experiment? The soil will eat all we offer it, but crops will assimilate only so much as they need. The line of profit lies in judicious feeding. The secret of success is in doing the right things at the right time. Successful farming consists in producing best results at least expense.

Manures, either barn-yard or chemical, have a two-fold office: They contribute their readily soluble plant food directly to the wants of the growing crops, and they help break down the soil particles near them by both their chemical and mechanical action. Their office is good if applied in right proportions and at proper times. Practical experience, ignorant of theory or philosophy in the matter, has laid out for itself the common sense, every-day practice of combining both methods—more or less working, and manuring also.

There is probably no magic alchemy, or quick and easy process by which our worn soils can be suddenly restored to virgin fertility. If there was there would be "millions in it" to the happy inventor. But the road is neither so long, so hard or so difficult that they cannot be very measurably and profitably improved by means within reach of every energetic possessor of them. There are many days during the season when the farm help and the team can be spared from the regular routine work; and five to ten acres per year of these run down fields can be thoroughly plowed. If rocky, strip them. If wet places abound, drain them. The plowing can be done by odd jobs, any time between planting and winter. Harrow down moderately smooth, apply a light dressing of yard manure, if to be spared for this extra work, and if not procure good, finely ground bone, plaster, ashes, salt and lime, or a good superphosphate. If the latter, sow on from two to four hundred pounds per acre and harrow in. If the former, take 200 pounds bone, 100 pounds plaster, 2 barrels ashes, 1 bushel salt, 1 barrel dry slacked lime, mix all together and sow and harrow in.

The land is then prepared in the fall for seeding in the spring. As soon as the land can be worked in the spring sow to oats and clover. The oat crop will generally pay for fertilizers used and labor done. There will be a large amount of oat straw for fodder and for bedding. Fed with shorts and cotton seed meal this will equal the best of hay and give a rich manure. This manure will be in addition to what the farm produced before. The stock-carrying power of the farm has been increased. When the clover is beginning to blow put on the teams, drag it down, and plow it in. Sow on the furrow as much superphosphate or the bone dust mixture as before and seed down to herds-grass, red-top and clover in liberal amount. The result will be pleasing. The crop of hay will prove that you have that field vastly improved, and on the high road to restoration, and at small expense. This plan is flexible and admits of modification. It is suggestive of thought. It is practical and the cost within reach of the average farmer. Continue this practice with adjoining, or other worn parts of the farm, until the whole has been operated. The yard manure is thus left to the use as before of the general farm routine. This work is additional and complete within itself. Through this means the land gets the benefit of the decaying turf, the benefit of two cheap, but effective manurings, two plowings, many harrowings, the oat stubble, and the green clover manuring from the green clover turned under. It is also further improved by removal of the rocks and by being underdrained where needed. It is now in fine condition for the mower and the rake or other machinery. It will on an average produce one ton or more of hay annually from three to six years, depending on its natural adaptation to grass.

Turning under green crops for manure costs but little. Waldo F. Brown, in his book "Success in Farming," says: "I have experimented enough with clover to lead me to determine that the second growth, plowed under in July or August, after the first crop has been cut for hay or pastured, is worth to the succeeding wheat crop as much as a dressing of ten loads of manure per acre. The difference in the cost of fertilizing by these two methods is great. Clover seed must be unusually high if the cost of seeding is over one dollar per acre, while the cost of hauling and spreading ten loads of manure, even if on the farm, would be about three times as much as this, and the actual cost of manure applied to the field will rarely fall short of one dollar per load, and often exceed it. * * * My practice has ever been since I began farming, and my advice to all

is, to sow clover with every acre of small grain. It is the cheapest and best fertilizer in America." He also recommends rye, as it can be grown in the fall after one crop and in the spring before another crop, thus growing a sufficient quantity to be used as a green manure between other crops. Also corn, of which a heavy growth for plowing in can be made in a few weeks in the fall. Also buckwheat, of which two and sometimes three green crops can be grown on the same land in a single season. He recommends, further, this experiment: "Seed heavily with rye in the fall; plow this under when in bloom, and seed with buckwheat, and as soon as this is large enough, plow it down and sow four bushels of corn to the acre and plow it under as soon as killed by the frost."

The old adage, "Tillage is manure" has come to have a very significant meaning in these times when more thorough pulverization of the soil is claiming increased attention. Tillage is manure because the finely pulverized soil absorbs valuable elements of fertility from the atmosphere; because it draws up fertilizing material from the subsoil; and because it makes available, material already existing in the soil.

The importance of bone as a fertilizer is, we fear, overlooked. Bone is condensed matter—condensed grass, grain and roots. It is the most dense part of the animal. It is rich in nitrogen and in phosphoric acid, containing in its fresh state from three to four per cent of the former and from twenty to twenty-three of the latter. Harris, in his treatise on manures, says: "One ton of good bone dust contains as much nitrogen as eight and a half tons of fresh stable manure, and as much phosphoric acid as one hundred and ten tons of fresh stable manure. But one ton of manure contains more potash than five tons of bone dust. Bone dust, like barn-yard manure, does not immediately yield up its nitrogen and phosphoric acid to plants." Ashes or kainit on moist soils should be used in conjunction with bone dust.

The theory that sheep are great renovaters of the soil when pastured upon it is not borne out by the test of actual practice. That they eradicate many bushes and weeds and sensibly improve some parts of their pasture we admit, but the improvement is at the expense of the other and larger portion. The sheep is a close feeder and utilizes in flesh, fleece, or milk for their lambs a large part of their food. The more food an animal utilizes the less there is of it left for manure. The excrements of the sheep are rich but small in

amount. They must obtain their subsistance from the soil if kept in the usual manner. But sheep may be made great renovaters, but not under usual methods of keeping. Put double the number on a field that its feed can carry, and supplement with sufficient amount of shorts and cotton seed meal—three parts of the former to one of the latter—to keep them gaining finely. A flock of wethers or of dry ewes would be best. Two or three years of this sort of renovation would put the land in very good condition. It would also put successive flocks and the farmer's pocket in good condition. The gain of the sheep would pay for the provender and the land improvement be net profit. But do not flatter yourself you can or are building up land or a farm with sheep under ordinary practices.

Feeding cattle for beef is a recuperative agency to the farm, for liberal feeding of grain gives liberal supplies of valuable manure. It is well understood that the manure from fat cattle, or cattle of mature growth, is richer in the elemetns of plant food than that from young, growing or poor cattle. Liberal feeding of stock means land improvement.

We have omitted purposely to mention the purchasing of stable manure, there being so small quantity for sale, and prices not being within profitable reach of the average farmer. On an average, stable manure purchased will cost, delivered in the field, from five to six dollars per cord, and the same money laid out in bone meal, or a good superphosphate, will be found more profitable.

In many towns we have examples of what keeping cows and carrying on the business of dairying will do in building up the farms on which it is a specialty. The towns of Winthrop, Turner, Belfast, Bangor, Cumberland and New Gloucester are representatives. Dairying requires, to be successful, that good cows be kept and that they be well fed. The refuse of the dairy feeds many swine. There are large supplies of the best manure from the stables and the piggery. Not only are special forage crops grown to help out the hay on the farm, but large amounts of western corn and shorts, and southern cotton seed meal are bought and fed. While the dairyman is intelligently pursuing his business, making a satisfactory profit, he is also surely building up his farm. Maine is so well adapted by natural advantages for production of first-class butter and cheese, that the specialty of dairying is one of importance. The areas of this country where the best of dairy products, those strictly prime, can be made, is so comparatively limited that we feel

to urge this branch of farm industry strongly upon your notice. The markets of the world are open, when home demand is supplied, if ever that point is reached.

The creamery, or butter factory business, is just gaining a foothold in Maine. If it shall be wisely and carefully taken hold of, avoiding the mistakes, the follies, and the fever of the cheese factory excitement, it has come to stay, and in it and through it we have hope, not only for alleviating the now too onerous duties of the farmer's household, but for a better farm-paying and farm-improving era in many localities.

We love our native New England, and the dear old State of Maine, and we want to see it prosper. We know our farms are not what they were when taken from the forest, neither are the privations and the disadvantages the same as then. We live in an era that is making large demands upon them. It is only by intelligent labor they can be made to respond. We have a soil that gives us honest returns for honest dealing, and whose make-up breeds no miasma; a soil from which a livelihood must come, and which we should be proud in the endeavor to transmit improved to posterity. Competition with natural advantages in some respects is a blessing. It demands labor, highly intelligent labor, and it develops the man.

A few deductions may be made in reviewing our subject:

Don't try to renovate lands that ought never to have been cleared.

Don't undertake to restore a piece of worn land without giving it a good deal of hard, sharp thought beforehand.

Don't get discouraged in the first attempt, nor attempt too large a piece the first time. Keep a strict and just account with each improvement and study the lessons it presents.

Don't try to improve wet lands until properly underdrained.

Don't be afraid to lay out a few dollars in a well devised farm improvement. Get up a faith in yourself and in your farm.

Don't fail to thoroughly learn the difference between 90 per cent and 110 per cent.

Don't be too sanguine at the first success, or too discouraged at the first failure.

Don't keep on selling bone off the farm and not buying any back for a fertilizer.

Don't neglect to make and save all the manure—solid and liquid—and all fertilizing material possible about the farm to use as judgment directs.

Don't sell hay and buy stable manure, or depend wholly on commercial fertilizers.

Don't take anybody's say so, but examine for yourself and do your own thinking.

Don't despise books or book farming, but read, reflect and act.

Everybody remembers the fable of the man who confessed to his sons on his death-bed that there was a treasure buried somewhere on his land, but where he could not exactly tell. The consequence was that the sons turned up the ground so thoroughly that, though they were disappointed of finding gold or silver, they got the treasure their shrewd father had in view in the finest crops of the neighborhood.

This is but an illustration of the benefits of tillage. When the farmers of the old State of Maine shall have learned and shall have reduced to practice the idea of thorough and persistent pulverization, the use and benefits of clover, the power and profit of bone, the art of saving and applying all farm resources of fertility; when they shall have doubled the number of animals now kept, and have learned to feed them from less land; when farming is given that persistent thought and close attention to details required in every other business; when more faith in themselves and in the soil is awakened in the business, then will agriculture go marching on triumphantly to the front.

EVENING.

In the evening, President Fernald of the State College gave a lecture on "Conditions of Success in Farming." It was listened to with close attention by a large audience.

SAGADAHOC COUNTY.

Institute at Brunswick.

An Institute for Sagadahoc county was held in connection with the winter meeting of the State Pomological Society, at Brunswick, January 22d and 23d. One session was devoted to the subject of dairying, no report of which is given, and the remaining time to fruit interests and allied subjects. A detailed report of the proceedings will be found appended to this report. The attendance was good throughout. There was a fine exhibition of winter fruits which added interest to the occasion.

KNOX COUNTY.

Institute at Thomaston.

The Knox county Institute was held at Union Hall, Thomaston, February 12. A lively interest was manifested in the meeting, and the attendance was good throughout.

M. R. Mathews, the local member, called to order, and invited L. F. Starrett, Esq., of Warren, to the chair.

THE CHAIRMAN. I have the pleasure of introducing Maj. J. H. H. Hewett, of Thomaston, who will welcome the Board.

MAJ. HEWETT. *Mr. President, Gentlemen of the Board of Agriculture, and Visiting Friends from Abroad*: It is my pleasant privilege to bid you welcome, to extend to you our kindly greetings, and proffer you the hospitality of our quiet village. This county is perhaps more distinguished for its ship building, lime burning and granite works than for its agriculture; but we know that our farming is by far the most important and fundamental of all our industries.

We can but be aware that the material prosperity and the welfare of the citizens of this county are more largely dependent upon our agricultural resources than upon any, if not all, other interests. We appreciate the truth that he who causes two blades of grass to grow where one has grown before is a real benefactor; and any organized effort such as you are making, having for its object the stimulation of public interest in agriculture, and the introduction of improved methods in farming, and the education of the people up to an intelligent appreciation of the capabilities of our Maine farms, should certainly be hailed with delight by every intelligent citizen. We believe it is an agency big with promise of beneficial results to the prosperity of the people of this State. I believe that the intelligent men of Maine as a rule, need, and ought to have, more faith in farming in Maine. In strengthening this faith and improving and developing our agricultural interests, we are very glad to see that very much has been done in the last ten years; and it is but just to say that the efficient efforts of our Board of Agriculture have contributed very largely to this end. Let us hope, gentlemen, that this is but the beginning of larger and grander results that in the near future may be sufficient to place Maine in the position she ought to occupy as an agricultural State. As I am not a farmer I will not detain you by undertaking to discuss the details of farming, nor will I endeavor to speak of the condition or prospects of agriculture in Knox county, but will leave that to be more fully and ably done by our honored member of the Board from this county.

THE CHAIRMAN. I will call upon Sec. Gilbert to reply in behalf of the Board.

SEC. GILBERT. *Mr. Chairman and Gentlemen of Knox county:* It is a pleasure to our Board of Agriculture to meet with the farmers of any locality.

We come here to-day to deliberate with the farmers of Knox county. We are glad to recieve your codial appreciation; we are glad, this stormy morning, to meet so many farmers here as we do; it certainly is a pleasing surprise to us at this time to see that you have come out in the numbers that you have.

An allusion was made in the opening remarks to the fact that you have not been especially denominated a farming community, or a community of farmers, but that other industries have been of prominence here among the people of this county. It is a fact worthy of careful attention that agriculture flourishes best where it is closely

connected with other industries; we find its highest type of prosperity where it is connected with a varied industry. It might, and probably would, appear at first thought that where a community is exclusively agricultural, there you ought to find the business worked up to its highest type of prosperity; but this does not hold good anywhere or any time. So here is an exemplification, right here in this county, of the importance of agriculture as one of the industries; and the very fact that a large amount of attention and a large amount of capital is invested in other industries is proof positive that here you can develop your agriculture to a higher condition and a higher character than would be possible did you not have these other industries in connection with it. Where a considerable proportion of the population is engaged in other industries, you find that the land bears a higher valuation than it does in an exclusively agricultural population, and this exists to a marked degree, too. Further than that, the farmer living on that land, secures a larger income per acre than the man who owns and carries on a farm in an exclusively agricultural region; and, better than all, the man who works on that land, either as a hired laborer or as proprietor, earns more for his year's wages, for his year's income, in that locality than it is possible for him to do in a locality exclusively agricultural. So, from whatever stand-point you look at it as bearing upon the value of the land, as bearing upon the income of the farm, as bearing upon the yearly wages of the laborer, you find agriculture taking a higher plane where it is carried on in juxtaposition with other industries. You will find this exemplified not only in States, not only in districts, but you will find it in neighborhoods also.

So you have here in this county everything to encourage you to persevere in the development of the agricultural resources of the county. Further than that, the citizens of this county not connected directly with agricultural pursuits find everything to encourage them in the development of this industry in their midst; there is a mutual relation between all; so that it is entirely improper for any individual or any class of individuals to stand up and say that they are of paramount importance in the community. Let the farmers then appreciate these other industries, and by all means let not these other industries look upon the farmer as an unimportant factor in the prosperity of the county.

FARMING IN KNOX COUNTY.

By M. R. MATHEWS, Member for the County.

I would say to the farmers of this section, that we have assembled in a Farmers' Institute to talk over and discuss matters in which all should have an interest, and especially to look at our own condition, to see if any new points of interest can be gained that will be a benefit to us. Hence I will very briefly present a few thoughts as they have occurred to me, mainly upon our own condition as farmers, and if in doing so, I should induce others to present their thoughts and doings, I shall be content — for it is desirable to hear from as many as possible on these matters.

It may be said by some, that farming in Knox county is not different from farming in other parts of the State. That may be so in part, still it appears to me that farmers in Knox county have advantages that farmers do not have in other sections of the State.

The surface of Knox county is quite uneven, being ridges, hills, valleys, meadows and bogs, suitable for all kinds of crops. The soil for the most part is good, so that farmers can engage in most any branch of farming they choose.

Farming in Knox county may be called mixed husbandry, more so perhaps than in many other counties in the State. Some have their fine herds of Jerseys, engaged in the dairying business; others are in the milk business, with their mixed, or native breeds, these being considered better on account of a larger flow of milk; still others are engaged in stock raising; some in keeping quite large flocks of sheep, and others in the various branches of farming.

To make farming profitable requires capital, with plenty of work to go with it. First the young farmer wants to know what branch of farming to engage in that will pay him the most profit—what the main crop should be that farmers must rely upon to make a success of their business. I think most farmers will admit that the hay crop, and stock husbandry in its various branches, is what we must rely upon for success. In order to raise a crop of hay, it requires dressing, and in order to get the dressing the hay must be used on the farm. It requires considerable capital to stock a farm, to meet its requirements, and it appears to me this is the most important question with which farmers have to cope; and this is wherein the farmers in Knox county have that advantage that I have spoken of, over other portions of the State—it is the facility for getting cheap dress-

ing without being obliged to stock the farm so largely with live stock. Not but there is money in stock raising, I think there is, but the whole secret, it appears to me, is in having cheap dressing to raise the crop of grass, so that farmers can engage in stock raising. The dressing I refer to is ashes, lime, lime ashes, salt water muck, muscles, and sea weed or rock weed. The lime and ashes can be had very cheaply in Rockland, Camden, Thomaston and Warren. The salt water muck and muscles are to be had very handy by those living on Georges river. Quite a number of farmers make a specialty of getting out quantities of this muck in the winter season, piling it up to be used in the summer as wanted for the barn-yard, stables, barn cellars, hog yard, etc., and very good results are realized, as I know from experience, and I know of good results from the use of muscles, procured further down Georges river.

Have the farmers realized and taken advantage of these facilities as they ought? I am pleased to say, in a great measure they have, but there is room for improvements in that direction. If any one doubts the improvements that have been going on in farming in Knox county for the past twenty years, let them ride through the county in the hay season and note the quantities of hay in the fields, also note the large barns well filled, and other improvements in farm building. Have these improvements been brought about by keeping large stocks of cattle, or from lime, ashes, salt muck and minerals that are to be had so cheaply and so near at hand? From my own observations, the farmers for the most part keep but a small stock of cattle, but rely upon this dressing, and make a success of it. I know of farmers who sell thirty, forty and fifty tons of hay each year, besides other crops raised upon the farm, and still the farms are improving from year to year, and mainly from the effects of dressing procured in this way. I don't wish to be understood as advising farmers not to keep much stock, for I think there are times, like the present, where it would pay the farmers more profit to use their hay on the farm. I think our farmers are pursuing the right course in their mixed crops, so if one crop fails, some other comes in good time.

I would have every farmer who has suitable land (and there are but few who have not), set an orchard, if but a small one. for I believe a small orchard well looked after is better than a large one not properly cared for. It is useless to set trees unless they are

properly set and looked after. What is more enjoyable for a farmer than to have nice fruit of his own raising for home consumption? Pardon me for referring to myself in orcharding. I have a small orchard of about forty trees that I raised from the seed. I had them budded and grafted into fruit of known varieties, and can say, it has been a source of enjoyment for me to care for those trees as they grew and came into bearing; besides, the income has been considerable yearly for a number of years. Orcharding is carried on to a more or less extent in most of the towns in Knox county—many farmers making a specialty in this branch of business and with good success.

There is one farmer in Warren, Mr. C. F. Starrett, our honored Chairman, who has recently set some three hundred and fifty apple trees that are looking well.

Among the improvements I am pleased to notice, is the removal of so many of the roadside fences. What an improvement over the old tumble-down stone walls by the roadside! Besides the improved looks and the quantity of land gained for crops, and the cost of fencing saved, there is also a great saving in the matter of expense for towns, as our roads are not so liable to be blocked with snow in the winter. I hope to see other farms make improvement in this direction.

I notice quite a change within a few years, and I think for the better, in regard to the time our grass crop should be cut and made into hay. Nothwithstanding the improved implements so that the grass can be cut and made in a very much shorter time than formerly, still the rule is with most farmers now to commence haying the last week in June, while in former years hardly anyone thought of commencing till about the second week in July.

I attended both our county fairs the past season—the Knox, held at Rockland, and the North Knox, at Hope Corner. Both were very creditable in most departments; they were well attended and a good degree of interest was manifested among farmers, and both were a success financially.

Associated dairying has been talked of by some farmers in my section; if such an enterprise could be started, I have no doubt it could be successfully operated. Think of the advantage to the farmer's wife, if she could be relieved entirely from the labors con-

nected with the dairy business! Would there not be brighter countenances all round? More light is wanted on this subject.

Notwithstanding the outlook is quite encouraging for farming in this section, there is need of more social gatherings, such as may be brought about by the formation of granges, farmers' clubs, or most any form of an association that will call the farmers together to talk over their experiences and observations on farm or any other matters. Progress in agriculture must keep pace with progress in other branches of business, and in what other way can so much good come direct to the farmer as in this? Most farmers are deficient in what could be acquired at these meetings, in taking part in discussions that may be had from time to time, in writing essays to be read at the meeting, and in various ways that persons belonging to one of these organizations can point out. Unfortunately not having belonged to anything of the kind, I am deficient in not being able to present a better paper to-day. There are but a few of those societies in Knox county that I am aware of. There is one at North Warren, called the White Oak Grange, that is in a flourishing condition and is doing good work, as I learn.

Knox county, generally speaking, is not an agricultural county, its people being engaged in other pursuits, such as ship building, lime burning, and manufacturing. Such being the case it seems another advangtage to those who do make farming a business, there being a home market for farm productions. So that all things taken into consideration the farmers of Knox county should congratulate themselves in having such an advantage, and should strive to profit by it as best they can. Let them take courage and push forward to the front rank, as representing a business that our young men, and maidens too, may feel proud to be engaged in.

Mr. Erastus Lermond, of Thomaston. I don't know as I can say anything interesting. I shall have to begin as a common scold. I think there is a serious defect in this county in the methods of carrying on agriculture. There are too many fields that look brown in the first part of the summer; too many of what are termed "old fields." You will hear farmers talk of them before haying, and ask how the "old fields" are looking I do not think there is any need of having these "old fields" at all. Farmers have learned considerable in some respects; they have learned how to save their manures, and as manure is the basis of success in farming, it is important that we consider carefully any questions relating to it. The

only way to increase the fertility of the farm is to keep stock to produce manures. There is no other fertilizer, generally speaking, that can be depended on to take the place of barn-yard manure, and the only way to get that is to keep stock.

Some farmers say that it will not pay to raise stock; but I will ask, If it does not pay to raise stock why do they raise any? They are not able to keep stock for the convenience of it, I believe. I think the trouble is in not keeping stock enough. If a mechanic makes a wheelbarrow to sell he cannot sit down all the rest of the year and live on the proceeds of it. No more can the farmer live on the proceeds of one or two cows, or oxen, or horses; they must keep more to make it profitable. I have heard more than one farmer rather boast of selling off part of his stock in order to give him a chance to sell more hay. That is a policy they had better not embrace too closely, for it may sometime prove to be a skeleton. I think stock can be raised at a profit here in this county. If a farmer does not want to make butter and cheese, or sell his milk, he can sell his cows very readily; for milkmen are coming down here from Massachusetts constantly for cows, and often have to go home empty handed. I undertake to say that the farms in Knox county are not half stocked. You may ask the butchers, the milkmen and the horsemen if this is not so. The farms in this county are not nearly as fully stocked as they were when I was a boy. Every farmer used to have one, two or three yokes of oxen, and as many or more cows—more cows than they have now. I cannot conceive of the reason of their falling off in stock raising as they have. I believe it will pay to raise beef, but not on so limited a scale as people generally raise it. The aim of a farmer ought to be to sell a certain number of steers each year. Suppose he should make it a point, after he gets his farm up to that condition, to sell five steers in a year. That would necessitate carrying twenty-five head; but he could easily do that after a number of years. At five years they would weigh ordinarily from 800 to 1000 pounds; but I think it is better to force them up to that weight in three years, and thus shorten the length of time one has to carry them. In order to have five in each year's lot he would only have to carry fifteen. Then he could add to his number each year and increase it to eight, perhaps, and then only carry twenty-four; that could be done with a little forcing.

A very large proportion of our horses are brought from Canada. There is a good chance for those who are suited to it to raise work horses. There is not much danger in raising work horses, for even if there is a blemish on them, they will sell for a good price.

I was requested to give an outline of my own farming, but I do not suppose it would be very interesting. But I believe it is a good idea, if you would improve a farm in its fertility, not to do as I have done, sell milk, but to raise some kind of stock. When I began to sell milk and got a herd of cows—I think it was eight in the first place—I raised beets to feed them with. I thought if I could raise a lot of beets it would save my buying grain, and that it would be a source of profit in that way. I grew beets for a number of years, 400 to 600 bushels yearly; I fed them for five or six years and tried many experiments with them and with grain feed during that time, and I came to the conclusion that there was absolutely no good in beets for milk making or for stock, except in the matter of health. During the time that I was raising the beets I used nearly all my manure on the ground where I raised the beets. Consequently I did not increase the fertility of my grass fields very greatly, although I did some. After I became convinced that there was no good in beets, I stopped raising them and went to raising grain; plowed up quite a number of acres, turned it over and sowed it to grain and grass. Soon I didn't have to buy any hay, though I increased my herd of cows at the same time. Year before last I sowed mixed grain, barley and oats mixed, and found it worked so well that last year I went in on a little larger scale and raised 240 bushels; that has been a great help to me; and I shall have six acres of new ground coming in this year.

If I was going to renovate a run-out farm, this is the way I should do it: I would raise stock, increase it just as fast as I could, and raise grain to feed them at the same time; I would distribute my manure over double the acres that I do now; I would plow a great many acres and spread out the manure considerably at first until I had got into fair grass, and then I could do differently if I chose. I think it would be an advantage to all farmers to increase their stock; otherwise the farms must run down.

Mr. E. Sanford Bucklin, of Warren. I believe with the gentleman from Thomaston, that the farmers of Knox county need more stock; I believe in stocking the farm up to its full carrying capacity. Feed all the hay you can and increase the stock. I know a few

farmers in issolated cases can run the farms very moderately stocked and sell hay, and are so situated that they can put on more manure than they use up in raising the hay; but not very many can do it. Few farmers are so situated that they can avail themselves of manure from the livery stables.

We can see that the stock on the farm in Knox county is decreasing, by the grown up pastures in summer. It is very evident that some farmers have little or no stock; the hay is sold off year after year. This is a systematic process of decreasing the value of the farm. It does not matter so much, I think, what kind of stock a man keeps, or what breed; but he should keep some kind in which he has an interest to care for.

MR. ROBINSON, of Warren. When I commenced farming for myself I cut hay enough to keep about four cows and two horses. I did considerable teaming. This winter I am carrying eighteen head and I am in hopes to have hay enough. I do not do so much teaming. I do not have to get up quite so early in the morning, and my stock is saleable, if they are Jerseys.

MR. BUCKLIN. I believe the farms can be improved by feeding the hay on them, and keeping stock, and in no other way. About twenty years ago a friend of mine in Warren bought a run-down farm; he stocked it to its full capacity and has kept stock ever since and sold no hay. He has bought no manure save a hundred pounds or so each year of commercial fertilizer to start his crops. He has more than doubled his hay crop in twenty years and very soon had to build a new barn to store his hay, and now he has got to again enlarge his barn accommodations.

AUSTIN DUNBAR, of Warren. I believe in raising stock and saving the manure, every particle of it. I think where I have made my greatest mistake in times past, is in allowing much of the fertilizer about the farm to go to waste. I am endeavoring at present to get a living through dairying. I believe in the best stock that I can get, and I find that it is necessary not only to have intelligence, but means to carry on the work.

MR. SAMUEL THOMAS, of Warren. I would like to ask Mr. Lermond a question. Do I understand that your farm did not gain any in fertility while you were planting beets?

MR. LERMOND. No, not exactly that; but it did not increase in fertility very fast, for it took the body of the manure to grow the beets.

MR. THOMAS. Then we are to understand that if we grow roots of any kind it takes about all we can put on to raise the crops, and our ground is but little improved by the process.

MR. LERMOND. I consider it so. I have always noticed where I have sowed grain on land where I had raised beets, that I could not get a good crop of grain without putting a lot of manure on in the spring when I sowed it down. If a great part of the manure which had been applied for the beet crop was left in the ground, I do not know why it would not produce a good crop of grain without additional dressing. In order to grow root crops successfully we have got to manure heavily, and therefore, if a farmer keeps but a small amount of stock, he will not get over his farm during his life time. If he has forty acres, and forty years of active life, he would just about get over it; and you can imagine what the tail end would be when he got through.

MR. THOMAS. I was aware that there was a certain amount of water in beets, and I tried the experiment one winter on a farrow cow (having some beets), and I found that I was receiving a considerable flow of milk from her by giving her beets, and also a pretty good amount of butter. I was satisfied that winter that there was some virtue in beets.

THE CHAIRMAN. I should like to ask Mr. Lermond, in connection with that, if he purchased about the same quantity of feed at the time he was feeding beets that he did at the time he was feeding grain that he raised.

MR. LERMOND. I had to feed about the same in order to get the amount of milk I expected. While I was feeding those beets, all through those years, I tried experiments in feeding all quantities from half a peck up to half a bushel and even a bushel, and then I would go a fortnight or three weeks without giving any beets, feeding a small quantity of grain in lieu of them. Every time I would change from the beets to the grain, even if there was but a very small quantity, I would increase the milk in quantity and improve it in quality; and the reverse when I went back to beets again. I have no doubt that beets are good for the health of cattle, but as for producing milk I do not think they are of any value. If I had thought that beets would produce milk I should have kept on raising them, for I could raise them for four or five cents a bushel; but I became convinced that I could not make milk from them and I quit raising them and went to raising grain, and I am satisfied

with the change. After I quit raising beets I noticed that they carried on some experiments at the State College at Orono, and the result of their experiments agreed with mine. They weighed the cattle every day and conducted the experiments very carefully.

AFTERNOON.

SPEED THE PLOW.

By S. L. HOLBROOK, Member from Sagadahoc.

This meeting and the meetings like it attest the importance attached to the great interest of agriculture. There is universal recognition of the fact of universal dependence upon farms and farming, and the higher the civilization the greater this dependence. The products of agriculture form the elements of nearly every kind of business in the whole range of society. We may annually witness the anxiety with which bankers and merchants, manufacturers and the great transportation companies watch the progress of the harvest. Good crops mean good times, poor crops hard times. With bountiful harvests the whole business life of the nation is quickened. History teaches that where a people have devoted themselves to a progressive agriculture they have been uniformly prosperous, while those nations which have abandoned or even neglected it have declined.

Farming is the well-spring of our national prosperity. With this important knowledge before us it is well for us to raise the question, How can we elevate the standard of agriculture, and how can we make our farms more productive?

The art of agriculture is older than history. The science of agriculture is entirely modern. For a peroid of nearly four thousand years, while the race advanced enormously in general culture, and while some of the arts grew from a rude beginning to a higher development than they now have, there was practically no advance in the art of agriculture as a whole, or if it made any progress at all, it was so very little that it seems as nothing when compared with the progress in the other arts and industries.

The history of agriculture in the United States falls naturally into four periods.

The first peroid is that of our colonial days, extending over about one hundred and sixty or one hundred and seventy years, or from the first settlement down to the American Revolution.

The second, beginning with the Declaration of Independence, extends over a period of about fifty years, or to the time when the cast iron plow came into common use throughout the country.

The third period, of about thirty years, began when the introduction of the cast iron plow was complete, say about 1825, and extended to the time when the reaper began to come into common use, about 1855.

The fourth period began when the reaper became common and extends to the present time.

A look back over our agricultural history will show at once that great has been the improvements in every department of our farming operations, from the clearing away of our forests and the breaking of the sward, to the harvesting of the different crops and the preparing them for food for man and beast. Yet great as has been the improvement in that direction, like all the improvements that have marked the age of progress, they have all been the result of necessity. The wants of a community or a people are always in advance of improvements, and waiting for them. And here we may well ask the question, What is the State of Maine waiting for? She is most certainly waiting for something. Unpleasant as it may be, the interests of true men are best served by looking facts squarely in the face. Only then can they act to the best advantage; and when we look at the facts, we find that during the last twenty-five years there has been a decadence, not only of agriculture, but of population in many parts of our agricultural towns, a dying out of a once vigorous civilization. The decay of once thriving towns, the departure of the young men from our State, the abandonment of farms, the fields overgrown with bushes, the tenantless houses, the closing of schools, dilapidation of churches, the inability to support public institutions, the loss of vitality, the coming on of a paralysis, which foreshadows the dying out of that civilization which has been a crown of glory to the State, is one of the saddest of pictures.

These pictures suggest to us that our system of farming is radically wrong, and tell us very plainly, that a change is demanded; and, as I have already said, we have had our first, second, third and fourth periods of agricultural history — it is high time that the fifth period or era had dawned upon us, and this year of our Lord,

1882, should mark the epoch. Of the possibilities of Maine, or of her great resources, I need not speak. Our soil is a mine of infinitely more riches than all the gold of California.

Perhaps it is easier to tell of our defects and talk about our mistakes, than it is to suggest a remedy; and I do not believe in too much fault-finding or croaking. But we must see and know that we are wrong in order to get right. One of the greatest evidences of our high civilization is our coast survey and light-house system which mark out the places of danger and erect a light or put a beacon or buoy on a hidden rock to guide the homeward or wayward bound mariner to his destined port.

Suppose we take a look at our system of farming as practiced at the present time. We shall find that it is no system at all; you ask a farmer what course of husbandry he follows and not one out of ten can tell you, in fact it is not a system, but a muddle. We have seen to our sorrow and disgust that our past and present practices are defective, and it would be unwise to follow them longer.

When General Grant found that he could not take Richmond by fighting his way through the wilderness, he changed his base of operations and then he took the city. We have looked on with amazement when we have seen our young men from the farm leaving the State; yet never have stopped to ask the question or raise the inquiry why it was so. It is not at all surprising that they should leave—the great wonder is that more have not gone. To say that the young men of Maine do not possess courage, pluck, and enterprise would be to call in question the recorded facts of history. They have often been weighed in the balance and never found wanting. Whether in time of political tumult, or in time of national peril, they have always stood as faithful sentinels on this northeastern bastion of our great republic. Let us take a look at some of the facts as we find them given to us by the census of 1880. First we will take our stock interests as given by the last census and see how we stand:

Whole number of	Cows	in the	State,		150,845
"	"	Oxen	"	"	43,049
"	"	Horses	"	"	87,848
"	"	Other Cattle	in the	State,	140,527
"	"	Swine	"	"	74,369
"	"	Sheep	"	"	565,918

This would give every farmer in the State 2 cows and $\frac{1}{3}$, $\frac{3}{4}$ of 1 ox, 2 other cattle and a portion over, 1 horse and $\frac{1}{4}$ of another, 1 swine and 1-6, 8 sheep and $\frac{1}{3}$. This is the showing of what the 64,309 farmers of this State are doing in the direction of stock husbandry. With 6,552,578 acres enclosed in farms, it shows a criminal neglect of that branch of husbandry which is the corner stone of that great industry.

That old proverb is as true to-day as when it first dropped from its author's lips, that "No cattle, no farming; few cattle, poor farming; many cattle, good farming." History teaches that man never has succeeded in subduing the earth and revealing its domestic beauty, until he has enlisted those servants without whose aid agriculture must fail.

In the Maine Farmer of Jan. 31, we noted the following: "Dr. Laws says that the future prosperity of British agriculture is bound up with stock, and asks the question, Where is stock more necessary to a prosperous agriculture than in Maine?"

There are many reasons why we should engage more largely in stock raising in this State, and among these reasons are the following:

1. That industry carries with it more intelligence than any other branch of farming.

2. Our soil and climate are particularly adapted to that industry.

3. There is more money in it, and the old saying holds good, that "He that drives fat oxen must himself be fat."

4. It is the cheapest way to build up the productive capacity of our farms.

Let us now take a look and see what we are doing in the production of field crops as given by the last census; and we find the following figures:

Whole number of bushels raised in the State,

Barley	242,185
Buckwheat	382,701
Indian Corn	960,633
Oats	2,265,575
Rye	26,398
Wheat	665,714
Potatoes	7,999,625

This would give every farmer in the State:

3 bushels and 3 pecks of	Barley
5½ "	Buckwheat
15 "	Indian Corn
35 "	Oats
9 quarts	Rye
10 bushels and 11 quarts	Wheat
120 "	Potatoes

Now if these crops could be sold at a fair market value they would amount to the following sum:

Barley	$3 00
Buckwheat	2 40
Corn	11 25
Oats	17 00
Rye	25
Wheat	15 00
Potatoes	60 00
Total	$108 90

The average size of farms in the State of Maine is 102 acres. The average amount of hay cut to the acre is about 8-10 of one ton. The whole product of the State is 1,107,788 tons. This would give every farmer in the State 17¼ tons.

Such is the showing of the condition of farming in the State of Maine. As I have already said, all the great improvements that have been a blessing to the world have been the result of necessity. Most certainly we are in that condition. Necessity demands that we should take a step forward.

As a remedy for these existing evils, I would say "Speed the Plow." I would recommend the practice that was taught by that world's benefactor, Jethro Tull, more than one hundred and fifty years ago, that the secret of producing large crops lay in the frequent stirring of the soil. Although his teachings then fell upon cold and doubtful hearts and deaf ears, yet the light which more modern research and investigation has shed upon the subject has convinced us that he was right.

I would say "Speed the Plow," not only as the way by which we can unlock the great storehouse of fertility, but I would urge its use over larger areas; plow more acres, and thereby increase your

income. I have shown to you that under our present system there is not money enough in it. Farming is a question of dollars and cents. The first question that the young man asks when he pushes out into the world of business for himself is, Is there any money in it? Now in order to increase your revenue you must do more of it. Instead of two or four acres in field crops, every farmer that owns a farm of fifty acres should have twenty or twenty-five acres under the plow. The gross income of an acre of hoed or grain crops may vary from $30 to $80; an acre of grass will pay perhaps $10 or $12. Now you have only to sit down and figure a little to know where the profits will come from. I have great faith in figures.

Another method by which we can enlarge our income and build up the productive capacity of our farms, and at the same time make a business of farming—that feature which has been so much neglected by farmers—is a judicious system of rotation of crops, a practice almost unknown to the farmers of Maine. The fact that there is in the soil an abundance of plant food, but only available to a limited extent, has suggested how that can be utilized to best advantage. The three principal elements of plant food which the farmer must look out for are nitrogen, phosphoric acid and potash. It is also known that different plants require this food in differing proportions, and also differ greatly in their methods of procuring it. There are plants which feed more largely on potash, and are sometimes spoken of as potash plants. Others require more nitrogen, and are called nitrogenous plants. Such crops as peas, beans, clover and wheat are of this class. Beets and potatoes would be called potash plants. Hay contains a much larger proportion of potash and lime than the cereal crops and a much smaller amount of phosphoric acid. By the growth of deep-rooting crops, like red clover, mangolds, and wheat and rye, in a rotation, the subsoil is made to contribute to the fertility of the farm and to yield up its accumulated wealth. Shallow-rooted crops, like white clover, potatoes, turnips and barley, cannot ask the subsoil to add to the products of the farm. Deep and shallow-rooted plants ought to alternate. Thus you will see the great advantage of rotation. By the succession and rotation of crops the land will produce a much greater aggregate product, the quality of the crops will be better, and exhaustion of the soil is very much delayed.

Farmers should remember that the most costly manurial ingredient they have to buy is nitrogen; and also, that no plant will grow

without it. Nitrogen is a gaseous body, and forms about eighty per cent of all the atmosphere that we breathe. Yet while it forms so large a part of the atmosphere, no plant can obtain it from the air. It can only reach them through the soil; and it is only by a thorough pulverization of the soil that it can be utilized to the best advantage. So, for that reason, we say "Speed the Plow."

Thus far I have spoken briefly of the three principal plant foods in the soil, and how they can be used to best advantage. While nature in her bounties has bestowed on us these great gifts, she has also placed within our control other agencies by which we can increase the fertility of our farms. Among them we have the clover plant. "Clover," says Harris, "should be the great renovating crop of American agriculture." There is, perhaps, no other plant in the world of such value to the farmer as clover, and the reason why it is so much neglected by our farmers I am unable to give.

It has been demonstrated beyond a doubt by our most careful scientific investigators, and practice substantiates the fact, that during the growth of clover a large amount of nitrogenous matter accumulates in the soil. Hence its great value as a manurial agent. We have at our command no fertilizer so cheap as clover. The very nature of the plant itself makes it valuable. Its long, deep tap root runs down into the subsoil and pumps up those elements required for plant food, and stores them up in the soil; and by its dense foliage it forms a shade for the soil during the heat of summer. With its leaves constantly falling it forms a covering for those atmospheric elements that are to enrich the soil. These facts, together with its great value as a forage plant, and the superior value of the excrement of stock when fed on it, most certainly claim the serious consideration of the farmers of our State.

I have said that a change was demanded in our farm practices; what I mean is this: that farmers should plow their fields more often. The practice now with most of our farmers is to let their grass fields lay, and mow them until they are all run out Now that is a mistake. We repeat it again, "Speed the Plow." Our fields should not lay in grass more than three years at the most. Two years would be a better course. By frequent plowing we get the benefit of inverted turf, which is an item of no small importance as a manurial agent. I place a high value on a good turf that is all alive with stubble and roots. The observing farmer will see at once, that by plowing his fields often, before they are run out or while they are in good con-

dition, and thoroughly pulverizing and manipulating the soil to unlock the hidden treasures which are most certainly there, and by the aid of clover and an inverted turf, he can keep up the fertility of his farm with much less manure and at less cost, and can at the same time cultivate more acres.

Another reason why I would urge more extensive tillage, is to put a stop to our farmers going out west to mill and buying a commodity that they should raise on their own farms, a practice that is taxing our farmers to an extent that is wholly uncalled for. The question may be asked, Is it not profitable to buy western grain and feed it out to our stock? Most certainly it is, but it is much more profitable for our farmers to raise that grain themselves and keep their money at home. Right here then is a very important point for us to consider, in connection with this question of more extensive tillage. Of course we cannot practice this new system by our old methods of farm management. It must be done by the aid of machinery. It must be done by more inviting methods than in the past, if we would be successful. The farmer that puts his muscle against machinery must certainly be left behind. We should remember that progress is in the air; that the boys of Maine read the newspapers—that they have caught the spirit of the age. They have heard the click and din of machinery in our great western States, and we need not think to hold the enterprising boys of Maine on our machineless farms. But there are other reasons why we should adopt the practice of rotation. By a system of rotation the farmer could plan his work ahead, and know just what work was to be done from year to year. Then we could direct our labor in a judicious manner. The question of hired help on the farm is a serious question for farmers to handle. How to direct that labor in a satisfactory way, so that it will be remunerative, often puzzles the best of farmers. This may appear to be of small importance, but that is just what the farmer should do—be looking after the odds and ends. Daniel Webster was once asked, Who was the greatest statesman in the world? His reply was "Sir Robert Peel." Why? was the next question. "Because he is always looking after small things."

Another reason why we should rotate our crops is, that under that system we could eradicate the weeds from our farms—a nuisance which costs the farmers of Maine thousands of dollars every year, and often robs him of the bread that should be found upon his table, and takes from him that money he should have with which to furnish

the necessaries of life. We often hear it said that one cannot afford to grow weeds—that they feed on the nutrition the plants ought to consume. But it is not merely a matter of food, it is one of drink also; it is not only what they eat, but what they drink that robs us of our due rewards.

Of course in this State, with our great variety of soils, we cannot mark out a specific course of rotation, and say just what crops should alternate. Here a farmer should use his good judgment. A lightish soil would want to be treated differently from a heavy or clayey soil. For a lighter soil I would recommend a five years' course. Say two years with clover and the mixed grasses followed with wheat, then corn or potatoes followed by wheat or barley, which would make up the course of five years. For clayey soil I would suggest a three years' course. Two years with clover and mixed grasses, followed by wheat or barley.

These are questions of great moment to the farmers of our State. It is plainly seen that it makes a great difference how you cultivate and manage your farm, if you would harvest the resources of your land. In conclusion I would say that with more attention to stock husbandry, with better and more extensive tillage, and by a judicious system of rotation of crops, the State of Maine will go forward as she ought and take a position in the front ranks of agricultural States.

Discussion.

Sec. Gilbert was called upon to open the discussion, and said:

Mr. Chairman and Gentlemen: The paper just read is suggestive of many important points bearing on the success of our agriculture. We have a class of farmers among us, prosperous, active, wide-awake and progressive, who appreciate the grass crop as the foundation of successful agriculture; and we are all aware that the money value of the hay crop in the State of Maine is greater than the money value of all the other crops put together. No one appreciates the value of the hay crop more than myself; yet some of us have already gone quite too far in that direction and advocate hay as the principal crop; claiming that it brings us greater profits in our business than can be obtained from any other source. This may be true in part, but yet I believe it does not wholly hold good. An adherence to this idea, together

with some other matters connected with our condition, has brought us to the practice of running our farms chiefly to hay. Through a practice of raising that hay without putting forth much of an effort, the result has been that we have in too many cases largely let our land alone and let the hay grow as it would.

If there is a single error that we are chargeable with here in this State more than another, it is that we are too much afraid of the plow. This comes in part from this idea of exclusive hay production, and in part from another error, namely, an effort on our part to so shape our operations as to get along with just as little work as possible on our farms. It seems as though the study of a large part of our farmers is to run their farms with just as little work as possible, hence keep the plow out of the soil, because the plow makes work. Instead of studying how to employ more help and bring all we can onto our farms, as we ought to, our study in too many cases is to keep the help off the farm. This is all wrong; we want to study to put just as much labor into the farm as can be made profitable. That course gives a larger income than is possible in any other way. The profits from one pair of hands applied to our agriculture must be limited. The man does not live anywhere who has ever got an independence from one pair of hands; he must in some way or other go to work and set somebody else to working with him, and out of the profits from a multiplicity of hands he may be able to secure a good income and finally an independence.

Suppose in a manufacturing industry any one should undertake to secure handsome returns from a single individual's labor. Just think how ridiculous that appears now! Yet that is just exactly what many of our farmers are trying to do. They are simply manufacturers of these products; yet they are trying to work out a profitable industry from the labor of possibly a single pair of hands, and think they are doing pretty well if they are so far-reaching as to employ a single individual to come in and work with them. We want to study to put more work into the soil; we want to study to put more men at work on the soil, and to plow, turn up and stir it more than we have been doing. By this system we not only get a larger aggregate return than from an exclusive grass production, but we increase the value of that very product and improve the fertility of the soil. The introduction of the system of rotation only changes the character of the products, and through the introduction of some other product connected with the growing of grass secures

from a given number of acres of land a larger income than would otherwise be possible. The advantages of a rotation of crops instead of this long continued grass production was hinted at by the speaker, but not elaborated to that extent it might well have been, and which its importance certainly calls for. He stated that plants have different feeding capacities. To illustrate the point: You have your fields in grass at the present time; they go on a series of years and produce a good crop of hay annually; the roots of that grass finally have sought out the principal amount of plant nutrition within their reach and readily available, and have given it to you year after year in the form of a hay crop. The result is, as you all know, the production of that field is gradually reduced and finally becomes unprofitable. That soil is not by any means exhausted of its fertility, but the roots of that grass have exhausted the fertility within their reach. In order to bring more of the plant food which exists in that soil into requisition, you have to stir the soil with the plow and other implements and seed again to a crop of a different nature, from the fact which was referred to in the paper, that different plants have different feeding powers, and are able to draw food from different sources. Most of the grasses draw their plant food from the material existing in the surface soil. Below that stratum which they are feeding upon is another stratum equally full of plant food which these surface-feeding plants do not draw upon. You want to introduce a class of plants of a different nature, like the corn plant for instance, or the red clover plant, each of which feed from deeper strata. Practice has proved over and over again, until it has become a law which is now undisputed, that the red clover is actually a renovating crop to the soil. Such is its feeding capacity that it has very little to do with the surface of the soil; it goes down into these unstirred depths and draws its nourishment from those sources regardless of the surface. The peculiar feeding value of the corn plant is such that it leaves the soil in a good condition for a succeeding crop. The bean is another such plant; the pea is another. The oat is a plant which somehow or other succeeds in getting hold of a goodly amount of material from the soil where we might suppose there is but little for it. Its feeding powers are intense, and as a result you all know that you find your soil in rather an exhausted condition after an oat crop. It does not respond to the next crop so well as it does after a corn crop. Oats have a power of extracting from the soil that which the corn has not. Our highest economy is to rotate the several

crops so that in the aggregate we shall get the largest possible amount of plant growth from the soil in a given number of years. This can only be done by a plowing and stirring of the soil and a succession of crops. This does not make less stock fodder on the farm. On the contrary, this system gives more stock fodder than is possible to secure by any single crop long continued on the same soil. The system pursued by the gentleman who spoke here this forenoon, of improving his farm by plowing and the introduction of a grain crop, and then following with a grass crop, is an illustration of this, which might possibly have been carried further to his still further benefit.

The rotation should vary with different soils. That best adapted to a strong, moist soil would not be the best for a light loam, or a sandy soil. The rotation should conform to the character of the soil. But in any case, on any soil, clover should fill an important place and a frequent place in the rotation. This, of course, would necessitate the use of the plow more than we have been using it in the past. We want to drive it to the field oftener and keep it there longer. The whole system, gentlemen, is worthy of your most careful attention, and it has much to commend it in its every aspect.

MR. HEWETT. Suppose you have soil that would require a great deal of labor in order to properly till for corn.

SEC. GILBERT. If an undue amount of labor would be required to produce a corn crop, then instead put on some other crop in the rotation that does not require that work, but which will give as large and perhaps a larger profit. Rotation must be adapted to the character of the soil and the condition it is in. If the soil is rocky, then introduce a grain crop which requires no hoeing, but simply a thorough working of the soil and a broadcast seeding.

MR. HEWETT. Would it not be difficult to pulverize the soil with one crop of grain so that it will be fit to sow grass seed?

SEC. GILBERT. Not with our present appliances. We have tools that will pulverize almost anything but rock. We have the implements for working all soils now to good advantage. While it is not quite so pleasant to work a soil that is somewhat rocky, yet it is possible; and we know such soils are strong and we can get good crops from them without that vast amount of hard work which used to discourage the boys in younger days.

MR. ROBINSON. This last summer I cut considerable clover, and I had some that was out in rather wet weather and it looked a little

black. I thought I would feed it, and I found that cattle ate it well and it was increasing the milk.

SEC. GILBERT. There is a practical illustration of a scientific fact. Clover hay is the most valuable feeding hay for certain purposes that we have. It is richer in those nutrients which are the most valuable, and which give you the rich milk and an abundance of it; they are just what put the muscle on the young animal and the kinks into the colts. Therefore clover is especially valuable to the farmer and never should be sold from the farm.

MR. STARRETT. I will remark, in connection with this matter of the rotation of crops, that if you give the subject a little thought you will see that nature is a crop rotater. You see it in connection with the very subject that Mr. Lermond touched this forenoon, when he said he did not believe in these old fields; that we ought not to have them. Nature has taken away the green in those fields. Because you will not rotate the crops for her, she has gone to work to do it herself. You have undertaken to keep that piece of land in grass year after year. The grass has exhausted the plant food suitable for it and nature has taken pains to supply other plants to take the place of the valuable grasses. For when you act at varience with the operations of nature you have her to contend with, but when you work in accordance with her laws you have her for an assistant. After the food for the clover and Timothy are exhausted, nature sets herself to work producing other plants in the form of inferior grasses and weeds. Mr. Lermond advocated the rotation of crops, although he did not call it that, when he said that we ought not to have these old fields. They are the result of a system, a law; and this law of the rotation of crops is going on whether you want it to or not. The best thing a farmer can do is to take a hand in it and direct it to his own benefit.

MR. HOLBROOK. Mr. Lermond stated this forenoon that he got 250 bushels of grain from five and a half acres, and I would like to ask him if that was not a more profitable crop than if the same field had been in grass?

MR. LERMOND. Yes sir.

MR. HOLBROOK. You see there is where the advantage comes in. There is still another advantage from plowing our fields; what we call cultivated hay is much more nutritious than that we get on our old fields.

MR. FRANK MORSE. I would like to ask one question. The Secretary told us we should plow as often as once in four years. Our first speaker showed us that our farms average about 100 acres in size. According to that we would have 25 acres under the plow on the average farm. I do not understand how the average farmer is going to get the manure for that 25 acres.

MR. HOLBROOK. I know of nothing so good, that has so much efficacy in it, as the fertilizer that we call "Get up and get." I have seen fields that were most unproductive clothed in robes of beauty by the application of that best of all fertilizers. If a young farmer has the will, there will be a way for him to get his fertilizers; and by putting in the plow and drawing from nature those elements which she has in abundant store there, and exerting this amount of energy and pluck which he ought to have, he will find his way to get his dressing. The more land you cultivate the more stock you will keep, and the more stock you keep the more fertilizer you will have.

SEC. GILBERT. Do not lose sight of the fact that you have no more acres to keep in a productive condition under this system than under the other.

MR. HOLBROOK. While the Secretary is up I should like to have him speak of the importance of an inverted turf.

SEC. GILBERT. I am glad to have my attention called to that. In run-out grass land you have but very little turf left and consequently you realize but very little effect from that turf as a renovator to the soil through its decomposition; but turn that field over when there is a good heavy turf and the surface soil is filled with grass roots—and with it possibly a heavy aftermath — and you have supplied material that will be of much benefit to the soil; hence an advantage from turning it over while in that condition. Never wait for the soil to become exhausted of its grass production before you begin to rotate again. It is one of our mistakes.

MR. STARRETT. There is one idea that I like in connection with this system as it is advocated by these gentlemen, and that is that it is apparent that if any of our farmers should adopt it they would have to go to work systematically. For the last few years such work as I have done at farming I have done by proxy. This is a very convenient way, and has a good many advantages connected with it, and one of them is that a fellow can see a great many things when he happens to go around a little during planting time, and at other

seasons, that he cannot where he is at work himself. I have noticed occasionally, while riding along in the spring, little pieces of plowed land here and there scattered over a farm. There is not enough land in a piece to work it systematically. A man will take a little piece and plow it and furrow it as straight as he conveniently can with the plow hitting a stone here and there, but the rows will be so crooked that he cannot even run a cultivator between them without covering up a hill here and going beyond reach of a hill there. But when you adopt this system you have got to go to work a good deal as they do in the West; if you are going to use machinery you have got to go to work systematically and make a business-like job of it.

FRANKLIN COUNTY.

Institute at Farmington.

An Institute was held at Farmington, February 30, under the auspices of the Franklin County Agricultural Society. V. L. Craig, Secretary of the society, presided, and opened the meeting in a pleasant manner. Following the opening exercises a paper was read on the subject of

WHEAT GROWING.

By J. W. BUTTERFIELD, Member of the Board for Franklin County.

Mr. President, Ladies and Gentlemen of the Institute: When our forefathers, principally from the parent State of Massachusetts, emigrated to the then District of Maine, and located in this beautiful Sandy River valley, and there hewed out homes in the unbroken forest for themselves and families, they seemed to realize the fact, as if by intuition, that their lot had been cast in the great wheat-growing belt of the North American Continent, a belt which extends westerly in the same latitude, and includes therein the now famous wheat lands of Minnesota, Dakota, Montana, Idaho, Oregon and Washington, hereafter destined to be designated as the granary of the world. Fully realizing the importance of the above-mentioned fact, those sturdy pioneers of the forest sowed wheat in their first clearings, and the virgin soil, teeming with all the essential elements necessary for the perfect development of the wheat plant, caused their rude, and in many instances, imperfect culture of their lands to be annually rewarded with bountiful crops of golden grain.

From the time of the first settlement of the section included within the limits of what is now Franklin county, and for several decades thereafter, the cultivation of wheat was relied upon as the principal field crop of farmers throughout this entire section. This whole tract of land, now Franklin county, was then sparsely settled, and the wants of the inhabitants, with their abundant crops, easily supplied; and even at this early period in the settlement of the valley, a surplus of wheat was frequently produced, and after roads had been opened up across the country to the Kennebec, in the

winter season of the year, long lines of ox teams were frequently seen slowly wending their way down the valley in the direction of Hallowell, loaded with wheat and grass-seed, and driven by Franklin county farmers, who exchanged their farm products at the Kennebec towns for such household, and other supplies, as they and their families might need during the ensuing year. True, indeed, those pioneer settlers, by their isolated location, were obliged to endure many hardships and privations, but on the whole, those were happy golden days for the pioneer farmer, when contentment, peace and plenty reigned supreme.

But as time wore on these fertile and once productive wheat lands became gradually exhausted by frequent cropping, and with only a limited knowledge of the absolute necessity of saving and applying fertilizers to their exhausted wheat fields, those Franklin county farmers who had hitherto relied upon raising wheat as their principal field crop gradually became aware of the unwelcome fact that their wheat yield was rapidly deteriorating both in quality and quantity. It is an old adage that troubles seldom come single handed; and in this instance the saying seemed to be fully verified, for then came rust, smut, the wheat midge or weevil, and all the kindred evils which confront the wheat grower in this and all other countries.

Under the erroneous supposition that some climatic influence, or other cause to them unexplained, and over which they could exercise no control, had produced this unfavorable result in their wheat crops, many Franklin county farmers became greatly discouraged in regard to wheat growing, and were anxiously inquiring what other field crop could be substituted in lieu of the one upon which they hitherto had placed their chief reliance. Some turned their attention to growing oats, others substituted the potato crop, and for several decades thereafter, and, indeed, until the present day, a large proportion of our farmers have ceased to make wheat raising a specialty; and as a direct result of this change, instead of lines of ox teams passing over the hills to the Kennebec towns loaded with surplus wheat for export to other parts of New England, trains of freight cars are frequently seen rolling into Farmington and Phillips loaded with flour from the West to supply the wants of the inhabitants, and in too many instances, I regret to say, the pressing needs of Franklin county farmers. No community, whose principal occupation is agriculture, can, for a long series of years, live, thrive and develop, in the broadest sense of the terms, and be a constant importer of

its own bread. Such a community may manage by a pinching economy to withstand this frightful and unnatural outflow of money from their midst for a season, but in the long run over every pulsation of industry will rest the shadow of death.

The all-important question then, which confronts the Franklin county agriculturalist of to-day, is whether he may not, by the intelligent application of the abundant means which lie at his very doors, namely, the economic use of fertilizers, both liquid and solid, in all cases saved in barn cellars and under barn sheds, and the judicious application of ashes, both leeched and unleeched, common salt and lime—thereby be enabled to bring back his now worn and idle, but natural wheat lands to their original fertility and productiveness, and thus check, wholly, or in part, the tremendous drain upon the financial resources of the county for western flour, which has hitherto, indirectly perhaps, threatened with disaster and ruin every industrial pursuit yet established within our borders. For an intelligent answer to the above mentioned question, the search need not be long nor far. Without fear of successful contradiction, we assert that the answer should be, most emphatically, in the affirmative—that it can, and should be accomplised without fail, and that, too, in the near future. Professor Miles, now of the Agricultural College of Massachusetts, but formerly of Michigan, made a study of the relation between wheat growing and animal growing in that State, from the State returns of 1874 to 1877. A map was constructed by counties, giving statistics of improved land, production, etc. With this map, it was readily discovered that in most cases those counties having large yields of wheat had a greater number of cattle and sheep than those counties in which the yield was smaller, a discovery that accords strictly with the well known fact that an abundance of manure -and I will add, of well decomposed animal manure, always to be well rotted down and decomposed in barn cellars and under barn sheds—is indispensible to the production of good crops, and especially the wheat crop. There may be some few exceptions to this general rule, but for all such, valid explanations are easily found. Here, then, is high scientific authority for the assertion that those farmers in this section who have good stock farms and wheat lands have it within their power, by the plentiful application of animal fertilizers, to bring back those bountiful wheat harvests which gladdened the hearts and added largely to the wealth of the early settlers of the Sandy River valley. That Franklin

county can and should produce its own wheat and flour at the present day, and even a surplus besides, admits of no shadow of doubt. Situated as we are, in the exact latitude of the great wheat-growing sections of the country, in the midst of farms annually producing bountiful crops of hay, and consequently feeding each season large numbers of cattle, sheep and horses, which produce plentiful supplies of animal fertilizers—a condition of things always essential for successful wheat growing—no earthly valid reason exists why the cultivation of wheat should not be immediately reinstated in its former honored position as the principal cultivated field crop in Franklin county. I would not be understood as advising any farmer to abandon the cultivation of a single half acre of corn, or any other profitable field crop, by substituting wheat tillage therefor, but rather would advise that by reason of a little more energy coupled with unflagging industry and perseverence, you beat back the bushes, briars and waste places encroaching upon your tilled crops and thereby double up, and more, if possible, the acreage of your wheat fields. We often hear farmers offer as an excuse for not raising wheat, that their supply of dressing is insufficient for enriching their lands enough to insure success in the cultivation of the crop. To all such we would say, go to the muck swamps, so numerous throughout all sections of our county, and from these fill into your barnyards, barn cellars and sheds, as much as you please. Visit the forests in which, on nearly every farm are to be found hundreds of cart-loads of leaves and leaf mold—the accumulation of ages, rich in all the elements essential in the successful cultivation of the wheat plant, and the very material whose fertilizing qualities produced the wonderful wheat harvests which gladdened the hearts and filled the purses of the original settlers of this county, and from these deposits fill to repletion if you will, your barn cellars and sheds, there to be thoroughly mixed and composted with animal fertilizers, both liquid and solid, and my word for it, you will never thereafter hear that class of farmers complain for the want of fertilizers sufficient for the successful and profitable cultivation of their wheat lands. To all who wish to engage in wheat growing, I will say that from some experience, and long and careful observation, I am convinced that the following conditions are essential: For location, select a high, airy ridge, and what is generally termed a hard-wood, upland soil, with a hard pan subsoil which will hold the dressing well, and after plowing make your land rich and fertile, it matters but little how

rich, with old, well decomposed barn-yard manure. If decomposed in a barn cellar so much the better, as one load from the barn cellar is worth two from the open yard. Thoroughly work your fertilizers into the soil in the fall, either by shoal plowing or with a common cultivator, when the land is dry. Great care should always be taken on this point either in fall or spring as plowing or harrowing the land when wet ruins the crop. An application of ashes, leeched or unleeched, lime, or common salt, will add materially to the value and the abundance of the yield. Wheat is essentially a lime plant, and fertilizers containing lime are absolutely necessary in its cultivation in order to produce a strong, stiff straw, which prevents lodging when the land is made rich as it always should be to insure a heavy yield. Plants obtain nourishment from fertilizers by the process of leeching, and principally if not wholly in a liquid form. Hence the advantage of applying animal fertilizers in the fall, so that the soil by seed time may become thoroughly saturated with plant food, leeched from the dressing by the action of the winter snows and spring rains. I recommend for seed the Lost Nation and also the White Russian varieties, and two bushels of *pure* wheat per acre, as the quantity to be sown. Either of the above-named varieties will make excellent flour, and the straw of each kind stands up well on rich soils and seldom if ever lodges.

When all the above-named conditions have been faithfully complied with, about all has been done, in my judgment, that need be, for successful and profitable wheat growing. Here let me remark, that many farmers, far too many, sow wheat on land literally starving to death for the want of any fertilizing material so necessary for the development of this or any other field crop, and then complain of failure in the cultivation of wheat. Reason should teach that under such conditions this or any other crop would fail. If, by any method—perhaps by offering increased premiums on wheat, by the agricultural societies of the county, (and here let me remark that the North Franklin Society doubled its premiums on this cereal at the suggestion of the Maine Board of Agriculture, three years ago)—the farmers of this county could be induced to so increase their wheat acreage as to produce their own wheat, and thereby check the heavy outflow of money in payment for western flour, a desideratum devoutly to be wished will have been secured, and one that would cause Franklin county to be ranked among the most prosperous in the State.

The signs of the times, from all points, indicate that a new departure in wheat raising throughout this county is about to be taken, when the successful and profitable cultivation of this crop shall again become general.

Let me give a few facts and figures. On a high, hill farm in North Franklin, sixty years ago, when the soil was teeming with all its virgin fertility, 40 bushels of wheat per acre was frequently raised. The very field where these crops were raised more than half a century ago, produced, the past season, with the application of only about twenty loads per acre of old well-decomposed dressing from the barn cellar, 28 bushels, of splendid quality, per acre. Here, then, is proof conclusive, that the wheat-producing elements in our soil have not been exhausted, but still remain therein, and that by the plentiful application of suitable fertilizers the natural wheat lands may again be brought back to their original vigor and productiveness. C. S. Phillips, of Avon, raised the past year, on a measured acre of ground, 40½ bushels of wheat. Mr. Phillips stated to the writer, that in the spring of 1882, he spread upon this acre fifty ox-loads of unrotted barn-yard manure, and planted to potatoes, and this season sowed wheat, with the result above-named. Hinkley Bros., of Rangeley, raised the past summer, on five acres of land, 108 bushels of wheat — averaging 21 bushels per acre. Ross Bros., of the same town, this season, from eight acres of burnt land, harvested 160 bushels of excellent wheat — 20 bushels per acre. Instances are numerous throughout the county this season where the yield of this cereal has been 30, and in some instances as high as 40 bushels per acre, but these may be considered exceptional yields, even for the unusually favorable season of 1883.

I will also briefly allude to the statements of two other parties outside this county as bearing indirectly upon the subject in hand. In the report of the Secretary of the Maine Board of Agriculture for 1878, Mr. Wasson, member of the Board for Hancock county, is reported as saying that Hancock county for the first time in many years had raised its own flour. This is a seaboard county, and not supposed to contain anything like as desirable wheat lands as are known to exist in Franklin county. Mr. Holbrook, President of the Maine Board of Agriculture, stated to me, at its recent annual session at Augusta, that he had raised on his farm in Brunswick, situated on an arm of the sea, as high as 39 bushels of wheat per acre. The land was made rich with animal fertilizers, and also treated with an additional

dressing of mussels — a small shell-fish, torn from the rocks in the sea at ebb of tide. These contain quantities of both salt and lime, and are condsidered an excellent dressing for wheat lands.

From these few brief statements and suggestions, as well as from the above-mentioned facts and figures gathered from the actual experience of practical and trustworthy farmers, there appears to be no question or shadow of doubt that wheat growing in the Sandy River valley under intelligent and energetic management may be made successful and highly profitable. Only give the wheat plant a rich, mellow soil, almost anywhere in this latitude, and therein it will thrive and revel in all its pristine vigor and productiveness.

In conclusion, then, I will say to the farmers of Franklin county who have noticed the methods herein recommended as necessary to be employed in accomplishing the above-mentioned results, and who wish to extend their acreage and excel in wheat growing, go forth with a full faith and an unflagging energy, and do likewise, and you shall receive a like abundant reward.

A discussion of the subject followed the reading of this paper, in which it was clearly shown that under good treatment wheat is a reliable and profitable crop on the hill farms of the county.

AFTERNOON.

NEGLECTED FARMS IN FRANKLIN COUNTY.

By Hon. James Morrison, Jr., of Phillips.

Mr. President, Ladies and Gentlemen: With the invitation extended to write upon the subject of "Neglected Farms in Franklin County," came a realization of inability to treat this important subject in a creditable manner, and as the magnitude of the question would seem to require.

A text sufficient for a whole course of lectures, a subject broad and deep enough on which to found a volumn, can only be touched lightly upon some of its principle features in a meeting like this; for although we do not pretend that one-half of the homesteads in Franklin county may be classed as neglected, yet we will all acknowledge that on nearly all farms and with nearly all farmers, there is more or less neglect. In the county there are many beautiful and valuable farms; there are also many happy, healthy, and well-to-do farmers, farmers who began life upon the farm, who have fought the

agricultural conflict, wrung from mother earth their sustenance and a competence, and to-day are living witnesses of what energy, muscles and brains can do when bent in the right direction, backed up by a determination to succeed. But on the other hand, scores of abandoned farms, hundreds of dilapidated houses, thousands of acres of once productive field and pasture now overgrown by weeds and bushes, and fast tending back to forest and wilderness, prove conclusively that many there are who have failed, many have become discouraged, many have fallen by the wayside.

Very many are the causes which have wrought this degeneracy; we can only consider briefly some of the most prolific. First, the idea that anybody can be a farmer, however dull the intellect or deficient the education, and unsound the judgment; this is the rock on which thousands have been stranded, and to which thousands more are yearly tending, notwithstanding the pioneers of intelligent agriculture are loudly calling for reform. But of this we shall speak hereafter. Second, many start upon a farm intending it only as a temporary occupation, and thinking that when they have accumulated sufficient means they will give up the farm and follow some other business more genteel and requiring less work. It is needless to say that this class never succeed as farmers, and their dreams of graduation from the farm and promotion to some soft place, away from field and woodland, are seldom realized. With no desire to make a permanent home, no kind of work is done in a permanent manner. Fences are cheaply built, buildings never repaired, rocks are left upon the ground, manure heaps are left to dry up, and waste and wash away, bushes invade the fields and pastures, weeds and grass choke the growing crops, the hay crop grows less and less, the soil rebels against the slovenish husbandry; it refuses, and well it may, to bring forth its former abundance, and very soon what was once a thriving, well-conducted farm, becomes a barren waste, unfit for the habitation of man, and affording little or no food for beasts; while the pseudo farmer is obliged to shift as best he can, and find employment as a day laborer in some city or village, where he fares worse and works harder than was necessary to make his effort at farming a complete success. Thousands of wrecked farmers all along the line evidence the sentiment that no man can succeed at farming unless his heart is in the work, unless he puts himself in.

I have diagnosed this particular disease, and now for the antidote, which is, never attempt to farm unless you plan to be a farmer. If

you would be a mechanic, then go and learn the trade and stick to your kind of labor; if a merchant, then acquire a knowledge of mercantile business, and engage therein; if a professional man, then delve in books until the o'er-worked brain is satisfied, and stick to your first love; but never engage in farming as a temporary stepping-stone to something easier, for you will slip and fall between; rather commence on some fruitful and prolific part of earth's surface with a determination thereon to found a home, there to live and labor, there to raise crops and rear herds of horses, sheep and cattle, there to build and maintain a permanent homestead for thyself and the coming generation, there to raise and educate children, there to have days of recreation and enjoyment, there to grow intelligent, there to develop brain power as well as muscular force, there to enjoy the fruits of a well spent life, and there to die under the shadow of thine own vine and fig tree. With this object in view success is insured from the word go, and grim want and gaunt poverty will never come across the threshold.

A great cause of failure in many localities is the neglect to give stock proper shelter and care in the winter season. Farmers lose more by keeping stock through our cold winters in poorly constructed barns than in any other way. They don't take pains enough to make their barns and stables warm and comfortable. However good the condition of stock in the fall, if the tie-up or the stable is open to cold winds and storms, and the cattle and horses are obliged to stand exposed, no matter how well they are fed, they will shrink in flesh continually so long as the cold weather lasts. There are hundreds of barns in our county to-day absolutely unfit to shelter cattle, even in mild weather. The cold storms blowing in through hundreds of cracks and crevices, the north-west winds and chilling frosts penetrating in every direction, the poor creatures shivering and frosty, cold and hungry, their life blood almost chilled within them, form a sad picture of man's neglect to God's animals under his care. In almost every instance this state of things is traceable directly to the heedlessness, the disreputable slackness and criminal laziness of the farmer. These are strong terms, nevertheless true. Almost any farmer who keeps a stock of cattle, if his barn is cold, can well afford to put forth a little extra energy, gather together two or three thousand boards and clapboards, fifty to a hundred pounds of nails, and devote a week or ten days in the fall to repairing his barn. He had better run in debt, even for the material, than freeze his cattle.

It is an outlay that will pay the first winter. Cattle kept in a warm tie-up, where the manure scarcely ever freezes, will only require about two-thirds the amount of fodder that they will require in an open chance. The colder they are the more hay they will have to eat to keep up an animal heat, and it will certainly cost much less to generate a portion of the heat by boards and clapboards than by using hay at $12 per ton. The abominable picture of a man toasting his shins before a blazing fire on a winter's evening, with his cattle all frosty and shaking with cold in his dilapidated tie-up, when a small outlay would make them as comfortable as himself, is almost enough to make the dumb animals, like Balaam's ass, cry out in human language against this abusive treatment.

Another cause for run-down farms is the fact that farmers do not keep team enough, and of the right kind, to successfully cultivate. To cultivate successfully in our rough, uneven county, it is necessary to remove rocks, build stone-walls, break up fields, haul timber for fences, haul manure, dig ditches, pile logs, make roads, and do many kinds of heavy work. Now the best power to apply to these kinds of work is the old-fashioned four-ox team. Of course on many intervale and upland farms, where the fields are all smoothed for the machine, where the stones have been taken out and the walls built, in places where the four-ox team has had its day, you can get along with a pair of horses or a yoke of steers; but generally it is necessary to have old "Star and Broad," and "Buck and Bright" to make business move. In order to be a success, the farm must be improved from year to year, and you might as well undertake to run a factory without water or steam, a railroad without a locomotive, or an ocean steamer without a propeller, as to try to run a farm without a team. If farmers would keep yokes of steers of the different ages, say from calves up to six years old, one solid yoke of oxen could be sold each year; others would come up to take their places and there would be a good heavy team on the farm the year round. All steers can be made to pay their keeping from three years old forward, and there is no class of stock in such good demand, and that brings such high prices, as good matched steers and oxen. But our farmers have been trying to get along without them, they have sold their hay or run their fodder through inferior stock and old horses, and the result is the run-down farm. Then, again, our farmers have been selling their best calves to the butchers. They are tempted by a few dollars to part with that which ought to live

and grow and develop into a seven-foot ox. This veal business is ruinous to the county. It is an outrage, an illegitimate trafic. No veal is fit for the table until two years old. No farmer ought to sell his calves for veal, and those who do it are killing the goose that lays the golden egg. They are getting ten dollars where they might get a hundred.

As to what kind of stock to keep, after that necessary to constitute the team above-mentioned, there are various opinions. Some favor sheep, others cows, and others colts and horses. Perhaps some particular farms are better adapted to keeping sheep, others cows, but speaking to the farmers generally, we would recommend a variety, viz., part cows, part sheep, a few colts and horses, but first and always, the steers and oxen.

Another evil of which I wish to speak in connection with farm stock, and as one other cause for run-down farms, and that is the tendency which we have to let the drovers, every fall, select and cull, and sort out the very best and fairest of our flocks and herds and drive them to market. The very ones that we ought to keep and breed from are sold simply because we can get a few dollars more. The odds and ends are kept, and from these we vainly try to maintain our reputation as farmers. Is it a wonder that farmers raise inferior stock, when the very best strains of blood go to the shambles? Remember, inferior stock means inferior farming, and inferior farming means neglected or abandoned farms.

Another evil is the lack of suitable pasturage in summer. Whether our stock gains or stands still, or grows poor, in winter, it is absolutely necessary that they should have abundant feed and drink in the summer season. But our pastures in many places, particularly in North Franklin, are becoming covered with bushes and the feed all the time growing less and less. This shows that the axe, the bush hook and the scythe are not brought into requisition often enough. It is but a light tax to go over our pastures, once in two or three years, and cut down the bushes, but if we let them once get the advantage, then the work of clearing and reclaiming the land will be nearly or quite equal to the cost of clearing the land in the first place. Farmers are continually complaining of lack of pasturing, and with many the bushes and trees are gradually closing in and usurping the place of the grasses, and not a hand is raised to repel the invasion. The only remedy is the strong application of the axe, the scythe and the bush hook, above-mentioned. Cut

down the clumps of bushes. Set back the edges of the forests to their former limits, pile up, burn off, sow grass seed, give it a chance to grow, and very soon the pasture can be brought back to its former richness. There are thousands of acres of land in this county where the timber is worthless, where the surface is too steep, rough or rocky to cultivate, but would make excellent pasturage for sheep and cattle if the same was cleared, well seeded down to grass, and the bushes kept subdued afterwards. Generally the crop of wheat, oats or barley that can be raised the first year will partly pay for clearing, and the satisfaction of having one's stock at home, in good feed, and sleek and fat in the fall, will pay the balance. The cry that clearing off the land will interfere with rain-falls, and make the country barren, may be raised, but at the present time, in North Franklin, there is greater danger that the forest will drive man out, and the territory will become a howling wilderness. Go back to the tops of our high hills and take a bird's-eye view for proof. More than three-quarters of the land is covered with forest. There is undeveloped wealth here. There is timber that in time will bring cash. There is land that ought, this moment, to be fenced into fields and pastures. Woodman, don't spare that tree too much! Let it come down.

As only a summary of the principal causes for run-down farms was intended, but one more will be presented, viz: (and now I expect to strike home) The lack of energy among the farmers. A great many farmers will begin and put in the spring crop; then drop everything till hoeing; then half hoe and half cultivate; then another rest till haying; having concluded, then another soft spell till the harvest, and after that is completed nothing is done through the fall, and the winter is spent in idleness. This class is always grumbling about high taxes, hard times, accumulated debts, and envying their more diligent and prosperous neighbors, when the prime cause of all their misfortune is their own inaction and their abortive attempts at farming. In order to make farming a success, the farm should be run as you would run a shop, a mill, a store, a factory, viz., every day (Sundays excepted) the year round. Suppose the blacksmith should only work half his time, how long would he hold his custom? or the merchant absent himself from his store, how long would he hold his trade? And what mill or factory, or other kind of business would be prosperous, lacking those vital essentials to success, energy, push and perseverence? But some will say that we must have rest and recreation. Admitted, but the difficulty

is we rest too much and work too little, and when we work we do not roll up our sleeves and take hold in dead earnest. In order to make things move, a man must pull off his starched shirt and gloves and put himself in.

"Let us then be up and doing,
With a heart for any fate;
Still achieving, still pursuing,
Learn to labor and to wait."

The soil of Franklin county is equal to that of any other county in the State, with the exception, perhaps, of Aroostook. True it is that many parts of the county are rough and mountainous, but no more so than the State will average. We have hundreds of farmers who to-day are on the broad highway of prosperity and affluence, and hundreds of others who are gradually working out the problem of successful husbandry, and are yearly falling into line. The great reason why so many fail is because they fail in the first instance to develop that energy, that vim, that go-ahead-ativeness which is necessary in all important undertakings. Dame Nature will fulfil her part of the contract if man will perform his, and the two acting in unison, provided the man exercises sound discretion and good judgment, and works, will bring about a successful result.

But hundreds have got the idea that farming is a degrading business, that farmers are but the mud-sills of society, and do not rank so high as merchants, doctors, lawyers and ministers; and consequently many farmers look with envy to the professions and deplore their own unhappy condition. Many farmers' sons look toward the professions with longing, and back to the farm with disgust, and as a result agriculture is neglected and the professions over-crowded. This is all wrong. There is no caste in America. The man who tills the soil should consider himself on the same plane with the merchant and professional man, and if he is not, it is generally his own fault. The man who owns a snug homestead, a well-stocked farm, and has by years of toil and study (for farmers should study) acquired a competence, can take more solid comfort than any professional man that ever lived. He works for himself, and is not dependent for employment upon others. He is independent; is his own boss. He has the fee simple of a territory as broad as his lines, as deep as earth center, as high as heaven, and either he or his wife is president of that little domain.

The oft repeated assertion that farming cannot be made to pay, is refuted by the hundreds of farmers in our county, and the thousands in our State, who have become independent and wealthy by perseverance and push in the agricultural line. Men may ring the changes on the oft repeated cry of "Go West;" may sing praises to the level prairie land and to the sunny slopes of the Rockies, but we venture the assertion that there is no State in this broad Union which affords so many facilities for the farmer with a small capital as our own. No State has better facilities for schools. No other commonwealth in existence where the society is better, or the intelligence of the people of a higher grade than here in the State of Maine. Our climate, though at certain times quite severe, will compare favorably with our Western States, and the rate of mortality in the several United States proves that. so far as health is concerned, we cannot better our condition by a removal. Good health is one of the greatest blessings. The farmer always obtains his full share. Somewhere I have seen the average longevity of persons in the several occupations. That of the lawyer is about 30, the doctor 35, the merchant 37, mechanics and machinists 40, and farmers 42. This is an important point in favor of agricultural pursuits. These figures may not be quite exact, but they do show that the average life of the farmer is longer than that of any other class — except, perhaps, the politicians, and I believe they never die; at least, they always come up every year for office. Then don't repine at your lot. You have the health and vigor which out-door exercise alone can give. You inhale the pure air, fresh from the everlasting hills, and you labor in the bosom of mother earth, under God's immortal sunlight. Then, brother farmers, let us not be discouraged. Our mistakes of the past will make us more careful in the future. Let us exercise sound judgment and lay our plans with wise discretion. Let us not be swindled by the locust swarms of sharpers that infest our country. Let us give bogus fertilizer and farm implement agents a wide berth, run pack peddlers and patent-rights men off our farms, and give quack doctors, corn-sheller and knife sharpener scoundrels the grand bounce. Let us deal only with men on whom we can rely, and with such deal justly. Let us stick to our hillsides, our meadows and broad intervales. Let us, with renewed energy and with a knowledge gained by experience, reading and observation, continue to cultivate the broad acres, and above all let us cultivate

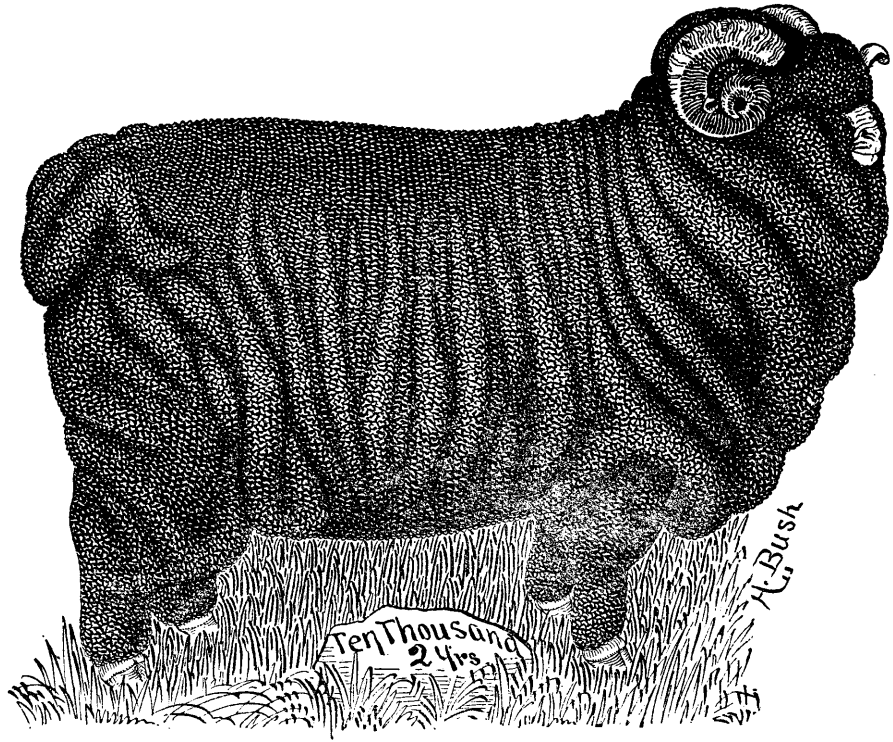
the mind, for by so doing we can occupy that position in society to which we of right belong.

The farmers of to-day have a wonderful advantage over the farmers of fifty years ago. Note the vast difference of the circulation of books, papers, magazines, and all kinds of reading matter among the masses. How does then compare with now? All of us know how it is now. Then, books, papers, periodicals and reviews were scarce and high. Only a favored few could afford the luxury of reading or spend the time in study for the purpose of improving the understanding. How is it now? Cast your eyes over the intellectual field and behold the change. The poet, the historian, the botanist, the chemist, the statistician, the agriculturist, the machinist, the inventor, the scientist—all are at work. The printing press has invaded every considerable village. The whole land is flooded with useful information upon all important subjects, farming in particular, and every book and paper and periodical so cheap as compared with "ye olden time," that well may we say that he who runs may read.

But we hear the cry in many localities that book farming amounts to nothing, and book farming don't pay—and true, you cannot read the forests from the face of the earth and make waving fields of grass and grain grow instead; you cannot write the rocks from out the soil and range them into stone walls; you cannot, by any fine-spun essay, renovate the soils of our hills and valleys and cause them to bring forth ten, twenty, sixty and a hundred fold, but we must have both the physical and the mental forces combined and acting in unison to insure success. Muscular force applied alone makes us beasts of burden. Muscular force yoked with intelligence makes us successful as farmers and places us on that exalted intellectual plane which the God of nature designed as the inheritance of his husbandmen. I can find no more fitting words with which to close this address and to express my own feelings upon this occasion than by again quoting from the Psalm of Life, as sung by America's greatest poet:

"Lives of great men all remind us,
We can make our lives sublime,
And, departing, leave behind us
Footprints on the sands of time.

Footprints that perhaps another,
Sailing o'er life's solemn main,
A forlorn and ship-wrecked brother,
Seeing, shall take heart again."



"TEN THOUSAND."

Two years old. Bred and owned by R. J. Jones, of West Cornwall, Vt. Sire, "Standard," by "Allright." Dam by "Allright." (See Frontispiece.)

BREEDING MERINO SHEEP.

By Hon. Henry Lane, Cornwall, Vermont.

There are but few, if any, principles of breeding that all breeders will agree are established beyond a doubt. Many of these laws are as yet hidden from us or imperfectly understood. The ideal standard for a Merino sheep differs among breeders, and the course pursued to obtain and perpetuate the desired type also differs. All the knowledge, experience, skill and success of our best breeders has left many questions yet unsolved. What we do not know is more than we do know. If any breeder, by long continued and close observation, or careful experiments, has succeeded to his satisfaction. and has knowledge beyond any of his predecessors, this light should not be concealed beneath a bushel. I believe that in the breeding of Merino sheep, and in their improvement, there has been developed as much if not more skill and intelligence, and as good care as in the breeding of any kind of farm stock. In this statement I would not except the dairy cow or the trotting horse. Breeders may not all have had the same definite type, form or merit in view, but whatever may have been their objective point, I think we can truly say, all have striven with persistent and well directed efforts towards their ideal. Nature refuses to adopt our notion, views or rules as her law in breeding, and confine herself to such limits as we choose to make. There are many vexed questions relating to breeding that have not yet been settled. Different breeders have not agreed in their theories relating to breeding. The principles of breeding are so varied, and change so much according to the surrounding circumstances, and as we study them from different points of view, it is not strange that we do not agree on many of these questions. There are but few facts established beyond dispute, upon which are founded the art of improving a breed. Undoubtedly in breeding, as in other things, "like causes produce like results," but when we look for like results, and are disappointed, the causes may be hidden and very unlike. Breeding is not an exact science where we can base our practice on certain laws that are established and with probable certainty predict future results, but the best results are obtained when we base our practice on certain theories that are reasonably well founded. If the conditions were not so often unknown, the experience of a successful breeder would be definite and of inestimable value to succeeding breeders. Satisfactory results have occasionally

been obtained, but the influence that caused them is a secret, and probably will remain a secret. Combinations that produce good results cannot be repeated with much probability of like results, and the problem will still remain unsolved, yet I am unwilling to believe that breeding is all a matter of chance. Its operations beyond doubt are conducted by fixed laws, the uncertain and varying results which so often disappoint the breeder are easily and sufficiently accounted for by the modifying influences of surroundings, care and conditions. These varying conditions which cause in the decendent a dissimilarity to either parent has always been a fertile subject of discussion among breeders. We have bred sheep of great beauty and wonderful wool producers. A lamb at one year old producing 24 pounds, and a mature sheep in one year producing from 35 to 40 pounds, are great achievements, but in accomplishing these great results has there been any principle brought to light, or any plan of breeding developed by which we can profit, any reliable system formulated that has received general acceptance?

Heredity is the ever-acting preservative force which tends to keep the offspring like their parents and ancestors, and hence make a breed possible. Heredity gives direction to the offspring, but only partly controls it; and there are other influences that modify it, that help to shape it, and many of these influences are in the hands of the breeder. The lamb may have better care and feed and grow larger, or be starved, and smaller than its parent. Art can supply conditions that will influence growth, shape, quality and product. Good care, or the opposite, given to a few generations will give a new character to the flock, and become part of its being, and then heredity tries and often does transmit this new character to the next generation. The law of nature is that the animal must transmit the tendencies it has itself inherited and acquired. Feeding has always been considered the requisite of success by all past celebrated breeders. It may be laid down as an axiom, that breeding alone can produce nothing beyond what is inherent in the animals coupled and their ancestors. It is food and management that makes a beautiful specimen of any strain of blood. Darwin mentions many instances where food has been the cause of variation in animals, while selection and breeding afterwards perpetuated that variation. All improvements require much time, and their value is in proportion to their fixed character, but their fixed character cannot stand long against an entire change of food and surroundings which produced

them. Many of our best Merinos that go into unfavorable sections of our country, unfavorable as to climate and food, rapidly deteriorate, and the charge is sometimes made that deception was used in their sale, that they had been fixed up, that they were not as good as appearances indicated. The soil and grasses of various sections unquestionably have different effects on the type and quality of the animal. The soil and climate of every district impress certain characteristics and qualities upon the sheep bred there. The favorable circumstances under which the Vermont breeder is placed has not only enabled him to establish and maintain a fixed breed of sheep, but his effort to improve has been crowned with success in the highest degree. Here a uniform type and quality if desired can be maintained for an indefinite time, and improvements when made can with proper care be held. In most wool-growing sections, especially the west and south-west, the tendency is to grow coarser, thinner and lighter fleeces, generation following generation. The grasses and soil are of such a nature that it requires but a comparatively short time for our pure-bred Merinos to develop a coarsening tendency. There is another reason besides the grasses—the roving life which the sheep of that region lead, thereby developing a muscular frame which strangely counteracts the effect of fine blood. In most of the western wool-growing sections, sheep travel ten times the distance passed over by our sheep to obtain their food. If we desire to modify our Merinos, we can, by care and feed, furnish them advantages which aid them in overcoming obstacles, and thereby change their type. It takes a long effort of both breeding and feeding to establish the fixed characteristics of the Merinos or other breeds.

The first point of excellence in an animal for breeding purposes that I will name is constitution. By constitution we mean all the characteristics which relate to health, vigor and vitality. I mention this first because I consider it the most important. One may be a fine judge of desirable points in a Merino, may be a good care keeper, a fine breeder in every other respect, if he does not make constitution his first consideration, if he does not make this the foundation for his flock, sooner or later he will fail as a breeder. It makes no difference how strong the building, or fine its architecture, without a solid foundation it has no permanency. A flock of sheep without this firm foundation, vigor of constitution, I don't care how well bred in other respects, it can have no permanency. The breeder

with this lacking must sometimes meet with failure. The weak and diseased should be weeded out, and vigor become a part of the physical system, and thoroughly heredity. While breeding for valuable points have these vital points always in view—health, vigor and endurance. Without these you are liable to weakness, barrenness, and a tendency to succumb to exposure and disease. Where both sire and dam are vigorous and healthy, they are most certain to be prolific in healthy offspring that will be good feeders, taking their food with a relish, and having sound health, vigor, fertility, and longevity. All breeders, I believe, will accept and adopt as a general principle in breeding animals, that we ought to have strong, vigorous, well-developed parents on both sides. It is a question worthy of consideration how far the breeder can go in the production of oil and wrinkles and not sacrifice this all-important point.

Pedigree is the process of improving blooded stock by breeding to points and strengthening the heredity of the good points by "pedigree." "Blood" means careful breeding for a protracted term for a special purpose; it means the development of some peculiar excellencies, it means the uniformity of type so essential when we know just what we want to produce; it means that any valuable characteristic that has been developed can be reproduced. The greater the number of ancestors possessing any special points of excellence the greater the probability that their points will be continued in the offspring. Purity of blood is likely to give uniformity of type. Pedigree is good only for what there is of it; to be specially good it must have a line of specially good ancestors. The value in pedigree Merinos, or thoroughbred Merinos (sometimes so called), consists in their ability to transmit to their offspring their own qualities. Their being bred in one line for many years, their blood is so strong that they are able to perpetuate with a good degree of certainty whatever characteristics they possess. If their characteristics are of an objectionable nature, the producing them on the offspring will be just as certain as if they were of a desirable nature. Pedigree alone may have little value. A ram or ewe, to be valuable for their increase, must have individual merit as well as pedigree, tracing back to valuable ancestry. The presumptive evidence of the value of any line of pedigree is the merit of the animal to which it belongs. A pedigree Merino that has serious defects and its ancestors have the same defects, the longer the pedigree runs back in a continuous line the more certain will these

defects be transmitted to their offspring. Pedigree, therefore, may be valuable, and also it may be without value. Here let me say a register of blooded stock, to be valuable, should require for admission merit and pedigree. The Jersey cattle, that breed of animals that has been attracting so much attention and interest for a few years past, and selling at almost fabulous prices, have been bred on their native island for hundreds of years; they have a pedigree as long as the most fastidious could desire, but one-third of the increase from this pedigree stock fail on examination to show sufficient merit to gain admittance to the herd-book. A defective animal is rejected by the examining committee as certain as a defective pedigree is rejected. It is a mistake to breed to a poor animal because it has a fine pedigree. I would not give much for a pedigree as long as your arm, if the animal has no good qualities it is worthless. The value of a pure-bred sheep is in its combining the greatest number of points of merit, and so backed by pedigree that in its breeding it will reproduce itself in form and character when it is crossed with another. It is a mistake to breed to a poor animal because it has a fine pedigree, and this mistake is not uncommon among breeders. The same pedigree will not always breed the same. This is noticed in twin rams, or own brothers. A ram may be somewhat deficient in merit and be a good stock getter, if in his pedigree it traces back through ancestors that were powerful to stamp on their offspring their own characteristics.

You cannot have growth without change. You cannot have improvement without change, without variation—variation from the parent, variation from any of its ancestors. When the breeder is satisfied with like producing like in his breeding, he is restraining his animals from being improved in their progeny. The law of variation should be the key-note for the breeder who desires to improve his stock. We may not fully understand the laws which govern or control variation. There is no doubt that management, care, food, climate, habit, all the surrounding conditions modify and change the size, form, vigor and fleece in all its qualities, and characteristics so acquired are to some extent transmitted to the offspring. All the causes we may not know, but the fact that these exist in what the breeder has to deal with, and he should hold every variation in the direction of improvement and, if possible, render it permanent, and reject for breeding purposes every animal that the variation is in the wrong direction. Variations in all cases have a

tendency more or less strong to be continued in the offspring, and if we can retain desirable variations for a number of generations these will become established or permanent. This is the true theory that has enabled the breeder to improve—by adding and holding, from year to year, the changes and excellences acquired by care and condition. Progress comes through variation, not through likeness. It is this law of variation that has caused the great improvements in the past, whether the breeders are conscious of it or not, and it is this law that we must apply in order to produce progressive results in the future. If a breeder has obtained all he desires in his flock, has nothing more by way of improvement to accomplish, then the law of likeness is of the most importance to him, as he will desire to so modify conditions as to restrain his animal from being improved; but to the breeder who is not satisfied with present attainments, but desires to further improve his flock, the law of variation is deserving of his careful attention. Heredity is not the only influence or force at work in the production, growth, type and quality of the animal. Heredity gives direction to its growth, but it only partly controls it. All through life these elements which nourish it also modify it, and this may be a sufficient reason why the offspring is never quite like its parent. The lamb may have better feed and better care and grow larger, or be starved and neglected and be smaller, or other influences help to shape it, to modify it, to give it a different type from its parent; but whatever new character it takes on becomes part of its being, and then heredity tries to transmit the new character to the next generation. I presume every breeder can recall instances when Merino sheep have changed ownership and passed into hands where poorly fed and poorly cared for, and in a few generations the character of the flock was entirely changed. A variation in the wrong direction was produced. You can also recall instances right the reverse of this, where variation in the right direction was produced. Art can supply conditions to influence growth and modify a breed. Animals growing wild seldom have these influences to produce variation. Take any of our wild animals as an example. The red fox of to-day is the same as that of fifty years ago, the same in size, color, form and type—no change no variation. The law of their reproduction seems to be as fixed as that which gives to the casting the shape of the mold, be it repeated times innumerable.

I here refer to a few instances of marked variation in our Merinos, and I will select some of the most marked instances without

prejudice. Take the McColly lamb of last year. In this lamb there was a great variation in points of fancy, or points of merit, that reached nearer perfection than any lamb ever dropped within my knowledge. I give this as my opinion, and I believe it is the opinion of nine out of every ten unprejudiced breeders. Now in this lamb some cause produced a variation in point of merit, far beyond those of his sire or his sire's ancestors. Take King Allright as another instance. In this ram was a variation of ten pounds more weight of fleece and at least twenty-five pounds more live weight than its sire or any of his ancestors—a marked variation or improvement in two desirable points of merit that breeders are seeking after. Banker and Rip Van Winkle are other instances when variation and improvement were far in advance of any ram in the line of their breeding that preceeded them. In these striking instances of variation it is not to be expected that heredity will transmit their own qualities with that certainty that it would had there been no variation, and they had been like their sires; but we can reasonably expect some at least of the offspring will vary in that direction, and in the second generation more of them, and so in time that variation which was so marked in the direction of improvement becomes established, fixed and permanent. We often hear this remark (and it is a remark founded on facts), that the increase from rams that by variation are far in advance of any that preceeded them was not uniform; that while they got some extra good lambs they also got some ordinary ones. This will most always be the case with a ram that stands preeminently far in advance in points of merit of any of his ancestors. If you wish to breed uniformity take those that have been bred in that way for generations, those that are not better than their ancestors twenty or thirty years ago. Variations have a tendency more or less strong to be continued in the offspring, and if we can retain desirable variations for a sufficient number of years these will become fixed. To gain an advance this year and gain another next, and so on continuously, is the secret of successful breeding. What the possibilities are of thus accumulating a special character, or the limit within which it must be kept, no one knows. It looks now as possible to us that a fifty-pound fleece may be reached, as it did ten years ago that forty pounds could be obtained.

Judicious selection is indispensable to success in breeding, and this should have regard to every point of merit—form, fleece, pedigree and constitution. The art of accurately judging sheep, of

selecting the best for a given purpose, is of incalculable value to the breeder. In every flock are a few animals superior to all the rest in every particular that is desirable. Those superior qualities are transmissable to its progeny. By breeding from these selected animals the superiority accumulates and an improved type is the result. You may carry desirable qualities by selection too far, to a point beyond which any further change in that direction is no longer an improvement. Take as an example wrinkles. A certain kind, quality and amount of wrinkles are by most breeders considered desirable. By selection, improvement in this direction can be made, but this may be carried to excess, and "too much of a good thing" becomes a defect. This may be true in respect to other points, such as fineness of fleece, length of staple, oil in fleece, size and form of animal. A few breeders seem to have some one hobby that they ride to death. It may be any one of the points just mentioned. If it is oil, it may be carried so far that there is more oil than wool. If it is length of staple, it may be carried so far as to lose other equally desirable qualities. If it is fineness of fibre, it may be to sacrifice almost every other valuable point. When we have reached a point which to go beyond would not be an improvement, we must use selection to maintain the excellency already attained. The improvements that have been made have come through the selection of sheep of merit, of particular excellence and the best in the flock to breed from, and weeding out the poorest. A good animal is the first consideration in selecting breeding stock; good ancestry is second, and this is determined by pedigree. Pedigree is good for what it represents. Its value depends upon what kind of animal there is in the line of its ancestors. It can never take the place of selection. The practice of selection, the continuous adding the good qualities, the continuous weeding out the poor, is the plain, common-sense view of breeding. If there is one principle of breeding which is more fully acknowledged and practiced than any other it is Darwin's theory, of the "survival of the fittest." Some breeders allow themselves to be too much influenced by prejudice or some striking merit. Selecting animals with fewest defects is probably a better and safer rule to go by, than to select the animals with the most good points. A few showy and desirable points should not so attract one that several serious defects might be passed over. There are many times with sheep of the same pedigree such a striking contrast in points of merit, that but few breeders would hesitate for a moment

which to select. I will give one illustration—the twin three-year-old rams exhibited and shorn by B. B. Tottingham & Son, Shoreham, at the public sheep shearing at Middlebury last spring. These twins were in general appearance as near alike as twins generally are. The fibre of wool on one was $4\frac{1}{2}$ inches in length, on the other $3\frac{3}{4}$ inches, a difference of $\frac{3}{4}$ of an inch. The longest staple ram weighed after shearing 114 pounds, the shortest staple ram 135 pounds, a difference of 21 pounds. The longest staple sheared 23 pounds 12 ounces, the shortest staple 33 pounds 10 ounces, a difference of 10 pounds lacking two ounces. This extra 10 pounds came mostly from a much denser fleece. You might possibly find one breeder in twenty whose hobby was long staple, who would select the longest fleeced ram, but the other nineteen would select the one having so many good points to be found in the shortest staple ram, and was lacking in the other.

There is much attention given to this question of fancy among breeders of blooded stock at the present time, and this question enters into the breeding of Merino sheep, and with a degree of importance that cannot be ignored. There is no end to the difference of opinion upon this fancy question; hardly two think alike as to the rank fancy should hold to merit, and we find some who would entirely disregard this fancy question in breeding. A Merino is a great wool producer, and to a lover of sheep is an animal of beauty. If beauty is not incompatible with merit, and is not an obstacle to her development as a wool producer, I can see no reason why we should ignore its claim as a thing of beauty. The breeder's aim has been, is, and should be to develop her wool capacity in quality and quantity to the highest limit, yet we cannot afford to disregard any legitimate collateral quality that will tend to enhance the money value of the stock we raise to sell. I noticed in one of Kellogg's combination sales of Jerseys last October that the prices varied from $15, the lowest, to $3000, the highest. When we consider merit alone we can hardly conceive it possible for this difference in value. For milk or butter there is a wide difference in value in every herd of cows. One may pay a good per cent above care and keep, and another run its owner in debt every day she is kept. Of course in these extremes there is a wide difference in value, but on merit alone we can hardly see the difference of $15 and $3000. In the latter price we can see besides merit the solid color and the black tips. To a Jersey breeder whose fancy is solid color, a white spot the size of your hand on a cow of

great merit as a butter producer might lesson its value from $1000 to $100. Breeders of Merinos know how this is. Two sheep of equal merit as wool producers, one with a black spot the size of a pea on its lip, face or ear with many purchasers would make the unequal prices between the two of $100 to $10. It's folly to "kick against the pricks." It's not wise to ignore facts in relation to breeding fancy. Wrinkles have merit. The great weight of fleece could not have been obtained without them. Wool sells, wrinkles sell, and often wrinkles bring the better price; but the number, size, kind where placed, and at just such an angle are questions of fancy, and the breeder who expects good prices cannot afford to disregard them. The soft silky face without spot or blemish, covered with wool to just such a point and there stop short, too much a defect as well as too little, with one or several wrinkles across a short nose are fancy points. These wrinkles across a Merino's nose may have no more merit than the black tip of the Jersey's tail, still the breeder cannot disregard them because there is money in them. The surface color of the Merino is a fancy point of but little merit, but so important is it considered that if breeding and housing will not give it, I am credibly informed that it may be artificially produced. So important is the black tip of the Jersey that it may be artificial too. What we call fancy points must be carefully considered in selecting pure-bred sheep. It is a fact that I presume breeders have all noticed, that when a committee, visitor, or purchaser enters the yard or shed, at the first glance, as if by instinct, they are looking for the fancy points, or to detect the absence of them. You may bring up to your visitor for a closer examination a sheep that in form or fleece has the most merit of any in the flock, if it should have a small black spot on its lip, it most likely would be examined with indifference. While we should not disregard fancy points, there is danger of this being carried too far, and these fancy and desirable characteristics may so attract one that several serious defects may be overlooked or passed over. Fancy should not be secured at the expense of the useful. Merit should not suffer at the cost of fancy points.

The quality of prepotency is one of the most important considerations in selecting a stock ram. That power to perpetuate the sire's merit in the offspring is superior to all other considerations. A ram to have this necessary prepotency must have three qualifications: form, constitution and pedigree. Greater improvements in the Merino

flocks have come from the qualities conspicuous in the ram instead of those conspicuous in the female parent. The reason is evident when we consider the greater care in selecting the ram. Breeders owning fifty or one hundred ewes are not satisfied with selecting a ram of uncertain qualities, but many times, regardless of price, select one of known good points, and one that will most likely transmit them to his offspring, while in the flock of ewes there may be the good, bad and indifferent. Breeders should pay the greatest attention in selecting the stock ram on account of his more extended services, and the more numerous produce of which he would become the parent. A large proportion of the stock rams that have been and are being used in the State came directly from a few of the best flocks; either were raised by these few breeders or sired by rams bred by them. This is wise on the part of a large majority of breeders. A few breeders have, by perseverance and intelligent selection, and by breeding from rams and ewes which possessed the important and fancied requisites of a good Merino in character, bred animals superior to those of the more numerous flocks, and these desirable qualities being thoroughly inbred and firmly fixed, the increase will possess all the desired points in the greatest perfection and best combination. In selecting, his greatest care should be observed as to individual merit, as well as pedigree. Rams should be the best individually and the best bred, and by virture of pedigree their influence on the offspring should be overpowering. Prepotency in an ancestor or strain of blood is the most important consideration. Individual merit may not give prepotency; the best pedigree may not give prepotency. We may admire individual merit, but of what value is it in an animal for breeding purposes if its merit dies with it and leaves no impress on its offspring. When you can combine prepotency with merit and pedigree you have a stock sheep that is a prize to any breeder. There are many facts to confirm the idea of the superior influence of the more potent animal in perpetuating individual merit. As an example take Hammond's Sweepstakes that had a line of prepotent ancestors back through Little Wrinkley, Old Wrinkley, Old Greasy, Wooster and Old Black, and from Sweepstakes down through California, Gold Drop and Green Mountain. In these was a line of merit and pedigree and prepotency to stamp their qualities on a large number of stock sheep in the State, that made in their day great improvements, and stamped their impress on almost every flock in the county and State. Another line of prepotent rams is the Allright line, bred

by R. J. Jones. This line is from Standard back to Allright, by Nevada, by Chub, by Serville, by Count, bred by W. R. Sanford. From this line of stock rams has sprung a large number of valuable stock sheep. Eureka is another ram that has produced a valuable line of prepotent rams.

Perhaps no question in relation to breeding has had warmer friends, or more bitter opponents, and been more freely discussed than that of in-and-in-breeding. The advocates for and against are earnest and confident of being right. Close in-breeding, if long continued, has a tendency to induce weak constitution and sterility. Breeding from animals of various degrees of relationship and sometimes from the closest relationship is often practiced by the best breeders, and in many cases is necessary in order to fix or continue extraordinary excellences. At the present day there is hardly the necessity for Merino breeders to pursue close breeding that there was at an earlier period in the history of this breed. Thirty or forty years ago they were compelled by the comparative fewness of well bred Merinos to a repeated use of the same ram, or offspring of his own getting. With the advantage of a large number of flocks and different strains and families to select from, there is no necessity at present for close breeding. A successful breeder of years ago once said, "in-breeding was sure to produce an uncommonly good or an uncommonly poor animal." It is noticed that those who deny any necessarily evil results from the practice will say that we must not continue to breed "too close" too long. If ancestors in line a few generations back were sound, healthy and vigorous animals, we may not be able to give any reason why the offspring should not be equally as sound, healthy and vigorous; but without giving any reason for it the facts are that evil comes after a continuance of the practice. So close an observer as Darwin admits that in-breeding tends to perpetuate the merits of the parents at the sacrifice of constitutional vigor. The strongest advocates of in-breeding admit this danger, and say caution and good judgment must be exercised in practicing it; and in view of this danger recommend the establishment of two or more lines or families of inbred animals, each of different strains of blood but of decided merit, and as weakness or barrenness appears, take out crops from the one to the other. Some of the most remarkable stock getters of the various breeds have been produced by close breeding. By such breeding, if an animal of genuine merit is produced (and one of the most important points of merit consists in

prepotency), they impress every animal with which their blood comes in contact.

There are various theories in relation to the part or power the sire and dam exert in transmitting qualities, that the one gives the leading characteristics of the form and external structure, and the other the vital organs, constitution, habit and temper. There have been some noted breeders who have had faith in this theory. No less a breeder than J. N. Blakeslee says, "experience has taught me that in breeding animals the offspring partake strongest in their outward coat and appearance of the male, and their temper and disposition of the female." This theory I think will not bear the test of experience, and can be of little aid to any one. The more vigorous and potent parent will unquestionably give controlling character to all the qualities in the offspring.

A few breeders of extensive and close observation have advanced theories which they claim will, to a limited extent, regulate or control the sex of progeny. I do not propose to discuss this question. There has been no theory presented but that some fact could be found to substantiate, and also quite as many facts to refute the same. Breeders, from some cause, may one year have a large preponderance of one sex, and next year by supplying the same conditions, so far as the conditions are known, have opposite results. Nature seems to have provided that the number of either sex produced shall be nearly equal, and man has not as yet found a law that will in the least disturb the equilibrium wisely established.

At a sheep breeders' meeting in Middlebury last winter, this theory was advanced and some facts presented to substantiate it: that the two first or at most three crops of lambs were better than any succeeding ones, if there was a continuous use of the same ram on the same ewes. I do not believe anything in this theory of breeding. I can't understand the causes for any such results, and the weight of facts are against it. What were presented as facts I think must have been too hastily-drawn conclusions. If you undertake to judge of the merits or quality of the young of any kind of animals, you are very liable to misjudge. You cannot tell at weaning time, or at the end of the first year's growth, or in fact any time until the animal has reached maturity, what quality of an animal it will develop into. There are different influences to affect the development of the young growing animal, influences to affect favorably or unfavorably, at different periods of its development. If you un-

dertake to judge the animal at any of these periods you are liable to draw conclusions that may not prove to be facts. How often the colt, calf, or lamb develop into a much poorer or better animal than what we expected they would from what we could see while passing through the various stages of their growth. How often breeders have too hastily judged the value of a stock animal, and misjudged by the character and quality of the stock when young, rejected and sold such animals only to purchase them back, at an expense regardless of price or distance, because the stock when fully developed proved to have great value. If you undertake to judge progeny previous to maturity, you are liable to draw incorrect conclusions. It is very common to have a flock of ewes do better by their lambs some seasons than others. The condition of the ewes, the season or the pasturage will cause this variation. Because the third, or fourth crop of lambs, from the same combination, do not look as well at weaning time, or at the end of the first year's growth, it should not be presented as a fact to substantiate a theory.

Wishing to ascertain the opinion of some of the best breeders of cattle, horses and sheep in our country, I addressed a letter like this to a few of them: "What is your opinion of this theory in relation to breeding, that from a continuous use of the same male on the same female, the offspring will not be as good after the first two or at most three combinations; and can you in your experience in breeding mention any facts to substantiate or refute this theory?" In the replies not a single breeder has expressed an opinion in favor of this theory. I will give extracts from some of these letters bearing on this question. William Crozie of Northport, Long Island, writes: "My experience with rams is as follows: I purchased the Cotswold ram, King Tom, in England, and bred him five years. The last year my lambs were fully as good if not better than they were the first year, and should have continued to use him had he not got injured and died." Mentions another instance where he used a ram four years on the same ewes with like results. A. J. Alexander, Woodburn Farm, Kentucky, says: "I cannot think that breeding the same ram to the same ewe for three years would deteriorate the flock." T. L. Miller, Beecher, Ill.: "The question raised to wit: the continuous use of the same ram on the same flock of ewes that the increase would not be as good after the first two crops of lambs or at most after the third crop." "I know this view is held by some flock-masters, but I should doubt its correct-

ness. From my own experience I have no occasion to think it true. Standard I continued to use while he lived, and his death I think was a great loss to me. I have been using my old bull Success, ten years. Although he is eleven years old, I would not part with him for $10,000. I am a strong advocate in the breeding of cattle, that whenever a bull has shown himself a good getter to keep him while he will work, and I believe the plan to be a good one." M. H. Cochrane, Campton, Canada, writes: "I would say in my opinion the use of a male animal to the same female year after year would not be likely to result in a deterioration of produce until the sire should have lost vigor by reason of old age." Watts & Seth, Baltimore, Md.: "Your letter asking the effect on offspring by using same sire on same female for many years, and is it deleterious, is received. We do not believe it to be true with cattle, but just the contrary." J. Milton Mackey, Great Barrington, Mass., says: "For twenty years I have been a breeder of registered Jersey cattle, and my experience on the subject you inquire about is that while in a few instances the last calves sired by a bull were inferior to the first, in a large majority of cases the second, third, and fourth calves of the same sire were the best. If any such law as that you speak of exists in sheep I am disposed to think it must depend on the fact that rams are over-worked." Smiths & Powell, Syracuse, N. Y.: "If we understand you right we see no reason in case an animal was bred into the same herd, and to the same animals year after year, why the offspring after the second or third year would deteriorate. We certainly think this is not the case in cattle. If you look at the human race would it be reasonable to say that the fourth, fifth, and sixth child and so on is less capable and healthy than the first, second and third. We cannot call to mind a single instance either in the human family or in animals when the fourth, fifth, or sixth offspring was not quite equal to the first." Miller & Sibley, Franklin, Pa.: "In relation to your query, will answer: "We do not believe that the continuous use of the same sire in a herd can injure in any way the offspring." "If such be the case we should change our social customs and marriage laws. Between breeding in the brute and the human we take it there is no marked difference." Powell Brothers, Springboro', Pa.: "In reply would say that there is no reason why, especially if the sire is better than the dam, that the continued use of the same ram on the same ewes would not increase rather than diminish the value of their

progeny, if the sire is not bred to his own get. This is an acknowledged fact by all breeders."

The last question that I will present is this: At what age should Merino sheep be put to breeding? In discussing this, like almost all questions pertaining to breeding, I am aware that I enter upon disputed grounds. Practice is not the same with breeders. Some breeders believe it is better to commence breeding their ewes at two years old, other breeders believe that three years of age is the best time to commence. Now what effect does either practice have on the ewe so bred, on the offspring, and on the breeding or improvement of the flock in the distant future? There is a provision or law of nature that all animals, all kinds and breeds, can reproduce before maturity. Some kinds can reproduce when they have reached but one-fourth their period of growth. The Guinea pig will continue to grow for one year, but will have young when three months old. Other kinds will reproduce when one-third or one-half the period of growth is reached. With the heifer of some breeds of cattle it is at one-third of its growth, with the Merino it is about one-half the period of its growth. The Merino ewe as grown by most breeders, if not put to breeding, will nearly or quite reach their growth when three years old. Not always will this be the case. The reason given by some breeders why they are not put to breeding earlier is that they may nearly reach maturity before any strain is put on their system by breeding; and then all breeders of blooded stock desire to have a few show animals, and those that have reached maturity before breeding are best for this purpose, show to the best advantage what has been accomplished in the flock or herd. Now what effect does reproduction before maturity have on physical development? I think it may retard it, but does not weaken it. It would look a little strange that if the animal, in accordance with the law of nature providing for reproduction before maturity, was put to breeding, and thereby physical development weakened, that by complying with a law of nature, degeneracy would follow. This I do not believe in. Wild animals that are not under the control or restraint of the hand of man reproduce soon after this law permits them to. I am not aware but that they have the same physical development that they did hundreds of years ago. Intelligent and long continued observation with the human race shows that married women who reproduce, on the average reach a stronger, healthier and better physical development than women that do not reproduce, and this is an argument

in favor of early marriage, or marriage and reproduction before growth is completed, that they have a better development and longer life than if reproduction commences later in life or does not occur at all. What are some of the reasons in favor of breeding our ewes at two years of age? First, a crop of lambs one year earlier, which gives a more rapid increase of the flock. Second, a more certain and continuous breeder. If animals are restrained from breeding until part of their period of reproduction is passed, the result is much more likely to be barrenness. This is coming to be a very serious defect in Merino flocks, and any course that will in the least increase this defect should be avoided. There is a tendency in all high-bred animals to barrenness, and the longer bred, the closer and purer bred, the more this becomes a serious defect, and any course that will tend to prevent this should be pursued. I think there is no question upon this point that a ewe put to breeding at two years of age will make a more certain continuous breeder. You have only to look at the early and late marriages in the human family to prove this position to be correct. The third reason that I will give in favor of early breeding is a better physical development. Experience does not prove that full development must preceed reproduction, or, if it does not, development will be dwarfed. It is not true, as some may believe, that in order to reproduce, the animal must make a strain upon itself, that it has no power left to carry on its own growth. Growth is greater during the five months the lamb is carried by the young ewe. During the three or four months of suckling the ewe loses flesh, but this is restored very quickly after the lamb is weaned, and by the close of the year will be quite as large and generally larger than the barren ewe of the same age. The best developed animals of any flock or breed will be those that reproduce before full growth is reached. If the animal is properly cared for, reproduction aids physical development. There are almost always a few in every flock of two-year-old ewes from some cause much under size. These I would not put to breeding until another year's growth was completed. The fourth reason I will give in favor of breeding two-year-old ewes is this: They will have longer life. There is this law of nature that has little variation, that with all animals and all breeds the longer in reaching maturity, the longer life. The Merino breed are slower in reaching full growth than the mutton breeds of sheep, and they are also a longer life breed. Early maturity is desirable in all meat-producing breeds, but not so

desirable in animals for the production of wool, milk, or labor. If by forced growth, if by feed to produce early maturity, if by withholding breeding until maturity is reached the tendency is to change the Merino in this characteristic, so that full growth is reached as soon as it is in mutton breeds, you very much lessen the value of the breed. A ewe that reproduces at two years of age and again at three years of age will most likely be one year longer in completing its growth than the ewe that does not reproduce until it is three, but it will in the end have a finer physical development, a longer life, and a more profitable life to its owner. There is this objection raised against early breeding, that the fleece is affected unfavorably. The fleece does not appear as firm, is not as dark color, appears lighter, is lighter in weight. This will be the case more or less with every ewe that breeds at whatever age all through life. This effect cannot have any permanency, cannot be in the least unfavorable to the breed, as wool produces in quality or quantity. Growth of wool is determined by breed and individual peculiarity, and only secondarily and within narrow limits by the effects of reproduction. The effect on the fleece by breeding the ewe young is only temporary. The lessening of weight of fleece is more in oil than wool, and this lasts only while the ewe is suckling her offspring.

The Merinos of to-day differ widely in their characteristics from the Merinos that were imported, or even from those of twenty-five or thirty years ago. They are very artificial productions. They have reached their present degree of excellence under vigilant care, skill in breeding, selection and perseverance. If improved in this way they can only be maintained by the same kind of selection and care which produced them. If care and selection are withdrawn, they will deteriorate as rapidly as they have been improved. It requires as much skill and care to maintain a good breed as it does to produce one.

Institute at North Jay.

A second Institute for the county was held at North Jay, January 31st. A good audience of farmers from this and the adjoining towns was present. Mr. Butterfield called to order, when a brief and fitting welcome was pronounced by Mr. Warren Leland.

Gentlemen: I have noticed in reading an account of your meetings in different parts of the State, that sometimes a lawyer or other

learned man would deliver an address of welcome; but unfortunately we have a limited supply of such talents here, and were I able to deliver an address of that kind, I do not think it would be acceptable to this audience. They did not come here for that purpose; they can see and hear enough of me on other occasions and so I rise only to offer an apology. We are almost entirely an agricultural community. We have no lawyer in town who gets his living by his profession, and I don't know as we need one, as we are a law-abiding people. We have no doctor when sick, we have to depend upon our neighboring towns for medical assistance. We have a few ministers, and were we not very good people, we should need more. So you see gentlemen this community is made up mostly of farmers. We need some help, and have invited you to our place, that we might profit by your experiences in the occupation in which we are engaged, and we extend to you a welcome and the hospitalities of our homes while you remain with us. We are poor in talent, but rich in natural resources which need development, and we want some assistance. There is wealth in our soil, but through ignorance of the scientific principles which should be applied to farming, we many times fail to extract it. Gentlemen, there is granite enough in that hill just across the way to supply the State of Maine the next three hundred years, if time should last as long, and then have plenty left, and it is being developed by an energetic company of men. They have already laid a track 1,850 feet from the main railroad track to the summit of the hill, with an altitude of 314 feet, or about 900 feet rise to the mile, over which the stone are to be transported by means of a powerful engine on the summit, to which a car will be attached by a wire cable, and the stone will be lowered down this steep grade, and the empty car drawn back by steam power. They are also now erecting a boarding-house a hundred feet long, containing 25 sleeping rooms for the accommodation of their help. Unless the farmers bestir themselves and apply more scientific principles to their work, and produce a larger surplus from their farms, they are going to get beat. Those quarrymen might be fed largely from the adjoining farms. But very little need be imported. The man who works in the quarry requires substantial food, such as our farms are capable of producing, and very little of tapioca.

We raise some very good crops, but it is more from accident than from the application of any scientific principles. I accidentally

raised a large yield of clover last season on a small spot of ground, but I don't know why it grew as it did. I sowed four kinds of grass seed, clover, Timothy, Red-Top and Orchard grass, upon earth thrown from a well eight feet below the surface, and none grew except the clover, and at the first cutting I should judge the yield was one and one-half tons to the acre, at the second cutting some of it measured three feet two inches in length and had blossomed. Now what I wish to know is what qualities that earth possessed that were so admirably adapted to clover and no other kind of the grasses. I submitted the question to the agricultural editor of the Lewiston Journal, for an answer through the paper which has not yet come. Some one suggested that my land was wrong side up. If so I wish to turn it over. I have tried repeatedly to raise onions on my soil but never succeeded, while my neighbor just across the meadow, on a slight elevation, raises them easily, and I don't know enough to know why he beats me. What the farmers want is a more thorough knowledge of their occupation in all its branches. I understand the State Board of Agriculture is an institution founded and paid by the State and sent among the people for the advancement of agriculture, and we have met here to hear discussed different subjects pertaining to our occupation, that we may be the better prepared to manage our farms successfully. I am aware that your time is limited, and any extended remarks from me would be neither interesting nor profitable. Please pardon me for trespassing upon your time.

After the opening exercises the programme of the meeting at Farmington was repeated in part. In the afternoon Henry Lane, of Vermont, gave an able lecture on "Winter Feeding of Animals," which does not appear in this report. In the evening President Fernald, of the State College, repeated his lecture on "Conditions of Success."

KENNEBEC COUNTY.

Institute at Manchester.

By invitation of the citizens of Manchester, the Institute for Kennebec county was held at Manchester Town Hall, March 6. Every effort was made to make the meeting a successful one. The attendance was good.

J. E. Brainerd, the member for the county, called to order and invited Sullivan Kilbreth, Esq., to the chair. Mr. W. H. Wing welcomed the Board and visiting friends in an appropriate manner. No further report of the exercises of the forenoon is here given.

AFTERNOON.

COST OF MAKING MILK.

By C. H. COBB, Poland.

When the subject of the cost of making milk was first given me, it occurred to me that while it was one of much importance it was also one that would be very difficult to present in a satisfactory manner. Some further consideration of it does not make it appear of less importance, nor make it any the less difficult to present.

In presenting this subject there are many things to be considered. Three of the main ones are: 1, The cows; 2, The feeding; 3, The care.

It is not a small task to select a herd of good deep-milking cows. They are oftener selected by dealers abroad and carried out of our State where dairy farming is made more of a specialty than in Maine.

In selecting a herd for making butter I would not take pains to select those which would give the largest flow of milk, but rather those which would produce rich and thick cream like the Jerseys. In selecting cows for milk alone good size is an important matter, as the final disposition of all cows, when done giving a fair amount of milk in return for their feed, is beef. Size can be easily secured by crossing the Short-Horns with other breeds, and the cross will give good material to work with. It makes a wide difference when a

herd of cows is disposed of whether they dress six hundred pounds or only four hundred and fifty. Besides, a herd of large, noble cows with big udders shows off to much better advantage than small ones.

These are some of the marks of a good cow: a mild disposition with a gentle look about the head and countenance; a thin sharp shoulder; a loose or open jointed back-bone; large milk-veins; a square bag, with teats set well apart each way; a wide escutcheon. When these marks are all found about a cow a dairyman runs no risk in buying her as a rule.

Feeding is the key-note to success in milk production. The best quality of cows will not amount to anything unless they are well fed. Good feed makes larger cows out of small ones, and many times deep milkers out of inferior ones. It also makes fat and good looking cows, out of what otherwise were inferior animals.

What kind of feed is the best for cows, is a question often asked, and there is this answer to it: Feed such fodder as is raised on the farm and add to it sufficient quantities of concentrated food, such as cotton seed meal, mixed grain, meal or corn meal, in such quantities as the animal may demand to produce the largest amount of milk she is capable of producing. Take a cow that has been brought up on poor fodder and no grain, and when you feed her well you produce one of two things: A large amount of milk or a large amount of fat. The feed will run to one or the other.

Good feed amounts to but little without comfortable quarters and good care. Pure water must be supplied, and in the winter it must be free from ice and frost. Warmth, with good ventilation, goes a great way in providing comfort. Successful dairymen look to these matters closely.

Cows should always be fed regularly and milked regularly, and it should be done by the clock. The barn should be kept clean and neat. A little dry sawdust or sand scattered under and behind the cows keeps them dry and prevents all bad odors. If the barn is cleaned out two or three times a day, as it should be, and the cows are cared for and kept clean, they will look well, feel well, and do well, and their milk will give satisfaction to the consumer. With these rules strictly carried out we have the following example:

Sum invested for cow	$50.00
Interest on investment	3.00
Tax and depreciation in value yearly	3.00
Pasturing 5 months	5.00

Meal, 2 qts. per day through Aug., Sept. and Oct...	$3.90
Fodder corn for same time..	2.40
Meal, 4 qts. per day for seven months from Nov. 1, at present prices.....	18.20
Two and one-half tons good hay..... ...	25.00
Total cost per year.....	$60.50

A good cow under proper care and treatment will give yearly 2700 quarts of milk. This makes the cost per quart two and one-quarter cents, average for the year. The cost of milk during the five months the cows are at grass, from June to October inclusive, is as follows:

Cost of keep for the five months.....	$13.80
Amount of milk for same time	1,125 qts.
Cost per quart	1¼ cts.

Cost of winter milk:

Cost of keeping cow seven months from Nov. 1st,	$46.70
Quantity of milk for same time.....	1,575 qts.
Cost per quart.....	3 cts.

Recapitulating, we have the following:

Cost of making milk by the year	2¼ cts.
" Summer "	1¼ "
" Winter "	3 "

Mr. B has seen Mr. A succeed finely for a number of years in the dairy business, so Mr. B selects a herd of cows according to his ideas and engages in the business. The cows he purchased are smaller in size and grades of all kinds. He pays $40 apiece for his herd.

Interest on capital invested yearly	$2.40
Depreciation in value and taxes yearly	2.40
Pasturing, six months.....	6.00
Corn fodder fed in the fall.....	4.00
Mr. B thinks they do just as well on 2 qts. of meal apiece per day, and believes that to be enough, consequently his meal will cost just half as much as Mr. A's during the six months at the barn, and that will be.....	9.10
Mr. B feeds more hay because he feeds no meal in the fall and feeds three tons at ten dollars a ton, amounting to.....	30.00
	$53.90

Then we have for the cost per head for keeping this herd one year, $53.90.

Mr. B has managed to get from this herd during the year, 2,160 quarts per cow, and has done well to do that. That brings the cost of the milk 2½ cents per quart for the year.

Take the number of quarts of milk per cow, 2,160 quarts, multiply it by 3½ cents per quart, the average price per year, and it gives $75.60 per cow that he receives as income. That is $18.90 per cow less income yearly than Mr. A's.

To do a thing in the best possible manner, requires a knowledge of a multitude of little things. We cannot be successful in any business or occupation without a knowledge of, and attention to, the details of that business. If we should go to the successful manufacturer, or railroad manager, and ask the secret of their success, they would tell us it depended largely upon their knowledge of, and attention to, details.

Now it seems to me that there is no business or occupation that depends so largely for success upon little things as does the occupation of farming.

How would it be possible for us to be successful in any business if we conducted it as we do our farming operations? Did we ever see or hear of anyone being successful who did not know what his productions cost him? We say it would make no difference with us if we did know how much they cost, we should go along about the same. If we should keep a debt and credit account with the farm, and we found at the end of the year or a series of years that some of our products had paid good profits and the others had not, should not we be likely to make something of a specialty of that which paid the best? And, again, if the figures should tell us we had hardly received pay for our labor, would it not lead us to make a little effort to find out the cause?

We might be led to ask ourselves if the crops we raise and the stock we keep are those best adapted to our conditions and circumstances; if we raised the best that could be raised, and if we raised it the cheapest it could be raised.

Ordinary farmers go along year after year making mistakes without knowing it. We simply know that our expenses are large enough to eat up all the income. But there are farmers who are successful, and lay up money every year. Their conditions are no more favorable than our own. But these successful farmers are men

who know when they make mistakes and know how to correct them. They learn from their mistakes as well as from their successes.

They know the cost of their productions; they do not guess at anything; they know by figures all the items that enter into that cost. They know which product pays the best, and make a specialty of it, and studiously strive to know and practice all the little things that will perfect it and make it yield the largest return. When we see successful farmers, we find they have kept debt and credit account with the farm, and in most cases have made a specialty of some of the productions of the farm. It is better to know how to do some one thing well than to have a superficial knowledge of a great many things.

WHAT TO DO WITH MILK.

By L. K. LITCHFIELD, Winthrop.

In presenting the subject of "What to do with the Milk Produced by Our Cows," I shall confine myself somewhat to this locality; or at least, so that what I may say will be applicable to Kennebec county more particularly. Location will always demand attention in the establishment of any business, and where judgment is at fault in this respect, failure is likely to follow. So it seems to me that what might be the best use to make of milk in one section or locality might not be the best in another. For instance, farmers situated within easy reach of large business centers like Portland, Lewiston and Auburn, where there is a constant market for milk at good prices, might possibly find that more profit could be realized from selling whole milk than from its manufacture into butter or cheese.

Doubtless many intelligent farmers and dairymen living in the vicinity of those cities do find it profitable to produce milk to be carried off bodily from their farms; and yet it admits of question, whether there might not be found a more profitable course, especially when we consider the problem of the continued fertility of the farm. Indeed, to my own mind, it was very clearly demonstrated, by *facts* and *figures*, at a recent Institute held in the vicinity of farms where the producing of milk for city consumers was the leading interest, that there *was* a better way; that really there was a little more money for the producer through the manufacture of his milk into first-class butter at home, and by the common system.

There are several considerations which forbid my entering into a discussion of the selling of milk, as against its manufacture into butter or cheese upon the farm, the first of which is my very limited knowledge of the business of selling milk; and besides this, it does not seem to be a practicable matter for Kennebec farmers to discuss, in the absence of any but a very limited market. Another reason is the fact that the able gentleman to whom we have just listened with so much satisfaction is the staunch supporter and champion of the milk sellers of Androscoggin county. Now then, let us see "What to do with it" in this locality, in Kennebec county, than which there is none better adapted for dairying in the State, or even now has a better reputation for product. There are a few farmers who claim, and who practice the theory to some extent, that stock raising for work and beef is the most lucrative business they can engage in, and to this end the milk of their cows should be and is allowed to the calves from three to five months, and that they take it directly from the cow. This practice for the few, and with the kind of cows used, may do, and give the owners satisfaction; but for the many, and with the ordinary stock of our farms, it cannot become a profitable method. It involves conditions which the average farmer, as a rule, cannot comply with, and which places it as not practicable.

The real question is, Can the farmers of Kennebec county get more money from the milk of their cows by making butter or cheese? and a second question of no less importance is, By what method of manufacture?

"What to do with it," then, is in my judgment to produce from it the very best grade of butter. Butter in those localities where it can be produced from sources and conditions which will positively insure best quality; and cheese to be considered the next best means for profit. Without doubt we have as good, or better conditions for dairying in this county, as can be found in any section; and for many years it has been the constant aim of our dairymen to improve their stock, and to excel in the quality of product. Notwithstanding the large percentage of Jersey blood in our herds, the production of cheese has been in the past a profitable and satisfactory source for the milk of our farms. For a limited season, from the 1st of May to October 1st, a season which in the past history of dairying with us has produced the largest flow of milk, and in which it is more difficult to make and market butter; when, also, prices for butter rule low, I am inclined to think the profit would be as large from cheese as from butter. Cheese making by the factory system has proved

to be a paying way to work up the milk of our cows, and has relieved the farm of a certain amount of hard work – more especially that required of our wives and our daughters—and has made it practicable for farmers in the vicinity of cheese factories to increase largely their number of cows. These two important items are often left out of the reckoning, when we talk about the profits of making cheese by the factory system. I think it cannot be denied, with all the array of failed cheese factories as against it, that more money has found its way to the pockets of cow owners through the successful operations of cheese factories, than would have been the case under other circumstances.

The attention of dairymen and farmers is just now more particularly directed to the creamery system for the production of butter. Although it is comparatively a new method, and perhaps not fully developed, yet upon careful inspection it commends itself to the intelligent progressive farmer. When we look at the results of the system of co-operative butter making as carried on in some of the western and north-western States, we are astonished at its magnitude; and still more so when we see Connecticut and Massachusetts in their dairy sections successfully competing with them, by means of the same system. A dozen years ago, the West depended upon the East for a large amount of butter then consumed; but to-day how is it? Eastern dealers are looking to Illinois and Iowa and the West generally for their best butter. The facts are, that the creamery system so extensively employed in the West furnishes a better and more uniform grade of butter, which takes precedence in the market over the dairy article, with its many shades, tints and styles. It also commands a higher price per pound. Day after day, cars come rolling into Boston, bringing many tons each, of creamery butter, made 1,000 to 1,500 miles away, and lay it down for thirty to thirty-five and forty cents per pound; at the same time the finest of eastern dairies cannot reach those figures, and by far the larger portion of Maine product goes a begging at twenty-two cents.

Many Maine farmers see the advantage of the creamery system, and are moving for its adoption. Already several creameries are in successful operation, more than satisfying their patrons. It is found in practice that as much butter is made from the same amount of milk, and of a vastly higher average grade in quality. Close uniformity is secured in texture, in flavor, and in style, thereby rendering it more acceptable to purchaser and consumer, and for which

they are willing to pay an increased price. By the creamery system, a large amount of hard work is taken from the farm; a better product is put upon the market; more money comes to the producer; an increase of stock is admissible, and no fertilizing elements are carried off the farm. These, briefly stated, are some of the reasons I put forth to show that "What to do with it" is to produce butter from it, by the creamery system.

Following the reading of this paper there was a lengthy discussion upon butter factories and their work.

In the evening H. L. Leland repeated his lecture on "Farmers' Boys and Girls," following which an exchange of courtesies closed a profitable Institute.

Institute at Fayette.

A second Institute for the county was held at Starling Grange Hall, North Fayette. No Institute had before been held in that part of the county, and it met a cordial greeting from a community of earnest farmers. A generous hospitality greeted all in attendance. Excellent singing added its pleasures to the exercises. Of the members of the Board there were present Mr. Brainerd, the local member, and J. W. Butterfield, of Franklin county. The farmers of the locality being largely engaged in the raising and fattening of steers and oxen, the subject of "Raising Steers" was selected for the forenoon; "Machinery in Corn Growing" for the afternoon, and "Fruit Raising" for the evening. No report of the exercises is here given. In earnest effort and real appreciation, as well as in its formalities and in its results, this was a model of its kind. It closed with an exchange of kindly courtesies.

WALDO COUNTY.

Institute at Thorndike.

Waldo county Institute was held at Thorndike, February 28. There were present of the Board, D. B. Johnson, the member of the county, and S. L. Holbrook, of Sagadahoc.

Mr. Johnson read a paper on "Waldo County Farming"; Mr. Holbrook on "Rotation of Crops"; Samuel Libby, of Orono, on "Drainage"; and W. B. Ferguson, of Dixmont, on "Relation of Science and Art in Agriculture." Discussion filled all remaining time. Farmers were in attendance from a wide circuit.

SOMERSET COUNTY.

Institute at North Anson.

An Institute for Somerset county was held at North Anson, March 26. The member for the county, A. R. Smiley, of Skowhegan, being out of the State, no assistance, either in arranging for the Institute, or in carrying on the exercises, was rendered by him. The meeting was attended by a goodly number of the prominent stock growers of the county. No report of the exercises is given. This closed the series of Institutes for the winter.

TABLE OF THE COMPOSITION OF AMERICAN FEEDING STUFFS.

By DR. E. H. JENKINS.

[From the Report of the Connecticut Agricultural Experiment Station for 1883, by permission.]

On the following pages is given the average composition of the fodders commonly used in the country, compiled exclusively from American analyses. The compiler has aimed to bring together all analyses which have been published and could be obtained up to September 1st, 1883. Probably a few have been overlooked.

In the first column of the tables is given the total number of analyses from which the average was obtained. The probable accuracy of the average increases with the number of analyses on which it is based.

It is very desirable to know within what limits the composition of each fodder is likely to vary, and for that reason the maximum and minimum amounts of each ingredient have also been inserted in the table.

COMPOSITION OF FEEDING STUFFS.

Compiled from all available analyses made in this country—Posted to September 1, 1883.

NAME.	Analyses.	Total Dry Matter			*Protein.			Fat.			§ Nitrogen-free Extract.			Fiber.			Ash
		Min.	Max.	Aver.	Min.	Max.	Aver.	Min.	Max.	Aver.	Min.	Max.	Aver.	Min.	Max.	Aver.	
GREEN FODDER.																	
Maize fodder	18	7.20	28.90	17.66	0.56	1.80	1.29	0.10	0.60	.28	3.20	17.70	9.83	1.90	9.80	5.04	1.22
Maize fodder—ensilaged	28	12.32	27.88	19.63	0.90	2.77	1.47	0.30	1.80	.72	5.62	14.23	10.12	4.04	10.02	5.96	1.36
Pea vine—ensilaged	1	.....	.....	18.36	.....	.....	2.40	.....	.....	.80	.....	.....	7.60	.....	.....	5.57	1.99
Rye	5	.....	.....	25.3†	2.30	3.00	2.60	0.60	0.70	.65	4.90	6.70	5.90	13.40	14.90	14.30	1.90
Sorghum leaves	3	23.30	32.70	27.00	2.40	3.70	3.10	.....	.....	.....	.....	.....	15.1‡	4.30	6.80	5.20	3.50
Cow pea vines, green and succulent, with the pods	2	13.97	17.90	15.94	3.00	3.25	3.12	0.58	0.62	.60	5.34	8.46	6.91	2.87	4.09	3.48	1.83
Cow pea vines, probably after the pods were removed	1	.....	.....	27.19	.....	.....	1.85	.....	.....	.21	.....	.....	7.86	.....	.....	15.27	2.00
Soja bean vines	2	30.15	30.65	30.40	3.88	3.94	3.91	1.05	1.55	1.30	14.24	14.39	14.32	8.26	8.91	8.58	2.29
Carrot leaves	1	.....	.....	16.70	.....	.....	4.26	.....	.....	.86	.....	.....	5.99	.....	.....	2.25	3.34
Beet leaves	1	.....	.....	11.16	.....	.....	2.74	.....	.....	.60	.....	.....	2.49	.....	.....	2.50	2.83
HAY AND DRY COARSE FODDER.																	
Low meadow hay	10	85.50	93.60	89.50	4.60	10.40	7.70	0.70	3.60	2.20	39.80	55.20	43.60	21.40	40.00	30.20	5.80
Maize fodder, field cured	9	61.00	85.20	72.63	3.40	5.80	4.56	.66	1.60	1.29	30.50	49.20	38.62	18.65	30.94	23.76	4.39
Meadow hay	7	.....	.....	85.7†	10.10	21.50	12.40	1.60	5.10	3.10	32.70	45.20	39.60	14.90	31.70	23.00	7.60
Low meadow hay	10	85.50	93.60	89.50	4.60	10.40	7.70	0.70	3.60	2.20	39.80	55.20	43.60	21.40	40.00	30.20	5.80
Salt marsh hay	11	81.40	92.80	89.53	4.30	7.80	5.90	1.63	3.10	2.32	34.10	53.67	42.42	27.00	37.90	31.47	7.42
Timothy hay	16	.....	.....	85.7†	4.80	9.60	6.29	1.10	3.30	2.01	39.98	48.60	44.31	25.10	32.35	28.92	4.17
Timothy and Red-Top	4	.....	.....	85.7†	6.00	9.00	7.60	1.50	2.50	2.00	39.20	46.90	44.10	24.70	28.50	26.50	5.50
Clover hay	8	78.18	91.53	85.51	8.87	13.54	11.42	1.47	3.10	2.18	35.03	45.47	40.40	23.79	28.64	25.83	5.63
Hungarian grass hay. Reckoned to average water content	6	.....	.....	83.30	5.72	10.67	7.02	1.30	2.47	1.72	34.85	42.40	41.79	27.30	28.94	27.34	5.43
Black grass hay (*Juncus gerardi*)	2	88.98	91.06	90.02	6.56	7.06	6.81	2.28	2.38	2.33	43.14	49.31	46.26	24.63	29.42	27.01	7.60

* Or albuminoids. † Calculated to average water content. ‡ Includes fat. § Carbhydrates.

COMPOSITION OF FEEDING STUFFS—CONTINUED.

NAME.	Analyses.	Total Dry Matter			* Protein.			Fat.			Nitrogen-free Extract.			Fiber.			Ash
		Min.	Max.	Aver.	Min.	Max.	Aver	Min.	Max.	Aver.	Min.	Max.	Aver.	Min.	Max.	Aver.	
HAY AND DRY COARSE FODDER—*Concluded.*																	
Black grass hay, with seed	1	.....	.....	90.84	.....	.....	7.50	.....	.....	2.96	.....	.....	51.44	.....	.....	22.10	6.84
Buckwheat straw	2	89.50	89.60	89.60	3.30	4.40	3.80	1.40	1.70	1.60	32.10	34.50	32.20	44.90	46.80	45.90	5.10
Wheat straw	2	88.63	92.22	90.43	2.19	2.56	2.37	1.24	2.53	1.89	41.51	47.01	44.27	37.32	40.05	38.68	3.22
Oat straw	3	87.50	93.47	89.89	2.30	5.08	3.35	1.00	3.15	2.07	26.42	44.26	36.97	35.21	55.96	42.78	4.72
Rye Straw	1	.....	.....	87.5†	.....	.....	6.89	.....	.....	2.68	.....	.....	35.70	.....	.....	34.20	8.03
Cow pea vines	1	.....	.....	89.78	.....	.....	19.81	.....	.....	1.13	.....	.....	34.98	.....	.....	23.66	10.20
ROOTS, BULBS AND TUBERS.																	
Mangolds	3	7.18	8.56	7.96	1.57	1.89	1.70	.03	.51	.20	3.56	4.91	4.19	.76	.91	.82	1.05
Ruta bagas	1	.....	.....	12.92	.....	.....	1.15	.....	.....	.09	.....	.....	9.11	.....	.....	1.16	1.41
Turnips	1	.....	.....	11.11	.....	.....	1.34	.....	.....	.09	.....	.....	8.11	.....	.....	.86	.71
Carrots	2	11.18	12.15	11.67	.97	1.35	1.16	.65	.71	.68	6.86	7.39	7.13	.86	2.32	1.59	1.11
Beets	1	.....	.....	12.32	.....	.....	1.73	.....	.....	.21	.....	.....	7.64	.....	.....	1.69	1.05
Onions	1	.....	.....	14.74	.....	.....	2.28	.....	.....	.22	.....	.....	10.80	.....	.....	.76	.68
Sweet potato	1	.....	.....	26.61	.....	.....	1.28	.....	.....	.28	.....	.....	23.00	.....	.....	.98	1.07
Yam	1	.....	.....	28.77	.....	.....	2.06	.....	.....	.25	.....	.....	25.24	.....	.....	.75	.67
FRUITS, GRAINS AND OTHER SEEDS.																	
Cucumbers	1	.....	.....	4.30	.....	.....	.83	.....	.....	.21	.....	.....	1.95	.....	.....	.85	.46
Tomato	1	.....	.....	8.74	.....	.....	1.00	.....	.....	.47	.....	.....	5.84	.....	.....	.70	.73
Squash	2	4.82	5.42	5.12	.64	.68	.66	.24	.32	.28	2.95	3.54	3.24	.53	.54	.54	.40
Peas	1	.....	.....	21.94	.....	.....	4.37	.....	.....	.55	.....	.....	14.48	.....	.....	1.66	.88
Apples	1	.....	.....	15.89	.....	.....	.21	.....	.....	.28	.....	.....	14.26	.....	.....	.91	.23
Barley	9	87.40	92.80	88.90	8.60	15.70	12.40	1.50	3.20	1.80	66.70	73.00	69.30	1.30	4.20	2.90	2.50
Buckwheat	8	85.10	89.10	87.40	8.60	11.00	10.00	2.20	2.40	2.25	62.60	65.40	64.50	7.80	9.40	8.70	2.00
Cotton seed, hulls and kernel	1	.....	.....	92.28	.....	.....	15.72	.....	.....	18 56	.....	.....	29.09	.....	.....	25.75	3.16

*Or albuminoids.

† Calculated to average water content.

COMPOSITION OF FEEDING STUFFS — CONTINUED.

NAME.	Analyses.	Total Dry Matter.			* Protein.			Fat.			Nitrogen-free Extract.			Fiber.			Ash
		Min.	Max.	Aver.	Min.	Max.	Aver.	Min.	Max.	Aver.	Min.	Max.	Aver.	Min.	Max.	Aver.	
FRUITS, GRAINS AND OTHER SEEDS—*Concluded.*																	
Cow pea	5	79 20	89.99	85.21	19.30	23.00	20.77	1.30	1.60	1.43	48.10	61.99	55.75	3.37	5.00	4.06	3.20
Soja bean	3	89.87	93.95	91.41	34.63	38.62	36.22	16.80	19.00	17.92	26.20	30.50	28.66	3 69	5.00	4.24	4.37
Doura, brown (Durha)	3	87.30	92.40	89.00	9.00	11 50	10.30	.....	.....	4.20	.....	.....	69.90	.....	.....	1.50	1.60
Maize kernel (flint)	50	81.80	95.90	88.99	7.90	13.70	10.87	3.40	7.10	4.49	65.00	77.30	70.12	0.80	2.70	1.61	1.45
Maize kernel (dent)	26	84.80	93.80	88.80	8.10	11.80	10.50	3.80	6.30	4.70	66.30	75.30	70.20	1.30	3.00	1.80	1.50
Maize kernel (sweet)	14	89.10	94 00	91.20	10 20	14.40	12.20	5.30	9.30	8.00	62.70	72.40	66.90	1.50	4.90	2.30	1.90
Maize kernel ("Western corn")	3	79.30	83.60	80.90	7.80	8.60	8.30	3.60	3.90	3.70	64.90	68.20	66.00	1.70	1.80	1.75	1.20
Maize kernel, average of all varieties	100	79.30	95.90	88.89	7.80	15.30	10.81	3.40	9.30	5.31	61.80	77.30	69.47	0.90	4.90	1.80	1.50
Oats	21	86.50	91.10	89 30	8.00	14.40	11.30	4.10	5.80	5.00	57.10	66.90	61.00	1.50	12.90	9.00	3.00
Rice	10	86.00	88.60	87.60	5.90	8.60	7.40	0.30	0.60	.40	77.50	80.60	79.20	0.10	0.40	.20	0.40
Rye	6	86.80	91.30	88.40	9.50	12.10	10.60	1.40	2.10	1.70	70.70	73.90	72.60	1.40	2.10	1 60	1.90
Sorghum seed	13	83.20	90.70	87.24	7.70	12.66	9.12	2.10	4.60	3.71	66.80	73.60	70.57	1.50	3.20	2.03	1.81
Sorghum seed (decorticated), (see also sorghum meal below)	2	89.43	90.07	89.75	9.54	9.98	9.76	3.95	4.60	4.27	71.56	73.59	72.58	1.48	1.52	1.50	1.64
Wheat (winter)	58	86.20	92.50	88.80	8.40	14.50	11.70	1.30	2.70	1.90	68.10	81.70	71.80	1.20	1.90	1.70	1.70
Wheat (spring)	10	86.70	92.10	89.50	8.10	15.40	13.00	1.89	2.60	2.20	66.10	78.70	70.60	1.40	2.30	1.90	1.80
Wheat (average of all varieties)	99	86.20	92 50	88.96	8.10	15.94	12.21	1.20	2.99	2.15	66.10	77.70	71.08	1.10	2.30	1.66	1.86
Peanuts (without hulls)	2	93.20	93.80	93.50	.....	.....	28.30	41.20	51.50	46.40	.....	.....	1.80	.....	.....	13.90	3.30
Sword bean seed (*Canavalia gladiata*	1	.....	.....	89.63	.....	.....	26.60	.....	.....	3.12	.....	.....	53.10	.....	.....	4.13	2.68
Chinese corn kernel	1	....	.....	92.13	.....	.....	9.63	.....	.....	3.75	.....	....	75.50	.....	.....	1.79	1.46
FLOUR AND MEAL.																	
Barley meal	3	83.80	86.00	84.90	8.80	13.90	11.80	0.70	2.20	1.70	.....	.....	70.90	.....	.....	.10	0.50
Buckwheat flour	3	85.10	87.20	86.50	4.20	8.00	6.50	0.70	1.70	1.30	75.80	79.40	77.30	0.20	0.40	.30	1.10

* Or albuminoids.

COMPOSITION OF FEEDING STUFFS — CONTINUED.

NAME.	Analyses.	Total Dry Matter.			* Protein.			Fat.			Nitrogen-free Extract.			Fiber.			Ash.
		Min.	Max.	Aver.	Min.	Max.	Aver.	Min.	Max.	Aver.	Min.	Max.	Aver.	Min.	Max.	Aver.	
FLOUR AND MEAL — *Concluded.*																	
Graham flour	3	86.30	87.90	86.90	11.30	12.40	11.70	1.50	1.90	1.70	69.80	70.00	69.80	1.80	2.00	1.90	1.80
Hominy	2	86.40	86.60	86.50	8.10	8.40	8.30	0.40	0.50	.50	77.10	77.20	77.15	0.30	0.30	.30	0.40
Maize meal	13	78.30	90.14	85.49	7.40	13.94	9 07	2.50	4.63	3.82	60.72	72.70	69.16	0.90	2.99	1.87	1.57
Oat meal	6	91.10	93.70	92.10	12.90	16.30	14.70	6.10	8.80	7.00	66.60	69.00	67.50	0.60	1.20	.90	2.00
Rye flour	4	86.40	87.70	86 90	6.00	7.10	6.70	0 80	0.90	.85	77.60	79.10	78.30	0 40	0.50	.45	0.70
Wheat flour	49	86.50	91.70	88.40	8.60	13.50	11.10	0.60	2.00	1.10	68.30	78.50	75.40	0.10	1.20	.20	0.60
BY-PRODUCTS AND REFUSE.																	
Apple pomace	3	22.80	27.40	25.90	1.00	1.70	1.40	1.70	2.00	1.90	15.70	17.00	16.70	3.90	5.90	5.20	0.70
Brewers' grains, from brewery	8	21.50	31.40	25.35	4.70	7.80	5.92	0.80	2.90	1.91	10.10	15.94	12.47	3.10	5.60	3.97	1.06
Brewers' grains, from Silo	1	.....	.....	33.20	.....	.....	6.90	.....	.....	2.60	.....	.....	16.90	.....	.....	5.40	1.40
Brewers' grains, kiln dried	1	.....	.....	97.40	.....	.....	20.40	.....	.....	6 40	.....	.....	54 90	.....	.....	11.80	4.00
Brewers' swill	1	.....	.....	5.70	.....	.....	1.90	.....	.....	.80	.....	.....	2.00	.....	.....	.70	0.30
Cotton seed meal	14	90.90	94.32	91.96	38.69	50.81	43.97	11.29	18.00	13.72	12.70	25.19	21.44	3.10	11.80	5.68	7.15
"Hominy chops," "hominy feed," "Baltimore meal," "white meal"	5	86.50	93.20	88.34	9.50	10.20	9.73	4.45	10.20	8.26	61.00	71.10	64.18	3.30	4.80	3.82	2.35
Sorghum meal (from seed mostly decorticated)	1	.....	.....	86.84	.....	.....	8.25	.....	.....	3.85	.....	.....	71.27	.....	.....	1.88	1.59
Linseed cake	12	89.20	93.80	90.96	26.00	35.60	29.70	2.80	16.20	11.25	29.10	41.90	35.03	4.50	15.70	8.54	6.44
Linseed meal	3	87.57	92.87	90.45	30.88	33.95	32.84	4.94	6.83	5.64	36.54	41.11	38.51	7.12	8.87	7.80	5.66
Linseed meal ("new process")	3	87.10	90.10	88.70	32.00	37.60	35.50	2.70	5.90	4.50	.....	.....	34.18	....	.....	8.80	5.80
Palm nut meal	2	89.16	93.86	91.51	13.63	16.01	14.82	6.41	18.73	12.57	33.80	41.66	37.74	21.57	23.98	22.77	3.61
Maize cob	9	85.60	92.80	90.80	1.20	2.70	2.20	0.10	0.90	0.40	45.30	59.60	54.90	29.80	38.30	32.00	1.30
Gluten meal	2	91.57	92.60	92.13	28.03	35.00	31.51	8.01	8.73	8.37	44.72	54.46	49.60	.73	3.25	1.99	.66
Malt sprouts	2	88.40	92.69	90.55	22.94	25.90	23.92	1.10	2.98	2.04	45.60	50.30	47.86	9.30	10.88	10.09	6.64

* Or albuminoids.

COMPOSITION OF FEEDING STUFFS — CONCLUDED.

NAME.	Analyses.	Total Dry Matter.			* Protein.			Fat.			Nitrogen-free Extract.			Fiber.			Ash.
		Min.	Max.	Aver.	Min.	Max.	Aver.	Min.	Max.	Aver.	Min.	Max.	Aver	Min.	Max.	Aver.	
BY-PRODUCTS AND REFUSE — *Concluded.*																	
Rye bran	3	86.30	89.70	87.70	12.60	16.80	15.26	1.79	2.60	2.19	59.75	67.00	63.12	2.50	4.10	3.51	3.62
Sorghum bagasse	3	11.30	16.60	14.50	0.62	0.68	0.65	.....	.....	.....	.....	.....	10.20	2.80	3.30	3.10	0.60
"Starch feed," refuse from starch manufacture,	2	27.80	37.70	32.90	3.60	5.70	4.60	1.30	2.00	1.60	18 80	28.90	23.80	1.60	3.40	2.50	0.20
"Sugar feed," refuse from glucose manufacture (dry)	2	89.60	93.40	91.50	13.10	13.50	13.30	5.90	11.20	8.60	54.90	61.40	58.10	8.40	10.70	9.50	2.00
Glucose waste (wet)	1	.....	.....	24.00	.....	.....	3.72	.....	.....	1.63	.....	.....	17.39	.....	.....	.75	0.51
Vegetable ivory sawdust	1	....	.....	81.20	.....	.....	3.40	.....	.....	.70	.....	.....	68.60	.....	.....	7.50	1.10
Wheat middlings	6	86.70	89.40	88.20	10.10	14.20	12.20	2.10	3.70	3.00	60.20	70.90	65.60	3.50	7.50	4.80	2.60
Wheat bran	15	86.10	91.35	88.24	7.80	16.88	14.88	2.60	5.84	3.90	50.41	58.90	55.07	5.90	16.60	8.70	5.69
Wheat shorts	5	87.80	89.00	88.50	11.10	15.10	13.00	2.50	4.90	4.00	56.30	62.30	59.70	6.30	10.50	7.70	4.10
Rice flour	1	.....	.....	89.68	.....	.....	14.00	.....	.....	13.49	.....	.....	51.22	.....	.....	6.12	4.85
Rice meal	1	.....	.....	84.90	.....	.....	9.30	.....	.....	1.60	.....	.....	59.90	.....	.....	8.10	6 0_0
Rice "Polish"	1	.....	.....	88.79	.....	.....	12.93	.....	... .	7.69	.....	.....	62.96	.....	.....	2.41	2.8
Rice feed	1	.....	.....	89.67	.....	.....	11.43	.....	.....	11.49	.....	.....	47.20	.....	.....	9.93	9.6^0
Rice bran	1	.....	.....	90.70	.....	.....	12.78	.....	.....	5.23	.....	.....	62.34	.....	.....	2.00	8.3^2
Rice bran "Douse"	1	.....	.....	91.22	.....	.....	10.93	.....	.....	8.20	.....	.....	41.93	.....	.....	17.76	12.4^5
Rice hulls	2	91.50	92.30	91.90	3.12	4.68	3.90	0.55	0.65	.60	38.74	41.60	40.17	30.27	38.57	34.42	12.80
Rice straw	1	.....	.....	96.34	.....	.....	4.68	.....	.....	1.74	.....	....	50.90	.....	.....	28 31	10.7_1

* Or albuminoids.

MAINE BOARD OF AGRICULTURE—1884.

OFFICERS.

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W. W. HARRIS, VICE PRESIDENT.
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			Term expires Dec 31,
Cumberland county,	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,	" Edward 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
Lincoln,	" J. J. A. Hoffses,	Jefferson,	1886
Androscoggin	" Nelson Ham,	Lewiston,	1886
Kennebec,	" John E. Brainerd,	East Winthrop,	1886
Waldo,	" D. B. Johnson,	Freedom,	1886
Washington,	" A. R. Lincoln,	Dennysville,	1886
Hancock,	" Vacancy.		

MEMBERS FROM STATE COLLEGE.

President, M. C. Fernald, Orono.
Professor of Agriculture, Walter Balentine, Orono.

ELECTED BY THE BOARD.

Z. A. Gilbert, North Greene, Secretary.

OFFICERS OF AGRICULTURAL SOCIETIES.

SOCIETIES.	President.	Post Office.	Secretary.	Post Office.	Treasurer.	Post Office.
State Agricultural Society..	Rufus Prince.....	South Turner....	A. L. Dennison.....	Portland.....	H. S. Osgood.....	Augusta.
Eastern Me. Fair Association,	– –	– –	– –	– –	– –	–
Maine State Pomological So..	Chas. S. Pope	Manchester.....	Geo. B. Sawyer.....	Wiscasset.....	Geo. B. Sawyer.	
Androscoggin.....	B. F. Briggs	Auburn.	Wm. R. Wright.....	Lewiston.....	David Farrar.....	Lewiston.
Aroostook, Madawaska.....	Pierre Gangnon.....	Frenchville	Alexis Cyr.....	Grand Isle.....	Jean Cyr.....	Madawaska.
Aroostook, North..	– –	– –	– –	– –	Columbus Hayford..	Maysville Center.
Buxton and Hollis	S. S. Milliken.....	Hollis	A. B. Burnham.....	Hollis Centre....	J. M. Marshall.....	Hollis.
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Franklin County	E. A. Hall.....	Chesterville.....	V. L. Craig	Farmington.....	P. P. Tufts.....	Farmington.
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Franklin Central.....	– –	– –	A. R. Norton.....	Strong.	– –	–
Knox County.....	John Wooster	Camden.....	E. G. S. Ingraham...	West Camden....	Jesse A. Tolman.....	Rockland.
Knox, North	C. R. Merton.....	Union	A. M. Wingate.....	Union	N. K. Burkett	Union.
Kennebec County	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 County	Henry Ingalls.....	Wiscasset.....	E. W. Dunbar.....	Damariscotta....	Ephraim Taylor.....	Newcastle.
Oxford County	S. T. 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.
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Penobscot County.....	J. E. Shaw	West Hampden..	B. A. Burr..	Bangor	B. A. Burr.	
Penobscot and Aroostook ...	S. C. Sweetser.....	Island Falls.....	Luthur B. Rogers....	Patten.....	E. W. Perry	Patten.
Penobscot, West.....	E. A. Chandler.....	Exeter Mills	T. P. Batchelder.....	Kenduskeag	T. P. Batchelder.	
Penobscot, North.....	Francis Crane	Lincoln.....	R. W. Bailey.....	Lincoln.....	Joseph Burland	Lincoln.
Penobscot Central.....	T. J. Peaks.....	Charleston	G. W. Dunning.....	West Charleston .	James Knowles.....	East Corinth.
Piscataquis, East	James L. Smart.....	Milo.....	M. L. Durgin, Jr....	Milo.....	M. L. Durgin.	
Piscataquis Central	Obed Towne.....	Dover	B. F. Hammond	Foxcroft	B. F. Hammond.	
Piscataquis, West	W. F. Towne.....	Monson.....	J. F. Thombs.....	Monson.....	J. F. Thombs.	
Sagadahoc	Chas. E. Townsend...	Brunswick.....	I. E. Mallett.....	Topsham	Lyman E. Smith	Brunswick.

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Somerset, East	C. M. Jewett	Palmyra	John Finson	Hartland	S. L. Mayo	Hartland.
Somerset Central	David Horn	Skowhegan	A. R. Smiley	Skowhegan	John Weston	Skowhegan.
Somerset, West	S. W. Tinkham	Anson	N. F. Clapp	North Anson	N. F. Clapp.	
Shapleigh and Acton	Joseph D. Sanborn	Acton	Horace Bodwell	Acton.	H. A. Staudley	Shapleigh.
Waldo County	Simon A. Payson	Belfast	Daniel A. Wadlin	Belfast	Alvah S. Redman	Belfast.
Waldo and Penobscot	Freeman Atwood	Monroe	E. H. Nealley	Monroe	F. L. Palmer	Monroe.
Waldo, North	James B. Vickery	Unity	Jas. H. Cook	Unity	H. B. Rice	Unity.
Washington County	M. L. Wilder	Pembroke	H. F. Porter	Pembroke	Peter E. Vose	Dennysville.
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Washington, West	Geo. A. Bucknam	Columbia Falls	A. W. Trickey	Jonesboro'	John T. Allen	Columbia Falls.
York County	Jonas R. Taylor	Kennebunk	John M. Deering	Saco	Ivory Lord	Saco

Maine State Agricultural Society.

The State Agricultural Society held its twenty-first State Fair on the society's grounds at Lewiston, September 18, 19, 20 and 21, 1883. The State Pomological Society united with the Agricultural Society and held its fruit and flower exhibition in the new Exhibition Hall on the grounds.

The weather throughout was favorable, and the attendance large. The exhibition excelled any previous one ever held by the society. Herewith is a detailed statement of entries, receipts and expenditures, prepared under the direction of the Treasurer.

STATEMENT "A."

Showing the number of Entries, together with Amount of Premiums Awarded and Paid at the Maine State Fair, 1883.

PARK.

No.	CLASS.	No. of Entries.	Premiums Awarded.
	CATTLE.		
1	Shorthorn Stock	27	$106 00
2	Hereford "	51	176 00
3	Holstein "	4	38 00
4	Polled Angus Stock	5	none
5	Devon Stock	none	
6	Ayrshire "	17	122 00
6½	Guernsey Stock	9	82 00
7	Maine Herd Book Jersey Stock	67	168 00
8	American Cattle Club Jersey Stock	93	183 00
9	Grade Shorthorn Stock	14	27 00
10	" Hereford "	31	32 00
11	" Holstein "	none	
11½	" Polled Angus Stock	1	3 00
12	" Ayrshire "	none	
13	" Jersey "	7	17 00
14	Working Oxen and Steers	54	152 00
15	Trained Steers	4	22 00
16	Fat Cattle	40	90 00
17	Matched Oxen and Steers	37	108 00
18	Town Teams	11	120 00
19	County Teams	1	50 00
20	Pulling Oxen	29	145 00
21	" Steers	14	49 00
		516	$1690 00

STATEMENT "A"—*Continued.*

No.	CLASS.	No. of Entries.	Premiums Awarded.
	HORSES.		
22	Stud of Horses	2	$90 00
23	Stallions for general use	30	85 00
24	" four years old	9	53 00
25	" three years old	8	35 00
26	Best Draft Stallion	1	15 00
27	Brood Mares	21	53 00
27½	Gelding and Fillies 5 years old and over	48	110 00
28	" " 4 years old	15	110 00
29	" " 3 years old	13	70 00
30	Stallions, Geldings and Fillies, 2 years old	35	104 00
31	" " " 1 year old	21	36 00
32	Draft Horses to be tested	12	43 00
33	Gents' Driving Horses	13	100 00
34	Best Trained Colt	none	
35	Matched Driving Horses	7	100 00
		235	$1004 00
T. B.	Trotting Horses	70	$3275 00
	SHEEP.		
36	Cotswold Sheep	8	$66 00
37	Lincoln "	none	
38	Leicester "	6	68 00
39	Hampshire Down Sheep	none	
40	Oxford "	6	48 00
41	South "	19	80 00
42	Merino Sheep	39	84 00
43	Shropshire Sheep	8	42 00
43½	Texel Sheep	12	72 00
		98	$460 00
44	Wool Fleece	2	$3 00
	SWINE.		
45	Large Breeds	31	$127 00
46	Small "	5	33 70
		36	$160 00
	POULTRY.		
47	Poultry	61	$122 00
	DAIRY, VEGETABLES, GRAIN AND MISCELLANEOUS.		
48	Grain, Seeds and Sheaves	135	$115 50
49	Roots and Vegetables	169	50 00
50	Aroostook County Special	32	75 90
51	Butter	21	56 00
	Domestic Cheese	6	27 00
	Factory "	9	43 00
	Dairy Implements	43	41 00
52	Honey	39	56 00
54	Household Goods of Maine Manufacture	1	1 00
55	Brass, Tin, Copper, Iron Work and Stoves	24	31 00
60	Carriages and Sleighs, Maine Manufacture	4	15 00
69	Mineral and Botanical	9	15 00
		492	$525 50

STATEMENT "A"—*Concluded.*

No.	CLASS.	No. of Entries.	Premiums Awarded.
	AGRICULTURAL IMPLEMENTS.		
53	Group I—Implements and Machines for the Preparation of the Soil	129	$13 00
	" II—Implements and Machines for Sowing and Cultivating Crops	45	29 00
	" III—Implements and Machines for Harvesting Crops	53	10 00
	" IV—Implements and Machines for Preparing Crops for the Market, and Food for Animals	38	30 00
	" V—Miscellaneous	95	28 00
		360	$110 00
	RECAPITULATION.		
	Cattle	516	$1690 00
	Horses for Exhibition	235	1004 00
	Trotting Horses	70	3275 00
	Sheep	98	460 00
	Wool Fleeces	2	3 00
	Swine	36	160 00
	Poultry	61	122 00
	Dairy, Vegetables, Grain and Miscellaneous	492	525 50
	Agricultural Implements	360	110 00
		1870	$7349 50
	ACTUAL NUMBER OF ANIMALS REPRESENTED ABOVE		
	Bulls, 48; Bull Calves, 27	75	$954 00
	Cows, 103; Heifers, 104; Heifer Calves, 52	259	
	Oxen (pairs), 85; Steers, (pairs), 49; Steer Calves, 10 pairs	288	736 00
	Horses for Exhibition	242	1004 00
	Trotting Horses	70	3275 00
	Sheep and Lambs	324	460 00
	Boars and Sows	22	160 00
	Litters of Pigs	14	
	Poultry	209	122 00
		1503	$6711 00

HALL.

56	Maine Corporation Manufactures	19	$39 00
57	Needle and Fancy Work	212	116 00
58	Articles of Leather, Saddlery, etc	6	18 00
59	India Rubber Goods	none	
61	Hardware, Cutlery, Tools and Machinery	3	9 00
62	Bread, and Table Luxuries	34	39 00
63	Canned Fruits, Preserves, Pickles, etc	134	32 50
64	Printing and Binding	3	6 00
65	Decorative and Industrial Arts	84	71 00
66	Household Furniture and Carpenters' Work	5	8 00
67	Millinery, Hats, Caps, Furs and Regalias	1	5 00
68	Musical, Surgical Instruments, etc	7	20 00
70	Miscellaneous and New Inventions	15	21 00
		523	$385 50

STATEMENT "B."

Showing Income and Expenditures of the Maine State Agricultural Society, on account of the Fair of 1883, and for other purposes.

	On Park Account.	On Hall Account.	On Gen'l Account.	Total.
INCOME.				
From Sale of Tickets (Single Admission)...	$9,520 25	$1,295 85	–	$10,816 10
" " " (Railroad).....	5,100 00	273 70	–	5,373 70
" " " (Grand Stand).....	616 35	–	–	616 35
" " " (Exhibitors').....	624 00	75 00	–	699 00
" " " (Tent).....	687 10	–	–	687 10
" " " (Balcony).....	69 10	–	–	69 10
	16,616 80	1,644 55	–	18,261 35
" Entry Fee on Trotting Horses.....	1,612 50	–	–	1,642 50
" Ground Rents.....	1,099 13	–	–	1,099 13
" Water Rents.....	63 00	–	–	63 00
" 12 Life Members at $20.....	–	–	240 00	240 00
" C. B. Reade, Coll'ns for space in Hall,	–	48 00	–	48 00
" Advertising in Premium List.....	–	–	58 75	58 75
" C. H. Weymouth, Coll'ns Track Rent,	54 00	–	–	54 00
" Use of Park for Ladies' Race, Oct. 16,	15 00	–	–	15 00
" " Base Ball, Sept 7-13,	23 00	–	–	23 00
" 1-4 Gate Money, Angust 8th and 9th,	66 00	–	–	66 00
" Two cords of wood at $3 00.....	6 00	–	–	6 00
Income of 1883.....	19,585 43	1,692 55	298 75	21,576 73
Balance from account of 1882.....	–	–	2,632 46	–
Income for 1883.....	–	–	71,576 73	–
				24,209 19
Gross Receipts as per C B.....	–	–	39,503 93	–
Less cash as per agreem't '82, with A. Co. So.	–	200 00	–	–
" Sale of one pair Oxen.....	–	187 94	–	–
" Prem. ret. by Burleigh & Bodwell,	–	46 00	–	–
" " " W. H Harris.....	–	18 00	–	–
" " " Westbrook Mf'g Co.	–	3 00	–	–
" Trotting Prems. overpaid by Sec'y,	–	22 80	–	–
" Loans.....	–	14,817 00	15,294 74	24,209 19
EXPENDITURES.				
For Materials (lumber, hardware, &c.).....	199 13	17 76	–	216 89
Labor.....	1,250 06	371 25	430 75	2,052 06
Police.....	347 50	–	–	347 50
Stationery and Printing.....	142 70	17 41	594 69	754 80
Advertising.....	5 25	3 37	78 95	87 57
Postage, Telegraph and Express.....	5 28	10 49	152 68	168 45
Hay, Grain and Straw.....	348 55	–	–	348 55
Stabling Stock.....	17 00	–	–	17 00
Transportation (including trucking)	272 65	9 35	2 70	284 70
Tools, Signs, Furniture, &c.....	41 40	2 25	–	43 65
Improvements to Buildings and Grounds...	21,077 80	–	–	21,077 80
Caps, Ribbons, Badges, Paper, Twine, &c..	69 87	2 36	2 10	74 33
Ice and Water for Grounds.....	32 81	1 00	–	38 81
Music.....	–	140 00	–	140 00
Insurance.....	114 00	–	–	114 00

STATEMENT "B"—*Concluded.*

	On Park Account.	On Hall Account.	On Gen'l Account.	Total.
EXPENDITURES.—*Concluded.*				
Pomological Society (as per agreement)	$325 00	–	–	$325 00
Salaries	–	–	$1,500 00	1,500 00
Board Bills and Meals for Laborers	224 65	–	–	224 65
Services of Experts (Stock Department)	35 09	–	–	35 09
Electric Light	1,050 00	–	–	1,050 00
Cloth, Towels, Lamps, Oil, &c.	58 51	–	–	58 51
Coal	69 86	–	–	69 86
Blacksmith Work	96 15	–	–	96 15
Oxen Purchased	415 00	–	–	415 00
Show Case Destroyed	12 00	–	–	12 00
Seeds for Grounds at Park	16 58	–	–	16 58
Use of Saddle Horse, C. H. W., during Fair	13 00	–	–	13 00
Interest on Debt to January 1, 1884	–	–	222 50	222 50
Miscellaneous	96 00	25	15 20	111 45
	26,340 84	575 49	2,999 57	29,915 90
Premiums Paid	7,267 50	377 50	–	7,645 00
Expenditures on account of Fair, 1883	33,608 34	952 99	2,999 57	37,560 90
TOTAL EXPENDITURES.				
Amount of Bills and Premiums	–	37,560 90	–	–
Bills of former years. Labor	443 98	–	–	–
Suit W. A. Whittier, on acc space in Hall	94 05	–	–	–
Hardware, Lumber, Materials, Cloth, &c.	206 15	–	–	–
Engraving Medals	46 80	–	–	–
Premiums	121 00	–	–	–
Tax of 1882 and Interest on same	95 85	–	–	–
Seward Dill, (old claim) $106	286 00	–	–	–
Frank Buck, " 80				
W. S. Tilton, " 100				
Entrance Fees of 1876 Refunded	30 00	1,323 83	–	–
			38,884 73	–
Gross Pay'ts as per vouchers & Appr'd Bills	–	38,312 03	–	–
Less Trotting Prems. overpaid by Sec'y	22 80	–	–	–
" Bill No. 60, yet unpaid	4 50	–	–	–
" Cash Andro'n Co. Society to Pay Prems.	400 00	427 30	38,884 73	–
RECAPITULATION.				
Cash Received for the Year	–	–	36,871 47	–
Balance from Acc't of 1882	–	–	2,632 46	–
				39,503 93
Am't of Bills & Prems. pd. '83 (as per vouch.)	–	37,988 20	–	–
" " " " of former yrs.,	–	1,323 83	–	–
			39,312 03	–
Balance to New Account	–	–	191 90	–
				39,503 93

FINANCIAL STANDING OF THE SOCIETY.

ASSETS.		
Original Park Purchase, Value	$7,000 00	
Land Purchased of Geo. Bonnallie	245 00	
" " Mrs. M. A. Nevens	1,000 00	
" " E. Cornish	300 00	
" " H W. Stewart	1,000 00	
Ex. Building, Boiler House and Boiler, Pulleys, Shafting, &c.	10,000 00	
Office at Main Gate	800 00	
Domitory Building	1,500 00	
Stable	400 00	
300 Horse Stalls	2,500 00	
200 Cattle Stalls	1,800 00	
Building Purchased of Mr. Clark	200 00	
Ladies' Dressing Room	250 00	
Coat and Parcel Room	150 00	
Sheep and Swine Pens	500 00	
Water Pipes	500 00	
Police Headquarters	100 00	
Furniture, Signs, Tools, &c	150 00	
		$28,395 00
LIABILITIES.		
Cash Loans	-	$14,817 00
Assets over Liabilities	-	$13,578 00

All the Property is well insured.

H. S. OSGOOD, *Treasurer.*

TREASURER'S OFFICE,
Augusta, Me., January 1, 1884.

Financial Statement of Agricultural Societies for the Year 1883.

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.
Androscoggin	$400 00	409 00	809 00	409 00	225 00	634 00	800 00	–	–	–	–	–	–	–
Aroostook, Madawaska	–	65 00	–	–	6 00	–	–	–	–	3 75	3 00	–	3 00	3 00
Aroostook, North	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Aroostook, Buxton and Hollis	200 00	296 00	591 00	198 50	182 89	235 96	1,000 00	45 00	–	8 00	33 00	3 00	9 00	3 00
Cumberland County	375 00	2,365 25	2,743 25	–	–	–	–	–	–	–	–	–	–	–
Franklin County	102 00	1,250 33	1,352 33	563 65	333 34	2,300 28	2,000 00	400 00	–	22 25	71 50	69 00	17 50	21 50
Franklin, North	61 00	419 27	583 13	275 00	150 00	486 42	–	275 00	2 50	10 00	24 00	20 00	15 00	9 00
Franklin Central	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Knox County	192 00	450 00	642 00	389 75	302 86	692 61	26 00	3 25	–	21 75	9 50	6 00	14 00	7 25
Knox, North	136 00	542 52	678 52	224 75	363 97	588 72	–	–	–	5 25	16 00	15 75	5 00	3 25
Kennebec County	296 00	840 97	1,136 97	663 25	388 47	1,053 72	750 00	–	–	10 00	86 00	50 00	17 50	20 75
Kennebec, North	104 00	359 25	463 25	289 00	125 84	368 34	1,500 00	264 00	–	25 00	20 00	15 00	23 00	15 00
Lincoln County	248 00	625 56	873 56	351 15	431 59	782 74	–	–	–	8 25	7 00	9 00	5 00	2 50
Oxford County	268 00	2,107 00	2,375 00	1,037 35	1,287 56	2,380 26	7,000 00	1,050 00	14 00	71 00	72 00	81 00	28 00	20 50
Oxford, West	60 00	900 35	960 25	500 90	204 13	705 03	2,000 00	–	–	22 00	54 00	46 00	14 00	11 25
Ossipee Valley	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Penobscot County	71 00	112 23	183 23	–	–	197 25	–	–	–	–	32 00	–	–	–
Penobscot and Aroostook	55 00	41 00	149 13	84 75	35 70	–	–	–	–	5 00	9 50	4 50	7 00	2 25
Penobscot, West	179 00	627 78	806 78	300 75	374 80	740 50	3,000 00	530 75	–	10 50	17 00	17 50	13 50	11 50
Penobscot, North	52 00	44 36	113 56	96 49	22 98	119 47	–	–	–	3 00	6 00	8 50	6 00	8 50
Penobscot Central	70 00	91 25	161 25	211 42	20 00	178 75	–	–	–	27 75	30 50	10 00	18 25	10 25

FINANCIAL STATEMENT OF AGRICULTURAL SOCIETIES FOR THE YEAR 1883 — *Continued.*

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.
Piscataquis, East	$19 00	40 00	59 00	69 00	18 35	87 35	10 00	-	-	1 25	10 00	8 75	2 50	1 75
Piscataquis Central	113 00	375 60	488 60	366 50	159 00	525 50	160 00	36 90	-	5 50	34 00	10 75	20 00	9 00
Piscataquis, West	18 00	42 00	60 00	46 90	25 00	71 90	-	12 00	-	1 25	9 75	5 25	3 00	2 50
Pomological, State	500 00	828 70	1,328 70	588 50	453 26	1,453 76	200 00	644 50	-	-	-	-	-	-
Sagadahoc County	263 00	2,432 00	2,695 00	738 54	1,066 21	2,414 75	5,000 00	-	-	20 00	181 00	50 00	27 00	36 00
Somerset, East	233 00	1,419 27	1,652 27	581 15	271 85	1,574 90	2,500 00	-	-	7 75	26 25	15 25	38 25	20 25
Somerset Central	30 00	872 30	902 30	747 25	580 48	1,327 73	1,500 00	425 00	-	32 00	64 00	54 00	35 00	41 00
Somerset, West	60 00	59 35	111 59	143 25	56 97	168 97	1,200 00	-	-	23 00	7 00	7 50	6 00	6 00
Shapleigh and Acton	85 00	412 12	497 12	390 25	21 00	411 25	4,500 00	-	3 00	8 25	56 00	10 00	8 00	4 00
Waldo County	126 00	783 36	909 86	647 50	104 00	751 50	2,000 00	-	-	11 50	8 00	4 00	4 50	10 00
Waldo, North	97 00	368 00	465 00	264 25	60 00	324 25	25 00	-	-	25 00	10 00	12 25	11 00	9 00
Waldo and Penobscot	130 00	1,129 30	1,259 30	853 30	207 26	1,060 51	2,500 00	-	-	25 50	35 00	23 00	18 00	13 50
Washington County	187 00	1,108 07	1,295 07	853 03	343 05	1,372 93	1,600 00	-	-	35 00	9 00	26 50	19 00	32 00
Washington, West	213 00	1,065 08	1,278 08	725 16	477 30	1,202 66	-	-	-	13 00	17 00	26 00	21 00	16 00
Washington, Machias Park Ass'n,	-	564 07	1,311 98	1,044 70	268 66	1,313 36	4,200 00	2,500 00	-	54 00	32 00	13 00	22 00	27 00
York County	185 00	1,323 21	1,508 21	998 63	479 20	1,476 23	150 00	266 50	16 00	12 00	34 00	6 00	24 00	10 00

FINANCIAL STATEMENT OF AGRICULTURAL SOCIETIES FOR THE YEAR 1883—*Continued.*

SOCIETIES.	For Fat Cattle.	For Trials of Speed.	For Stallions.	For Breeding Mares.	For Other Horses and Colts.	For Swine.	For Sheep.	For Poultry.	Total Amount Awarded for Live Stock.	Total Amount Awarded for Horses, not purses.	Amount Awarded for Indian Corn.	For Wheat.	For Rye.	For Barley.	For Oats.	For Buckwheat.	For Beans.	Peas.	For Potatoes.	For Carrots.
Androscoggin	–	–	–	–	–	–	–	–	–	–	60 00	17 00	–	5 00	5 00	–	–	–	17 00	–
Aroostook, Madawaska	–	$4 50	3 00	3 00	11 25	–	4 50	–	17 25	21 75	50	75	–	75	75	75	75	75	75	–
Aroostook, North	–	–	–	2 00	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Aroostook, Buxton & Hollis,	$3 00	70 00	–	–	4 00	3 00	3 00	1 50	74 50	11 00	4 00	50	–	–	–	–	1 50	50	2 75	–
Cumberland County	–	–	–	10 00	25 00	12 00	30 00	12 00	–	–	2 00	–	–	3 00	–	–	–	2 00	3 00	1 00
Franklin County	6 50	172 00	13 50	3 00	25 75	4 00	41 25	4 00	256 50	42 25	6 00	–	–	–	–	–	–	–	50	35
Franklin, North	3 50	155 00	5 00	4 50	10 50	5 30	7 00	8 00	108 00	20 00	4 00	7 00	–	1 00	2 50	–	3 50	–	4 00	45
Franklin Central	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Knox County	6 00	–	8 00	5 00	29 00	10 00	4 00	14 00	92 50	75 00	8 00	12 00	2 00	2 00	2 00	–	3 25	1 50	6 50	–
Knox, North	3 00	–	6 00	3 00	23 00	5 50	2 00	1 00	48 25	32 00	6 50	5 50	1 50	1 50	3 00	–	75	–	4 75	–
Kennebec County	7 50	148 00	16 00	6 00	44 00	9 00	27 00	9 50	202 25	66 00	41 50	11 00	–	2 00	–	–	–	–	6 75	–
Kennebec, North	5 00	150 00	18 00	6 00	26 00	9 00	13 00	4 00	129 00	50 00	–	–	–	–	–	–	–	–	–	–
Lincoln County	–	120 00	4 00	5 00	12 00	2 50	6 50	2 50	38 50	71 00	14 25	7 50	1 00	1 00	1 50	–	2 50	50	1 75	50
Oxford County	9 00	308 00	33 00	–	21 00	15 00	32 00	11 00	300 50	54 00	20 50	27 75	4 00	–	4 00	–	3 00	–	8 75	75
Oxford, West	12 00	112 00	8 00	6 00	39 50	9 00	6 50	4 00	178 75	53 50	8 25	5 25	–	–	2 75	–	–	–	5 00	50
Ossipee Valley	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Penobscot County	–	–	–	6 00	14 00	3 00	14 00	3 50	96 50	55 00	30 40	11 00	3 00	4 50	3 50	–	3 00	–	–	–
Penobscot and Aroostook	–	–	–	8 50	12 25	5 00	9 00	50	42 75	15 75	50	3 50	–	50	2 50	–	2 00	–	2 00	–
Penobscot, West	6 00	–	13 50	6 00	35 50	3 00	4 50	2 00	41 50	20 00	8 75	–	1 00	–	2 25	1 00	2 25	1 75	3 20	–
Penobscot, North	–	–	3 00	3 00	13 00	3 75	2 00	–	37 15	19 00	1 00	–	–	–	–	–	–	–	–	–
Penobscot Central	4 00	–	5 00	5 50	33 50	3 50	14 00	1 75	120 00	44 00	2 15	2 50	–	–	50	–	–	–	2 75	1 00
Piscataquis, East	–	5 00	2 00	3 00	5 25	5 50	2 00	1 25	33 00	10 25	75	–	–	–	–	–	75	75	75	–
Piscataquis Central	–	113 00	10 00	11 00	34 00	10 00	9 00	5 00	103 25	55 00	13 00	–	–	5 00	–	–	–	–	5 00	–

FINANCIAL STATEMENT OF AGRICULTURAL SOCIETIES FOR THE YEAR 1883—*Continued.*

SOCIETIES.	For Fat Cattle.	For Trials of Speed.	For Stallions.	For Breeding Mares.	For Other Horses and Colts.	For Swine.	For Sheep.	For Poultry.	Total Amount Awarded for Live Stock.	Total Amount Awarded for Horses, not purses.	Amount Awarded for Indian Corn.	For Wheat.	For Rye.	For Barley.	For Oats.	For Buckwheat.	For Beans.	Peas.	For Potatoes.	For Carrots.
Piscataquis, West	–	–	–	1 25	13 50	–	1 00	–	22 75	14 75	–	–	–	–	–	–	–	–	–	–
Pomological, State	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Sagadahoc County	$9 00	644 00	10 00	8 00	53 00	–	19 00	42 00	345 00	71 00	10 00	–	4 75	7 50	9 50	–	3 50	1 75	13 00	75
Somerset, East	–	340 00	3 00	3 75	27 00	2 00	11 25	–	121 25	33 75	9 00	9 00	–	–	–	–	–	–	–	–
Somerset Central	–	300 00	14 50	12 00	42 00	8 00	13 50	–	247 50	68 50	5 00	–	–	75	75	–	2 50	75	1 50	50
Somerset, West	4 00	25 00	7 00	7 60	–	–	10 00	–	67 75	14 00	–	–	–	–	–	–	–	–	–	–
Shapleigh and Acton	6 00	126 00	2 00	2 00	25 00	7 00	8 00	8 00	119 25	27 00	5 00	2 50	2 50	2 50	2 50	1 00	7 50	2 50	1 50	1 50
Waldo County	–	400 00	11 00	4 50	452 50	3 00	15 00	–	112 00	57 00	–	–	–	–	–	–	–	–	–	–
Waldo, North	3 00	171 00	29 50	6 00	32 25	–	10 00	75	70 25	67 75	6 00	6 00	–	–	2 25	–	3 50	–	6 00	75
Waldo and Penobscot	6 00	420 00	35 00	7 00	31 50	5 00	10 00	15 50	151 50	15 50	7 75	4 00	–	1 00	1 50	–	1 50	–	5 25	1 50
Washington County	5 00	312 00	32 00	12 00	23 50	22 00	34 00	8 00	190 50	73 50	2 25	3 25	25	2 25	2 25	–	27 50	3 75	41 25	2 25
Washington, West	–	370 00	–	11 00	20 00	15 00	21 00	14 50	91 00	31 00	1 75	9 50	4 50	3 50	–	–	5 00	5 00	8 75	5 75
Wash'n, Machias Park Ass'n	5 00	430 00	25 00	19 00	37 00	18 00	27 00	52 00	250 00	81 00	–	5 50	–	4 00	5 00	50	7 25	4 50	44 00	2 00
York County	6 00	353 00	15 00	7 00	22 00	9 00	4 00	16 00	136 00	44 00	1 50	1 50	1 00	1 50	75	–	1 50	–	1 50	–

FINANCIAL STATEMENT OF AGRICULTURAL SOCIETIES FOR THE YEAR 1883 — *Continued.*

SOCIETIES.	For Beets.	For Onions.	For Turnips.	For Cabbage.	Total Am't Awarded for Grain and Root Crops.	For any other Cultivated Crops.	For Fruits and Flowers.	For Bread, Honey, Sugar and Syrup.	For Butter and Cheese.	Agricultural Implements.	Household Manufactures and Needle-work.	Manufactures of Wood, Iron and Leather.	Other Mechanical Products.	All Objects not enumerated above.	NUMBER OF ANIMALS EXHIBITED.									
															No. of Bulls and Bull Calves.	No. of Cows.	No. of Heifers.	No. Heifer Calv's.	No. Working Oxen (Pairs)	No. Prs. Steers.	No. Fat Cattle.	Total No. of Cattle.	No. Horses, Colts.	No. Sheep	No. Swine.	No. Poultry.
Androscoggin	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Aroostook, Madawaska	$0 75	–	–	75	6 25	–	–	75	1 50	–	6 85	3 20	–	1 65	6	8	10	12	12	–	–	48	34	90	–	–
Aroostook, North	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Aroost'k, Buxton & Hollis,	–	–	2 00	–	11 25	–	–	50	3 75	–	24 75	–	–	9 25	9	12	5	4	66	22	6	213	14	12	16	45
Cumberland County	1 00	–	1 00	–	12 00	–	22 00	5 00	–	25 00	15 00	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Franklin County	20	–	–	–	–	1 30	9 80	4 60	8 50	33 25	34 40	2 00	5 00	5 50	21	26	18	8	50	62	15	336	95	142	22	36
Franklin, North	45	–	45	25	23 10	2 50	6 50	2 50	6 50	1 50	25 00	3 00	1 00	3 00	11	13	15	6	42	43	7	232	41	62	9	99
Franklin Central	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Knox County	50	–	2 50	3 50	44 45	21 50	12 00	9 00	28 00	–	24 25	–	–	83 05	9	32	16	5	19	2	3	79	22	2	27	73
Knox, North	1 00	–	50	1 50	29 50	3 00	19 90	45	15 00	–	37 45	2 00	–	7 75	9	17	12	1	13	18	4	74	39	20	40	6
Kennebec County	5 00	1 50	–	–	74 50	–	35 25	2 50	39 00	9 00	38 75	–	–	50 00	18	33	17	13	200	–	32	350	103	100	70	49
Kennebec, North	–	–	–	–	7 00	–	15 00	–	5 00	4 00	10 00	5 00	–	2 00	14	12	8	6	7	17	18	113	43	53	17	25
Lincoln County	2 00	–	1 00	1 25	30 50	4 25	28 50	–	2 50	3 50	18 45	–	–	79 95	5	16	10	2	13	22		115	23	33	15	45
Oxford County	5 73	–	75	75	78 00	–	43 30	10 80	38 00	19 00	29 00	46 00	5 25	73 50	19	12	9	2	46	43	8	278	11	150	18	46
Oxford, West	50	–	50	50	25 75	8 70	10 65	10 25	10 50	4 00	35 00	6 50	–	29 00	5	4	11	4	36	24	9	173	41	7	5	36
Ossipee Valley	–	–	–	–	18 50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Penobscot County	–	–	–	–	18 50	–	22 00	12 50	10 25	–	12 50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Penobscot and Aroostook,	50	–	50	50	12 00	–	–	50	2 75	–	–	–	–	5 75	6	8	3	2	6	12	–	55	33	23	5	6
Penobscot, West	–	–*	5 80	–	58 65	1 75	14 55	8 25	27 25	3 75	33 80	1 25	–	–	5	17	8	4	20	23	6	83	55	62	7	25
Penobscot, North	25	–	–	–	1 25	1 25	5 25	50	14 00	–	8 00	3 00	–	6 50	2	13	12	5	10	11	–	74	55	10	–	10
Penobscot Central	–	–	–	–	8 90	1 75	7 00	4 50	6 75	4 00	9 52	3 00	–	21 25	14	12	15	6	20	25	3	140	30	39	16	14

* Kitchen Garden.

FINANCIAL STATEMENT OF AGRICULTURAL SOCIETIES FOR THE YEAR 1883 — *Concluded.*

SOCIETIES.	For Beets.	For Onions.	For Turnips.	For Cabbage.	Total Am't Awarded for Grain and Root Crops.	For any other Cultivated Crops.	For Fruits and Flowers.	For Bread, Honey, Sugar and Syrup.	For Butter and Cheese.	Agricultural Implements.	Household Manufactures and Needle-work.	Manufactures of Wood, Iron and Leather.	Other Mechanical Products.	All Objects not enumerated above.	NUMBER OF ANIMALS EXHIBITED.								
															No. of Bulls and Bull Calves.	No. of Cows.	No. of Heifers.	No. Heifer Calv's.	No. Working Oxen (Pairs.)	No. Prs. Steers.	No. Fat Cattle.	Total No. of Cattle.	No. Horses, Colts.	No. Sheep.	No. Swine.	No. Poultry.
Piscataquis, East	$0 75	–	75	50	5 00	–	–	–	3 50	–	2 35	–	–	9 90	2	8	6	–	6	12	–	52	24	6	5	12
Piscataquis Central	–	–	–	–	39 00	1 75	10 50	1 50	14 00	1 75	14 75	–	–	–	5	25	10	5	17	20	–	119	50	31	13	30
Piscataquis, West	–	–	–	–	–	–	2 25	50	2 25	–	1 40	–	50	2 50	2	9	12	3	6	9	–	41	25	25	–	–
Pomological, State	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Sagadahoc County	3 50	–	4 25	2 00	60 50	22 75	54 00	12 75	30 00	3 00	45 00	–	–	29 04	9	25	33	6	45	30	2	154	67	24	27	216
Somerset, East	–	–	–	–	10 50	–	3 50	–	12 00	–	25 00	–	–	12 00	13	45	33	7	23	27	–	148	75	50	18	–
Somerset Central	50	–	50	1 00	13 75	4 50	23 50	1 00	12 75	4 00	22 25	9 00	16 00	10 75	17	33	20	13	81	72	–	389	51	130	9	–
Somerset, West	–	–	–	–	–	–	–	–	–	–	–	–	–	30 25	9	8	9	3	4	5	2	65	15	71	–	–
Shapleigh and Acton	3 00	–	3 00	1 50	34 00	21 00	33 25	10 50	12 75	–	93 75	–	24 25	12 00	8	22	10	6	65	26	10	238	41	32	16	55
Waldo County	–	–	–	–	32 50	–	8 50	–	5 00	–	–	–	–	30 00	6	38	13	3	2	6	–	68	36	37	19	21
Waldo, North	1 25	–	1 25	–	40 25	–	7 75	1 25	6 00	–	22 10	3 00	–	5 00	9	17	8	3	11	10	4	81	50	30	–	60
Waldo and Penobscot	3 00	–	1 75	1 50	28 75	8 00	23 75	1 00	5 75	6 00	104 75	–	–	30 30	15	19	10	7	24	19	5	147	80	16	12	150
Washington County	2 25	–	3 25	2 25	92 75	22 75	17 99	3 00	11 50	–	54 29	16 25	–	64 50	22	37	18	13	5	23	7	125	43	30	40	125
Washington, West	5 75	–	5 75	1 30	66 75	–	–	3 75	15 00	–	33 00	5 00	–	74 00	5	10	10	5	6	23	–	95	25	19	4	78
Wash'n, Machias P'k Ass'n	12 00	–	3 00	–	87 75	10 75	15 75	3 75	10 00	3 00	83 60	18 10	–	51 00	10	22	13	8	10	9	6	78	42	17	20	150
York County	1 50	6 00	1 50	1 00	29 25	–	26 50	1 50	10 00	8 00	121 50	–	–	44 60	5	57	9	4	83	3	4	250	39	13	34	75

Maine State Pomological Society.

OFFICERS FOR THE YEAR 1883.

President—Robert H. Gardiner, Gardiner.

Vice Presidents—Stillman W. Shaw, Minot,
S. C. Harlow, Bangor.

Secretary and Treasurer—George B. Sawyer, Wiscasset.

Executive Committee—The President and Secretary, *ex-officiis*, Samuel Rolfe, Portland; Charles S. Pope, Manchester; Henry McLaughlin, Bangor.

Corresponding Secretary—Granville Fernald, Harrison.

Trustees—Androscoggin county, D. J. Briggs, South Turner.

Aroostook	"	Henry Tilley, Castle Hill.
Cumberland	"	S. F. Strout, 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, Waldoboro'.
Oxford	"	N. T. True, Bethel.
Penobscot	"	J. E. Bennoch, Orono.
Piscataquis	"	H. A. Robinson, Foxcroft.
Sagadahoc	"	H. S. Cary, Topsham.
Somerset	"	James S. Hoxie, North Fairfield.
Waldo	"	D. L. Pitheher, Belfast.
Washington	"	H. A. Sprague, Charlotte.
York	"	John Hanscom, Saco.

Maine State Pomological Society.

OFFICERS FOR THE YEAR 1884.

President—Charles S. Pope, Manchester.

Vice Presidents—S. C. Harlow, Bangor.
S. R. Sweetser, Cumberland.

Secretary and Treasurer—Geo. B. Sawyer, Wiscasset.

Executive Committee—The President and Secretary, *ex-officiis*, Andrew S. Sawyer, Cape Elizabeth; Leander H. Blossom, Turner; Frank E. Nowell, Fairfield.

Trustees—

Androscoggin	county,	N. W. Harris, Auburn.
Aroostook	"	E. E. Parkhurst, Maysville Centre.
Cumberland	"	Francis C. Jordan, Brunswick.
Franklin	"	G. K. Staples, Temple.
Hancock	"	Charles G. Atkins, Bucksport.
Kennebec	"	Richard C. Plaisted, Gardiner.
Knox	"	Elmas Hoffses, Warren.
Lincoln	"	H. J. A. Simmons, Waldoboro'.
Oxford	"	Jairus K. Hammond, Paris.
Penobscot	"	J. E. Bennoch, Orono.
Piscataquis	"	H. A. Robinson, Foxcroft.
Sagadahoc	"	Henry S. Cary, Topsham,
Somerset	"	James S. Hoxie, North Fairfield.
Waldo	"	D. B. Jackson, Freedom.
Washington	"	Nelson S. Allen, Dennysville.
York	"	Randall Boothby, Limerick.

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
*Atherton, H. N.....Hallowell
Atherton, W. P. .....Hallowell
Atkins, Charles G.....Bucksport
Atwood, Fred .....Winterport
Bennoch, John E.....Orono
Burr, John.....Freeport
Carter, Otis L.....Etna
Chase, Henry M.....North Yarmouth
Chase, Martin V. B.....Augusta
*Clark, Eliphalet.....Portland
Crafts, Moses.....Auburn
*Crosby, William C .....Bangor
Dana, Woodbury S.....Portland
DeRocher, Peter.....Waterville
Dirwanger, Joseph A.. .....Portland
Dunham, W. W.....North Paris
Dyer, Milton .....Cape Elizabeth
*Emerson, Albert.....Bangor
Farnsworth, B. B.....Portland
Frost, Oscar F.....Monmouth
Gardiner, Robert H.....Gardiner
Gilbert, Z. A. .....North Greene
Godfrey, John E.....Bangor
Hanscom, John.....Saco
Harlow, S. C.....Bangor
*Harris, N. C.....Auburn
Harris, N. W.....Auburn
Hersey, T. C .....Portland
Hopkins, Miss S. M.....Gardiner
Hoxie, James S.....North Fairfield
Ingalls, Henry.....Wiscasset
*Jewett, George. .....Portland
Johnson, Isaac A.....Auburn
Jordan, Francis C.....Brunswick
Low, Elijah.....Bangor
Low, S. S.....Bangor
McLaughlin, Henry.....Bangor
*Metcalf, M. J.....Monmouth
Moore, William G.....Monmouth
Moor, F. A.....Waterville
Morton, J. A.....Bethel
Morton, Will. E.....Allen's Corner
*Noyes, Albert .....Bangor
Perley, Chas. I...Seward's (Vassalboro')
Pope, Charles S .....Manchester
Pulsifer, D. W.....Poland
Richards, F. G.....Gardiner
Richards, John T.....Gardiner
*Richardson, J. M .....Greene
Roak, George M.....Auburn
Robinson, H. A.....Foxcroft
Rolfe, Samuel.....Portland
Sawyer, Andrew S.....Cape Elizabeth
Sawyer, George B.....Wiscasset
Shaw, Stillman W.....Minot
Simmons, H. J. A.....Waldoboro'
Smith, Alfred.....Monmouth
Smith, Henry S.....Monmouth
Starrett, L. F.....Warren
*Stetson, Isaiah.....Bangor
Stilphen, Asbury, C.....Gardiner
Stanley, Charles .....Winthrop
Strout, S. F.....West Falmouth
Strattard, Mrs. A. B .....Monroe
Sweetser, S. R.....Cumberland Centre
*Taylor, Joseph.....Belgrade
Thomas, William W. Jr .....Portland
Tilton, William S.....Chelsea
True, Davis P .....Leeds Centre

* Deceased.

LIFE MEMBERS—*Concluded.*

Varney, James A..... Oregon
Vickery, James.....Portland
Vickery, John.....Auburn
Wade, Patrick.....Portland
* Weston, James C .....Bangor
Wharff, Charles S.....Gardiner
Whitney, Edward K.....Harrison
Woodman, George W.....Portland

* Deceased.

ANNUAL MEMBERS — 1883.

Baker, Miss Millie.....Lewiston
Blossom, G. W.....Turner
Blossom, L. H.....Turner Centre
Briggs, D. J .....South Turner
Carey, Henry S.....Topsham
Carpenter, James M.....Pittston
Chipman, A. B.....West Gloucester
Dill, Seward.....Phillips
Emerson, Ivory W .....Lewiston
Fogg, ——.....Lewiston
Ham, Nelson.....Lewiston
Hoffses, Elmas.....Warren
Jordan, Miss Alice M.....Auburn
Kenniston, E. H.....Simpson's Corner
Lapham, E. A .....Pittston
Lapham, Wm. B.....Augusta
Lennan, L .....Gardiner
Litchfield, L. K.....Winthrop
Mason, John B .....Mechanic Falls
Merrill, T. M.....West Gloucester
Mitchell, Israel.....Lewiston
Nelson, E. N .....Minot
Nowell, Frank E.....Fairfield
Osgood, A. J.....Cumberland Centre
Perkins, L. J .....Deering
Pittee, Tristram D....Cumberland Centre
Plaisted, Richard C.....Gardiner
Staples, G. K.....Temple
Towle, J. J .....Dixfield
Whitcomb, C. C .....Simpson's Corner
Whitmore, Thomas P.....Bowdoinham
Young, W. H.....Auburn

To the Secretary of the Maine Board of Agriculture:

I submit herewith a report of the transactions of the Maine State Pomological Society for the year 1883, containing an account of the annual exhibition; the more important papers presented at the winter meeting, with an abstract of the discussions on the same and other subjects; and such other matters as are, in my judgment, required or authorized by law.

I take this opportunity to repeat what has been said with respect to the previous reports, viz: 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 repetitious, irrelevant and unimportant matters."

GEO. B. SAWYER, *Secretary.*

Maine State Pomological Society.

TRANSACTIONS FOR 1883.

The eleventh annual exhibition of the Maine State Pomological Society was held at Lewiston, in the new building on the grounds of the State Agricultural Society, on the 18th, 19th, 20th and 21st days of September, 1883. It occupied two wings on the third floor of the main building, which were well filled. The premium list was substantially the same as that of the preceding year. The amount offered in premiums was $916.75; and the amount awarded, $557.15. All the classes were well represented in the entries, the apples, as usual, taking the lead; and there were a larger number of collections, both of fruit and flowers, than in former years. Several of the counties were represented for the first time, and by very creditable exhibits. In the classes of grapes and flowers, the exhibition was among the largest ever made by the Society. Pears were well represented, and plums better than an average. All the fruit indicated increased care in the selection of varieties, and skill in the art of exhibiting; and the proportion of inferior specimens and of unknown and incorrectly-named varieties was noticeably small.

Provision was made for holding the annual meeting of the Society on September 20th, at the City Building, in Lewiston; but on account of the temporary illness of President Gardiner, which prevented his attendance, and for other reasons deemed sufficient, the meeting was adjourned to the time and place of the winter meeting —and was accordingly held at Lemont Hall, in Brunswick, January 22 and 23, 1884. The details of the annual exhibition and the proceedings of the several meetings appear in subsequent pages.

SCHEDULE OF PREMIUMS OFFERED, ENTRIES MADE AND PREMIUMS AWARDED AT THE ANNUAL EXHIBITION.

[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.

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; James S. Hoxie, North Fairfield, second premium, $10; Perley & Perkins, Seward's (Vassalboro), third premium, $5.

Under the practice adopted by the Society, of allowing all collections entered for premium No. 1 to be also entered for the county premiums, all the collections were so entered, and the names of the competitors will appear under their respective counties.

2. For the best general exhibition of apples, grown by the exhibitor, in Androscoggin county. N. W. Harris, Auburn, $10; G. W. Blossom, Turner, $8; D. J. Briggs, South Turner, $5.

Rufus Prince, Turner; Charles Richardson, Greene; A. B. Chipman, Poland; D. P. True, Leeds Centre.

3. For the same in Aroostook county. No entry.

4. For the same in Cumberland county. S. R. Sweetser, Cumberland Centre, $10; Milton Dyer, Cape Elizabeth, $8.

T. D. Pittee, Cumberland Centre.

5. For the same in Franklin county. G. K. Staples, Temple, $10.

6. For the same in Hancock county. No entry.

7. For the same in Kennebec county. W. R. Wharff, Gardiner, $10; E. A. Lapham, Pittston, $8.

8. For the same in Knox county. Elmas Hoffses, Warren, $10.

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; E. H. Kenniston, Dixmont, $8.

12. For the same in Piscataquis county. No entry.

13. For the same in Sagadahoc county. H. S. Carey, Topsham, $10.

14. For the same in Somerset county. Frank E. Nowell, Fairfield, $10.

15. For the same in Waldo county. Mrs. A. B. Strattard, Monroe, $10.

16. For the same in Washington county. No entry.

17. For the same in York county. No entry.

18. For the best five named varieties of Autumn apples. Miss L. L. Taylor, $3; E. A. Lapham, $2; F. E. Nowell, $1.

Simmons, True; C. C. Whitcomb, Dixmont; Harris, Briggs; R. H. Gardiner, Gardiner; Dyer, Sweetser, Hoffses.

19. For the best five named varieties of Winter apples. R. H. Gardiner, $3; C. C. Whitcomb, $2; E. A. Lapham, $1.

Miss Taylor, Simmons, True; Ivory W. Emerson, Lewiston; Harris, Briggs, Dyer.

20. For the best collection of apples for home use, for the entire year, in the smallest number of varieties. S. R. Sweetser, $5, (*Red Astrachan*, *Gravenstein*, *Northern Spy*, *Rhode Island Green-*

ing, Baldwin, Roxbury Russet, Talman's Sweet) ; H. J. A. Simmons, $3, (*Early Harvest, Gravenstein, Honey Sweet, Northern Spy, Baldwin, King of England* (?),).

Miss Taylor—King Sweeting, Gravenstein, Baldwin, Somerset; D. P. True—Large Yellow Bough, Winthrop Greening, Swaar, Talman's Sweet, Roxbury Russet; D. J. Briggs, (list not found).

21. For the best collection of Crab Apples, not less than five varieties. J. S. Hoxie, $2.

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.W. Shaw, Minot, (*Gravenstein*), $2 ; A. B. Chipman, $1.

Miss Taylor, Nowell; L. K. Litchfield, Winthrop; Charles A. Day, East Turner; Simmons, Briggs, True.

23. For the best single variety of Winter apples. R. H. Gardiner, $2 ; H. J. A. Simmons, $1.

Miss Taylor, True, Chipman, Shaw, Day, Briggs.

24. For the best dish of Alexander. W. R. Wharff, $1 ; Miss L. L. Taylor, 50c.

Melzer Gilbert, Turner; John Dunton, Lewiston; Day, Bennoch.

25. American Golden Russet. (*Syn. Sheepnose*). Not awarded.

26. Baldwins. S. R. Sweetser, $1 ; Miss L. L. Taylor, 50c.

Simmons, Gardiner, Perley & Perkins, Dunton, Shaw, Sawyer, Emerson, True, Kenniston, Litchfield, Whitcomb, Day, Staples, Lapham, G. W. Blossom; L. H. Blossom, Turner Centre; B. F.Teague, Auburn; David Farrar, Lewiston.

27. Benoni. L. K. Litchfield, $1 ; J. E. Bennoch, 50c.

Gardiner.

28. Black Oxford. W. R. Wharff, $1 ; Perley & Perkins, 50c.

True, Hoxie, Staples.

29. Blue Pearmain. T. D. Pittee, $1 ; R. H. Gardiner, 50c.

Kenniston, Bennoch, Mrs. Strattard.

30. Briggs' Auburn. G. W. Blossom, $1.

31. Cole's Quince. T. D. Pittee, $1.

32. Danvers' Winter Sweet. John Dunton, $1 ; W. R. Wharff, 50c.

Perley & Perkins, Shaw, True, Sawyer.

33. Dean. A. J. Osgood, Cumberland Centre, $1; Miss L. L. Taylor, 50c.

Nelson Ham, Lewiston; Towle, Staples.

34. Duchess of Oldenburgh. S. R. Sweetser, $1; W. H. Young, Auburn, 50c.

Dunton, Bennoch, Hoxie, Mrs. Strattard, Kenniston, Nowell, Briggs, Staples, Lapham.

35. Early Harvest. Mrs. A. B. Strattard, $1; H. J. A. Simmons, 50c.

Dunton.

36. Early Strawberry. Not awarded.

Alfred E. Mitchell, Lewiston.

37. Fall Harvey. Miss L. L. Taylor, $1; A. G. Thurlow, Poland, 50c.

Emerson, Gardiner, Bennoch, Towle.

38. Fall Pippin. J. J. Towle, $1; H. J. A. Simmons, 50c.

Farrar, Gardiner, Lapham.

39. Fameuse. F. E. Nowell, $1; S. W. Shaw, 50c.

Gardiner, Harris, Simmons, Pittee.

40. Franklin Sweet. Perley & Perkins, $1; G. W. Blossom, 50c.

Sweetser.

41. Garden Royal. J. J. Towle, $1; J. E. Bennoch, 50c.

42. Gravenstein. Miss L. L. Taylor, $1; E. N. Nelson, Minot, 50c.

Farrar, Dunton, Gardiner, Bennoch, Staples, Lapham, G. W. Blossom, Harris, Shaw, Sweetser.

43. Hightop Sweet. Perley & Perkins, $1; H. J. A. Simmons, 50c.

44. Hubbardston Nonsuch. Miss L. L. Taylor, $1; A. J. Osgood, 50c.

Emerson, Lapham, G. W. Blossom, Perley & Perkins, Wharff.

45. Hunt Russet. Elmas Hoffses, $1.

Gardiner, Staples, G. W. Blossom, Mrs. Strattard.

46. Jewett's Fine Red. W. R. Wharff, $1; Miss L. L. Taylor, 50c.

Whitcomb, Dunton, Sweetser; O. F. Frost, Monmouth, presented fine specimens too late for entry.

47. King of Tompkins County. S. R. Sweetser, $1; Miss L. L. Taylor, 50c.

Sawyer, Dunton, Chipman, Bennoch, Farrar, True, Kenniston, Whitcomb, Staples, Thurlow, Lapham, G. W. Blossom, Harris, Shaw, Nowell, Perley & Perkins.

48. King Sweeting. Miss L. L. Taylor, $1; Perley & Perkins, 50c.

Nowell, Hoxie.

49. Large Yellow Bough. E. A. Lapham, $1; Perley & Perkins, 50c.

True, Whitcomb, Chipman, Gardiner.

50. Minister. Elmas Hoffses, $1; G. W. Blossom, 50c.

Lapham.

51. Moses Wood. Miss L. L. Taylor, $1; W. R. Wharff, 50c.

Gardiner, Perley & Perkins.

52. Mother. Ivory W. Emerson, $1; R. H. Gardiner, 50c.

G. W. Blossom.

53. Northern Spy. R. H. Gardiner, $1; E. A. Lapham, 50c.

Miss Taylor, L. H. Blossom, Emerson, Farrar, Chipman, Bennoch, Staples, Ham, G. W. Blossom, Nowell, Perley & Perkins, Sweetser.

54. Orange Sweet. G. B. Sawyer, $1; E. H. Kenniston, 50c.

Simmons, Hoxie.

55. Peck's Pleasant. E. A. Lapham, $1; G. K. Staples, 50c.

True.

56. Pomme Royale. No entry.

57. Porter. W. R. Wharff, $1; Charles A. Day, 50c.

Miss Taylor, Litchfield, Whitcomb, Dunton, Lapham, Gardiner, Simmons, Sweetser, Perley & Perkins.

58. President. L. H. Blossom, $1; G. W. Blossom, 50c.

59. Primate. Miss L. L. Taylor, $1; H. J. A. Simmons, 50c.

Staples.

60. Pumpkin Sweet. Ivory W. Emerson, $1; R. H. Gardiner, 50c.

Miss Taylor, G. W. Blossom.

61. Red Astrachan. N. W. Harris, $1; S. R. Sweetser, 50c.

Simmons, Nowell, Gardiner, Lapham, Hoxie, Mrs. Strattard.

62. Red Canada. R. H. Gardiner, $1.

63. Red Russet. Not awarded.

S. W. Shaw.

64. Rhode Island Greening. Miss L. L. Taylor, $1; L. H. Blossom, 50c.

Farrar, True, Kenniston, Whitcomb, Dunton, Gardiner, Lapham, G. W. Blossom, Harris, Perley & Perkins, Wharff; B. F. Teague, Auburn.

65. Rolfe. No entry.

66. Roxbury Russet. W. R. Wharff, $1; D. P. True, 50c.

Kenniston, Gardiner, Perley & Perkins, Sweetser, Miss Taylor.

67. Sops of Wine. H. J. A. Simmons, $1; Miss L. L. Taylor, 50c.

Whitcomb, Gardiner, Staples.

68. Somerset. Miss L. L. Taylor, $1; J. E. Bennoch, 50c.

69. Starkey. Perley & Perkins, $1.

70. Talman's Sweet. S. W. Shaw, $1; J. J. Towle, 50c.

Farrar, True, Kenniston, Gardiner, Hoffses, Lapham, G. W. Blossom, Nowell, Perley & Perkins, Sweetser.

71. Tetofsky. G. B. Sawyer, $1.

72. Wagener. N. W. Harris, $1; F. E. Nowell, 50c.

Simmons, L H. Blossom, Staples, Sweetser.

73. Williams' Favorite. Miss L. L. Taylor, $1; J. S. Hoxie, 50c.

Mrs. Strattard, Carey, Nowell.

74. Winthrop Greening. W. R. Wharff, $1; E. A. Lapham, 50c.

Miss Taylor, True, Litchfield, Gardiner, G. W. Blossom, Nowell.

75. Yellow Bellflower. R. H. Gardiner, $1; E. A. Lapham, 50c.

G. W. Blossom, Dunton, Miss Taylor.

76. Crab Apples. H. J. A. Simmons, (*Transcendent*,) $1; G. K. Staples, (*do.*) 50c.

True, Litchfield, Lapham, Perley & Perkins.

Sundries. Beauty of Kent, exhibited by Kenniston, Whitcomb, Ham. Maiden's Blush; Emerson, Thurlow. Ben Davis; Kenniston, Emerson, Dunton. Wine Apple; Kenniston, Whitcomb. Colvert; Teague, Dunton. Fairbanks, Jersey Sweet, Gloria Mundi, Hubbardton Pippin, Ribston Pippin, Winter Stripe, Napoleon, Cooking Red, Richards' Graft, by R. H. Gardiner. Walbridge; Lapham. Willow Twig and Rambo; Staples. Granite Beauty and Honey Sweet; Simmons. There were also several specimens with local names and a few unknown.

Class 2—PEARS.

"Entries for premuims Nos. 77, 78 and 79, must consist of five specimens of each variety exhibited."

77. For best general exhibition of pears. Samuel Rolfe, Portland, $12; D. P. True, $8; L. J. Perkins, Deering, $5; J. E. Bennoch, $3.

Chipman, Sawyer, Perley & Perkins.

78. For best five named varieties of Autumn Pears. D. P. True, $3.

79. For best five named varieties of Winter Pears. No entry.

"Entries for premiums Nos. 80 to 109, inclusive, must consist of five to ten specimens, according to size, of each variety exhibited."

80. For best single variety of Fall Pears. Nelson Ham, $2; C. H. Bradford, Turner, $1.

D. P. True.

81. For the best single variety of Winter Pears. D. P. True, $2; L. K. Litchfield, $1.

82. For the best dish of Bartlett. L. K. Litchfield, $1; A. G. Thurlow, 50c.

Miss Taylor, Nelson, E. M. Leavitt, Auburn; A. C. Symmes, Auburn.

83. Bell Lucrative. S. W. Shaw, $1; G. B. Sawyer, 50c.

J. S. Hoxie.

84. Beurre d' Anjou. Israel Mitchell, Lewiston, $1; G. B. Sawyer, 50c.

Symmes, True.

85. Beurre Bose. No entry.

86. Beurre Hardy. R. H. Gardiner, $1.

87. Beurre Superfine. D. P. True, $1; D. J. Briggs, 50c.

88. Beurre Clairgeau. G. B. Sawyer, $1.

89. Beurre Diel. Ivory W. Emerson, $1; D. J. Briggs, 50c.

Sawyer, True.

90. Buffum. E. N. Nelson, $1; D. P. True, 50c.

Sawyer, Litchfield.

91. Clapp's Favorite. A. C. Symmes, $1; Rufus Prince, 50c.

W. H. Young, Gardiner, Sawyer, Briggs, Carey, Hoxie, Bennoch; A. E. Frost, Lewiston.

92. Doyenne Boussock. Not awarded.

93. Duchess d' Angoulenne. E. N. Nelson, $1; Perley & Perkins, 50c.

True, Symmes, Bennoch.

94. Flemish Beauty. Perley & Perkins, $1; R. H. Gardiner, 50c.

Emerson, Briggs.

95. Fulton. Not awarded.

96. Glout Morceau. D. J. Briggs, $1; L. K. Litchfield, 50c.

97. Goodale. Miss L. L. Taylor, $1; Perley & Perkins, 50c.

98. Howell. E. N. Nelson, $1; L. K. Litchfield, 50c.; Israel Mitchell, *gra.*, 50c.

Sawyer, Gardiner, Ham.

99. Josephine de Malines. No entry.

100. Lawrence. Miss L. L. Taylor, $1; D. P. True, 50c.

Sawyer, Shaw, Nelson.

101. Louise Bonne de Jersey. E. N. Nelson, $1; Israel Mitchell, 50c.

Emerson, Symmes, Gardiner, Briggs.

102. Maria Louise. No entry.

103. Nickerson. Miss L. L. Taylor, $1.

Gardiner, Perley & Perkins.

104. Seckel. D. J. Briggs, $1.

Alfred E. Mitchell, Lewiston.

105. Sheldon. Miss L. L. Taylor, $1; Ivory W. Emerson, 50c.

Perley & Perkins.

106. Swan's Orange. J. E. Bennoch, $1; Rufus Prince, 50c.

107. Urbaniste. G. B. Sawyer, $1.

108. Vicar of Winkfield. D. P. True, $1; A. B. Chipman, 50c.

Perley & Perkins.

109. Winter Nelis. E. M. Leavitt, $1; R. H. Gardiner, 50c.

Sundries. Rufus Prince exhibited Dearborn's Seedling; D. J. Briggs, Columbia, Beurre Duval; R. H. Gardiner, St. Ghislain; G. B. Sawyer, Kirtland, Ott's Seedling.

Class 3—GRAPES.

110. For best exhibition of foreign grapes, grown with fire heat. Miss Mellie Baker, Lewiston, $10; John Vickery, Auburn, $8.

111. For best exhibition of foreign grapes, grown in cold grapery. G. B. Sawyer, $8.

112. For best cluster Black Hamburgh. Miss Mellie Baker, $1; G. B. Sawyer, 50c.

113. White Frontignan. No entry.

114. Grizzly Frontignan. No entry.

115. White Muscat. G. B. Sawyer, $1.

116. Muscat Hamburgh. G. B. Sawyer, $1.

117. White Chasselas. Miss Mellie Baker, $1; G. B. Sawyer, 50c.

118. Lady Downes. No entry.

119. Buchland Sweet-Water. G. B. Sawyer, $1.

120. Trentham Black. G. B. Sawyer, $1.

121. West's St. Peters. No entry.

122. White Nice. No entry.

123. Red Chasselas. Miss Mellie Baker, $1.

124. Chasselas Musque. Miss Mellie Baker, $1; G. B. Sawyer, 50c.

125. For the best collection of Native grapes (open air). J. S. Hoxie, $6; Perley & Perkins, $4; D. P. True, $2.

126. Best single variety, (open air). Perley & Perkins, $2; D. P. True, $1.

127. Best three bunches Delaware. W. R. Wharff, $1; G. B. Sawyer, 50c.

True, Vickery, Perley & Perkins; I. T. Waterman, East Auburn.

128. Concord. W. R. Wharff, $1; Perley & Perkins, 50c.

True, Vickery.

129. Hartford Prolific. W. R. Wharff, $1; J. S. Hoxie, 50c.

True, Briggs, Sawyer, Perley & Perkins.

130. Rebecca. No entry.

131. Allen's Hybrid. No entry.

132. Creveling. Perley & Perkins, $1.

133. Adirondac. No entry.

134. Massasoit. No entry.

135. Wilder. No entry.

136. Lindley. J. S. Hoxie, $1.

137. Agawam. No entry.

138. Merrimac. No entry.

139. Salem. Not awarded.

140. Worden. Perley & Perkins, $1.

Sundries. John Vickery exhibited Sweet-Water and Martha, grown with fire heat, also two varieties unknown; G. B. Sawyer, Diana, Iona and Allen's Hybrid, grown in cold grapery; D. J. Briggs, Clinton and Blood's Seedling.

Class 4—PLUMS.

141. For the best general exhibition of plums, not less than ten varieties. No entry.

"Entries for premiums Nos. 142 to 160, inclusive, must consist of not less than twelve specimens each."

142. For best dish of plums of a single variety. G. B. Sawyer, (*Washington*), $2; D. P. True, $1.

143. For best dish of Green Gage. No entry.

144. Purple Gage. Nelson Ham, $1; G. B. Sawyer, 50c.

145. Red Gage. No entry.

146. Yellow Gage. No entry.

147. Prince Imperial Gage. H. J. A. Simmons, $1.

148. Coe's Golden Drop. No entry.

149. General Hand. No entry.

150. Lawrence. No entry.

151. Moore's Arctic. No entry.

152. McLaughlin. No entry.

153. Reine Claude de Bavay. W. H. Young, $1.

154. Lombard. Nelson Ham, $1; Thomas H. Longley, 50c.

True, Young; Frank Burrill, Lewiston.

155. Columbia. No entry.

156. Magnum Bonum. No entry.

157. Washington. G. B. Sawyer, $1; T. H. Longley, 50c.

158. Jefferson. No entry.

159. Penobscot. J. S. Hoxie, $1.

160. Smith's Orleans. No entry.

Sundries. G. B. Sawyer exhibited Victoria; Frank Burrill, Bradshaw; L. K. Litchfield and Nelson Ham, varieties not named.

Class 5—MISCELLANEOUS.

161. For best dish of peaches. Fogg & Goss, Lewiston, seedlings, $2; George H. Harmon, Auburn, $1.

162. For best dish of apricots. No entry.

163. " " nectarines. "

164. " " quinces. "

165. " peck cultivated cranberries. Seward Dill, Phillips, $2.

166. Samples of nursery apple trees. Not awarded.

I. C. Merrill, Lewiston, exhibited trees of Pewaukee, Northern Spy, Mann, Tetofsky, Walbridge, Grimes' Golden and Baldwin. The trees were well grown, but the varieties exhibited were not satisfactory to the committee.

167. Nursery pear trees. No entry.

168. " grape vines. D. P. True, 50c.

169. Best orange tree, in fruit. No entry.

170. " lemon " " "

171. " fig " " "

Sundries. Mrs. B. A. Townsend, Freeport, pineapple, *gra.*, $1; James Vickery, Portland, oranges, *gra.*, $1; Frank Burrill, figs.

Class 6—FLOWERS.

"In this class no article can be entered for more than one premium."

FIRST DIVISION.

171. For best display of cut flowers, filling not less than 100 phials. Mrs. G. B. Sawyer, Wiscasset, $10; Mrs. Charles Stanley, Winthrop, $8; Geo. M. Roak, Auburn, $5; Miss M. L. Pope, Manchester, $3; Mrs. A. B. Strattard, Monroe, $2.

172. For best exhibition of roses, not less than five varieties. W. E. Morton, & Co., Portland, $2.

173. Dahlias, not less than ten varieties. Mrs. Charles Stanley, $2.

174. Chinese Pinks. No entry.

175. Carnations, not less than five varieties. W. E. Morton & Co., $2.

176. Japan Lilies. W. E. Morton, $2; Mrs. A. B. Strattard, $1.

177. Asters, not less than ten varieties. Miss M. L. Pope, Manchester, $1 ; Geo. M. Roak, 50c.

John Burr, Freeport; Miss Ida M. Litchfield, Winthrop; Mrs. Stanley, Mrs. Strattard.

178. Pansies. W. E. Morton & Co., $1 ; Mrs. Charles Stanley, 50c.

Mrs. Strattard.

179. Zinnias. Mrs. Chas. Stanley, $1.

180. Phlox Drummondii. Mrs. Charles Stanley, $1 ; Miss M. L. Pope, 50c.

181. Stocks. Miss M. L. Pope, $1.

182. Balsams. Mrs. Chas. Stanley, 50c.

183. Chrysanthemums. No entry.

184. Petunias. Mrs. A. B. Strattard, $1 ; Miss Ida M. Litchfield, 50c.

185. Gladiolus. W. E. Morton & Co., $2.

186. Verbenas. Miss M. L. Pope, $2 ; John Burr, $1.

Roak, Mrs. Strattard.

SECOND DIVISION.

187. For best pair of parlor bouquets. Mrs. C. Stanley, $1 ; Mrs. M. E. Thomas, Rockland, 50c.

188. Pair wall bouquets. Mrs. C. Stanley, $1 ; Miss I. M. Litchfield, 50c.

189. Pair hand bouquets. W. E. Morton & Co., $1 ; Mrs. C. Stanley, 50c. ; Mrs. M. E. Thomas, 25c.

190. Floral pillow. W. E. Morton & Co., $5.

191. Floral design. Geo. M. Roak, $5 ; W. E. Morton & Co., $3 ; Mrs. A. B. Strattard, $1 ; Mrs. C. Stanley, $1.

192. Floral wreath. W. E. Morton & Co., $2 ; Mrs. C. Stanley, $1.

193. Dinner table decoration. W. E. Morton & Co., $2.

194. Basket wild flowers. Miss Edith Leavitt, Auburn, $1.

Miss I. M. Litchfield.

195. Dried grasses. Mrs. C. Stanley, $2.

196. Everlasting flowers. Mrs. A. B. Strattard, $1 ; Mrs. A. C. Pierce, Lewiston, 50c.

197. Dish cut flowers. W. E. Morton & Co., $2 ; Miss I. M. Litchfield, $1.

198. Fancy basket of flowers. W. E. Morton & Co., $2; Miss I. M. Litchfield, $1; Mrs. M. E. Thomas 50c.

Bouquet Asters. R. H. Gardiner, 50c.

THIRD DIVISION.

199. For best exhibition of greenhouse plants. John Burr, $8; G. M. Roak, $5.

200. For best exhibition of pot plants, not less than 20 pots. Miss Alice M. Jordan, Auburn, $3.

"Persons exhibiting greenhouse plants, (No. 199), cannot compete for premium No. 200."

201. For best exhibition of ferns. John Burr, $3; G. M. Roak, $2.

202. Geraniums. John Burr, $2; G. M. Roak, $1.

203. Begonias. John Burr, $2; G. M. Roak, $1.

204. Coleus. G. M. Roak, $2; John Burr, $1.

205. Tuberose. R. H. Gardiner, $1; John Burr, 50c.

206. Dracæna. G. M. Roak, $1; John Burr, 50c.

207. Double Geranium. G. M. Roak, $1.

208. Single " No entry.

209. Salvia Splendens. G. M. Roak, $1.

210. Foliage Begonia. G. M. Roak, $1.

211. Flowering " John Burr, $1; G. M. Roak, 50c.

212. Coleus. G. M. Roak, $1.

213. Fuchsia. John Burr, $1.

214. Carnation. G. M. Roak, $1.

215. For best single pot plant. G. M. Roak, $1.

216. Best hanging basket with plants. No entry.

217. Best climbing plant, on trellis. Miss Alice M. Jordan, $1.

218. Wardian case. No entry.

219. Aquarium. "

220. Rustic stand. "

Proceedings of the Winter Meeting.

The ninth Winter Meeting of the Society, (being an adjournment of the annual meeting which was held at Lewiston, September 20, 1883), was held at Lemont Hall in Brunswick, on the 22d and 23d days of January, 1884, in connection with a Farmers' Institute under the direction of the Secretary of the Board of Agriculture.

In point of number and interest of the members and other persons attending, as well as in the importance of the subjects considered, the meeting compared favorably with any previous Winter Meeting. The division of the time between the Society and the Board of Agriculture rendered it impossible to give to all of the subjects presented as much attention as some of the members thought desirable, and prevented the reading of a portion of the papers prepared for presentation. These circumstances led to some unfavorable criticism *afterwards*; but it is easier to find fault with what has been done than to foresee difficulties—and it is respectfully submitted that a busy meeting, in which the time is fully occupied, even if some matters of secondary importance are excluded, is better than one at which the interest lags and members have to be urged to "occupy the time." There are also important economical considerations affecting both the Society and the individuals attending, in favor of a joint meeting. There was no subject presented in the programme, in either department, undeserving of the attention of any person attending, whatever his own specialty might be. But the subject, with respect to future meetings, is in the hands of the members, and the Executive Committee desire nothing more earnestly than that they will make their wishes known with respect to this and all other questions affecting the management of the Society's affairs, at a proper time and in an appropriate manner.

Three sessions were held on each of the two days of the meeting, and the following is an abstract of the record, showing how the time was occupied:

TUESDAY, JANUARY 22.

MORNING SESSION—9 A. M. Formal meeting of the Pomological Society.

10 A. M. Meeting under the direction of the Board of Agriculture. Lecture on "Co-operative Butter Making," by Z. A. Gilbert, followed by a discussion of the subject.

AFTERNOON SESSION—1.30 P. M. Meeting of Pomological Society. Address of welcome by A. G. Tenney of Brunswick, and reply.

Address by the President on the general subject of orcharding.

Paper by T. S. McLellan of Brunswick, on the same subject, read by the Secretary.

Remarks by Z. A. Gilbert on the apple maggot.

Paper by C. G. Atkins, entitled "Studies on the Codling Moth," read by C. J. Gilman, Esq.

Remarks and resolutions offered by Mr. Henry S. Smith of Monmouth, in relation to the extermination of injurious insects.

EVENING SESSION—Paper by Hon. Rufus Prince of Turner, President of the State Agricultural Society, entitled "My Experience in Orcharding, and its Lessons."

"Railroad Gardening," by John Burr of Freeport.

"Floriculture," by Mrs. A. B. Strattard of Monroe.

Papers by Mrs. M. D. Welcome of Yarmouth, on "Ornamental Foliage Plants," and by Albion Cobb, M. D., of Webb's Mills, on "Botany as a Guide to the Cultivation and Improvement of Fruits and Flowers," read by Hon. C. J. Gilman.

Remarks by Rev. S. F. Dike of Bath.

WEDNESDAY, JANUARY 23.

MORNING SESSION—9 A. M. Business meeting of the Pomological Society. The report of the Treasurer for the year 1883 was presented, and having been examined and approved by the Executive Committee, was accepted, and is as follows:

GEO. B. SAWYER, *Treasurer*,

IN ACCOUNT WITH MAINE STATE POMOLOGICAL SOCIETY.

DR.

To cash in the treasury, January 1, 1883,	$99 05	
Am't rec'd from the State, bounty of 1882,	500 00	
" " on loans,	400 00	
" " of life members.	40 00	
" " " annual members,	33 00	
" " of State Agricultural Society,	325 00	
" " from interest, Permanent Fund,	17 20	
" " " donations,	9 50	
	$1,423 75	
Balance due Treasurer December 31, 1883,	24 81	
		$1,448 56

CR.

By am't paid loans,	$340 00	
" " interest on loans,	14 55	
" " orders of Executive Committee,	248 01	
" " John Hanscom, on contract,	90 00	
" " Secretary, salary,	100 00	
" " Premiums of 1882, balance,	234 50	
" " " winter meeting 1883,	31 25	
" " " annual exhibition 1883,	390 25	
		$1,448 56

Amount on deposit to credit of Permanent Fund, $344 40.

Analysis of Cash Accounts.

The expenditures for the year, as will be seen, amount to		$1,448 56
Of which there was paid on loans and interest,		354 55
Balance, current expenses,		$1,094 01
Consisting of the following items:		
Premiums,	$656 00	
Salary of Secretary, in part,	100 00	
Printing,	90 00	
Expenses of winter meeting, not including premiums,	21 04	
" annual exhibition, not including premiums,	98 14	
Purchase of plates and utensils,	72 24	
Postages and express bills,	23 14	
Miscellaneous expenses,	33 45	
		$1,094 01

This amount has been provided as follows:		
Cash in treasury January 1, 1883,	$99 05	
Am't rec'd from the State,	500 00	
" " " State Agricultural Society,	325 00	
" " " memberships,	73 00	
" " " interest in excess, of amount paid,	2 65	
" " " donations,	9 50	
Increase of loans from last year,	60 00	
Balance due Treasurer December 31, 1883,	24 81	
		$1,094 01

Loans.

Amount due December 31, 1883,	$200 00
" January 1, 1883,	140 00
Increase,	$60 00

Statement of the Financial Condition of the Society, December 31, 1883.

Assets.

Amount due from the State, bounty for 1883,	$500 00	
Property owned by the Society, estimated,	150 00	
		$650 00

Liabilities.

Am't due on loan,		$200 00	
"	" premiums, 1883,	167 00	
"	" unpaid orders and bills not rendered, estimated,	200 00	
"	" Treasurer as per his account,	24 81	
"	" Secretary, balance salary,	100 00	
"	" Permanent Fund,	415 60	
			$1,107 41

(Deficiency of assets, $457.41).

Permanent Fund.

Cr.	By fees of 76 life members,	$760 00
Dr.	To amount on deposit to credit of fund,	344 40
	Balance due fund,	$415 60

Respectfully submitted,

GEO. B. SAWYER, *Treasurer.*

BRUNSWICK, January 22, 1884.

Voted, That the salary of the Secretary for the present year be fixed at one hundred dollars.

The Society then, at 10 A. M., took a recess until half past eleven, and in the intervening time a meeting was held under the direction of the Board of Agriculture.

11½ A. M. The Pomological Society, resuming its sessions, proceeded to the election of officers for the current year, with the following result:

For President—William P. Atherton, of Hallowell.

[Mr. Atherton afterwards declined to serve and was excused].

The Society then elected

For *President*—Charles S. Pope, Manchester.

Vice Presidents—S. C. Harlow, Bangor.
S. R. Sweetser, Cumberland.

Secretary and Treasurer—Geo. B. Sawyer, Wiscasset.

Executive Committee—The President and Secretary, *ex-officiis*, Andrew S. Sawyer, Cape Elizabeth; Leander H. Blossom, Turner; Frank E. Nowell, Fairfield.

Trustees—Androscoggin county, N. W. Harris, Auburn.

Aroostook	"	E. E. Parkhurst, Maysville Centre.
Cumberland	"	Francis C. Jordan, Brunswick.
Franklin	"	G. K. Staples, Temple.
Hancock	"	Charles G. Atkins, Bucksport.
Kennebec	"	Richard C. Plaisted, Gardiner.
Knox	"	Elmas Hoffses, Warren.
Lincoln	"	H. J. A. Simmons, Waldoboro'.
Oxford	"	Jairus K. Hammond, Paris.
Penobscot	"	J. E. Bennoch, Orono.
Piscataquis	"	H. A. Robinson, Foxcroft.
Sagadahoc	"	Henry S. Cary, Topsham,
Somerset	"	James S. Hoxie, North Fairfield.
Waldo	"	D. B. Jackson, Freedom.
Washington	"	Nelson S. Allen, Dennysville.
York	"	Randall Boothby, Limerick.

The following resolution was presented by Mr. C. J. Gilman, and was unanimously adopted, viz:

Resolved, That the Society extends its thanks to the Hon. Robert H. Gardiner for his faithful and zealous labors as its President during the last three years; and that upon his withdrawal from the Presidency at this time, we tender to him our best wishes for his health and happiness.

Afternoon Session. The report of the committee on the fruit exhibition at the present meeting, was presented by Mr. Rufus Prince, Chairman, and was accepted.

Proceeded to the discussion of the paper read by Mr. Prince at last evening's meeting, after which,

A paper on "Pear Culture," by D. P. True of Leeds Centre, was read by the Secretary.

A paper on "Gardening for Profit," by Mrs. A. L. Hersey of Oxford, was read by Mr. Z. A. Gilbert.

The report of the Corresponding Secretary was read by the Secretary, and was accepted.

Voted, That the several papers prepared for this meeting, and not read for want of time, be referred to the Secretary, with instructions to publish such of them, and of the papers read, in the next annual report, as the limits of the work will admit, giving preference to those papers relating to fruit and flower culture.

The Secretary reported the decease of the following named life members of the Society, viz:

William C. Crosby of Bangor, Febuary 20, 1880.

Isaiah Stetson of Bangor.

J. M. Richardson of Greene.

George Jewett of Portland, April 17, 1883.

Eliphalet Clark of Deering, June 8, 1883.

Mason J. Metcalf of Monmouth, June 23, 1883.

Albert Emerson of Bangor, December 2, 1883.

Voted, That the Secretary prepare or cause to be prepared appropriate notices of said deceased members for publication in the annual report.

Voted, that the Committee on Russets present their report to the Secretary.

On motion of Mr. Gilbert, a standing committee on new fruits was appointed, consisting of Messrs. W. P. Atherton and S. L. Boardman.

On motion of Mr. Boardman, a committee was appointed, consisting of Messrs. S. L. Boardman, Rufus Prince and Charles S. Pope, to prepare and report to the next annual meeting a plan of action for the proper representation of this Society and State at the International Horticultural Exhibition to be held at New Orleans in December, 1884.

Voted, that the thanks of the Society be extended to the Sagadahoc Agricultural Society for the facilities afforded for holding this meeting; also to the Maine Central and Knox & Lincoln Railroads for reduction of fares, and to the several persons who have furnished papers to be read at this meeting.

Adjourned without day.

ATTEST: GEO. B. SAWYER, *Secretary*.

Memorandum. On the evening of the last day of the meeting an address was delivered by Hon. B. G. Northrop, L. L. D., of Connecticut, on "Rural Life and Homes," before a joint meeting of this Society and the Sagadahoc Agricultural Society.

The Work of the Winter Meeting.

ADDRESS OF WELCOME.

By A. G. TENNEY, of Brunswick.

Mr. President and Gentlemen of the State Pomological Society, and Members of the Board of Agriculture:

It is made my pleasant duty to welcome you to this town, one of the oldest, being the eleventh town incorporated in the State. We are not an agricultural community in the proper sense of the word, though we have fine farms in this locality, some farms that are kept in good condition, and some cultivators of fruit. Our soil is not fertile; we are exposed to atmospheric conditions which make it almost impossible for us to cultivate the finest fruit. It is said that varieties of apples which, thirty miles from here, will grow fair, and well developed, will be here almost undeveloped or badly developed. Therefore we welcome you with all the more pleasure, as you bring us some of your fruits, as well as instruction in the methods of culture in making one of the finest displays upon your tables. We are glad to see you and hope it will be an incentive to *us* to do the best we can under the circumstances that exist.

I might say to you perhaps -- no, I cannot quite do that, because it is out of season and I am too good a respecter of law,— but I will refer to John Josselyn's first visit in 1638. He wrote a work entitled "New England Rarities Discovered." In it he says: "The Pejepschut river is famous for multitudes of mighty large sturgeon. Trouts there be in good store in every brook, ten and twenty inches long." Now, there are some of us here, who would be glad to know where those brooks are to be found. The difficulty now is, to avoid the law in catching them five inches in length.

When in Aroostook county several years ago, the varieties of fruit were few and small, but still, what there were were in very good condition; but the farmers said they had been making a mistake; they had been getting their trees from New York, and the result had been that many of their trees had died, and those that lived had borne fruit in imperfect condition. I was there again in

1878, and the improvement in fruit was perfectly surprising; I found apples as fine as any I have seen anywhere. I found that instead of getting their trees from New York nurseries, they were getting them from Maine nurseries. But I have no doubt that gentlemen here can talk about that better than I can. I am glad to greet you; I feel that it is highly important that these meetings should be held and I cannot doubt that the largest possible benefit will accrue to the State from these gatherings. I will again refer to this exhibition of fruit as one of the finest I ever saw, and that is double cause why we should welcome you upon this occasion.

RESPONSE,

By Hon. Z. A. Gilbert.

Mr. Chairman, Ladies and Gentlemen:

In consequence of the inability of the President to respond, being much out of health as we all know — pleased as he would be to reply to a welcome of this kind; and as appreciative as he is of the greeting which has been tendered to us — I consented to make the reply.

It is certainly gratifying to our Society to be thus assured that we meet a welcome among the people with whom we assemble to-day. Our Society was organized some years ago from a necessity for special work in the direction of fruit culture in the State. Fully realizing as we did, that the industry was one worthy of special encouragement in our State, the Society seemed a necessity. At one of its earliest meetings the remark was made by its President that the industry here among us was apparently in its infancy, although for many years it had received large attention from leading fruit growers in the State; and that if we could encourage the business through special effort, so that our meetings should largely increase, we should find our advantages from it increased in like measure, that we should be able to put upon the market a hundred or a thousand barrels of apples where we were then putting *one;* and we should find a quicker market and more purchasers. Some of the members were hardly able to assent to that position, but subsequent events have proved the truth of the claim then put forth. We have since that time increased the productions of the fruit in our State largely; we are beginning to attract the attention of buyers now, as we put a larger quantity of our leading late-keeping

fruits upon the market, we find that purchasers are seeking for them, that the market is quicker, the demand is surer, and we now fully believe we can go on increasing it in the same ratio and that in the future we shall find our market still improving, and there is from present appearances no limit to the demand for our special fruits grown here in the State of Maine.

So we have, as a Society, the encouragement and assurance that we are at work in a good cause; and we would assure the citizens of this county and the gentleman who has so kindly expressed their welcome, that the Society needs this encouragement. Working as we have been without any other reward than the knowledge of earnest work in a good cause, and unless we meet sympathy and receive some encouragement, that work, after a time, tires. But with such assurances and with the knowledge that there is still an appreciation of this work, we can go on, and it is our determination to go on and encourage this industry. We have also the assurance that there is at the present time a universal interest in the fruit industry. Those who are producers are not the only ones interested. Consumers, as well, from a different standpoint, are alike interested, and the producer and consumer meet together and encourage each other, which is one of the advantages derived from a meeting of this kind.

The fruit exhibited here was pleasantly referred to by the gentleman who gave us this welcome, and this is an inspiration to all concerned; it is an inspiration and encouragement to the producer and a tempting appetizer to the fruit consumer; so there is a benefit to all accruing from such an exhibition.

The membership of our Society is more limited than we wish, and we would like to have it understood that the list is open for additions; and while we do not propose to pursue any special canvassing in this direction, we would be glad to enroll still others upon the list.

There is no particular locality which is exempt from this interest in fruit growing. As the gentleman has referred to the more easterly part of the State, I will add that we find greater encouragement in these border lands of the State in the direction of fruit production than we hardly dared to hope, even the few years ago that this Society was organized. In the County of Piscataquis are to be found as thrifty and productive orchards as are to be found in any section of our State. A better knowledge of the business

prevailing among those orchardists has enabled them to select varieties to suit their localities, and they are meeting with the highest success in that direction at the present time. With respect to the famous County of Aroostook, I must acknowledge that I had my fears with regard to the success of the business in that locality. But as time goes on, as they learn from experience, even then there is very much more of encouragement in this direction than existed a few years ago, and the effort of the Society to introduce some of the new varieties there, adapted to the locality, has already manifested itself in better fruit trees and in a considerable abundance of fruit in certain localities, giving promise that in course of time that county is to supply itself with fruit. So we are able to say that the whole State is embraced and interested in this industry. Thus while we meet here to-day in this central locality, we may bear in mind that our work is not confined in its effects to this section of the State, but that it is a wide-spread influence, reaching to our furthermost borders.

While possibly, as the speaker has said, fruit culture has not assumed that special importance here that it has in some localities, still we know that there are those here interested in the business and meeting with success, and that this locality is not an exception in this regard. So we have much to encourage us, and for every word of sympathy and every expression of welcome which may come from any locality, and especially here and now, we wish to extend our thanks.

ADDRESS BY THE PRESIDENT, HON. ROBERT H. GARDINER.

Gentlemen of the Pomological Society, Ladies and Gentlemen:

It is announced in the programme that an address may be expected this afternoon from the President. I am sorry to say that he is not prepared to make a formal address, but instead will venture to say a few words upon

ORCHARDING.

There are so many admirable books with full directions for forming an orchard, and giving all the requirements for success, and so much too is constantly appearing in our ably conducted agricultural papers, that it may seem a work of supererogation to discuss the subject here, and yet inquiries are so often made by beginners, it has seemed to me that a few words upon the mode of preparing an

orchard, its after-cultivation, and the gathering and marketing the fruit, though an oft told tale, might perhaps be of use to some, if reiterated at this our winter meeting.

In the first place, I would advise every one who has already started an orchard, to begin a nursery by sowing seeds. When an orchard has been planted, it is a safe calculation to make, that about ten per cent of the trees must be renewed annually for some years. The trees when small may be broken down by the wind, or accident, or killed by borers. With a nursery of one's own these can be replaced in a more satisfactory manner than by purchase, and at a trifling cost. The seeds should be sown in drills, and the second year after, the trees shall be taken up and planted in rows two or three feet apart and well manured and cultivated. The next thing to be considered is grafting, of which there are several modes. I have often practiced *splice* grafting with success, but with this mode the body of the tree, or of the branch to be grafted, should not be much larger than the cion. For some trees, especially the Bellflower, which is inclined to split at the forks, it is much better to graft the branches, and for this, splice grafting is an admirable method.

Budding is another mode, and in this I have been very successful. The time for this is in August, as soon as the buds are well formed. The process is very simple, and the advantages are, that if the bud takes you gain time, and if it fails your tree is not injured as it would be by the failure of a graft. In budding it is best always to use waxed strips of cloth, and after two or three weeks have elapsed if you find the buds have taken, cut across the waxed cloth on the side opposite to the bud, to allow the bud to swell. It is generally recommended to cut off the wood beyond the bud, in the spring when the bud begins to grow, but I much prefer to allow the old wood above the bud to remain till the bud is nearly the size of the stock, as in this way the bud, as it grows, can be tied to the stock as to a stake, but care must be taken to cut off all leaves that appear on the stock above the bud. I have probably one hundred trees in bearing that were budded. I do not speak of the usual modes of grafting, as they are familiar to everyone. In planting out apple trees I am satisfied that thirty feet each way is the best distance. For the first ten years, twenty feet might do, but after twenty years, thirty feet will prove to be the best. Great care should be taken in planting. Dig the hole as large as the roots, and a foot deeper than you wish to set the tree, then all around the hole undermine the

ground for a foot or more, fill up the hole a foot with good earth, making a little mound in the centre, set your tree upon this, stretching out the roots carefully, having first taken care to trim any broken root smoothly, and cover the roots with rich earth, shaking the tree so that there shall be no hollow spaces, and then firm the ground around the tree with your feet. Planted in this manner, the roots strike out into the good loose earth surrounding them, and grow rapidly.

To have a handsome orchard it is important to attend to the form of the tree when young, taking care that no branches cross or rub against one another, and that light and air are admitted into the top. By early attention to this, there will be no occasion ever to remove large branches, and the small ones can be removed at any season of the year. If, however, it is necessary to remove large branches, from my experience, I should say, do not do it in the autumn. Many recommend June as the best time for pruning. No doubt it is a good time, but it is a busy season, and beside, one hesitates perhaps about removing a branch which is covered with blossoms. I decidedly recommend March and April as the best time for a general pruning. It is a leisure time, the trees are bare of leaves, and you can see better what branches to cut, and any wounds you make will heal in half the time of those made in autumn. If any branch is cut larger than an inch in diameter, it is of the greatest important to cover the wound at once with paint, shellac or grafting wax. There is a great difference of opinion as to the proper height from the ground to have the first branches. Some say six feet, so as to allow a team to pass under. The objections to this are, that there is great danger of the trees being moved out of plumb by the wind, it is more difficult to gather the fruit, and the trunk of the tree is exposed to the sun. On the other hand, others would have the trees branch about three feet from the ground. There is convenience in picking, it is true, but it is difficult to get under the tree to cultivate and manure it, and in case sheep or hogs run in the orchard, you will lose a good deal of fruit. I think therefore a medium height is best, say not less than four, nor more than five feet.

No one can expect to succeed with an orchard without constant attention. Who would think of raising corn without cultivating and manuring the land? And if it pays to do this for corn, it certainly will for apples and pears. Nowhere on the farm does the use of

manure pay better than in the orchard, and I believe too that mulching is often of the greatest benefit.

The especial enemies to the apple tree in this section are the borer, the mouse, the tent caterpillar, the codling moth, and the apple maggot. Every tree should be examined twice in the season and all borers removed. The usual method recommended to guard against mice is, after every snow storm to tread down the snow around the tree. This is effectual, but one year there was a heavy fall of snow in April. It being supposed that the winter was over, no attention was paid to the trees, and I lost twenty trees girdled by mice in one day in April. Since then I have always protected all trees less than two inches in diameter by means of a piece of old stove or tin pipe. The pipe costs nothing. Cut it into pieces large enough to go around the tree and about ten inches high. This is but little more trouble and is a sure protection. The simplest remedy for the tent caterpillar is to examine the branches in autumn or winter, and whenever a branch of the eggs is discovered glued on towards the end of a small branch, cut off and destroy it. If, however, some escape detection, the moment the caterpillars are discovered in the spring, destroy them. Follow this course faithfully and the great loss of fruit and injury to the trees that occurred a few years since can never happen.

The apple maggot was particularly destructive with me the past season in the Talman Sweet, Red Astrachan, and Mother apples, but did not trouble other trees. As we are presently to have a paper from the able pen of one who has made a thorough study of the codling moth, I will not now dwell upon it.

When one is about to commence an orchard, the first inquiry he makes is, what varieties shall I plant? The answer must depend very much upon the object sought. If it is merely to have an orchard for *profit*, then the answer is very simple. Turn a deaf ear to all the seductive talk of the tree agent about his wonderful new varieties illustrated by beautiful pictures, and set only the old standards, the Baldwin, Rhode Island Greening, Roxbury Russet, Bellflower and Talman Sweet, and if you have a near market, the Red Astrachan for very early, and the Porter for autumn. But if one wishes to raise apples for family use there are several others that are desirable, such as the Fameuse, Jewett's Fine Red, Peck's Pleasant, Wagner, Hunt's Russet, and perhaps a few others, but there can be no greater mistake than having too many varieties. If one wishes to have an

orchard which is profitable let them try which of the old standard sorts will do best upon his ground, and then have at least 75 per cent of his trees of this. One man will tell you that nothing is so profitable as the Baldwin, another will say the Roxbury Russet, another perhaps the Bellflower. This depends upon the soil and location, but dealers will go a long way to seek a man who has five hundred barrels of one kind to sell, when he would not cross the street to see a man who has ten barrels each of fifty different kinds. If, however, one has the taste and time to experiment, like Mr. Atkins and others, with the hope of producing a new and superior variety, he is laboring in a good cause, and should have the hearty thanks of every member of our Society, but although his experiments may result in good to the world, there will be no profit to himself.

The next point is the time and mode of gathering the fruit. I ought to have said before that it is very important, if neither sheep nor hogs run in the orchard, to gather daily all the windfalls. Most of these are wormy, and when fallen the worms directly leave the apples and bury themselves in the ground, to be ready for next year's operations.

As to the *time* of gathering—this must of course depend upon the season. A slight frost does not injure apples on the tree, but with the temperature below 28° they will be injured. As a rule, about October 1st is the time to begin to gather winter apples, but generally they will not be injured before the tenth. Various methods are followed in gathering and storing apples. Usually the apples when picked are emptied from the basket into a cart which, when full, is dumped on the barn floor, and on a rainy day or other leisure time are sorted and put in barrels. This plan may do for Baldwins and other firm apples, but will never answer for Bellflowers, Porters, or other tender-skinned varieties. The plan I follow in gathering Bellflowers is, to have three empty barrels under the tree; a little straw is always put in the bottom of the basket, which has a hook attached to hang it to a branch of the tree; when the basket is full, the apples are placed by hand into the barrels—those unquestionably first quality in one barrel, those decidedly refuse in another, and those that are doubtful in the third, to be subsequently sorted. The barrels, when full, are put in the store-room and not headed up till about the time for marketing them. In packing for market, a flour barrel is generally used. Make it a point always to wash out the barrel with water. Merely dusting out the barrel, no matter how

thoroughly, will leave particles of flour, which will injure the appearance of the fruit. Always use water, it is no more trouble. In packing a barrel of first quality, place the first tier of apples with the stalks down; after that put in the apples just as they come, large and small, but taking care to put in none that are bruised. By and by, when the barrels are headed up, they are turned end for end and the bottom is marked, so that that end will be opened and the apples, seen with all their stalks up, add much to their appearance and will always command twenty-five cents more a barrel. A very important point in packing apples is to have the barrel packed so tight that there can be no movement or rattling. To accomplish this, use a screw, an inexpensive affair made for the purpose. With this a barrel can be headed in half the time and there will be no danger of the apples being bruised by transportation.

I cannot allow this opportunity to pass without saying a word about strict honesty in packing. The world is beginning to learn that fruit raised so far north as Maine will keep much longer than that from the south or west of us. Why is it then that Maine apples sell in Liverpool for three shillings (50 cts.) less than those from Canada? It is simply because the Canadian shippers have the reputation of shipping apples that are honestly packed, whereas it is a prevalent custom in Maine to *deacon* their apples, that is: put the large ones at the top and the poor and small ones at the bottom, or in the middle. Dealers in apples, upon receiving a new consignment, always examine one or more barrels, and if they discover unfair packing, at once knock off fifty cents or more in price from every barrel. I have not heard of any apples being sold the past season for more than $3.50 per barrel, and yet I received $4.00 for all my Bellflowers from a party who felt sure he could guarantee the entire contents of every barrel as equal in every respect to those on the top. When this mode of packing is universally adopted, Maine apples will command the preference in all the markets of the world.

MY EXPERIENCE IN ORCHARDING AND ITS LESSONS.

By Rufus Prince.

So much theory has been written upon all subjects pertaining to agriculture, that when your Secretary invited me to furnish a paper for this, I decided to give the results of my experience, and what I consider the results of that experience. I am well aware that in a

paper with the above heading, it will be necessary to use the pronoun I so often that it may seem egotistical, still I trust that I may be as ready to state my failures as successes, and commencing as I did when a mere child, with no more knowledge of fruit raising than the average boy of fifty years ago who had tastes for this vocation, I must have made many failures. I always loved to labor in the orchard, to watch the opening buds and growing fruit.

My experience commenced with raising pears, or rather pear trees. A neighbor of mine having an old native pear tree, I procured some seeds and raised some twenty-five pear trees. When these trees were old enough to transplant to the orchard, my boyish ideas not being large, I thought I had an immense number, and having no thought of making money, I gave away to my young associates all but about half a dozen, thinking that I had kept all that I should ever want. Of the trees that I kept three are now bearing bountiful crops of Clapp's Favorite, while the remainder have long since gone to the brush pile. Of those given away a few are now large, thrifty trees, but the larger part, although nearly half a century of age, have not yet come to bearing—the larger part being dead and the remainder exemplifying the old adage "He who plants pears, plants for his heirs."

Since arriving at manhood, my mind has changed and I have purchased many pear trees, and I believe that with proper care there is no more reliable or profitable crop raised. The great difficulty in raising pear trees in this State is that we do not realize that they will not stand neglect and still produce crops, like an apple tree. We must ever bear in mind that to raise pears successfully we must treat them bountifully with the best fertilizers.

To illustrate my point I will say that one of the trees from my boyhood nursery had been grafted to Buffum pears, and, although it had been large enough for many years to bear bushels of fruit yearly, still I only occasionally found a specimen. I finally decided to "kill or cure" and boxed up the trunk of the tree almost two feet in height and made a yard some fifteen feet in diameter enclosing the tree. Into this yard I put a litter of Poland Chinas and kept them there some two months, and the result was that the next year I had to prop up my tree to save it. This was eight years since, but the tree continues to bear good crops annually.

Profiting by this experience, and having a small pear orchard near my house, I made a pig yard of it and last season, while almost

everyone was lamenting the almost entire failure of the pear crop, I was propping up my trees to prevent their breaking down under their heavy load of Rostizers, Buffums and Clapp's Favorites. Hence, I think that I can safely say that there is little danger of over-feeding pear trees or their not giving good returns for good feed. Pear trees with me have thus far been much less liable to disease and have less enemies to contend with than apple trees.

About the time I sowed my pear nursery, my father, being a progressive man, went to a neighboring county and hired a man to graft the old orchard—a feat that was then understood by but few. Like other boys, I was much interested and watched attentively during the few days he worked, and the morning after this man left found me in the orchard, armed with my old jack-knife, newly ground, the family hand-saw, and together with the butcher-knife to split the stumps. With these tools I commenced to graft, and you may rest assured that the scions thus set were attentively watched, and when I saw them growing like those set by the wonderful man from abroad my boyish measure was full, and from that day to this what grafting has been done on the old homestead has been done in the family. The grafts thus set were in old trees that have long since yielded to the march of time and have been replaced by others.

Soon after I sowed my pear nursery, in company with an older brother, I procured some apple pomace from a neighboring cider mill and started an apple nursery—I being at this time not more than twelve years of age. We succeeded in raising several hundred nice trees which from time to time were transplanted to the orchard to replace old trees.

After being in the orchard a year or two I found they nearly all toppled over and died. In this way all of our hundreds of trees soon went save less than a score which came to bearing. What the trouble was I knew not, but have since learned that it was that terrible scourge to the orchard, the borer. After arriving at manhood and being settled upon the old homestead of my great grandfather, where my experience in orcharding began, in the fall of 1860, I decided to commence an orchard. I selected six and one-half acres of pasture land that was inclined to the north-west, gravelly loam. This was plowed very deep and heavily dressed with barn manure. I was several years in setting the orchard and during this time and several years afterwards the ground was cultivated and well manured. It was finally seeded down and for several years I cut large crops

of hay, and my trees were thrifty; but this course began to tell upon my trees, and from year to year they made less growth and it became a serious question how I could manure the orchard and not starve other portions of my farm.

Still I knew something must be done for the orchard. I finally decided to pasture with sheep and swine, and last year, although an off year, with the fruit crop nearly a failure in the State, this orchard paid me fifty dollars per acre net, besides being a good sheep pasture. The trees were set thirty feet apart, and set both fall and spring with equally good results.

But I will not tire you with the detail of my work in this direction, but simply say that, as a result of some thirty odd years since commencing orcharding for myself, I find myself in possession of about twenty acres, a larger part of which was set by my own hands. The first orchard I set, the trees were set thirty feet apart, but I now set them twenty-five feet.

In starting an orchard, the first thing to be done after the selection of the site, is to decide upon the varieties to grow and in this one can not be too careful. The first question should be: Is the fruit good? I mean, among the best; and if so, Is the tree a shy bearer? and if so, you can not afford to set it. Then, is it known and appreciated in the markets? If not, although you may think it among the best, being juicy, melting and delicious, an abundant bearer, and there is not a call for it in the markets, do not invest largely in it, as life is too short to risk in this direction, too short to think of building up a variety that is but little known, no matter how good it may be. Better, by all means, cultivate those varieties like the Baldwin and Russet, for which there is always a demand in all markets.

Before setting your trees, plow and pulverize your ground deeply, and then before the tree agent comes along decide upon the varieties you will set, being sure not to have too many. Then make a plan of your orchard, so that you can see at a glance where every variety is, that when a tree dies it can be replaced with the same variety. In this way you can have each variety by itself, and you will not only add beauty to your orchard, but it will add much to the convenience in getting the fruit. Above all things, fight shy of new varieties. Think how many varieties have been placed upon the market within the last two decades with high-sounding names, and for which great prices were asked, but which are now hardly

thought of and which no good fruit grower thinks of setting. I say, think of these things when beset by the tree agent to give an extra price for some new variety which he will tell you not only bears enormous crops every year, but will stand the coldest winter ever known in Greenland. He will inform you that he has perchance a new variety that has never been put upon the market before and that he only sells to a few of the best orchardists, and that the nurserymen that he represents, knowing your reputation as a fruit grower, wished him to be sure and let you have a few, they being possibly the only ones to be sold in town. We take the bait and purchase, only to learn when too late that the same story had been told to scores of others in our own neighborhood. In these and various other ways, we multiply varieties much to our disadvantage. We should study the characteristics of our soil, experiment carefully with new varieties known to be choice and profitable and when we find one adapted to our soil and location make a specialty of it.

I prefer good sized trees for setting, those from six to eight feet in height. I am aware that the prevailing opinion is that small trees are more likely to live than larger ones, but all should recollect that young trees have many enemies to contend with, consequently the sooner you can get them out of the way of these enemies the better, and when I mention among these enemies the borer, cattle, grass, &c., I trust that every one that has set out an orchard and lost the larger part of it will ask himself which of these enemies killed it? or did all combine? Also did he not undertake to shield himself for his neglect of these beautiful trees by cursing the New York apple tree agent while the fault was his own. In the preparation of trees for setting I would rather cut out branches entire to balance the roots that have been cut off in taking up, than head in, as is recommended by most writers, for the reason that the result of heading in is a thick top, the very thing you wish to avoid, rather as I said trim out branches enough to make the top as small as desired.

Set your trees leaning slightly to the south, for if perchance they get inclined in the opposite direction they are sure to be spoiled by what is known as "sun scald." This is caused by the sun striking directly upon the trunk of the tree, thereby causing the bark to die and peal off. So sure is this to occur that I think it would be hard to find a sound tree that had had a northern inclination for any length of time.

Do not be satisfied with growing fruit the bearing year, but feed your trees so that they will produce crops every year. The more one makes fruit growing a specialty the better he will succeed, for the reason that he will study more to make it a success. The orchard may be kept in a growing condition in several ways,—the better way for each one being dependent upon his situation and resources, and either of which will be entirely satisfactory if properly done. If a person has a plenty of common farm-yard manure that is thoroughly decomposed, we believe nothing will give better returns than this, thoroughly incorporated into the soil with plow or cultivator, being always careful while at work with these tools in the orchard.

If you have not a plenty of farm-yard dressing to spare, but have brakes in your pastures, coarse hay or straw to spare for the orchard, you may thoroughly mulch and follow it up year after year with no risk as to the final result. The course that I pursue and the one that my experience teaches to be best for the average farmer is to pasture with sheep or swine. The orchard which I spoke of in the former part of this paper, has been used as a sheep pasture for several years and the trees make good growth and bear as good crops as any one that I know of.

The worst enemy that I have to contend with in the orchard is the borer, and I know of but one sure preventative and that is the death of the pest. A wash occasionally of whale oil soap suds will in a large measure prevent his getting into the tree, still you must ever "watch and pray" and go through your orchards occasionally with the knife and wire and see that this terrible pest does not long remain in the tree. I trust that no one will be so enthusiastic as to believe that he can be successful in raising an orchard without much care and labor. The old adage that "eternal vigilance is the price of success" holds good in fruit raising, and with vigilance, with care, and intelligent labor at all seasons nothing pays better dividends, nothing adds more to the comfort of the family than an orchard, but if one expects to raise fruit without labor, without eternal vigilance, he is in the end doomed to disappointment. I am aware that there is a feeling of distrust among the farmers of Maine. I am aware that many of even our most successful farmers, long to revel in the orange groves of Florida, the cattle plains of Texas, or the wheat fields of Dakota. But, Mr. President, where can we find happier homes than in our own New England, where the apple, the "King

of Fruits," can be ever at hand? What greater attraction can there be than a New England home surrounded by a thrifty, well selected fruit orchard? I would not advise any person that has not a natural taste for fruit raising to undertake it extensively, although for one having a taste in this direction it is our most profitable crop. Still everyone owning an acre of land in Maine should raise fruit enough for his own family. What will add more to the comfort and enjoyment of our long winter evenings than the ever present dish of fruit, raised by our own hands, upon our own farms? Who of common capacity but can have thrifty fruit trees enough to adorn his grounds and fruit enough of his own raising to grace his table at all seasons of the year?

THE NURSERY BUSINESS.

A paper specially contributed for this meeting,

By JOHN J. THOMAS, of New York.

The business of raising and selling young fruit trees is in one respect unlike other commercial business, on account of the time required to prove them in bearing. Most kinds of goods may be examined on the spot and their good or bad quality at once determined by inspection. None but men of long experience can recognize a variety of fruit till they have seen the ripened specimens. For this reason more care is required by the nurseryman to secure the sorts he propagates true to name; and more care must be exercised by the purchaser in procuring his young trees from trustworthy and reliable sources.

For the same reason, there is more opportunity to conceal frauds from the great majority of purchasers, who do not recognize by sight in the growth of young trees what they are. Forty years ago most of the nurseries were full of errors. Sufficient care had not been taken to obtain the genuine sorts from which to propagate, and many were ignorantly but honestly unaware of the harm they were doing in disseminating poor sorts. When the writer of these remarks commenced the nursery business, so abundant were these errors that he adopted and never deviated from the rule of propagating nothing for sale which he had not proved or seen in bearing.

At the present time the best nurseries and those which have an established reputation have reached much accuracy in this respect,

and some could be named from whom the public could procure supplies with almost a certainty without a single mistake. Specimen orchards, thorough acquaintance with the different varieties, and an accurate system of propagating and filling orders, have enabled them to reach this desirable condition in their business. Care in the selection and employment of their travelling agents has enabled them generally to give trees correct to their names through these agents, although it must be admitted that a more completely satisfactory way is to order directly from headquarters.

But there is another part of the business of vending trees, of a very different character. Its success in imposing on the people at large is owing to the ignorance of the people of fruits and fruit establishments. There are some nurseries of secondary character which sell trees to travelling venders who have an entirely irresponsible character. They shield their frauds under the time required to fruit the trees, together with the want of information on the part of purchasers. Not only have the more common fruits been represented by spurious trees, but imaginary things, such as trees which bear strawberries, been sold at triple prices to the ignorant. Multitudes of examples might be given, of the impositions practiced all over the country. The thousands of these impostures discourage many from planting at all, moral improvement is retarded, estates are lessened in value, and an indirect damage is thus inflicted, amounting all together to millions of dollars.

The question at once occurs, What is the remedy? The answer is, *The diffusion of information among the people.* Planters should know the difference between reliable sources on the one hand and buying trees of an unknown agent representing an unknown nursery on the other. Purchasers should understand the harm they are doing by patronizing these frauds, for it is this patronage which causes the imposters to continue in the business. Some mistakenly urge that all tree vending should be suppressed by law. This would be impracticable, for it is essentially an honorable and useful business when divested of its frauds. There are no counterfeits on a worthless bank, and these venders live on the reputation of a good business. Probably nine-tenths of all the nursery trees sold are disposed of by tree agents, and the great point is to distinguish the genuine from the counterfeits.

This discrimination is to be made, in the first place by puchasers informing themselves of the best and most reliable nurseries; by

procuring their catalogues, observing their prices and selecting those sorts which have been long proved valuable, avoiding unknown and high-priced novelties; buying only of agents who can show full credentials of recent date; or still better, where practicable, ordering directly from the nursery. All this will require time, inquiry, care and labor, and possibly years of time, but success in any business is not to be reached without labor. Information may be variously obtained—from neighbors who have studied the subject; from periodicals; from books; from visiting fruit gardens, and by gradually and cautiously working into fruit growing.

The discouragements which many have met with by these frauds have led them to assert that all nurseries are full of errors and impostures. There is no necessity for error. Nurseries may be freed from them as well as a bank from counterfeit bills. The writer can adduce a single case in proof now that he has long since gone out of the business. He supplied a well known pomologist with a thousand trees, of as many different sorts as he had, for home planting. When they all bore, the owner averred that every one proved true to name. They were all propagated from proved sources.

CULTIVATION OF FRUIT.

By T. S. McLELLAN, of Brunswick.

By the politeness of the officers of this Society, I have been requested to prepare an article on fruit culture, to be read at this meeting. I could hardly feel like declining, although I am well aware that there are many members present who are much more capable and better qualified for preparing such an article than myself, but probably very few, if any, have had a longer experience, as I had my little nursery of apple pips in one corner of my father's garden nearly seventy years ago, and since that time have possessed a deep interest in the cultivation of fruit. At that early age I labored under the impression that "like begets like" and carefully saved the seeds of every nice apple, pear, &c., which came into my possession, and planted them in my little nursery; but as my trees grew and yielded fruit, I learned that with apple seeds, as with some other things, the best were liable to produce the most worthless fruit, and out of hundreds of trees raised from the seeds of good fruit not one in five hundred will be worth propagating.

In my youthful days it required but little labor or care to raise apples, cherries or plums. All we had to do was to set out our orchards and the trees took care of themselves, and yielded fruit, such as it was. But few farmers took the trouble to graft their trees, and those who did so procured their scions from some neighbor who possessed a native favorite tree, plastering them up with an unsightly lump of clay, kept in place by some old rags tied on with rope yarn. At the present time the fruit of these scions would be discarded as only fit for cider apples. The only plums raised sixty years ago were sour damsons; and red cherries were considered a luxury. The propagation of good fruit has made great progress within the last half century, although the labor of accomplishing it has vastly increased. Three score years ago the orchardist had but few insect enemies to contend with, and his trees yielded large crops of fruit, with very slight care, while at the present time nothing but the utmost vigilance will protect his trees from destructive insects.

Apples are now selling in our market for one dollar and fifty cents a bushel, while sixty years ago the best could be bought for twenty-five cents a bushel, and cooking apples for twelve and a half cents, and some of our farmers who possessed large orchards, sold their apples at six cents a bushel, the purchasers gathering them from the orchard; while cider sold in our market for one dollar a barrel, the empty barrel to be returned to the seller.

In 1850 and '51 I was station agent on the railroad at our depot. At that time, every spring, thousands of apple, pear and plum trees were brought from New York and Connecticut by the cars, and set out by our farmers. I then came to the conclusion, from the great interest taken in orcharding, and the large number of trees brought into the State, that in a few years the fruit of our orchards would be a drug in the markets, and would hardly pay for the harvesting, but such has not proved to be the fact, as apples now bring a higher price throughout the country than ever before. Why is this so? Do our orchards refuse to yield fruit as in former years?

Among the earliest enemies of our apple trees which we had to contend with were bark lice. If these pests infest a tree badly they absorb the juices which are required for its growth and the perfection of fruit, and the tree is barren of fruit or yields only a few shriveled apples. To destroy these pests a wash of strong soap suds must be applied about the middle of June to every part of the tree infested. Probably some who are present have noticed that

about that season of the year, the limbs of apple trees thus infested are covered with a substance resembling a fine mould, of a cottony appearance. The eggs of the bark lice are deposited in this substance, and can be destroyed by being wiped off with the hand covered by a mitten. As the middle of June is the season of the dopositing of the eggs of the aphis, at that time their shell is loose and the alkali applied will penetrate the scale and destroy the insect beneath. But the orchardist has a friend to assist him in the destruction of the bark lice. In the first warm days in spring a small brown bug or beetle known as the lady bug may be seen crawling slowly among the limbs of trees infested with bark lice. These little beetles destroy vast numbers of the bark lice. I have watched them with a small magnifying glass. They proceed from shell to shell, perforating the covering of the bark lice and sucking out the contents. They are about the size of a half of a pea, with two black spots on their wing covers. A few years since on visiting a neighbor I found him in his orchard busily engaged in destroying these little beetles, and told him he was killing his best friends.

Another vexatious pest which the orchardist has to contend with is the apple tree borer, which can only be got rid of after they enter the tree by digging them out with a small chisel or drawing them from their hole with a blunted or hooked wire. Sometimes when the worm cannot be reached without badly lacerating the tree I have inserted one or two lighted matches into the hole, and found that the fumes of the sulphur destroyed them. The borer continues its destructive work for three years after it enters the tree. The eggs from which the worms are hatched are deposited on the bark of the tree very near the surface of the ground, and soon after the eggs are hatched the minute worms may be discovered in the early morning by a small damp spot on the bark caused by the wounding of the bark and flowing of the sap. Before they enter the tree they can be destroyed with slight trouble. But prevention is better than cure, and it is far less trouble to prevent the borers from molesting our trees than it is to dislodge them after they have once entered the body of the tree. I have found that a covering of birch bark or old oil-cloth fastened around the tree, will prevent the eggs from being attached to the bark. The covering should be about a foot in width and inserted an inch beneath the surface of the ground.

The codling moth is another destructive pest the orchardist has to contend with, and one of the most difficult to subdue. It is

estimated that one-half of our apple crop is destroyed every year by the havoc of this insect. I have sometimes wished that not an apple might be raised in the country for one year, so that the moths would all perish for want of sustenance. I have noticed that when we have a good crop of apples for several years in succession, the apples are more wormy each succeeding year. Applying a circle of tar or printer's ink around the trunk of the tree is said to be a partial protection, but I have not seen much benefit from this application. A rope of straw or braided corn husks, fastened around the tree a foot or two from the ground, will afford a place of deposit for their eggs, and this should be often removed and dipped in scalding water or destroyed by fire. I have sprinkled dry ashes or air-slacked lime among the branches of the trees while they were in blossom, but did not find that it was a preventative of wormy apples.

Within a few years another destructive insect or worm has attacked our apples, and I fear it will prove one of the most serious our orchardists will have to contend with. Some five or six years since, I noticed that the earliest sweet apples we received from the south were infested with a minute worm, which had thoroughly perforated the fruit. Three years since, I noticed my earliest sweet apples were similarly affected; and last season all my sweet apples and most of my pleasant tart apples, such as the Haley, Hurlbut, Nodhead, Primate and Porter, were more or less infested with this new enemy. These apples appear perfectly sound on the outside, with no signs of the entrance or exit of worms through the skin of the apple, but on cutting them open they are found worthless, being thoroughly perforated in every direction by a very minute worm. I had supposed that this new enemy of our fruit might be confined to this immediate vicinity, but a friend residing in the northern part of Somerset county, informs me that the apples in that locality were similarly affected the past season. If some of our entomologists can discover a remedy for this new enemy of our apples, they will merit and receive the grateful thanks of all who are engaged in the propagation of this excellent fruit. [See remarks of Mr. Gilbert on this subject, hereafter. *Sec.*]

Another enemy of our apple trees, which in former years we had to contend with, has nearly ceased its depredations in the orchards in this vicinity. I refer to the tent caterpillar—although I often

notice their tents in the spring on the wild cherry trees in the forests, they do but slight damage to our orchard trees.

From experience, I am decidedly of the opinion that the safest location for an orchard, to be protected from the winter killing of trees, is a northern exposure, or on land sloping to the north,—that it is not so much the extreme cold weather which kills our fruit trees, as the frequent thawing of the sap of the tree after it has been frozen.

In the cold winter of 1857, when the thermometer went down to 40° below zero, and many of the apple trees in Maine perished or were seriously injured, I had a young orchard located on the north side of a hill, where it seldom thaws in the winter, and did not lose a tree, while nearly all the apple trees in this vicinity, exposed to the winter sun, perished. Even the Baldwin did not winter kill in my orchard, and a few peach trees survived, though I have read that a temperature of 22° below zero is fatal to the peach. In fact, I have never had a tree injured by the cold in my orchard which slopes to the north.

The secret of success in grafting, is to be careful and have the inner bark of the stock and scion meet, and great care in waxing the wounded parts, so as to exclude the air. Waxing the upper end of the scion prevents its drying, which is very liable to occur if a drying northwest wind follows grafting.

In the immediate vicinity of our village there is an extensive tract of land of a light sandy nature, which is quite unfitted for the raising of fruit, except blueberries, and we only succeed in raising apples and other fruit by heavily enriching the ground on which our fruit trees are set. A friend who has expended much time and money in cultivating an orchard on this land was asked at our village Farmer's Club a few years since: "What success he met with in raising fruit on plains land." He replied that he thought "he should meet with fair success, but it was very difficult to harvest much fruit from an orchard located in the vicinity of an orthodox college, where one-half of the students were preparing for the ministry."

ORCHARDING IN FRANKLIN COUNTY.

By S. R. LELAND, of Farmington.

That the influence of the Maine State Pomological Society is giving a great impetus to fruit raising in all parts of our State, there are abundant indications. In travelling over Franklin county I see unmistakable signs of a very marked improvement in fruit growing in the last ten years, not only in the extra care bestowed on old orchards but also in the large area being planted to young trees. This is in part attributable to the enlarged markets, and in part to the influence of the Pomological Society. Although there are but few members of the Society in this county, its transactions are read by the firesides of most of the orchardists, and its wise suggestions and recommendations are silently working a mighty influence for good.

There is no mistake but that there is a great improvement being made in the *profits* of apple raising in this county. One important step in the right direction is the planting of more native or Maine grown trees and less of the New York and Connecticut stock. The early orchardists in this vicinity most unfortunately grafted much too largely of early varieties for which there is no market. And another important step in the right direction is the re-grafting of trees bearing early fruit to such varieties of late-keeping apples as have an established market notoriety.

At no time in the history of orcharding in this county has there been so many and such flattering inducements to increased effort in the production of good varieties of apples as now, both by bestowing better care on our trees and increasing their numbers. The pioneer orchardists of this county had comparatively no market for their fruit. A few barrels of eating and cooking apples could be sold in the villages, and the wives, sons and daughters dried a few, but the larger part were made into cider or fed to stock at a very small profit. But now, how changed! It is safe to predict that in the future there will be an unsatiable market for all the good apples that can be produced.

The shipment of Maine apples to foreign countries is a business evidently in its infancy, and that the foreign demand for shipping varieties of Maine apples will increase there is no doubt. The drying of apples by the steam evaporating process is a new industry and a growing one, and one that will call for thousands of bushels of second quality apples annually in this county, and it is a busi-

ness which we can hardly imagine can be overdone, as the products have the whole world for a market. In addition to the above calls for our apples, thousands of bushels are used at our canning factories annually, and there is no good reason why that business will not continue if the apples can be procured. In view of all those facilities for marketing our fruit, is there not great encouragement for farmers to engage more extensively and more perseveringly in the production of apples?

There is an abundance of land upon the hill-sides in this county peculiarly adapted to the late-keeping varieties of apples, and particularly the Baldwins, to enable us to increase the area of orcharding to almost an unlimited extent.

During our county fair, last autumn, I was in the Secretary's office one day when a farmer of this town brought in a bushel of Baldwins to be entered for a premium, and it was decidedly the handsomest and best basket of Baldwins on exhibition. As the Secretary handed him the tag he noticed the apples and made the remark "I suppose those grew upon trees in your garden, that are highly cultivated?" The answer was "No, they grew upon trees on a side-hill, half a mile from my garden, where the stones are so thick you can hardly see the ground, and they receive no cultivation." Is there not a hint here worth heeding? There are hundreds of acres of just such land in this county, too stony to cultivate and not worth fencing for what feed it will produce as pasturing, which, if planted to apple trees and given proper care while young, would in a few years take care of themselves and yield a large profit on the investment.

Any farmer having a spot of high land sufficiently steep for natural drainage, and "chock full" of either granite or schistous rocks, has *the* place to grow apples at a profit. If I were to set trees upon such land I should set native seedlings and graft them in the branches when large enough, largely to Baldwins. The year they were planted, I should mulch with coarse manure, and perhaps also the second year. Afterwards, for a few years, mulch with any vegetable matter, and when they had got their roots well in among the rocks should risk them to take care of themselves, and I have no doubt they would do it, for there is that quality in such land that exactly suits the apple tree, particularly the Baldwin, and they have a way of appropriating it.

There is a great deal said and written on the "Northern limits of the Baldwin," and some writers say the southern limits of Maine is the northern limits at which it is safe to grow it, but here in the central part of the State it is doing wonderfully well. I commenced setting trees fourteen years ago, and have set some every year, and grafted as fast as they became large enough. I have grafted to Baldwins, Rhode Island Greenings, Roxbury Russets and Talman's Sweet, but more largely to Baldwins than any other variety, and thus far the Baldwin has proved as hardy as any of them and more so than the Russet.

I have no doubt that in time other varieties may be produced that will be equal to the Baldwin for all purposes, and perhaps take the lead as market apples, but I predict that it will be so far in the future that I am content to acknowledge the Baldwin as the King of apples for the present, and should advise Franklin county orchardists to be shy of new varieties urged upon them by agents, until their merits are well known and their reputation thoroughly established in the market.

The raising of pears has not yet proved profitable in this county. The trees seem to make a good growth and stand the winters as well as the apple trees, but they fail to produce good crops of fruit. A well loaded pear tree is rarely seen. There are a few small pear orchards in the county and almost all the farmers and many of the village residents have a few trees. These are nearly all trees purchased of tree agents and of course grafted at the ground when small, which may be the reason why they fail to produce. If we would raise our trees from the seed and graft them, when large enough, to such varieties as we liked, perhaps they would produce better — an experiment I am trying, but my trees are not old enough yet to report with what success. I am informed that pear trees near the sea coast produce well and perhaps the application of salt to our trees here might cause them to fruit better.

While I by no means recommend the cultivation of grapes as a source of profit here, I *do* recommend to every person who has a spot of land large enough, to rear a few vines of the early varieties as a source of health and enjoyment.

GROWING APPLES FOR PROFIT.

By D. J. BRIGGS, of Turner.

In order to produce the best results, it will be necessary to begin at the foundation. Seed should be selected with care. Who would think of producing a good crop of corn or grain from imperfect seed? The formation of a large tree from a minute seed is one of the most interesting and wonderful occurrence in nature. It is important that the fruit culturist should so understand the process as to know what will hasten it on one hand or retard it on the other. By understanding these principles the necessary rules will be greatly simplified and directions rendered more clear and obvious.

The first movement of the seed towards forming a new plant is *germination*. After the plant is formed and its growth is carried on through the agency of its leaves, the process is *vegetation*. To produce germination, seeds require heat, moisture and air, but not light. As a general rule seeds germinate and grow most readily when buried to a depth of from three to five times their diameter, in soil of ordinary moisture. The germination of apple seeds and some others will be hastened by subjecting them to freezing and thawing, to admit air and moisture.

The great cause of failure in growing trees in the nursery is in the preparation of the soil. Let it be remembered that the soil for a nursery should be as good and well worked as that of a well cultivated kitchen garden. Young trees must be well guarded against the depredations of cattle, as all farm stock are fond of the young shoots of fruit trees. After the trees have been started and well cared for in the nursery until they are of proper size for transplanting, say three or four years old, they should be carefully lifted and planted in orchard rows. In taking up trees, care should be used in preserving as many of the fibrous roots as possible.

Good soils vary in many particulars, but as a general rule one which is dry, firm, mellow and fertile is well suited to the purpose of growing apples. It should be deep, to allow the extention of the roots; quite dry or else well drained, to prevent injury from stagnant water below the surface. I would prefer a gentle inclination to the westward as a site for an orchard. Before setting the trees the soil should be well and deeply tilled, and few soils exist in this part of the country which would not be much benefited for all

hardy fruits, such as the apple, by enriching. Nothing for general use is equal to stable manure for the basis. The same composted with peat, muck or turf, with a mixture of ashes and bone meal will be found to give uniform and satisfactory results. After the soil is prepared as above, stake the ground in rows forty feet apart each way, then one in the center of every square, being careful to make the rows as straight as possible. Make an excavation where every stake stands, in the fall, if possible, from one and one-half to two and one-half feet deep, according to circumstances, and three or four feet in diameter. In early spring, after the trees have been carefully lifted in the nursery as recommended, set in straight lines about as deep as when standing in the nursery, having one person to hold the trees nearly upright (inclining a little to the westward, if anything, and another to straighten the fibrous roots in natural position, and at the same time filling in with fine soil, gently pressing it at the top. It is well to fasten the trees, after the planting is completed, to stakes, for a year or two, until the roots get a good hold of the soil. It is well, also, to make use of some kind of mulching, to prevent the too free evaporation of moisture.

I have pointed out what I believe to be the proper course to pursue, as far as it goes, to insure success. The old maxim is, "Whatever is worth doing at all is worth doing well." Probably no truer words were ever uttered.

Of the thousands of trees which are every year planted out in all parts of the country, it is safe to say that more are lost from neglected after-culture than from all other causes together. Some destroy their trees by crowding the roots into small holes cut out of a sod, where, if they live, they have but a stunted and feeble existence, like the half-starved cattle of a neglectful farmer; others set them out well, and then consider their labors ended. They use no dressing of any kind, and suffer them to be choked with grass and weeds. I say again, give young trees a good mulching and keep the grass and weeds out after planting. In winter it excludes frost, and in summer it prevents the evaporation of moisture and the effects of drouth.

WHEN TO MANURE AN ORCHARD.

The answer must be according to circumstances. The examination or analysis of the soil will be of little use, but the trees will tell their own story. If the soil is so rich that they make annual shoots

of two or more feet in length without any manuring at all, which, however, is rarely the case, then it will be needless to give heed in that direction. The annual growth is the best guide to treatment.

There are but few apple orchards which, after reaching a good bearing state, throw out annual shoots more than a foot or a foot and a half long, and many not half this length. The owner of apple trees may lay it down as a rule, that when his trees do not grow one foot, or nearly that, annually, they need more manuring. By observation he can answer all questions of this kind without difficulty.

Ashes, leached or unleached, are of great value to an orchard. Autumn or early winter is a good time to manure an orchard. Spread the manure over as much ground as the top covers, and do not be afraid of putting on too much. A heavily bearing tree, or one which it is desired to make productive of good fruit, must have some food to produce it from; and a young tree needs looking after as much as a hill of corn, and should have in proportion to its size about the same manuring; and there is no crop that will pay better for care and manuring than good, thrifty apple trees of the right varieties.

PRUNING.

As to the best time of year to prune an orchard, much has been said and written, and considerable difference of opinion and practice prevails. According to my observation, I think that it can be most successfully and properly done when the trees are free both from fruit and leaves; and all things considered, perhaps no time is better adapted to this important work than early spring, after the frost is entirely out of the limbs. There is a tendency to over-prune many times, especially those just commencing to bear fruit. There is no practice that needs reform more than this one. There is no quicker way of spoiling trees than by injudicious pruning. In pruning fruit trees, do not make a cut till you think what it is for and what will be the effect. When I first commenced the care of apple trees, I thought that there must be *some trimming* done; so I went at it and pruned eight or ten trees that had been set about thirty years. It was done, as I thought, in good shape. The consequence was, two of the most thrifty ones died outright, and they are all dead now but one. Trimming should be reduced to a system. By beginning when the trees are young, and annually going over the orchard, cutting out all suckers and crowded

branches, one will avoid the necessity of cutting off large limbs in after years,—a practice that should always be avoided if possible; but if there should be any such overlooked and grow to be an inch or more in diameter, make a smooth cut and apply gum shellac prepared in alcohol, with a brush, and when once hardened, heat or moisture will not affect it.

GRAFTING.

The proper time to graft is in the spring, as soon as the season is warm enough to put the sap in motion. The best time is when April showers are prevalent, and it may be continued until June, but the scions had better be cut previous to this. They may be cut in autumn and stored in a dry, cool cellar, with the ends in sand or dry soil. For scions, cut the the thrifty wood of the last season's growth from bearing limbs. I prefer shoots near the top or center of the head of an old and thrifty tree. It is easy for any one to learn to graft. Grafting is the true way of propagating almost all choice fruits. There are many formulas for making grafting wax, which can be readily procured.

VARIETIES.

What varieties of apples shall we cultivate? is a question of importance. It is a well known fact that some kinds will succeed admirably in one place and utterly fail in others. Probably the best plan to adopt in making a selection for an orchard is to examine carefully what sorts succeed best in the vicinity where we wish to plant an orchard, and select a very few of the most productive and best selling varieties. Furthermore, the farmer who neglects to provide for himself and his family a succession of choice apples, commencing with July and continuing until the next July, each variety crowding upon the others with no interval of dearth, neglects the privilege of his birthright, and no wonder that his children desert the old farm with no feeling of regret, for it is to them a scene of privation rather than of enjoyment. They share the hard work and have none of the rewards which skillful industry should bestow.

It hardly admits of discussion that habits of observation are of practical assistance, are indeed a necessity in all the industrial pursuits of life; and this is especially true of fruit growing. The fruit grower has to deal with climate, soil, location, markets, insects and

other enemies; and to be successful, he needs all the practical knowledge possible, and he can attain it only through habits of observation. It is easier to acquire habits of carelessness, habits of running by and overlooking facts without any investigation. Perhaps too few of us really have fixed habits of observation. Such a habit is worth our time, and it seems to me that fruit growing affords better facilities for acquiring it than any other pursuit. If we spend much of our time in the orchard, we can not help being observant of the changes taking place day by day and year by year. The insect enemies—and their name is legion,—have to be watched and their ravages guarded against. Each new enemy as it comes, has some new way of doing its work, and must be watched, its habits noted, and means devised to prevent its ravages.

The fruit grower has friends, also, as well as enemies, among the insects and the feathered tribes, and it needs the closest observation sometimes, to judge between friend and foe. There are also many mysteries connected with the diseases of fruit trees, which intelligent, close and long-continued observation alone can solve.

The climate and soil of a large part of our State afford unequalled facilities for the cultivation of fruit, to make it a source of income unequalled by any other industrial pursuit on the farm.

FRUIT GROWING IN PISCATAQUIS COUNTY.

By H. L. LELAND, of Sangerville.

The present and future outlook of fruit growing in Piscataquis county is as a whole encouraging. Our upland soils are well adapted to orcharding, and the climatic conditions do not essentially differ from those in counties south of us.

The greatest obstacles to progress in growing fruit come through the lack of interest and want of intelligent and systematic effort on the part of our farmers. In the past there has been no call for apples outside of our local demands, hence there has been no inducement to encourage increased culture. Within a few years there has been a demand for good apples for shipment. This demand is awakening increased interest and will lead to more study, intelligence and care in the selection of trees and varieties. In the early settlements of the county, beginning in 1805, and down to 1830, nearly every farmer planted out orchards, many of them of large

extent; these trees were grown upon the farms where planted or in the near vicinity, and in the virgin soil grew healthy and thrifty, coming early into bearing and producing abundant crops. Later, a portion of these trees were grafted, but the work not being well done, the operator usually standing upon the ground and grafting such limbs as were within his reach, leaving the most thrifty part of the tree unchanged, together with the selection of varieties (largely Baldwins) not adapted to the climate, the results were not satisfactory nor profitable and did much to discourage future efforts in the growing of improved fruit. As I have said, the average farmer has given but little thought or attention to orcharding and this neglect and ignorance has given the irrepressible and irresponsible western tree agent a fruitful field for operation.

From experience and observation I feel safe in making the statement that the trees that have been sent into this county through the orders given to tree agents have been entirely unsuited to our conditions and have proven as a rule complete failures. Among those earliest brought in I doubt if one out of fifty lived to produce fruit. Later, orders given under the assurance of obtaining "iron clads," producing fruit far superior to the old well known varieties, have lived better, but what has the farmer got for the money paid out, paying seventy-five cents and $1.00 for each tree? A lot of crab trees worse than useless, "Ben Davis," "Hass," "Mann," and "Chase's Golden"; the last extolled as one of the most valuable varieties, it being nothing better however than a seedling originating in this county with no merit whatever to recommend it. There may be locations where these "iron clads" are needed because more valuable varieties can not be grown; but decidedly we have no use for them in Piscataquis county, and the sooner our farmers learn the fact the better it will be for the fruit growing interests and the pockets of our people.

There have been among us frequent attempts at growing nursery stock, and although these efforts have not generally been profitable pecuniarily, yet out of these nurseries of well grown trees we have obtained our best orchards. I think our farmers are learning this truth. If they had learned it sooner it would have saved them a good many hard earned dollars, beside all the disappointments and delays that have come through the purchase of western trees.

To sum up, as I propose to make this paper brief, my experience and observation teaches me that our reliance for successful fruit grow-

ing must come first through well grown home-grown trees; second, the best orchards, at least of most varieties, are those planted out as seedlings and grafted in the limbs; third, our most profitable varieties are those well known in the market, with perhaps the exception of the Baldwin, which is not fully reliable and does not mature so as to possess that excellence of quality that it does in more favored localities. We are growing extensively the Rolfe, a seedling originated in Guilford, which is superior to anything we grow in its season, late fall and early winter. This variety is becoming disseminated and is giving complete satisfaction.

Accompanying the paper of Mr. Leland, was an interesting letter from Calvin Chamberlain, Esq., of Foxcroft, relating to the history of fruit culture in the State, and especially in Piscataquis county, and forming a valuable contribution to that department; which will appear subsequently.

STUDIES ON THE CODLING MOTH.

By CHARLES G. ATKINS, of Bucksport.

In the summer of 1882, I passed the most of the time between July and October upon my farm in Manchester and Readfield, and was able to make some original observations on the habits of the codling moth. They were far from complete, being in fact but the first steps in a series of studies which I proposed to make on this insect, and which I do not despair of being able to carry out some day, though the opportunity is for the present denied me. Yet, fragmentary as my notes are, I venture to present them to the Society, with the hope that they may incite some one else to pursue the same object in a systematic way.

I am a devout believer in *system* in all studies, as I am a believer in the *study* of all important topics. I have no faith in guess-work, and am skeptical toward all theories deduced from observations conducted by the *rule of thumb*. When, therefore I wish to know how an apple worm enters an apple and how he proceeds after entering, I consider it much better to examine a lot of wormy apples, without

and within, than to sit down to my writing table and guess at it. So when I set out to study the codling moth I determined to use my eyes diligently, record what I saw, and defer theories till I had some basis of facts on which to form them.

To ascertain facts relating to the deposition of eggs and the career of the worm while in the apple I took pains to examine critically two hundred and one wormy apples taken at sundry times from the trees or from the ground, and note in the case of each one how many worms had entered it, whether from the blossom end or side, how many still remained, to what extent they had mutilated the specimen, and some other items. From the record of these observations I am able to draw some conclusions which will be presented presently. As an example I will give the results of my observations on thirty-seven wormy apples, mostly Baldwins, July 22. I found that 34 of them (= 92 per cent) had been entered by worms from the blossom end (calyx) only, 3 (= 8 per cent) from the side only; 14 of them (= 38 per cent) had each one hole in the side; 3 (= 8 per cent) had each two holes in the side, one had three holes in the side, and the remaining 19 (= 51 per cent) were free from any worm holes except those made by the worm entering through the calyx; 31 of the specimens (= 84 per cent) contained each a single excavation, indicating that but a single worm had entered each one, four of them had each two excavations and two had three excavations each, the whole indicating that forty-five worms had been at work in these thirty-seven apples. Twenty-five worms in all were found still in the fruit, eighteen of the apples containing one worm each, two containing two worms each, and a single specimen containing three worms, thus it appears that twenty worms had already crawled out of these apples or had died within, without leaving any noticeable remains. Fifteen of the apples had been abandoned by the worms, five of them being slightly mutilated, seven much and three very much mutilated. In this way all the examinations were made.

Being personally unacquainted with the subject of my studies in any but the worm stage, I took measures to obtain an introduction to the winged form by imprisoning some well grown worms and awaiting their transformation. In this I was quite successful, and reared a large number of moths. I also dabbled some with remedies, but am sorry that I cannot form any certain conclusions as to their efficacy.

When are the eggs laid? On this point I cannot be so definite as I would like. On July 8th, I took twenty-three apples at ramdom from a sweet tree, cut them open and found but two worms and one empty worm hole. July 19th, I tried twenty specimens from the same tree with similar result, but on other parts of the farm found the worms more plenty, some of them had opened holes in the side of the apple but still remained within, and the largest I found that day was half an inch long. So far as this goes it indicates that the earliest eggs—and what I have observed of the date when the moths begin to fly in the summer leads to the same conclusion—are not laid before the last of June; but this point needs further study. How late in the season the moths continue to lay eggs I can only judge from the fact that very small worms continued to be found up to the last examination, September 3d. August 3d, out of twenty-nine worms found, twelve were less than a quarter of an inch long and five of them less than three-sixteenths of an inch, two being found in the eye of the apple, the pulp of which they had not yet penetrated. August 7th, out of twenty-eight worms twelve were less than a quarter of an inch long, and on the third of September four out of fourteen were equally small.

On what part of the apple is the egg laid? In the great majority of cases in the calyx or the remains of the blossom. This is proved by the fact that sixty-eight per cent of the wormy apples had been entered from the calyx exclusively and a further percentage of twenty-three and one-half had been entered from both the calyx and the side, while but eight and one-half per cent had been entered exclusively from the side. It appears that as the season advances the proportion of newly hatched worms entering from the side increases, but five per cent of the apples being in that class July 22, while in August the percentage of such apples was, in different lots, from eleven to twenty-two per cent.

The worm appears generally to complete its larval growth in the apple where its existence begins, but seven instances being observed where one had changed from one apple to another, and all of these may have been instances where the two apples touched each other and the worm passed from one to the other without exposure or conciousness of change.

How many worms enter a single apple? Out of 201 specimens, 9 (= 4½ per cent) had been penetrated by three worms each, 47 (= 23½ per cent) by two worms each, and 148 (= 74 per cent) by

one each. In no case did a worm knaw through into the burrow of another.

When does the worm leave the apple? July 22, out of 59 apples 27 had been deserted by the worms, which had doubtless completed their growth and gone out to form their cocoons. These samples were Baldwins and Nodheads in about equal proportions, but I regret that my notes do not allow me to say whether they were taken directly from the trees or picked from the ground. We may say then that the worms begin to leave the apple before July 22. On the 29th I found cocoons already formed by worms that came from apples gathered on the 24th.

Does the worm leave the apple before or after it falls from the tree? In 8 cases out of 32, August 3d, the worm had left the apples that still hung on the tree. The same was true in 11 cases out of 38, August 7, and so on. In order to determine how many apples that drop contain worms at the time of dropping requires some close observations that I have not made. As to apples that have been accumulating on the ground, I have some notes. September 3, I examined fifteen or twenty such apples and found a worm in about one out of five or six. Similar results were obtained at other dates.

The Cocoons. To aid in the study of the habits of the worm from the time of leaving the fruit, several expedients were adopted. Apples supposed to contain worms were placed in covered pasteboard boxes, along with bits of paper. The full grown larvæ crawled out from the apples and formed cocoons under the paper and in the corners of the boxes. These were examined daily and as soon as each cocoon was formed the date was affixed to the paper or the box alongside. These were afterwards separated by cutting the boxes up, when each cocoon could be placed in a box or vial by itself. Some two bushels of wormy apples gathered the first week in August were placed in half barrels which were covered over with many thicknesses of old newspapers with a stout cloth outside, all securely tied down so that no worms could crawl out. The cover was several times removed and the worms that had crawled up and made their cocoons around the chink or in the folds of paper were destroyed or transferred to small boxes for further experiment.

One of the first things learned was the existence of a strong instinct in the worms in the barrels to crawl upward as soon as they had left the apples. The most enticing traps were set for them, resting on the top of the fruit, but not a worm could be induced to

enter. They insisted on climbing the sides of the barrel to the highest point. If the cover was left off they would reach the ends of the staves and then travel round and round the rim in vain endeavor to find something leading still higher. This may be taken as indicating the correctness of the theory that the worms that fall to the ground immediately seek to climb the trunks of the trees. Many cocoons were found between the papers composing the covers, but a larger number in the corner between the staves and cover and and in the groove which receives the barrel-head, and not a few worms had excavated for themselves neat cells entirely within the substance of the pine staves, lining them with the soft material obtained from the excavation and with the silk that they spin for the purpose.

In the pasteboard boxes I placed many loose bits of paper and fine paper cells carefully formed on the end of a penstock, hoping that the cocoon might be formed within them and thus be readily removed, but though a good many accepted this invitation, the majority evidently thought these loose bits too unstable and preferred to make the box itself the basis of their hiding places, either under a bit of paper or in the corners or on the bare sides, where they partially burrowed in the pasteboard. In like manner, also, in the case of paper bands around the trunks of trees, no instance was observed of a cocoon being formed between the thicknesses of paper, but in all cases they were beneath all the folds, next to the bark, and had often burrowed slightly into the bark.

In transferring the worms from one box to another and examining them they were very generally torn from the cocoons and obliged to form new ones, which they readily did. Some of these were torn out a second time and not one of these failed to make the third cocoon, and this extra labor did not appear to exhaust them in the least, such specimens completing their transformations equally well with the others.

How many broods in a season? I expected to find the worms that went into cocoon early in August rapidly developing; but, though quite a number were opened during the succeeding weeks, not one was found to have changed perceptibly. It seemed for a while an inevitable conclusion that none of the worms would transform the same season and that therefore we had but one brood in a season. In September a very few moths were discovered to have come out from the August cocoons, but whether they were early enough to

give rise to a new brood of worms I have no data to determine, but as the vast majority of the worms remained unchanged until spring it appears that practically there is but one brood. That is to say, if, indeed, there be a second brood, it is so small in number and begins life so late in the season that its operations are of little moment to the orchardist.

Wintering over. I had three separate lots of worms. The first consisted of those that I had been closely examining, which were kept in a warm room in the farm-house until mid-October, when the house was shut up for the winter, and the cocoons left there until spring. About the first of May I carried twenty of these to Bucksport and kept them in a warm room until they transformed. I suppose that the artificial heat to which they had been subjected would hasten their development so much as to bring them through their transformations before the time of apple blooming. It was therefore a great surprise to find, May 28, that of eight of these worms that day taken from their cocoons, only two had begun their transformation and reached the "pupa stage," the other six crawling about in a lively way and afterwards constructing new cocoons for themselves. It was not until June 16 that the first moth emerged from any of the cocoons, and the remainder continued to emerge until July 15 or 20.

The second lot received the same treatment as the first except that it was not brought into the warm room in Bucksport till June. These were all examined June 18 by opening the cocoons enough to see the condition of their inmates. Out of fifty specimens, all but three or four had reached the pupa stage and could no longer crawl about. They were but little disturbed and most of them transformed finally in July, one of them coming out as late as July 27. Two specimens found in larva state June 18, made new cocoons and completed their transformation between the 10th and 12th of July; they had originally gone into cocoon between August 9 and 12.

The worms belonging to these two lots made their original cocoons between August 7th and 12th, and completed their transformation between June 16th and July 31st, notwithstanding their subjection to artificial heat in the fall and spring. Their period of transformation thus averaged about eleven months. The most of them had been obliged to form one or two extra cocoons, which may have retarded their development somewhat, perhaps enough to counter-

balance the accelerating influence of the artificial heat to which they were subjected. But this is surmise.

The third lot consisted of worms that emerged from the apples enclosed the first week in August in a covered half barrel before referred to, and allowed to lie undisturbed in their original cocoons through the winter in a cold shed. The cover was removed June 1st. There were found the remains of a very few dead moths that must have completed their transformation in the fall, but of thirty worms then torn from the cocoons every one was still an active larva with the exception of two very small pupæ. June 18th, the rest of these cocoons were examined and found to contain active larvæ. The first of these emerged in moth form July 13th, and the last observed was as late as August 6th.

Until some specimen can be carried through their entire transformation without being compelled to build new cocoons or exposed to any unnatural conditions it will be impossible to state accurately the natural duration of the cocoon stage, but I feel warranted in saying that it lasts in the great majority of cases from August to at least the last of the following June. In all, I succeeded in bringing out about fifty perfect codling moths, the first, with two exceptions, that I had ever seen, and the first that I had ever recognized. It is a neat little grayish moth with bright coppery spots on its wings, by which it will generally be recognized.

Remedies. As before intimated, I have merely dabbled in this part of the subject. I have had all the wormy apples picked up several times in a season and either sent out of the neighborhood or buried, finding the latter method of disposing of them too laborious, and as to the former, not reaping much satisfaction from the reflection that I had got rid of the pest at some risk to the man who took them to feed his pigs. In 1882, all the wormy apples that could be found were picked from the trees twice during August; and I am inclined to try that again, though it did not free me from the pest, and I have not the data to tell whether it had any appreciable effect. In 1882, and again in 1883, paper bandages were applied to all the bearing trees and many moths thus trapped. I shall surely continue this. Until better informed, I shall not take pains to apply the bandages before July 15, unless to avoid a pressure of business during haying time; may possibly examine them about August 10 or 15, to catch any early worms that might form a second brood, and shall be in no hurry to look at them again till some convenient

date after the close of the apple harvest. Old newspapers are good. They should fit the trunk snug, and the more of them on a tree the more effective, I presume. Pasturing with sheep I have not tried, but doubt its efficiency, unless the trees be banded also, because so many of the worms leave the apples before they fall. Catching the moths in jars of sweetened water I have tried, and taken many other kinds but never a codling moth. Those people who think they have captured it in this way are without doubt mistaken; they have taken some other kind. Spraying with poisoned water I have not tried, but if really as effective as is claimed, I see no reason why it should not supersede all the other methods. The date when it should be applied is an important point, which needs some study. I should not suppose it would be worth while to apply it immediately after blossoming time, for there is good reason to believe that no eggs are laid until three or four weeks later. As the moths continue to lay eggs until the last of the summer, it would appear that one application would not be sufficient.

But I find that I am running into theory on insufficient data of fact, and will bring this paper to a close with an earnest entreaty to the members of the society to take up the subject and experiment without ceasing until we discover some mode of controlling this most serious of our orchard pests.

DISCUSSION OF THE FOREGOING PAPERS.

INSECTS.

MR. GILBERT, being called upon, said with respect to the *apple maggot*, alluded to in the paper of Mr. McLellan:

I would like to give some comfort on this subject, but I know of nothing comforting in the situation. It is comparatively a new enemy, and yet apparently a serious one. The maggot is exceedingly small, very seldom to be seen by the naked eye, except by the most careful examination; working secretly, out of sight under the skin of the apple, through the pulp, and entirely unfitting it for any use whatever. It was first discovered in the central or Middle States, and has gradually spread until it is now found all over the country. At a recent meeting of the Connecticut State Board of Agriculture, a member of the Board, Mr. P. Mayne, stated that the apples of that section, especially the *sweet* apples of early autumn,

were being very seriously injured from its effects. It also appears to a limited extent in the winter sweet fruits, and now appears in some cases in the richer of the tart fruits, like the Benoni and some others. Whether they will multiply and extend through all kinds of fruit no one knows; neither has there been a remedy suggested. Some of our scientific investigators are studying its habits, and possibly in time there may be some method devised by which its ravages may be prevented. It is not a very comforting fact that the labors of man are to be defeated and set at naught by an infinitesimal insect, almost out of the reach of the human eye; that with all our knowledge and our power we are at the mercy, to a great extent, of many of these little enemies. It is not a high compliment to our wisdom, but such is the fact. There is one other point in this paper which I wish to refer to, and that is the old subject,—the *borer*.

The idea of brimstone, as connected with the borer, is new to me. It is another application and suggestion of the efficacy of that material where serious sin exists; and certainly the sinful work of this borer is a thing that deserves brimstone or some other effectual application. Trees are often badly lacerated in the destruction of the borer. I have learned that after the borer has been allowed to work its way for two years in a tree, having entered to a considerable depth, its destruction requires deep cutting and causes serious injury to the tree. The borer at that stage, let alone, will work less injury than you will in your efforts to destroy it with the mallet and chisel. When I find the borer has gone beyond the reach of my jack-knife, I let him alone. Sometimes I can reach them with a wire. The injury has been accomplished then and he is simply working up through the wood to the proper height where he is to emerge next spring. The damage comes largely from his working near the surface of the wood; between that and the bark, or in the bark, thus cutting off the supply of sap. He cuts off no supply of sap when working on the interior of the tree and you will work more destruction with the mallet and chisel than he will. With respect to the application of bands for protection; I have not secured protection in that way. I have found it was an invitation, in fact, for the deposit of the eggs. The insect depositing eggs, seeks and likes a slight shelter, hence you find more of the eggs deposited where there is grass and weeds growing around the tree. A band is just the protection and shelter that they seek for, and if nothing else

shelters the tree they will, if there is a chance, secrete themselves partially behind or under this band and there deposit their eggs; and the only time I ever found the borer at work up in the stalk of the tree, above the ground, for any distance, was where I have wrapped matting around the tree. I have invariably found borers up through the stalk of the tree, secreted behind this band. It is an invitation to the insect; it furnishes the shelter which it seeks.

MR. GARDINER. In the few words which I read in the beginning upon protecting trees against mice in winter, with pieces of pipe, I ought to have added, that I found one year that when I had left the pieces of pipe around the tree all summer, I almost invariably found borers under that tin pipe. Since that I go after the snow is gone and pull them off and lay them at the foot of the tree until the next autumn, because I find a tendancy to borers where the pipe remains on all summer.

MR. ATHERTON. The damage which the borer does in the first two years of its existence is principally on the outer and inner bark. If he enters the heart of the tree, or as he ascends previous to his emergence from the tree, I would advise in all cases, *never to let him alone.* It has been an invariable rule with me, when I fail to reach the borer with my knife, to reach and destroy them with a wire. I always carry two or three pieces, so if I break one I can have another. I never fail to reach the borer. I can generally, by running the wire up, catch it in its body and bring it down; but if it is from eight to ten inches, or six inches even, it is too far to bring it down; but you will have indications at the end of the wire that you have killed it. I never fail to reach and destroy them. I do it whether the tree is large or small. When the borer ascends he makes a round hole in the heart of the tree. If there is more than one, they will make several of these holes. If the tree is small, they weaken it; therefore my advice is, not to let him alone; pursue him to his destruction, it can be done with a flexible wire.

L. H. BLOSSOM, of Turner, recommended the application of the fumes of brimstone, forced into the cavity made by the borer, by means of a bellows, and described an apparatus to be affixed to the bellows for that purpose. He said he had used it successfully. He would never leave a borer alive in a tree, but thought too much cutting injurious. Had seen trees very much injured by excessive cutting.

MR. GARDINER alluded to the absolute practice of boring a hole in the trunk of the tree and filling it with sulphur as a means of preventing the ravages of insects. He had tried it years ago and found it useless.

MR. LAPHAM, of Pittston, concurred in the opinion last expressed, and said he had found the knife and wire to be the only reliable means for destroying the borer.

MR. HAMMOND recommended pasturing sheep in the orchard, and said that in five years since adopting that practice he had very little trouble from borers or insects of any kind.

MR. POPE, of Manchester, and MR. BRIGGS, of Turner, speaking from their own experience in pasturing with sheep for many years, found no diminution in the number of borers from that practice.

C. J. GILMAN, of Brunswick. The matter of pruning of fruit trees seems to have been overlooked in this discussion thus far. If there is any fault in the orchards in the State of Maine, I think it is in the abundance, or super-abundance of wood in the tree. A gentleman who is now present has a splendid orchard in this town, and although it is in proximity to that institution which my friend McLellan alluded to, I hope it will survive the ordeal. I have been constantly saying to him, as the result of my observation and practice, that now is the time for him to begin to trim his orchard. An apple tree, or the fruit upon it, requires the sun, as much as corn, wheat or potatoes, for proper development, in order to arrive at the best results. On examination, one-half of the Baldwin apples that we find in our markets in New England are simply *shaded*; it is of a *green* color; it has not had the sun, and the fruit does not command the highest price in the market; the quality is inferior. Therefore I say that this subject of the trimming of our orchards is important. The process should commence a year or two after the tree is set out to save large gashes in cutting out limbs in the after life of the tree. I have been told that my process was severe, that I was taking out too much wood. I cut some limbs two or three or four inches in diameter and the result has been that while it was a severe operation to the orchard, the fruit has greatly improved. Then again, I have still further to suggest that where an orchard is taken in season and treated in this manner, the fruit is larger and more perfect, and is more easily harvested.

With respect to another point suggested by the President in his very interesting paper, as to the mode of packing fruit. Now I

take it that most of our fruit growers have reached that; there are gentlemen in this house who need no instruction as to the mode of packing fruit, but the process that has obtained among the best orchardists that I know of in New England, is, in the first place to pick the fruit from the tree by the human hand, and then put the stem downward in the bottom of the barrel, in other words, "face the barrel" as fruit packers term it, then to fill the barrel about half full, then give it a gentle shaking, not enough to injure the fruit, then fell the barrel and let the apples come a little distance, say half an inch, above where the head of the barrel fits into the staves, then put the head over the fruit and press it down into its proper position. To be sure this process will slightly jam the fruit next to the head, but a barrel thus packed will bear to be carried to New York or Liverpool, and this is the only safe and reliable way to prevent apples from becoming bruised when in transit.

I will only say to the younger portion of this audience, and in this State, who are about to enter upon the practice of orcharding, my advice to you is, begin with the pruning knife early, and do not be afraid of the use of it, but open up the centre of the tree to the sun, in order to have good fruit.

MR. ATHERTON, referring to the paper of Mr. Atkins, on the codling moth, said: The paper just read is a most interesting one to me, and I hope my enthusiastic friend will continue these investigations until he shall arrive at something more definite with regard to the time when the codling moth lays its eggs, so that if any remedy can be applied at that time, it may be done. I have understood that sprinkling apple trees with Paris Green has proved very successful, but I don't remember as it was stated at what time it was applied, whether in autumn or when the apples were small. It is a well known fact that in the southern and middle states, they frequently have two broods of the apple worms, while in this latitude we seldom have but one. It was my observation last season, (it was an unusual year for us), that we had two broods. I took some apples from a tree in November and found a number of very small worms, half an inch in length, and I was convinced that we had two broods of them. Another thing also convinced me of this; while examining my trees for the apple tree borer, in June, I carried a small sharp trowel to scrape the trunks of the trees and scraped out a great many of the apple worms, some of them very small. Finding them in June and November led me to believe that we might

have had last year, not only an unusual number of apple worms, but two broods of them. I think this is sometimes, but not usually the case. I think the worm seeks to ascend after it leaves the apple, which confirms what has been said in the paper, that the worm after coming out, climbs up. But while I would not take the ground that the worm never enters the ground, I will say that while scraping my trees I have found large numbers of them under the loose bark. It occurs to me that we might take advantage of this in the spring and destroy many of them. A great many will get through the winter and form cocoons under the bark. Would it not be a good idea in the month of April to scrape the trees and apply water? I am determined to try it, I believe it will be a good thing to do.

Mr. SIMPSON, of Brunswick, recommended sprinkling the trees with ashes, while wet, after a shower, to destroy bark lice.

Mr. HENRY S. SMITH, of Monmouth, spoke at some length, urging co-operation among farmers and orchardists for the extermination of injurious insects; and presented the following resolutions, the adoption of which, at this time, he thought might be premature, but he hoped their presentation would serve to draw the attention of the public to the importance of the subject, and might result in some concerted and effective action:

Resolved, That in view of the damage done by insects to many of our crops, and especially to fruit, it is the duty of the Legislature to adopt and enforce measures to encourage the extermination of such insects.

Resolved, That the President and Secretaries of this Society be a committee to petition the Legislature at its next regular session to adopt such measures.

Resolved, That said committee be and are hereby instructed to invite the Board of Agriculture to join them in this work.

On motion of Mr. GILMAN,

Voted, That the resolutions presented by Mr. Smith be referred to the President and Secretaries of the Pomological Society, and also to the officers of the Board of Agriculture, and if in their judgment they deem it proper to call the attention of the Legislature to the subject matter of the resolutions, that they be authorized to do so.

DISTANCE FOR PLANTING.

Mr. BRIGGS inquired of Mr. Prince whether in setting his six-acre orchard, he set the trees in rows both ways, and why he set pear trees in the squares between the rows.

Mr. PRINCE. I did it simply because I thought the trees were not near enough together; I wanted more, and hence I set the pear trees; my apple trees being originally thirty feet apart. I have set pear trees between a part, and between the rest I have set apple trees. Where there were four trees, I put one in the centre between them—not opposite. I leave every fourth row in order to have a place to drive between.

Mr. GARDINER. I once had a Bellflower tree which spread over a space of forty feet. What would become of such a tree as that in an orchard where the trees are but twenty feet apart?

Mr. PRINCE. Where you find one tree that spreads forty feet you will find forty that do not spread twenty feet.

Mrs. STRATTARD. We have an orchard of about three hundred trees, now beginning to bear, which are set thirty feet apart each way, and to-day they are getting so they interlace or touch each other; it is hard to get through with a team. There is a drain from three to five feet in depth under each row, and you will hardly find a thriftier orchard in that vicinity. They are growing on what was once a frog pond.

O. C. NELSON, of New Gloucester. I will say that from my experience in orcharding I have been in favor of the practice of setting close, say twenty feet apart, for various reasons. I have been successful with the Nodhead. I have grafted trees that grew up naturally, without removing them, and have obtained strong trees.

Question. Do you manure them?

Answer. I put something about them every year; some years I have mulched with straw or hay, sometimes with barn-yard manure, very light; sometimes mulched them with sand; a little something every year.

Mr. ATHERTON. How old are those trees that you have set twenty feet apart?

Mr. NELSON. Those trees were set in 1848. They didn't make much growth. At that time the ground was used as a vegetable garden. I commenced to take care of them and they commenced to bear. They have borne heavily until within four or five years.

I thought swamp muck was excellent for mulching trees, and I put in four ox-cart loads between each four in the square. The result was, I did not get good Baldwins for three years. The apples wouldn't stay on the tree; they were rough. I had to plow it and put in pigs. Finally I put on a dressing of leached ashes, and now they bear. To be sure my trees interlace, but they are growing taller and no limbs die. I thought if I could obtain in twenty years, with trees twenty feet apart, the same profit from a tree that the trees forty feet apart would give in forty years, I had better take the close setting. These trees being close, the wind does not affect them.

Mr. GARDINER. In Gardiner there is a small orchard of very fine trees, set from fifteen to eighteen feet apart. The result is, that the outside trees bear large crops and the inner ones no apples at all. They are all interlaced and cannot get light and air, and do not bear. I asked the proprietor why he didn't cut down every other tree. He said they were so fine he couldn't make up his mind to do it.

THE SIZE OF BARRELS FOR APPLES.

Mr. GILMAN. I would like to inquire of Mr. Pope or Mr. Atherton, in respect to the size of the barrels in which apples are packed for shipment in Michigan and Western New York. How do they compare with ordinary flour barrels?

Mr. POPE. I am informed that the regular apple barrel of New York holds two and one-half bushels of the fruit, and that in Michigan and New York the fruit is put in new barrels made on purpose, costing about thirty-five cents each.

Mr. GILMAN. It is an important question, when we consider the magnitude of the crop of apples in this State as it is destined to be in the future, What should be the size of our barrels? If we go into the market with a peck more of apples in a barrel than they do in Michigan and New York, we are put at a disadvantage.

Mr. GILMAN, referring to the paper of Mr. Prince, inquired with respect to the

STORAGE OF FRUIT.

Did I understand Mr. Prince to say that he put apples in bulk and allowed them to lay in bulk from the time of harvesting until

the middle of February? If so, in what condition do they come out?

Mr. PRINCE. I would say that formerly, as I stated in my paper, I kept my apples upon shelves, but I found that they were liable to wither in that way. The cellar I have now for a fruit cellar is used for that purpose only. It has a cemented floor and the walls are of split stone laid in cement. I put the apples in bulk, sometimes with boards at the bottom and sometimes directly upon the cement floor. I think I have had full as good success laying them upon the floor, piling them, I don't care how deep, three or four feet. They keep better than in barrels or upon shelves, or any other way that I have tried. I am careful to have no leaves with them, for a leaf is as bad as a rotten apple. I never disturb them until I want to market them, even if there are rotten apples. In 1879 I was away; I had four hundred bushels of Baldwins all in one pile, which was from three to five feet in height, coming up to the cellar windows. They laid there until the 10th of March. When I sold them and packed them there were less than two bushels decayed. As I said, I would never keep them in a dry cellar. The cellar of the house I live in is dry, being warmed by a furnace, and I find apples don't keep at all in it. I would have a cellar damp, but not wet, not wet enough so the moisture would stand upon the apples; but moist, and I don't care how cool if it does not freeze. If apples are frozen a little, some think, it don't hurt them,—I don't think they are as good as before, although they may look as well.

Mr. GARDINER. The late Nathan Foster, of Gardiner, was remarkably successful in raising and caring for apples. He often said that he made it a point that his children should have an apple to eat every day in the year. He would keep them until the new crop came in. Once on a cold day in December, the thermometer being below zero, I went to his cellar and found his cellar windows open. He said he wanted to keep the temperature below 32° the whole time, and that the apples would not freeze until it went below 28°.

Mr. ATHERTON. I would ask Mr. Prince how, if his cellar is too dry, he obtains the requisite dampness or moisture? And before I sit down I want to say a word with regard to temperature. I have recently learned something that I didn't know before, and that is that you can run the temperature down to twenty-eight or thirty degrees with safety; my opinion having previously been that it was

unsafe. I recently visited one of the foremost farmers of Winthrop, and had the pleasure of going into his fruit cellar in company with two other gentlemen. He showed us his bin of Baldwins, which were in bulk. The cellar had a cemented floor and appeared to be dry. The apples were in a bin some four feet wide and from ten to twelve feet long. I should judge their depth to be from four to six feet. He had a thermometer lying upon the apples. I never saw handsomer Baldwins; it was a rich treat to look upon them, they were so large and of such a bright, beautiful color. They were well assorted and ready for the market, but he was not ready to sell them. He said he kept the temperature down to 28 or 30 degrees, and he said: "I am not afraid if it runs down to 28." I also learned that it is better to keep Baldwins in bulk than in barrels or upon shelves. My practice has been to put No. 2 Baldwins on shelves some distance from the bottom. Baldwins will keep better on shelves than in barrels. I shall never barrel Baldwins in the fall again; shall put them in bulk. Rhode Island Greenings will not bear barrelling; they should be kept in an open bin in the cellar.

Mr. PRINCE. You ask how I can make a cellar moist. I would say, I don't intend to have it so. My fruit cellar is more than half above the ground, but in a moderately moist soil. I believe that any cellar with a cement floor and the walls laid in cement will be moist enough to keep fruit. I think a cellar with a wall of common round stone and laid up open would be dryer than one with both wall and floor laid in cement. I think where both the walls and floor are laid in cement it would be moist enough.

Mr. GARDINER. I do not see how it is possible to keep the yellow Bellflowers in bulk; they are so tender that in picking they will show the marks of the fingers upon them, and if carried and dumped on a barn floor and left in bulk, 99 per cent of them would be bruised. Therefore I cannot see any other way to handle them except to pick them from the tree and put them into barrels by hand, assorting them at the same time. They will keep until April if not bruised. If they are bruised they will not keep.

Mr. PRINCE. I think, if you sort your apples as you pick them, and let them lay until spring, you will find a good many of your No. 1 apples No. 2s, and your No. 2s will be No. 3. When I gather my apples I put all that are sound together and let them lay until I want to sell them; then I sort them. It saves one sorting. I never allow my apples to be overhauled until they are ready for

the market. I never sort except to pick out the decayed ones. There is no need of dumping them in a pile in bulk. I pick my apples by hand in small baskets. I have several years lined my cart body with blankets so they will not bruise in emptying them into the cart. I take them to my cellar and put them in by hand, and let them be until it is time to sell them.

Mr. NELSON. With regard to wet cellars. One of our apple buyers has told me that the best apples he gets are from wet cellars. I had occasion, a year or two ago, to visit a farmer in Androscoggin county who is celebrated for keeping apples. I found his cellar was floored over, and 400 bushels of Baldwins in a bin. I looked through the cracks of the floor and saw water underneath. He said he kept water there; and if the natural flow of the water stopped, he pumped water in, but did not allow it to become stagnant. He is noted for putting his Baldwins on the market in June in as good condition as mine are in December.

WESTERN TREES.

Considerable discussion took place in respect to the merits and value of western trees, as compared with those grown in this State; but without eliciting anything of importance in addition to the points previously settled by the Society—some of which are, that it is vastly more important to inquire *how* a tree is grown, taken up, set out and cared for, than *where* it is grown; that good trees and poor ones are grown both in and out of the State; "that Maine can and ought to grow her own apple trees;" that all the good trees grown in Maine find a ready sale; that vast quantities of trees are still brought into the State from abroad; etc., etc. A question was raised in regard to the most profitable

VARIETIES FOR MARKET.

Mr. CHILD, of ———, said: I think no person can tell what variety he can do best with until he tries them. I raise more Baldwins than any other kind, and still I believe I can raise more No. 1 Hubbardstons than of any other variety. I have a few Black Oxfords. They grow small with me; but a neighbor who has an orchard not more than 50 rods from mine, on what people would call the same soil, raises the best Black Oxfords I ever saw. What the

reason is I don't know. He says he can sell these black apples as well as any others.

Mr. POPE called for statements in regard to

THE WAGENER APPLE.

Mr. ATHERTON. I know but little about it; I have only three trees; they have been set seven or eight years. They commenced to bear four years after setting. It is an early and free bearer, but slow grower; the limbs are inclined to run upward. I mean they are inclined to be prolific bearers while young. I was well pleased with my first crop from these trees, and thought highly of the apple. With my second crop I was not as well pleased, because they mildewed badly in the cellar, and almost entirely ruined the sale of them. Since that time I have had none to speak of; I have had no further experience in that way. I have had this year, some of fair size and good color. With regard to the flavor of the fruit, I should pronounce it superior to the Baldwin, a better eating apple, finer grain, but the skin is tender and requires more delicate handling than the Baldwin.

Question. How is it as a keeper?

Mr. ATHERTON. It will keep as well as the Baldwin; it can be kept in good condition until March or April.

Mr. POPE. I have never raised the fruit and am not acquainted with it; but as the agents are pushing it through our section, and the farmers buy largely, I took pains at our exhibition last autumn, to inquire of all who had raised it, and have referred to several parties who have the fruit, and with one exception, and hardly that, they have all pronounced the apple worthless for a market variety. It comes into bearing early, bears heavily and very good fruit, but it over-bears; it is crowded so that only a portion of the fruit is large enough for market, and in a very few years the trees are exhausted, and never attain a large size. They all agree upon that.

Mr. SWEETSER. I have two trees of the Wagener, and as Mr. Pope and Mr. Atherton both stated, they bear early and over-bear. I have picked half of them standing on the ground. I think ten feet is far enough apart to set them, if Baldwins are 30 feet, because they never will live to be old trees; they over-bear so they never will have large tops. I think it is a superior fruit, nice, and fine-grained, but not a profitable variety to plant largely.

Mr. GILBERT. Why do we want to plant the apple at all? What of the fact that they recommend the character of the fruit? I have watched this fruit from its first introduction into the State—the characteristics of the tree and its habit of growth. It is an early and most persistent bearer. Now what is the result when you find those two qualities in combination? That it is almost impossible to grow up a good, well-formed and fairly good sized tree which will produce a large quantity of apples. You will usually see such trees of small size, and finally they bear their life out in the fruit. And further than that, they are naturally small; their habit of overbearing renders it impossible to bring them to a large size. If you feed the tree and make it grow larger, or try to, you simply employ the means without effect. They are small; you find them generally quite small—below the medium size. The quality of the fruit is good; the color is good and the fruit is good, and selected specimens of fair size make a good show on plates at the fairs. It is a good apple for the table; but I would ask seriously, When you can raise so many other varieties of uniformly good size and market qualities, why do you want to encourage the introduction of this, unless it is the *best?*

Mr. JORDAN. Almost every one wants to get some fruit as quickly as possible. I should take those trees and let them bear; if they do well it is a good thing—and then let them die.

Mr. MERRILL. I have seen two rows of the Wagener in a large orchard. Any good, practical, intelligent orchardist, seeing them, would say that the variety was entirely worthless as compared with the Baldwin, or almost any other late-keeping variety. I think, as a rule, we had better discard it. If any one has a small place, it is a good garden variety; it will not occupy a great deal of space.

Mr. ATHERTON. I don't like to put my foot down on every new variety. If anything comes out worthy of particular attention, I like to encourage it; and if I could say an encouraging word for the Wagener I would do so; but I cannot say much. I only spoke very highly of its flavor; I was strongly tempted once to order 50 trees in addition to what I had, but thought I would test it further, and I am glad that I did so. My three trees are all I want of it.

COMMITTEE ON NEW FRUITS.

Mr. GILBERT. There is one matter which I wish to present to the attention of the Society. The Society is aware that we have frequently presented to our notice, new varieties of fruit; they are offered for sale to purchasers of trees, and generally high prices are charged, with recommendations in proportion to the price asked; and on the supposition of their superiority, many of our fruit growers have bought largely and found themselves encumbered with trees of little value. It has occurred to me that it might be well for the Society to keep a watch of these things, with a view of making itself a medium for the communication of reliable information with regard to them, so that purchasers might have some reliable source of information. I would move that a committee be appointed and charged with the duties of looking after the matter of new fruits, seeking for information and availing themselves of all sources within their reach to obtain that information, and to report, at the next annual meeting, the results of their researches. I am certain that we are to have an avalanche of new varieties pressed into notice within the near future. Our present duty is to forelay by securing such information as we can with regard to them.

The motion of Mr. Gilbert was adopted, and Messrs. S. L. Boardman and W. P. Atherton were appointed as said committee.

POMOLOGICAL NOTES AND REMINISCENCES.

By CALVIN CHAMBERLAIN, of Foxcroft, in a Letter to H. L. Leland.

We here [Piscataquis county] occupy a middle-ground between the southern portion of Maine and the most of New England on one side, and that of the extreme north of Vermont, New Hampshire, Aroostook county and the contiguous Province of New Brunswick on the other. On the one side, our friends glorify the Baldwin and the Russets, and class the luscious Nodhead and Hubbardston Nonsuch as autumn and early winter fruits; on the other and colder side, they talk of Iron-Clads, and are laying the whole Northern Hemisphere under contribution for a moderate list to make home life tolerable in that region. With us, the Baldwin at its best, on our hills, is a fair cooking apple; in the valleys it has no place. The Nodhead and Hubbardston Nonsuch, as representatives

of their class of keepers, abide with us in good cellars through the winter. But I have before put myself on record on this point.

The valley of the Piscataquis, having been first settled by emigrants from the older settlements of New England, they naturally took their first grafting from the fruits that suited their taste in childhood; and their first-grown apples were a rich solace to years of privation and suppressed homesickness. An old uncle of mine, who moved from Massachusetts to the wilderness east of the Penobscot early in this century, once said to me: "When we raised our first apples, and one of them came as my share on a winter evening before the great open fire, I would pare it prudently and eat it slowly. The paring, core, seeds and stem lay before me. The seeds were carefully saved to be planted in spring. Then to prolong the taste of that apple, I ate the parings, then the core followed—and lastly I chewed the stem."

My father, the late Samuel Chamberlain, planted a small nursery on the land he first cleared in the present town of Foxcroft, and when this was sufficiently grown he grafted some of the trees with scions from his native place, Charlton, Mass. This grafting must have been done from the year 1810 to 1814, as the fruit appeared very soon after the last date. I hoed over that little nursery of about four square rods many times before the last of the trees were removed.

As a boy I heard very little said about names of apples. In after years I learned that this beginning included two greenings, four sweet apples, one early sour, one large red winter apple, and the since well-known Hubbardston Nonsuch. One of the greenings is that known as Limbertwig. The other, a smaller apple, called by us the Cluster Greening, from its habit of giving several apples to each set of blossoms. It was a nice winter fruit, but was not continued beyond the first few grafted trees. The sweet were one early autumn, called the Hightop (not the well-known Hightop of the present), a juicy, very sweet apple, of the size and form of the Porter; one a little later in season, called Spurr Sweet by some; one the Pound Sweet; and the fourth, the Talman. The large red was larger—when we could get a good one from a young, thrifty tree—than the King or Rolfe or any other apple I ever saw in Maine. Trees with ordinary care or under neglect, gave only green, worthless fruit, little colored. It was condemned after a trial of twenty years as not adapted to the climate. Of the Hubbardston Nonsuch I have

something to say further on. The early sour was a nice apple, but the single tree standing too near the hog-pen died suddenly after a few years of good service, and the variety was lost. I have not met that apple since, and rarely find one so good.

I have reasons for thinking this grafting of my father's was the first done within the present limits of this county, as in after years I was called to do grafting in most of the towns, and on the farms commenced near the same time, and then learned that no grafted fruits had ever grown on them. In the twenty years following this first successful grafting, my father occasionally extended his work and added a few varieties; but in the whole his bearing, grafted trees scarcely counted beyond a hundred, while his orchards had grown to a thousand. In these years a few other men had entered this field of progress, prominent among whom, was Capt. Salmon Holmes, from Oxford county, who made one of the best farms and one of the largest grafted orchards in Foxcroft.

My father's work ended in his death by accident in 1838. I then returned from Michigan where I had been two years cutting out a home in the big timber, and entered upon the care of the orchards I had helped to plant, and where I continued for the next thirteen years. From this time I took a hand with the workers and did some real labor for a few years in the cause of fruit culture; and I hope to be pardoned for the use I must make of the pronoun I in referring to some of it. In disposing of one or two crops of apples I tired of working the cider-mill two or three months in a season (the mill worked for this and adjoining towns), and became disgusted with selling good cooking apples in the orchard, sixteen bushels for a dollar, and doing most of the work of picking and loading them. Some years before this, I had some personal acquaintance with many orchards and their owners, in Kennebec county; had spent several months in a good orchard district in Massachusetts, and had seen something of Connecticut, New York and Ohio. The circumstances in which I was placed in 1838 were urgent prompters in the way of orchard improvement. With abundant material to work upon, and a considerable circle of acquaintance from which to get good advice and better fruits, I entered with considerable zeal upon the work of improving myself and the orchards. My success in the way of good advice was rapid and satisfactory for the time, and in collecting varieties of apples I was soon over-loaded. I met and made the acquaintance of Marcian Seavey and Dr. E. Holmes at the printing

office of the *Maine Farmer*, at Winthrop. I met Dr. Holmes, Nathan Foster, John Kezer, Daniel Fairbanks, and two or three others, and organized a pomological society—and then and there we made the blunder of giving a sweet name to a sour apple presented by the venerable Paul Bailey, the man and the apples being present —and neither the man nor apples objecting. I made the acquaintance of Moses B. Sears, who probably did more grafting than any other man in Maine; and from his work, and that of N. Foster, D. Fairbanks and some other successful operators, I made the heads of grown trees a study, to so change them to better fruit *safely* through the least possible number of scions, and in the least time.

I was in the meetings of fruit growers holden in Syracuse, Rochester and Boston, and became familiar with the faces and voices of many of the giant workers in the past and present, among which I particularly remember the names of Kennicott, Thomas, (David and John J., father and son), Barry, Reed, Hovey, Downing and Wilder. I had accomplished something before receiving help through the books of Downing, Cole and Thomas. I had become a rapid and successful operator in the orchard and nursery, and my reputation as such became somewhat an annoyance from pressing invitations to do work for others. To this I yielded for a few years, and in five consecutive years set one hundred thousand scions for myself and others, and in all the towns from Abbott and Monson, to Brownville and Milo. In these years I urged boys and men to learn and practice for themselves, giving them all the necessary instructions to start. With this sort of gratuitous work done in every neighborhood I entered, I soon had the pleasure of seeing several young men carrying on the work I had well begun.

In these years of orchard work I introduced most of the leading varieties known in the State, that had not reached here before. Jewett's Red (Nodhead) I first obtained from Hon. Joseph E. Foxcroft, the proprietor and patron of this town. On a package of scions received from him, he wrote: "Nodhead. Of this variety you cannot raise too many."

I moved from the old farm to a few acres at the village in 1851, and started a nursery—putting 3000 trees in the cellar, which I grafted in winter and set out in the spring of 1852. To these I made additions in the three following years, so as to have ten thousand grafted trees growing at once. Considerable zeal was then abroad for new and good orchards. Agents for the large western

nurseries then appeared. Those who could resist importunities to give orders, made much talk of setting orchards with home-grown trees; and being advised that they could be set in either spring or fall, and as the trees were in stock in quantity in their neighborhood, few were quite ready to take them in spring, and would defer to fall. In fall they would conclude to wait till spring.

The deep snows of winter and excessive cold wrought havoc on the nursery; and at the end of a few years I cleaned the thing up and discharged it in the smoke of a few brush-heaps. The maker of the county map honored my place as *the nursery*—all else was emptiness. I never received 25 cents a day for the time I had given it. Let the work of the tree peddlers go on. I can buy a better tree than I can grow here;—and what is more, we are almost sure, with each tree bought, to get new fruit, unheard of before and not ordered.

Names are important things in fruit matters. The origin and history of a choice variety sometimes seems to confer honor and dignity upon the locality producing it, so that men contend for that honor when the matter of place happens to rest in doubt. This is seen in the case of the Baldwin apple. I raise a question in regard to the

ORIGIN OF THE HUBBARDSTON NONSUCH.

I asked a friend in Barre, Mass., for scions of that variety. On sending them he expressed regret that he had not received notice a few days earlier, as he had occasion to pass the original tree in the adjoining town of Hubbardston. As it was, he was able to take them from a tree he knew to be engrafted from the original. These scions soon produced fruit, and you may imagine my surprise on finding it identical in appearance with that from my father's grafting thirty years before. I then sent samples of both to S. W. Cole, editor of the *New England Farmer*, as the then best authority, and he pronounced them alike and true to the name. I then visited the neighborhood where my father obtained his scions, thirty miles and more south of Hubbardston, and in an earlier settled portion of the State, and there in Charlton and Southbridge, in Massachusetts, and Thompson, in Connecticut, in the oldest orchards, found trees bearing this same apple—trees of the largest size and greatest age, and giving no sign of being grafted in the tops. They surely were grafted at the root. Doubting the claim of origin, I then obtained

the following: That a tract of land twelve miles square, embracing Hubbardston and three other towns, was purchased of the Indians, and that the owners of the tract had encouraged about thirty families to settle upon it before or near the year 1750. There is an account of one Jonathan Allen setting out the first orchard, bringing forty trees from Lexington on the back of a horse. The year not given. Now putting things together, my friend in Barre could have taken scions from the original (?) tree in 1845, and I found many trees bearing the same apple in 1848—trees appearing to be a hundred years old or more; and if I have made a wide error in an over-estimate of such age, then these trees must have been at their best estate when my father left there in 1806; and if grafted from Hubbardston, would undoubtedly have borne the name as now, and that name familiar to him. The facts substantially as I now give them, were given out through the *Maine Farmer* when I had them fresh in hand. My belief is, that the tree in Hubbardston was a graft from the older settlement on the south—but it is a matter of little consequence now.

With the nursery disposed of, and my few acres fairly stocked for family use, I took no further *special* interest in the cause of fruit culture. My fine stock of plums and cherries went out suddenly with the malady of black-knot, and I am not yet able to replace them, as the tendency of those fruits in that direction has not ceased.

Pear trees succeed fairly here, and an increasing interest in that fruit is apparent. Of grapes, I have, or have had, thirty varieties on trial; but the last two seasons have given little encouragement for continued efforts with them.

I can do no more for the fruit cause with my hands, and can only advise the people of our county of Piscataquis to continue to work for good apples and pears, believing that in and through them will come many of the blessings of life.

NOTES ON PEAR CULTURE.

By D. P. True, of Leeds Centre.

Pear growing in this State is largely on the increase, many of the trees that have been put out in the past have already borne their first fruits, and those who have waited and watched feel a new interest as they reap the reward of their labor. But to secure the

best results, the right location and suitable varieties should be chosen. The pear is more delicate than the apple, and will not bear the disadvantage of a dry or wet soil as well. It requires a deep, friable loam, with a rather dry subsoil, as its roots run deep. Hillsides are good locations.

Standard pears should be set twenty-five or thirty feet apart, and dwarf pear or plum trees may be set between them; as these trees come to bearing very young and are short-lived, will give some fruit soon and will die or can be cut away so as to give room for the standard trees.

Of the numerous varieties on trial, many proving desirable in other sections do not give satisfaction in this State. For an early pear, Osband's Summer is perfectly hardy, a good grower, and great bearer; ripens the middle of August. The Brandywine is a good pear and follows Osband's Summer in the order of ripening, but it takes the tree a long time to come to bearing. Clapp's Favorite is a large, fine pear; tree very hardy. Of the fall pears, the Flemish Beauty is one of the best, if the fruit did not have the habit of cracking. Those that have trees of this variety can very readily change the top by grafting. They make the hardiest of stocks, will stand the winters where many of the "Iron-Clad" varieties of apples will not. The writer has seen the Flemish Beauty growing and fruiting in the town of Hodgdon, in Aroostook county, and the owner, Col. Thomas, said that in his location he only succeeded with five or six of the "Iron-Clad" apples. The pear can be as readily grafted as the apple. The Louise Boune de Jersey, Beurre Superfine and Beurre d' Anjou have proved very hardy and good bearers. The Lawrence is one of the best winter varieties; tree very hardy and has never failed to mature its fruit. A number of the winter varieties fail to ripen in this section. The Vicar of Winkfield is one of this class, but it is very productive, the fruit is large, and quite good if it can be well ripened. Winter Nelis is one of the most delicious of pears, but in many locations is not hardy.

In the analysis of the wood of the pear and apple, the heart wood of the apple was found to contain 6.2 per cent of potash, and the pear, 26.4 per cent. Of phosphate of lime, the apple contained 5.2, and the pear, 20.9 per cent. We see by this comparison how necessary good culture is; and do we wonder why we often meet with failure when the pear is planted in our old worn-out soils? The land should be constantly tilled among the trees, and the ma-

nure should be such as to give a constant growth. Apply potash in the form of wood ashes, phosphate of lime in bone manure; use lime, stable manure, salt, plaster, etc.

Blight has been the bane of the pear grower in other States, but up to the present but little trouble from it has been experienced in this State. Insects are not very numerous on the pear. For slugs, throw slaked lime among the leaves and branches when the dew is on. As a rule the winter pears are best when allowed to remain on the tree as long as the season will permit, but some of the summer and autumn varieties, if allowed to remain on the tree until fully ripe, will become dry and insipid.

Pears when gathered should be packed in barrels or boxes, for, like the russet apple, they will wither if exposed too long in the open air. As a general thing, it costs more to raise pears than apples, yet they are so desirable that every fruit grower should cultivate them, and carefully select the best and most hardy.

EARLY GRAPES FOR THE NORTH.

By H. A. Robinson, of Foxcroft.

Every year the possibility of growing and ripening grapes still a little farther north, is increased by the production and dissemination of new varieties which ripen extremely early; a great advance having been made in that direction in the last few years.

Here, at Foxcroft, latitude 45° 15′, we are beyond the northern limit of the ripening of the Concord and such other varieties as ripen with it. The Delaware, being a sweet grape, will, in favorable seasons and in good locations, get to be quite good eating.

But we now have a long list of varieties earlier than the Concord. Of the more than forty varieties which I have now growing, and to which I am adding every year from all over the country, those kinds which have the recommendation of extreme earliness, I will mention a few, first early, and of good quality. The Lady grape, originated by Mr. Geo. W. Campbell of Delaware, Ohio, is a seedling of the Concord, first early, greenish white, sweet and good. Moore's Early, another Concord seedling, originated by Capt. John B. Moore of Concord, Mass., is very early. Berry large, black, good quality. These I have fruited and can recommend.

There is a new very early black grape, the Early Victor, originated by Mr. John Burr of Leavenworth, Kan., which has not yet fruited

with me, but which is so unanimously well spoken of by those who have fruited it, as a very early, hardy grape of excellent quality, that I have no doubt it will prove to be so.

Other early varieties of varying quality in order of merit are, Early Dawn, Cottage, Janesville, Florence, Hartford Prolific, Blood's Black, Champion, (poor), etc. Others that ripen a trifle later, but earlier than the Concord, are, El Dorado, Purity, Brighton, Massasoit, Vergennes, August Giant, Worden, Wyoming Red, Dracut Amber, etc., to which might be added as many more all earlier than the Concord. But these will suffice. Those who are greatly interested in the matter will learn from the various catalogues the names and characteristics of the different varieties. For those who only want a few varieties, the above is a sufficient guide to kinds of a satisfactory quality. One's taste should be educated to crave better grapes than the Clinton, Hartford, Champion, etc. It is as easy to cultivate the vine of a good variety as that of a poor one, and the satisfaction is much greater. To be sure, our grapes do not have that sweetness and fine flavor that grapes have that grow in a warmer climate, but we need not for that reason remain entirely without.

At the magnificent fair of the Pennsylvania Horticultural Society, held at Philadelphia last September, I was shown and invited to taste the famed "Niagara" grape—the grape that is held and controlled by a company who refuse to dispose of a single vine except upon stringent conditions and for vineyard planting; the company to share in the production for a term of years. These grapes were grown, so the gentleman in charge informed me, upon the Jefferson estate at Monticello, in Virginia, and had been sent by a roundabout way to the fair, yet they were in perfect condition—the boxes even full, and in quality perfectly delicious beyond what I had ever imagined a grape could be. The skins, which seemed at first to resist, would break with a sudden sharpness and then was let loose what seemed to be nectar—a mixture of stored sunshine and honeydew. The bare remembrance of that taste is a pleasure.

But I have an idea that those grapes were more perfect in flavor and sweetness raised in the warm and balmy air of the "Old Dominion" than they would have been grown in New York or Massachusetts; as much better, perhaps, as their grapes are better and sweeter than ours.

The Niagara is a large greenish white grape, developed from a cross between the Concord and Cassady. The Cassady was an immense bearer, greenish white, with a peculiar honeyed sweetness which seems to have descended to the Niagara. Ripens about with the Concord.

At the fair of the Massachusetts Horticultural Society, in Boston the next week, I saw Moore's early grape as grown by the originator. It was very fine. Also a new early white grape by the same originator, named the Francis B. Hayes, or as it will probably be called for short, the "Hayes." This grape has been awarded a first-class certificate of merit by the Massachusetts Society, and will be for sale in the spring of 1884

I obtained, in the fall of 1882, a vine of the Jessica, a new white grape introduced by Dr. D. W. Beadle of the St. Catharine's nurseries, Ontario. This he claims is the earliest white grape in existence, ripening with or before the Champion, and of the best quality; equal to the Delaware. If so it will do to plant alongside of the Lady.

Green grapes, or rather those not quite ripe, make excellent jelly, jam and preserves. They sell in this section for from 5 to 10 cts. per pound for these purposes; and grapes that are fairly ripe will always bring 10 cts.

Why not plant a few grape vines suited to your climate, in some favorable location, on the south side of some building, great boulder, ledge or stone wall? I see plenty of such places through the country and I never see them without thinking—what a nice chance for a grape vine. If people would only improve their opportunities, how much they might have that they do not now have. They would have a strawberry patch, where on three or four square rods would grow all the strawberries an ordinary family would need. Fresh fruits and berries are wholesome, and are luxuries that the farmer and his family, who can so easily have them, too often go without. This may be owing partly to the lack of knowledge of their proper and successful cultivation, and oft-times doubtless is; but that can be easily acquired.

Vines that can be planted on high ridges or elevated lands will often escape late and early frosts, and mature grapes when those situated on the lowlands in the same vicinity may be injured. The foliage of the grape vine is easily ruined by frost, especially in the spring; and a very light freezing injures the fruit.

Grape vines should, on the approach of winter, be pruned and laid down upon the ground; and it is well to place on them a few evergreen boughs or something of the sort, especially if they are not situated where the snow will drift over them early to protect them.

In buying, I always as far as possible order of the originator of the variety wanted. Next, of long-established and reliable nurserymen, at their nurseries; and then take pains to permanently label the different varieties. A very simple way to do that is to write the name on a small strip of sheet zinc with a common black lead pencil. It will last for years.

I think that in the southern part of the State, where the long list of grapes that ripen about with the Concord will barely mature, better fruit would be obtained by planting the best of the very early varieties, as they would ripen while the weather was warm and more favorable for the development of that sweetness which only comes with a proper degree of warmth and by long hanging upon the vine.

THE SWEET PRINCIPLE OF FRUITS AND PLANTS.

Reprinted from the transactions of the Massachusetts Horticultural Society by permission of the author,

DR. JAMES R. NICHOLS, of Haverill, Mass.

The most interesting phenomenon connected with the growth of fruits and vegetables, is the development in their structures of chemical principles which influence in a peculiar manner the sense of taste. A variety of impressions are produced upon the nerves of taste, some of which are agreeable and others disagreeable, by bringing in contact the juices of certain fruits, roots, grasses, leaves, etc., in their mature and fresh condition. The sense of sweetness is usually agreeable, while the sour and the bitter are of the opposite character.

The term sweet is applied to a class of bodies which are found in fruits, and in a considerable number of vegetable structures, but we do not clearly understand *how* they are capable of exerting so decided and pleasurable an influence upon the palate, not only of human beings, but upon animals as well. As we walk through our gardens and orchards, and watch the growth of the luxuriant products of the soil, we do not often stop to consider the intricate and wonderful chemical reactions which are unceasingly taking place in everything that springs from the earth upon which we

tread. We place the luscious ripened fruits upon our tables, and partake of them with deep sensual gratification, but we do not often consider the origin and nature of the complex agents which render them so acceptable.

The sense of taste is in some respects the most mysterious and wonderful of all senses. If the sense of touch is, as seems probable, the parent sense, or the primal avenue through which mind was able to assert itself, it must be that taste was the next most necessary sense for man's elevation and protection. All we know about it chemically or physiologically, is that a delicate network of nerves ramifies through the tissues of the tongue, and in surrounding or adjacent parts, and that they have the functional duty to perform of conveying to the "central office,"—the brain,—sensations as regards the nature of what is brought in contact. If we examine into the chemical or physical character of these nerves, we do not find that they are in the slightest respect different from the optic or auditory nerves which transmit sensations so absolutely unlike. They are the same in color, structure, and chemical constitution; but how different their office! Nature has fixed limits to our fields of investigation, and however anxiously we may inquire, we cannot take a single step over the boundary line which divides the known from the unknowable. We must content ourselves, therefore, with the act of bringing substances in contact with the little telephonic nerve conductors of the mouth, and permit them to inform the interior man whether they are noxious or innoxious, agreeable or disagreeable, and not ask *how* the messages are conveyed.

Substances characterized by sweetness, are assumed to contain an organic product called sugar, and, as a class, vegetable structures do contain it in some one of its forms. There are, however, a few substances which have a sweet taste not due to sugar. Acetate of lead is an example afforded in the mineral world, and glycerine is a sweet liquid, the base of fatty acid compounds having no sugar. There is a form called *hepatic* sugar, which is a product of the liver, and some of the secretions of the body contain it. It is, however, in the organic world that we find sugar in the vast quantities needed by man, and in the juices of fruits and plants we find its hiding place.

Before vegetable physiology and chemistry were understood, the belief prevailed that all the characteristic constituents of fruits and

plants were in some way hunted from the soil, and conveyed to their resting places by the sap, which was known to circulate through living vegetable organisms. Although no sugar could be detected in any soil by the most persistent scrutiny, yet it was supposed that sugar, and its associated acid and other plant constituents, were present, and ready for transportation by the ascending sap. We are disposed to smile at this error of our fathers, but we should remember that, in accounting for natural phenomena, or seeking for a reason for things, the easiest and shortest path is the one usually followed. This remains true until we are guided by facts learned from accurate observation and experiment, or until science becomes sufficiently robust to act as an unerring guide.

Science, in our epoch, is capable of explaining many of the former mysteries of plant movements and plant production, and we now know the source of the sweet principle of fruits and plants, —we know that the soil has no direct agency in supplying sugar to any organic structure.

Sugar is a very remarkable substance, and its investigation opens to view surprises and paradoxes not afforded by any other agent in nature. It is highly complex in its organization, having a high atomic constitution, and yet it is the simplest of all compounds when considered in regard to the nature of the elements of which it is composed.

In studying the sweet principle of plants, we soon discover that they possess the capability of elaborating more than one variety of sugar in their structures, and that there is a curious blending of several forms in the ripened fruits which come upon our tables. We discover, also, that each plant has the power of manufacturing a special variety, or a combination of varieties, and that this law of their constitution cannot be changed by man.

In beet roots, in the stems and trunks of the sugar maple tree, the sycamore, the palm, in sugar canes, in the sorghum plant, in the stalks of maize, in grasses, we have one kind of sugar, called *sucrose*, which is the sweetest variety; in grapes we have another distinct variety, called *dextrose* or *glucose;* in apples and other fruits we have still another, called *fructose* or *levulose*. In melons we have a sweet which is nearly pure sucrose, or cane sugar. We learn from this examination not only that sugars differ widely, but that, for wise and doubtless beneficent reasons, the Supreme Intelligence has not permitted all fruits and plants to be sweetened

alike. In that vegetable monstrosity called a beet, which is hidden from the clear sunlight and the air during the whole period of its growth, there are found juices which hold the most noble and valuable form of sugar known to man. The crimson tissues of this root contain the snow-white sugar which graces the tea tables of the kings and princes of continental Europe; and millions of pounds find their way into commerce, always commanding the highest prices. The humble, earthly beet, can hold up its head in pride, when its sweetness is contrasted with that of the petted grape, which occupies the foremost place among our delicious fruits. The grape is sweetened with glucose, an ignoble form of sugar which the chemist can make in the laboratory, and its production does not require the employment of costly or rare materials. Even if it lessens our respect for the tempting fruit of the vine, the truth must be told. The chemist can make the sweet juices of the grape from old cotton rags and old newspapers; and if this statement does not indicate a sufficiently low origin, I have only to remark that it can be made from common sawdust as well. Human art has not yet been able to number among its triumphs the production of the sugar of the beet, the maple, or the cane.

The sweet principle of fruits, other than the grape, cannot be imitated in the laboratory. It is a mixture of at least two forms of sugar—sucrose and dextrose—in varying proportions, as is shown in the following tables.

How curious and mysterious is this plan in nature, of delicately adjusting the taste of our noble fruits, so as to produce a sense of the highest enjoyment in their use. In some fruits we find the sweet to exist in its lowest modified form; but this is not due to a lessening of the amount of the sweetest sugar, but to the presence of an entirely different kind. It is probable that the peculiar delicate flavor and taste of the grape could not be secured by any adjustment of quantity of sucrose or cane sugar, or by any mixtures. It requires glucose, pure and simple, to act in conjunction with the delicate acids, in order that we may have this fruit in its highest perfection. The watermelon would not be the fruit it is if it had not the capability of manufacturing cane sugar in large quantities; neither would the apple, the peach, the cherry, the strawberry, or the pear be what they are, if the plants and trees upon which they grow had not the power of bringing into play a subtle chemistry, by which is produced a mixture of distinct forms

of sweets which no art of man can imitate. If there was in nature but one kind of sugar, the number of choice delicacies in our gardens and fruit orchards would be lamentably small.

But nature does not, in the bestowal of her fruits, spontaneously, or of her own free will, sweeten them for us so acceptably. What are designed to be luxuries and the most highly prized forms of food, she ordains shall be bestowed only through the exercise of labor, care, and skill, on the part of man. No one of the fruits in its wild or native state holds any considerable quantity of sugar of any kind—not enough to make it acceptable to the taste, or fit it to serve as food. It is only by skillful cultivation, by hybridizing, by budding and grafting, that we have secured the sweet principle in fruits. We have, as it were, educated the dumb chemists in the vegetable cell, and fitted them for the work which nature made them competent to perform under man's guidance.

It is indeed wonderful that we can increase or diminish the amount of sugar in any kind of fruit or plant by cultivation. The beet, for example, under ordinary care, will afford from four to six per cent of sugar; but, by scientific and generous culture, the percentage can be nearly or quite doubled. I have succeeded in increasing the sweet principle in apples, grapes, and peaches, by cultivation and proper fertilization, and this, when the principle was originally present in normal quantity. In increasing the sugar, we also increase every other desirable quality in the fruit; for one principle cannot be forced into prominence without being accompanied by all the others.

I will now endeavor to explain by the aid of chemical symbols the nature of the different sugars, and also show the nature of the sweet principle of some fruits. In the arrangement of symbols, table No. 1, I bring to view the atomic constitution of a molecule of sucrose or cane sugar; also that of starch, and the necessary changes to convert starch into sugar.

Table No. 1.

Sucrose	C_{12}	H_{22}	O_{11}
Aqua	H_2	O	
Starch	C_6	H_{10}	O_5
Multiply by			2
	C_{12}	H_{20}	O_{10}
Add		H_2	O
Sucose	C_{12}	H_{22}	O_{11}

Table No. 2.

Glucose	C_6	H_{12}	O_6
Multiply by			2
	C_{12}	H_{24}	O_{12}
Subtract		H_2	O
Sugar	C_{12}	H_{22}	O_{11}

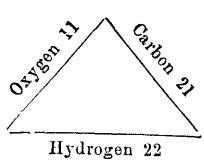

Table No. 3.

HOW FRUITS ARE SWEETENED.

	Cane Sugar.	Grape Sugar.
Strawberries	6.37	4.98
Peaches	2.10	3.17
Pears	.62	8.42
Oranges	4.22	4.36
Grapes (Black Hamburg)	.00	17.26
" (Concord)	.00	14.08
" (Green)	.00	1.60
Melons (Water)	8.17	.00
" (Musk)	9.02	.00

Dextrose	C_6	H_{12}	O_6
Levulose	C_6	H_{12}	O_6
Fruit Sugar	C_6	H_{12}	O_6

A molecule of common water is represented thus, $H_2 O$, which means that it is composed of two atoms of hydrogen and one of oxygen. Now to form sugar out of starch we must double the molecule, and this we do by multiplying the starch molecule by two, but this does not give us sugar; it is necessary to add a molecule of water, which gives us in the diagram, sugar, as shown by comparing the resultant line of notation with the upper.

In table No. 2 is shown the composition of grape sugar or glucose, and also how it must be modified so as to change it into cane sugar. We must first double the molecule as is shown, and then *subtract* one molecule of water, and this gives us cane sugar, $C_{12} H_{22} O_{11}$. In the triangle is presented a hypothetical molecule of cane sugar, composed of its constituent atoms, Oxygen, Hydrogen and Carbon. It is apparent that a substance so constituted must be in a condition of unstable equilibrium, for there is constant tendency to change and form new compounds. Sugar is a substance very easily decomposed, and by the application of heat, a large number of new compounds result. One of these new bodies is alcohol, which is represented by the formula

$$C_2 H_6 O.$$

An examination of the diagrams will show you how starch is converted into glucose. Starch has the formula as shown,

$$C_6 H_{10} O_5.$$

Now if we add to a molecule one molecule of water, $H_2 O$, we have glucose,

$$C_6 H_{12} O_6,$$

and this is all that is necessary to convert the starch of corn or potatoes into the sweet principle of grapes.

We cannot convert starch into cane sugar, because we cannot double the size of the molecule and force into combination one more molecule of water. If we could accomplish this result, all our crystallizable cane sugar would be made in the laboratory, and the growth of sugar cane, beets, etc., would cease, as the artificial process would supply sugar at cheaper rates.

We can make grape sugar out of starch, because we have discovered a method of forcing one more molecule of water into combination with it, and this gives us glucose.

Table No. 3 explains how several kinds of fruits are sweetened. The percentage of cane sugar and fruit sugars which enters into

strawberries, peaches, pears, etc., is shown. It will be noticed that in grapes no cane sugar is presented; the sweet principle is entirely glucose. Of course fruits vary greatly in the amount of sugar they contain. These examples are presented as the results of analysis made with the view of obtaining general or approximative results. Whilst it is possible to increase the saccharine principle, and also to modify the hydrated malic acid constituent in fruits, it is entirely beyond our power to change the fixed nature of vines, shrubs, and trees by any methods of cultivation or fertilization yet discovered. I know of nothing more wonderful in nature than the persistency with which vegetable structures adhere to their original bent or design. Trees producing sour apples, pears, peaches, or vines producing astringent grapes, cannot be turned aside from their laboratory work, unless by the introduction of scions, or the employment of the knife in other ways.

We all know that two trees growing side by side, from the same soil, breathing the same air, and precisely alike in external and internal structure, will grow fruit totally dissimilar in chemical constituents and physical appearance. If a young sour apple tree is cut off low in its trunk, and scions of another kind inserted, it is changed only above the point where they are placed. The chemical reactions below continue true to their original instinct, and if fruit comes from a sprout it is charged with the acid juices of the parent tree.

We thus have the bewildering fact brought before us that sap circulating through one portion of a tree culminates in the production of excess of acid in the fruit; while in another there is found an excess of sugar. It is not unusual to observe a newly set scion bud, blossom, and bear fruit the first year. The apple may weigh ten times as much as the frail scion which held it up, and supplied the nutriment necessary for its growth, but the little twig transplanted to an alien limb, will set up a laboratory of its own, and from the strange juices brought to it, will manufacture fruit entirely dissimilar to its companion fruits growing in close proximity. An example of this nature was afforded in my orchard, when from a scion having a surface for cell action of only nine square inches, a sweet apple was grown weighing seven ounces, and affording from its juices ninety-three grains of fruit sugar.

We have, however, still more wonderful examples of fruit chemistry in apples which in their own structure exhibit sectional differ-

ences of composition, one-half or one-quarter being saccharine, the other portions being extremely acid, and having the sectional lines distinctly drawn. I have seen a basket of this remarkable fruit in which the divisions were in all proportions, but each one unmistakably marked.

I have brought to view these interesting examples of plant chemistry, not with the supposition that they are new to you, but simply to awaken inquiry and stimulate research, that we may, if possible, obtain new light upon some most perplexing problems.

The sap of plants, which is largely water, may have but little agency in influencing those changes which result in the production of the sweet principle in fruits. Cell action, controlled by the actinic solar ray, is unquestionably the source or active agent in the chemical changes which accompany vegetable life. The vast volume of water, which in the form of sap courses through our fruit trees, cannot, however, be lightly regarded. It brings to the cells the elements and molecules of inorganic material, which enter into the reactions involved in plant chemistry; and it is only through the sap that we can beneficially influence the products of our orchards and vineyards. It is probable that we do not often stop to consider the immense preponderance of water in our fruits, which is shown by analysis.

Several years ago, I made analysis of several varieties of apples, with the view of determining their exact food value. Among them were the Talman's Sweet, Hubbardston and Baldwin.

The apples selected were in different stages of ripeness, the Hubbardston being more advanced than the others. Very important modifications are produced by the chemical changes in apples as they approach the stage of maturity, or the period when they become mellow and ready for the table. The amount of sugar increases, and the hydrated malic acid decreases, or disappears altogether in some fruits. The cell walls of the structure become softened, and readily break down; oxidation begins at any point where imperfection or abrasions in the skin occur. The amount of nutritive material is to some extent increased in ripe apples, and they are much more easily digested and assimilated by men and animals.

The results of the analysis were as follows:

HUBBARDSTONS.

Water	88.57
Albuminoids, pectose gum, and sugar	11.27
Ash	0.16
	100.00

TALMAN'S SWEETS.

Water	83.29
Albuminoids, sugar, pectose gum, etc	16.54
Ash	0.17
	100.00

The unripe Baldwins gave 87 per cent water, with a less amount of albuminoids and sugar than the others, and considerable free hydrated malic acid. The sugar varied from about 5 per cent in the Baldwins to 9 per cent in the Sweets. The total insoluble matters, including skin, seeds, pectine, ash, etc., averaged about 3.25 per cent.

These results show how largely preponderating in apples is the water, which in amount is about 85 per cent of their weight. Therefore, a tree bearing 30 bushels (46 pounds to the bushel), holds up in the fruit about *half a ton* of water. The nutritive value of apples, is, of course, not in the water, but in the solids,—albuminoids, sugar and gum. In a bushel of Hubbardstons, there is about six pounds of soluble nutritive material at the period of ripening; in Talman's Sweets, about seven pounds; in Baldwins, five pounds; and this material will vary to a considerable extent in value. Sugar is a carbonaceous substance, and nutritive in a certain direction. It is mainly useful as fuel, and by oxidation serves to maintain animal warmth. The albuminoids are nitrogenous and therefore are foods proper; the gum is also a food.

The albuminoids are seldom found above half of one per cent in any varieties, and this would give us less than four ounces in the bushel; of sugar, we find in a bushel about two and a half pounds in acid fruits, and considerably more in sweet.

The analysis of apples as presented, shows that the amount of nutriment, or absolute food they contain, in proportion to bulk, is small. This research extended over considerable ground, much of

which is not pertinent to this discussion. I will simply say that, as regards apples as food for animals, my practical experience in feeding them confirms the results of analysis. They are of *some* value, and when fed in connection with meal, serve to give zest to the appetite and keep animals in health. The riper the apples the better the results, and they should not be fed in a half-frozen state to milch cows, as this course will invariably cut short the milk supply. If they are cooked by boiling, their value is much enhanced, as more perfect digestion results.

In the cultivation of fruits, we should not be misled by the fact that they do not, in themselves, exhaust soils, except in a slight degree. The constituent principles of fruits are, to a large extent, organic, and, therefore, derivable from water and the atmosphere. Sugar, the important principle of all fruits, takes nothing from the soil which has money value. The albuminoids, as has been shown, are very sparsely distributed through most of our fruits, and as they hold the nitrogenous element, it is seen that nitrogenous manures are not needed in large quantities in orchards or fruit gardens. Analysis of the grape shows that in most varieties nitrogen, as supplied in manures, is not necessary. The results of analysis in the case of all fruits, have been satisfactorily confirmed in my practical experience.

I have never found nitrogenous manures to exert marked specific influence upon any of my fruit crops, and years ago I discontinued their use. Fruit trees, shrubs, and vines need nitrogen, but the spontaneous supply in soils is fully equal to the comparatively small amounts required. There is one mineral element which may be said to be the pabulum *par excellence* of growing fruits, and that is potash. It is certainly true that we cannot raise perfect and desirable fruits if we withhold this element from the soils of our orchards. When it is considered that we influence growing fruits only through the act of rendering the tree or vine vigorous and healthy, and when we further consider how much potash is required to maintain a normal condition in large fruit trees, which are constantly under the pruning saw and knife, we obtain some correct views of the importance of this agent in soils. Both the fruit of the vine, and the vine itself, are great consumers of potash. The same may be said of most of our small or soft fruits.

It is not usually advisable to attempt to reclaim and render productive a worn out grape border, but if any satisfactory success is

attainable, it is only through a plentiful supply of good wood ashes and bone meal.

Twenty years ago, I discovered that it was best, in preparing borders for cold grape houses, to use plenty of wood ashes, and to place the fertilizing materials in successive thin layers, rather than in the usual form of a mixed heap. I have one border prepared in this way which is made up of sixty alternating strata of different fertilizing substances, and they have remained undisturbed for twenty years. The fruit product from this border has been uniformly excellent in quantity and quality, from year to year, and renewal has not been necessary.

My view is, that the subterranean feeders of the vine will follow what may be designated as vegetable instinct in procuring food, going no further for it than is necessary. If we place phosphoric acid, lime, potash, and nitrogenous salts in distinct layers, each resting upon one of good soil, we place our vine roots, as it were, at a table spread with many dishes, and unerring instinct will guide in selecting what is needed to keep the vine and fruit in the best possible condition.

The saccharine qualities of the Black Hamburg and Frontignan varieties are greatly improved by having at hand plentiful supplies of potash; and wood ashes is the best possible source for this alkali. The German chlorides are next to be preferred, but they do not, in vineyards, meet the desirable results supplied by ashes.

The ordinary German Kainit, as found in commerce, I class among the poisons in the list of assumed vegetable foods. I have never failed to observe injurious results in the use of these salts on my farm. Common salt is not a manure, and we may as well so decide once for all.

After an experience of nearly a quarter of a century in conducting an experimental farm, I have reached the conclusion that the growth of our fruits, and most of our cereal crops, is best promoted by the use of a fertilizing mixture, made up of finely ground fresh bones and good wood ashes. This mixture I arranged and recommended twenty years ago, and I find after persistent soil experiments, extending over many years, that I am using it more freely than ever.

My method of preparing it is, to take six barrels of pure raw bone flour, and twelve of good wood ashes, and mix them well together upon a shed floor, adding, during the mixing, twenty

buckets of water and one barrel of gypsum or plaster. This mixture may be allowed to stand a few weeks, or it may be used at once if needed. If permitted to stand long it heats from chemical action, and the freed ammonia is in part fixed as a sulphate by the plaster, but not all of it.

For fruits of every kind I know of no better fertilizing material, and as it supplies every needed element of nutrition, its effects are remarkably persistent and immediate.

But, gentlemen, I must detain you no longer. I cannot think that I have presented anything new, or of special value to a company so intelligent and experienced as this. There are old facts and forms of knowledge, which it is well to call up for consideration occasionally, as we often find that the good and excellent have been neglected because they are old.

AN ESSAY ON FLORICULTURE.

By Mrs. A B. Strattard, of Monroe.

"These are thy glorious works, Parent of good,
Almighty! Thine this universal frame,
Thus wondrous fair; thyself how wondrous then,
Unspeakable! who sittest above these heavens,
To us invisible, or dimly seen
In these thy lowest works; yet these declare
The goodness beyond thought, and power divine."

"And nature is to me a living thing,
Food to the heart, and beauty to the eye:
The bud, the flower, the autumn's mellow sky
Awake the moral thought and sympathy."

The cultivation of flowers is a God-given vocation, and is as old as the creation itself. The great All-Father created man in His own image, and made him only "a little lower than the angels," and as a fitting home for such a creation, He made the garden of Eden and filled it almost to overflowing with all manner of fruits and flowers, and placed man in the midst of it, that he might enjoy them, and worship Him by looking "through nature up to nature's God." And to-day every flower that grows on the face of this fair earth of ours, had its origin in the garden of Eden, which in its turn was a part of the beautiful gardens in that bright world beyond—

"Where everlasting spring abides,
And never-withering flowers."

God created flowers as a connecting link between Himself and man, and they were made so beautiful that even "Solomon in all his glory was not arrayed like unto one of the humblest of them." All the way down through the ages of the past, and even to the present day, floriculture has kept even pace with civilization, cultivation and refinement.

And yet there *are* people to be found occasionally, even in this enlightened age, who will call all this rubbish, and who have no love for flowers, and no appreciation of their beauty. I recollect a case of this kind—two or three years ago, (while attending the yearly campmeeting at Northport). A lady acquaintance who was as great a lover of flowers as myself, suggested that we trim our town tent with wild flowers and vines, to take away the bare, hut-like look of the building; while we were arranging the flowers and vines, a minister from our town sat looking at us for some time quite soberly, and at last he said to me: "Do you expect to get to heaven any quicker for that, or to see any such rubbish as that there?" "Sir," said I, "I could as soon conceive of a heaven without a God, as a heaven without flowers! In fact, I consider flowers a gift of God, and part of heaven itself." He said: "That is blasphemy." Do you think it was? I do not. Truly and well has one of our eminent divines said: "Blessed is he who really loves flowers; who loves them for their own sake—for their beauty, their associations, the joy they *have* given and *always will* give; so that he would sit down among them as friends and companions, if there were no one else on earth to admire and praise them. But such persons need no blessing of mine. They are blessed of God! Did he not make the world for them?"

I said that floriculture had kept even pace with cultivation, civilization and refinement. When Babylon was at the summit of her glory, her immense hanging gardens, in which all manner of flowers and fruits were cultivated, were considered so beautiful as to be named as one of the seven wonders of the then known world. Where are her gardens to-day? and where are her people? Verily they have departed, and faded away together. Rome, when she "sat on her seven hills, and from her throne of beauty ruled the world," was almost like Eden in the superabundance of her fruits and flowers. Her glory has likewise departed.

But we will come down to our own times. Who looks to find flowers, (except such as nature has sprinkled there), growing about

the wigwam of the Indian, or to find *him* sitting under his own vine? They are of the class, "who, having eyes, see not; and ears, hear not." The voiceless lips of the flowers never speak to *his* soul, to tell him the message that *their* Maker has sent by them to all; and, alas! we too often find persons living in civilized countries, yes, and even in our own good State, who are just as deaf and blind to all the beautiful influences of flowers as the untutored Indian. I suppose there always will be such people in the world, (as it is said that it takes all kinds to make a world), but be that as it may, we find that both floriculture and horticulture have taken almost giant strides in the last half century; yes, even within the last quarter of a century. Well and truly has the poet Whittier said:

> "I look across the lapse of half a century,
> And call to mind old homesteads, where no flower
> Told that the spring had come, but evil weeds,
> Nightshade and rough-leaved burdock in the place
> Of the sweet doorway greeting of the rose
> And honeysuckle, where the house walls seemed
> Blistering in the sun, without a tree or vine
> To cast the tremulous shadow of its leaves
> Across the curtainless windows from whose panes
> Fluttered the signal rags of shiftlessness."

Many of us here can look back over half that length of time and remember many a place, (or homestead rather), in our own towns, which were then bare and unsightly, but which to-day are surrounded with beautiful flowers and luxuriant vines, with thrifty, well-kept orchards in the background, arbors covered with fruitful grape vines and currants and other small fruits scattered here and there about the grounds, all forming a picture very much the reverse of the poet's above. Homesteads, such as he has too truly delineated, are to-day exceptions, and these exceptions are found mostly in localities where refinement and culture have made but slow progress. And if the persons who are responsible for these exceptional cases could only be led to see what a great drawback to the beauty of the rural landscape the barren and desolate aspect of their farm-houses and out-buildings is, I have no doubt they would exert themselves to produce a different state of things.

How well I remember the gardens of the village, in Massachusetts, where I lived forty years ago. It was a place of considerable size, about twenty-four miles from Boston. There were but two gardens that one could really call flower gardens. I had to pass them both

every day in going to and returning from school. How I used to love to stand and look through the palings at those gardens; sometimes I would almost forget where I had started to go, in admiring those flowers. One of the gardens belonged to a widow lady who lived in her large house alone; she always seemed unwilling to allow the scholars the privilege of even looking at her flowers. It was in her garden that I first saw petunias; they were the single white and magenta colored; but oh, how lovely they looked to me. As for the other flowers, they were such as one would find in most gardens at that time—two or three varieties of roses, (red and white and old-fashioned Provence and Cinnamon), hollyhocks, gilias, sweet-williams, marigolds, Spice pinks, London pride, etc. The lady that owned the other garden, (which contained about the same things, only a greater profusion of roses), was the exact reverse of the widow. She would fill our hands full of roses in their season, and it used to seem to me that the more she gave us, the more she had; and I believe it is always thus with flowers. It happened a year or two ago, that I visited the same village, and I could hardly find a house without a beautiful flower garden attached; and there were also many greenhouses, all of which were doing a thriving business. I thought to myself, why cannot it be the same in my own little vilage at home? But when I thought it over, I was fain to confess that the change had been as great among the people here, according to their facilities, as it had been there. I find where there was but one house in the place (thirty-one years ago, when I came here), that could make any pretension at all to a flower garden, there is scarcely a house in the village, or for some distance out on the roads leading from it, but has one now; and they are also well kept, and filled not only with the old-fashioned flowers of our grandmothers' days, but also with the newer varieties. There has also been a great change in horticulture. But still there are some persons, (thank heaven they are not many), who seem too intent upon field labor, or upon making money, to have time or inclination to make their dwellings beautiful, or to give their children a little plot of ground for a garden. And yet they say: "Why do our children leave us?" The great heart of humanity reaches out after the beautiful; if it cannot find it here, it will go yonder to seek it. How well does the human spider who sits behind the bar of the gilded saloon know this. Everything that can attract the eye, all that can allure the sense are here displayed; and so the young and

innocent are enticed to enter, and they are lost; when if those very places had been stripped as bare of every object of beauty as some farm-houses are, they would have turned away with a shudder of disgust. God has given us this love for the beautiful, and He has also given us more than enough to satisfy all our longings for it. "Beauty is an all-pervading presence. It unfolds in the numberless flowers of the spring. It waves in the branches of the trees, and the green blades of grass." We cannot look anywhere without feeling that we are encompassed with it; and it is sad to think there are people living in the midst of all this beauty, as blind to it as if instead of this fair earth, with all its beautiful flowers, and the glorious sky over all, they were tenants of a dungeon. Let us each and all try to instil into the minds and hearts of our children a true and genuine love for all these beautiful gifts of God, and more *especially* for flowers and floriculture. If we have had it starved and choked out of our natures, let us *not* follow the same course with *our* children. Let us walk with the beautiful!

"I hear thee say, 'The beautiful! what is it?'
Be sure, 'tis no long, weary road, its form to visit,
For thou canst make it smile beside thy door,
Then love the beautiful."

RAILROAD GARDENING.

By JOHN BURR, of Freeport.

The improvement in laying out lawns, and decorating the grounds around the stations with shade trees and flowers, has been for some years extensively practiced in different parts of Europe, and carried to such an extent, that, to use the expression of a friend, "Some of the roads there looked like one large flower garden." In our own country, on the roads running from New York to Philadelphia, they use an extremely large amount of plants for summer decoration. It is stated that last year one road alone gave an order for fifty thousand plants to be used for decorating the different parks and stations along its line. In New England, the railroads are not to any considerable extent, and I might say, not at all beautified with plants and flowers, except the MAINE CENTRAL, which, running from Portland to Waterville by two routes, and thence to Vanceboro' —besides its many branches—has for a few years past decorated its principal stations with flowering and foliage plants, besides lay-

ing out a large number of parks and lawns which are planted with shade trees.

I propose, in this paper, to give a brief account of the origin and extent of the decorations and improvements on the line of the Maine Central railroad and its branches.

During the years 1879 and '80 the stations on the line of the road running from Cumberland Junction to Waterville, and its branches, very many of them, were much improved by the laying out of parks and lawns where the grounds would admit of it. Walnut Hill, Gray, Danville Junction, Auburn Park, Leeds Station, Monmouth and Winthrop each had improvements made, and in each case the work was very finely laid out and finished; so that at each station the lawn presented a beautiful deep green. In 1880, Maranacook was opened up and laid out for a summer resort, and it would be needless for me to attempt to describe its many attractions, as it has become so familiar to all. On the lower route, Woodford's, Cumberland Junction, Freeport, Brunswick Park, Riverside, Winslow and Fairfield each had their lawn or park as the grounds would allow. These were either filled up and graded and then turfed with rich sods, or sown with lawn grass seed, and as they are all kept sheared, one can easily conceive how attractive they are. The larger parks have been set with trees. Auburn and Brunswick particularly having each a fine lot of thrifty trees, that in a few years will be very ornamental, not only to the road but the city and village. The grounds at Waterville are set with trees, but they are so extensive, and I believe a portion belong to the colleges there, that they are not enclosed, but are very fine.

This work has been done, on the back route, under the direction and supervision of Mr. Geo. Wagg, and on the lower route by Mr. Geo. Nevens, both gentlemen of very fine taste. Besides these there has been very much done from Waterville to Bangor, and since the Maine Central has taken control of the European & North American Line, the same beautifying of stations has been commenced there.

The New York *Graphic*, of June 29, 1883, speaking of the amount of plants, &c., used on the different roads, says: "Now the General Manager of the Maine Central railroad takes as naturally to this method as a part of his management as a duck takes to water, but it is not applied the same way. No prizes are offered upon the Maine Central for the care and ornamentation of the depot

grounds and tracks, because it is believed that the practice is unfair, it being manifestly the case that in some situations these grounds will present a pleasing and satisfactory appearance, even though the minimum of attention and labor is bestowed upon them, while others can hardly be beautiful though the keeper should tear his hair in anxiety over the matter—besides, the thing should be done upon principle, as a matter of duty and as a part of good system in carrying forward the interests of the road."

Up to the year 1881 much had been done in setting shrubs and trees along the line; parks had been laid out and depot grounds graded. In the spring of 1881, Mr. Tucker, as General Manager, conceived the idea of beautifying the stations with flowers, and as Freeport was a station which seemed well fitted for the work, a portion of the grounds, about one hundred feet long and twenty-four feet wide, was prepared and beds laid out. In the center of the garden the name of the station was worked in colors, so that a person riding on the cars could easily read the words "Freeport." The plants used were those that would bloom most freely through the summer months, so that by the middle of July there was a fine show of flowers. The result of the experiment was very satisfactory, and in the spring of 1882 Mr. Tucker decided to decorate the principal stations along the line of the road, where the grounds would admit of it. As a result, Danville Junction, Auburn, Leeds Station and Winthrop, on the back route, and Woodford's, Freeport, Brunswick and Waterville, on the lower road, were improved as principal places, while there were quite a number of stations that had a small circle or bed of plants to break up the plain green of their lawns, making a fine contrast. This year was also a success, the majority or nearly every one doing very nicely. The spring of 1883 was the same as the spring of 1882, only more stations were supplied with plants and some changes were made in the arrangements of the beds, the results being satisfactory. So that now the decorating of the road has become so familiar to the travelling public that one will read with pleasure the reports given by the summer tourists from all parts of our country.

While giving praise to each and all who have had the care, to a greater or less extent, of the grounds as laid out and planted, I feel that I ought to mention the gardens at Crowley's Junction, Leeds Station and Winthrop, which were unusually fine, particularly those at Crowley's and Leeds. These were under the supervision of Mrs.

Knowles at Crowley's and Miss Ham at Leeds, both ladies of very fine tastes, and quite amateur florists. Besides the summer gardens at these stations, they have large windows which are, during the winter months more particularly, filled with flowering and foliage plants; and one will have to look a long time to find prettier windows or better kept plants than found here. There are many other stations at which the operators or station agents make a very fine show of plants in their windows during the winter, but none who have so good facilities as the two named.

When the work of decorating the different stations was commenced, those who had the care of it felt a little fear that the different people having charge of the plants would not care for them through the summer, but it gives me great pleasure to say that with hardly an exception all have joined in trying to get the best results; and at quite a number of stations where, during the hot dry days of summer, the plants had to be watered, the station agent would see that this was done each day, so that failure in a single instance has not occurred; and to-day the different station agents look forward to their flowers and gardens with the same feelings and anticipations that the ladies do to their private gardens at home.

Now the good results arising from the system of railroad gardening can hardly be enumerated. It extends far beyond the mere planting of beautiful flowers along the line; it has the effect to bring up the grounds of each station to that standard of neatness for which the road is justly credited, and it also is an example for each village and city through which the road passes, that they could follow with profit. Very many are seeing the good effects, and you will read of village improvement societies being formed in many places. Wherever the work has commenced you will readily see the good effects in the trees being trimmed, unsightly banks graded, flowering shrubs planted, and beds of plants set out. It also elevates and stimulates individuals to the improvement of private grounds, and the result will be, that people who never thought to set a tree or shrub, or purchase a plant for summer decoration, will now commence to beautify their own homes, and by so doing not only add to the beauty, but to the attractions of home. The system of railroad gardening is yet in its infancy. It will be but a few years before all roads which aspire to having everything attractive and pleasing to the travelling public will follow the lead of the Maine Central, which in this, as in other improvements, has

always been a pioneer; and we will see the stations all over our New England as tastily arranged, and as neatly kept as a gentleman's grounds.

I have often heard the question asked: "Of what use is this work?" I think I have fully explained some, but not nearly all, the good arising from it; and I believe there is no one thing that has been done by the persons having the care of the Maine Central railroad that will do so much to elevate and improve the public mind, as the beautifying of the road with shrubs, trees and flowers.

This report has already reached the length originally assigned to it, and there are some matters of particular interest which cannot properly be omitted. It is therefore necessary to omit the remaining papers read at the winter meeting.

REPORT OF COMMITTEE ON EXHIBITION OF FRUITS AT THE WINTER MEETING.

The committee appointed to examine the exhibition of fruit are pleased to say that although the past has been called an off year, still, on examination of tables loaded with more than two hundred plates of apples and six of pears, from different parts of the State, shows that Maine is progressing in this most lucrative and pleasant calling, and we trust that in this respect she will be true to her motto, "Dirigo," and will ere long be celebrated in the markets of the world for her long-keeping, fine-grained, melting, juicy and excellent flavored winter apples.

The exhibitors, with the number of varieties exhibited by each, are as follows:

O. C. Nelson,	New Gloucester,	12 plates.
H. S. Cary,	Topsham,	12 "
E. A. Lapham,	Pittston,	14 "
T. M. Merrill,	New Gloucester,	4 "
L. H. Blossom,	Turner,	7 "
Jas. M. Carpenter,	Pittston,	14 "
D. J. Briggs,	Turner,	11 "

S. R. Sweetser,	Cumberland,	18 plates.
W. P. Atherton,	Hallowell,	27 "
W. H. Pearson,	Pittston,	1 "
Mrs. D. Smiley,	Vassalboro',	2 "
Chas. Osborne,	"	2 "
J. W. Starkey,	"	1 "
J. R. Smiley,	"	1 "
R. H. Gardiner,	Gardiner,	5 "
W. R. Wharff,	"	15 "
G. K. Staples,	Temple,	14 "
D. W. Merrill,	New Gloucester,	2 plates and limb.
C. H. Page,	———	1 plate.
J. C. Dudley,	Readfield,	13 "
C. J. Gilman	Brunswick,	2 "
J. Pope & Son,	Manchester,	2 "
Frederick Wright,	Bath,	6 "
G. B. Sawyer,	Wiscasset,	12 "

Among the particularly nice plates were the Hubbardstons of O. C. Nelson; King of Tompkins County of D. J. Briggs; Baldwins and Gilliflowers of S. R. Sweetser; Baldwins of Mrs. D. Smiley; Bellflower of W. R. Wharff; Bellflower of R. H. Gardiner; D. W. Merrill, limb of Hubbardston was very nice; Baldwin by J. Colby Dudley; Starkey and English Sweet by G. B. Sawyer.

The general exhibition of O. C. Nelson was deemed the best, and G. K. Staples, second best.

The pears exhibited were as follows:

D. P. True,	Leeds,	3 varieties.
Henry Ingalls,	Wiscasset,	1 "
L. K. Litchfield,	———	1 "
C. H. Page,	———	1 "

Mrs. A. B. Strattard of Monroe; Mrs. M. E. Thomas of Rockland, and Mrs. B. A. Townsend of Freeport, exhibited bouquets and cut flowers. Mrs. Townsend also exhibited pot plants which added much to the exhibition.

Grafting was exhibited by D. Blake & Co. of Mount Vernon.

RUFUS PRINCE,
JAIRUS K. HAMMOND, } *Committee.*

IN MEMORIAM.

The following notices of deceased life members have been contributed by friends or compiled from miscellaneous sources:

GEORGE JEWETT was born in Portland, May 8, 1795. When at the age of about one year his father died and his training and education devolved on his mother. He was graduated from Harvard College in 1816 and adopted the profession of law, which he practiced for a few years at Bowdoinham in this State. Not finding this occupation congenial, he abandoned it and returned to Portland and engaged in mercantile pursuits, being associated with Major Hinckley and doing business at Long Wharf, and after a few years retired to private life. He represented the town of Bowdoinham in the Legislature of 1829.

Mr. Jewett became a member of this Society at its organization, and attended its meetings whenever his health would permit, taking a great interest in all horticultural subjects. He was never married. He died at Portland, April 17, 1883, being then nearly 88 years of age.

ALBERT EMERSON was born in Durham, N. H., June 29, 1810. He came to Bangor in his youth, but soon went to New York City, where he remained about twelve years. He then returned to Bangor and lived there continuously until the day of his death, December 2, 1883, which was also the forty-second anniversary of his wedding. His life was a very busy one, and he retained his active habits until a few weeks before his death, though a victim for many years to debilitating disease. One of his principal pleasures was the superintendence of his large garden, which was full of the choicest fruits and flowers. The care of this garden was always a pleasure to him, even when his physical strength was not equal to it. He delighted in distributing the products of his skill among those who, from lack of knowledge or means were not so highly favored. No little Irish boy who even looked wistfully and *respectfully* at his apples ever went away empty handed. He did much towards improving the quality of fruit in his city by his intelligent culture of the choicest varieties. Your Society has never had a more enthusiastic

devotee on its rolls, I am very sure. One of his last acts was to stand at his window and watch the pruning of his trees by another hand, when his own strength had failed. There are no startling facts in his life that I can give you. He loved his family and his home, and strove to make all his friends happy; a thorough gentleman of the old school.

JOSEPH M. RICHARDSON of Greene, died at his home in that town, May 18, 1883, aged 73 years, lacking a few days. He was an extensive and eminently successful orchardist, and a highly respected citizen.

HON. ISAIAH STETSON was born in Hampden, February 6, 1812. He removed to Bangor in 1833, where he engaged in general mercantile business in company with Cyrus Emery, under the firm name of Emery and Stetson. In 1835 his brother George was admitted and business conducted under the name of Stetson & Co. till the ill health of Mr. Emery caused him to withdraw in 1850, leaving the remaining partners under the same firm name until the death of Isaiah, which occurred June 30, 1880. He was mayor of Bangor for the four years 1861–62–63–64, and was a member of this Society from its organization.

WILLIAM C. CROSBY was born in Dover, N. H., December 2, 1806, and died at Bangor, February 21, 1880. His early education was obtained in Dover, N. H., and at the Gardiner Lyceum, but was supplemented by extensive and judicious reading. In the spring of 1822, he went with his father to Atkinson, Piscataquis county, Maine, and settled on a farm in the then wilderness. He remained there with his father until the latter part of May, 1828, when he removed to Bangor and opened a store. In 1830, he entered into a co-partnership with Higgins Hill, of Bangor, under the firm name of W. C. Crosby & Company. This partnership was dissolved in October, 1833, but Mr. Crosby remained in trade for about two years longer. In 1835 he removed with his family to Atkinson, where he remained till the spring of 1845.

During the first portion of this period he was connected with his father in the management of the extensive farms and other business of the latter, but later, he had a farm and business of his own, distinct from that of his father. During the latter portion of the time of his residence in Atkinson he studied law, and was admitted to the bar in Piscataquis county in 1845. In 1845 he returned to Bangor and entered into a co-partnership with Daniel T. Jewett in the practice of law, under the firm name of Jewett & Crosby. This firm was dissolved in the autumn of 1850.

During the latter part of his life he became interested in timber lands in Maine and invested a large share of his means in them. He was always interested in gardening and horticulture, at both of which he was very successful.

He was a member of the Common Council of Bangor for the years 1852 and 1853, and of the Board of Aldermen for the years 1870, 1871, 1872 and 1874.

In religion he was a liberal Unitarian. In politics, originally a Whig, afterwards a Republican.

Mason J. Metcalf of Monmouth, died in that town June 23, 1883, aged 76 years. His family was of Massachusetts origin, and in his youth he experienced the vicissitudes which appear to have been a heritage of the period. While yet a boy his father removed to Ohio, spending several years in what was then considered a far-off wilderness. The mutations of life, however, brought him again to the East, and he settled in the town of Litchfield, Mass. The subject of this notice meantime had grown to manhood's estate, already having given promise of a future of activity and usefulness. Attaining his majority, he became a resident of Monmouth, which town, notwithstanding several years spent in Boston, where he was engaged at intervals in active business, he ever considered as his home. He was possessed of a remarkably fine mental as well as of a most robust physical organization, and was the originator of several valuable mechanical ideas, among them a certain method of building fences that has become of great utility, particularly in the West, and he was the first to manufacture letter stencils by the use of dies. In later years his inclinations led him to seek the retirement of his country home, where he had acquired valuable mill properties, to which he devoted much attention. His busy tendencies made him a marked man locally, and he was particularly active in matters pertaining to the educational, moral and religious welfare of the community. He was an early promoter and for years the most generous contributor to the support of the Congregational church in Monmouth. In politics he was a pronounced Republican and an influential local factor, distinguished for an inflexible adherence to what he believed to be right. He was a member of the State Legislature in 1869, and repeatedly was called by his fellow townsmen to positions of trust and responsibility.

Dr. Eliphalet Clark died at Woodford's, near Portland, June 8, 1883, after a protracted illness. He was born in Strong, May 12, 1801, and was 82 years of age at the time of his decease. His

father was a farmer, one of the first settlers of that village. Eliphalet was educated at Farmington Academy and graduated at the Medical School, Bowdoin College, in 1824. He then studied with Dr. Thomas Little, a very eminent surgeon at New Gloucester, and also with Dr. J. L. Blake at Phillips. He practiced in Wilton successfully for five years, and removed to Portland in 1830. About 1845 he became interested in homœopathy and became a practitioner of that school, the pioneer of Maine. To his profession he was devoted, and, although often urged to accept political office, especially to become a candidate for mayor of this city, he positively declined. He accumulated a large property in his profession, and, a few years ago, took up his residence at Pleasant street, Woodford's.

Dr. Clark early became identified with Methodism, and the denomination in this State owes a great deal to his encouragement and support. He became a member at eighteen years of age, and was a leader later in life. He was the oldest trustee of the Maine Wesleyan Seminary and Female College, and not only gave it liberal donations during his life, but has remembered it in his will. All three of the Portland Methodist churches have been assisted freely by him, and he was, while in Portland, a member of the Chestnut Street society. He also to a great extent contributed to the erection of the new Methodist church at Woodford's.

Dr. Clark was no ordinary man; he was a born leader and inherited the stern and noble qualities of a heroic Puritan ancestry. After removing to Portland, he almost immediately built up for himself a large and lucrative practice both as a surgeon and physician, which he held during his long life, until the infirmities of age and disease obliged him to retire.

In all his social relations Dr. Clark was a model Christian gentleman. Gentle, kind and sympathetic, he drew around him a world of friends — commanding the profound respect of all with whom he associated. His home and family circle was a model of domestic happiness, nearer a type of heaven than earth. Dr. Clark's last sickness was long and painful, but through all his sufferings his religion triumphed. As he approached his end on earth, with his mind perfectly clear and rational, many of his dying words uttered to his friends had the clear ring of the heavenly land. His final exit was the triumphal departure of a Christian hero to the rich rewards of the blest. "He was not, for God took him."

Report of Inspector of Fertilizers.

Commercial Fertilizers is a term applied to material which is prepared and put into the hands of dealers or traders as an article of merchandise. It is called out by a general demand for more manure than the ordinary channels of supply on the farm furnish. The essential difference between commercial manures and barn manures is that the fertilizing ingredients contained in the commercial manures are concentrated into a smaller compass, or are a constituent part of a less bulky material, than is the case with barn manures. The material, too, is derived from a different source from that of the farm manures.

The Value of a Commercial Fertilizer to a farmer comes from the fertilizing ingredients contained therein. Practice has shown and it is now universally accepted, by scientific authorities and practical men alike, that in ordinary fertilization only three elements have to be supplied to the soil. These are *Nitrogen*, *Phosphoric Acid* and *Potash*. It is to bring to the soil, from sources independent of the farm, these three substances that a resort is made by the farmer to commercial fertilizers. The value, then, of these fertilizers lies in their contents of nitrogen, phosphoric acid and potash. If a farmer goes into the market to buy commercial manures, and their benefit to him comes through the nitrogen, phosphoric acid and potash which is found therein, his own intelligence at once indicates that it is for his interest to know the percentages of these ingredients to be found in the fertilizers offered for sale. Hence the propriety of the law requiring that all such merchandise shall be marked with contents of nitrogen, phosphoric acid and potash; and hence the necessity for an examination that will determine whether the percentages claimed are actually to be found in the article.

The Agricultural Value of a commercial fertilizer is indefinite, and never can be actually measured. The plant food—nitrogen, phosphoric acid and potash—contained in a fertilizer and applied to, and mingled with the soil, contributes to the production of a crop upon

that soil. Just how much this application contributes to the production of the crop then and there made is not easy to determine. Applied to different soils, or under different treatment and different conditions, the results in each case probably would not be identical, though precisely a like amount and kind of material had in each case been applied. A commercial fertilizer, then, will have an agricultural value, or a crop-producing value corresponding in a measure to the innumerable varying conditions attending its use. All attempts, then, to show the *actual value* to a purchaser of a fertilizer, or to show a comparison of crop-producing values of different kinds of fertilizers when put into the hands of different farmers, must be unreliable and misleading, and in no case is it attempted.

A *Chemical Analysis* of a fertilizer shows, reliably, the amounts of nitrogen, phosphoric acid and potash contained in the article examined. It may also show the particular form in which each of these elements is found, and which gives them a greater or less fertilizing value. If an examination is made for the purpose, the particular material used as a source of supply of these different fertilizing elements may be determined with tolerable accuracy. Further than this it does not attempt to go. Its value to the purchaser of commercial fertilizers comes from the fact that the effect on the crop comes from the nitrogen, phosphoric acid and potash applied, and the analysis shows how much of these manurial substances is contained in the article purchased. But this contents shown by the analysis is not an infallible indication of agricultural effects. Unless this valuable material is in a fertilizer no crop will be benefited by its application. If applied the crop may not always get the full benefit of the application.

The Valuation of a fertilizer is a representation of its commercial or trade value. All articles of merchandise, as wool, cotton, flour, &c., have a market value. So do nitrogen, phosphoric acid and potash. This market value is simply the price it is worth on the market. In no sense does it represent its *agricultural value.*

Trade Values of Fertilizing Ingredients. The following figures are used in making a comparison of the commercial values of the several different brands of commercial fertilizers which have been offered for sale in the State in the season of 1884. They are the same as those used at the Massachusetts, Connecticut and New Jersey Experiment Stations, and are intended to represent the price at which the respective ingredients could have been purchased at

retail in our markets in the raw materials which are the regular source of supply for all purchasers. Their cost to manufacturers at wholesale prices would have been about twenty per cent less.

	Cents per lb.
Nitrogen in ammonia salts	22
" nitrates	18
Organic nitrogen in dried and fine ground fish	20
" " in guanos, dried and fine ground blood and meat	18
" " in cotton seed, linseed meal and in castor pomace	18
" " in fine ground bone	18
" " in fine medium bone	16
" " in medium bone	14
" " in coarse medium bone	12
" " in coarse bone, horn shavings, hair and fish scrap	10
Phosphoric acid, soluble in water	10
" " " in ammonium citrate	9
" " insoluble in dry fine ground fish and in fine bone	6
" " " in fine medium bone	5½
" " " in medium bone	5
" " " in coarse medium bone	4½
" " " in coarse bone	4
" " " in fine ground rock phosphate	2¼
Potash as high grade sulphate	7¼
" kainite	4¼
" muriate	4¼

Nitrogen is found in different forms, and is derived from a variety of sources. Its trade value corresponds with the material which is the source of supply. Fertilizer dealers offer it in three forms, namely: sulphate of ammonia or ammonia salts, nitrate of soda, and in animal refuse of all kinds, such as dried blood, meat and fish. It is also found in cotton seed meal, where it is in a form similar to that in flesh and blood. In these varying forms it bears the different values named in the list. The first two compounds are readily soluble in water. As plants feed on soluble material, nitrogen in these forms is considered to be of more value for agricultural purposes than where less soluble. So the market has placed a higher trade or market value upon it when in this form.

Phosphoric Acid is furnished by dealers mainly in two combinations, in animal bone, and in rock phosphate. For the same reason as in the nitrogen, the soluble phosphoric acid is understood to be worth more for fertilizing purposes than the insoluble. Its trade value has thus become higher. In raw bone there is but little of the phosphoric acid soluble, while in the rock phosphate there is

practically none. In the valuations used in this report the soluble and the reverted is expressed as *available*, and is reckoned at ten cents a pound. The insoluble is figured at five cents. If the insoluble phosphoric acid found is in the form of rock phosphate this valuation of five cents a pound is too high. Since many of the manufacturers are using the rock phosphate as a source of phosphoric acid for their make, it is more than probable that this reckoning gives the valuation to that extent too high; but where that material is used there is but little of the phosphoric acid found in an insoluble form, so that no great misrepresentation is made. But a valuation must not be taken as absolute. As applied to different brands of fertilizers it presents an approximately correct comparison of the market value of the materials of which they are made up, and nothing further is intended by it.

The Contents of a fertilizer, that is, the nitrogen, phosphoric acid and potash, may reasonably be concluded to fairly represent its value to the purchaser. This material is plant food; plant food applied to the soil contributes to the growth of plants. If a large amount is found in a fertilizer, and that fertilizer is applied to the soil, it is certain that more fertilizing material is placed within reach of the plants growing on that soil than in the application of a fertilizer whose contents of nitrogen, phosphoric acid and potash is essentially less; and it may be reasonably concluded that the larger contents will do the most good, and that the fertilizer containing it is worth the most to the purchaser.

Mechanical Condition. The result from the application of a fertilizer to the soil is not entirely dependent upon the amount of material it contains. The mechanical condition in which this material is found has an effect on the result from application. Where the fertilizing material is concentrated into so small a compass as in commercial manures it is important that they be in a condition favorable for the even distribution of the same through the soil. The best results cannot be derived from application when a fertilizer is scattered into the soil in lumps and pellets. It should be distributed evenly through the soil. It is of great importance, then, that a fertilizer be *fine and dry.* Only when prepared in this condition can the best possible results from application be realized. A ton of bone applied to an acre of land in their natural form of jaw, knuckle and rib would be of trifling benefit. Cracked into pellets, some good would be realized. Ground fine and evenly mixed into

the soil, marked results would follow. Yet there was the same material—the same contents in the one case as the other. Chemical analysis takes no account of the mechanical condition. The purchaser must himself look to this; and it is an important matter.

The Selling Price of fertilizers differs among the several selling agents. On this account explanatory notes accompany the report on each kind examined.

The Samples analyzed were taken from the stock in the hands of selling agents, or from that which had been purchased for use; and in most cases it was sampled by the Inspector. In a few cases only it was done by parties deputized to do it by the Inspector. Extreme care was used that the samples taken should fairly represent the article which went into the hands of the users.

It would have been desirable to have had the examinations made and the report of the results published in time for purchasers to have consulted them before making their spring purchases. This, however, was found impracticable. The sampling must be done from the stock offered for sale by dealers; generally dealers do not care to have their stock forwarded till about the time trade opens, and trade does not start to any extent till the work on the farm commences. A few lots only were shipped into the State prior to the month of April. Several samples were taken April 8. Others could not be found till April 22 and 23, when other samples were taken. Even at this late date some dealers had not received their stock, and samples of some brands could not be taken till later.

The Actual Contents is the contents which the fertilizer was found by analysis to contain.

The Guaranteed Contents is what the manufacturers guarantee is the contents of the fertilizer, and is the marking found on the package.

List of Fetilizers Sampled.

Name of Fertilizer.	Name of Manufacturer.	Sampled by	From Stock of
Bradley's X. L	Bradley Fertilizer Company, Boston	Z. A. Gilbert	Kendall & Whitney, Portland.
"	" " "	"	S. P. Eaton, Augusta.
Bowker's Hill and Drill	Bowker Fertilizer Company, Boston	"	Purchased by W. H. Keith, Winthrop.
" "	" " "	"	Fred Atwood, Winterport.
Bay State Fertilizer	Clark's Cove Guano Company, N. Bedford, Mass.	"	Hardy & Bartlett, Bangor.
Bay State Bone Superphosphate	J. A. Tucker & Co., Boston	"	Robinson & Cony, Augusta.
Buffalo Ammoniated Superphospate	L. L. Crocker, Buffalo	J. K. Hammond	N. D. Bolster, South Paris.
" " "	" "	Z. A. Gilbert	J. L. Hayes, Lewiston.
" " " Potato & Hop	" "	"	" "
Common Sense Fertilizer	Dole Common Sense Fertilizer Co., Boston	"	A. L. & E. F. Goss, Lewiston.
Cumberland Superphosphate	Cumberland Bone Company, Portland	"	Kendall & Whitney, Portland.
" "	" " "	"	R. B. Dunning, Bangor.
" "	" " "	"	E. P. Ham, Lewiston.
Dirigo Fertilizer	Sagadahoc Fertilizer Company, Bowdoinham	"	At Factory, Bowdoinham.
Dungesalz	Imported	"	A. A. Mitchell, Portland.
Dissolved Bone	Bowker Fertilizer Company, Boston	"	Fred Atwood, Winterport.
Standard Superphosphate	Standard Fertilizer Company, Boston	"	Edwin Chick & Co., Bangor.
Stockbridge Potato Special	Bowker Fertilizer Company, Boston	"	Fred Atwood, Winterport.
Sagadahoc Superphosphate	Sagadahoc Fertilizer Company, Bowdoinham	"	At Factory, Bowdoinham.
Soluble Pacific Guano	Glidden & Curtis, Boston, General Agents	"	J. R. Nelson, Winthrop.
Red Beach Bone Phosphate	Red Beach Plaster Company, Red Beach	"	O. Williamson, Augusta.
" "	" " "	"	J. E. Cornish, Bowdoinham.
" X. L. C R	" " "	J. W. Butterfield	M. H. Davenport, Phillips.
Bone Meal for Top Dressing	Sagadahoc Fertilizer Company	Z. A. Gilbert	From Manufacturers.
Bone Meal	C. W. Belknap & Son, Portland	"	Manufacturer.
Bone Fine Ground	Bowker Fertilizer Company, Boston	"	Robinson & Beede, Auburn.
Bone Meal	C. W. Belknap & Son, Portland	"	S. P. Eaton, Augusta.
Bone Meal for Top Dressing	Sagadahoc Fertilizer Company	"	At Factory.
Lime Ashes	Burgess, O'Brien & Company, Thomaston	"	At the Kilns.
Bone Phosphate	Jennings Brothers, North Wayne	D. H. Thing	

Bradley's X. L. Superphosphate.

Sampled from stock for sale by Kendall & Whitney, Portland.

	Actual Contents.	Guaranteed Contents.
Nitrogen	2.84 per cent.	2½ to 3¼ per cent.
Available phosphoric acid	10.66 "	9 to 11 "
Insoluble " "	1.84 "	2 to 3 "
Potash	1.69 "	2 to 3 "

Valuation per Ton of 2000 pounds.

56.8	pounds nitrogen	$12.50
213.2	" available phosphoric acid	21.32
36.8	" insoluble " "	1.84
33 8	" potash	2.45
		$38.11

Selling price per ton, $42.50 to $45, varying in the hands of the different agents. In one locality in the State it was on sale at $40.

Bradley's X. L. Superphosphate.

Sampled from stock for sale by S. P. Eaton, Augusta.

	Actual Contents.	Guaranteed Contents.
Nitrogen	3.25 per cent.	2.5 to 3.28 per cent.
Available phosphoric acid	10.07 "	9 to 11 "
Insoluble " "	1.70 "	2 to 3 "
Potash	1.52 "	2 to 3 "

Valuation per Ton of 2000 pounds.

65.0	pounds nitrogen	$14.30
201.4	" available phosphoric acid	20.14
34.0	" insoluble " "	1.70
30.4	" potash	2.20
		$38.34

Selling price, see other sample.

Cumberland Superphosphate.

Sampled from stock offered for sale by Kendall & Whitney, Portland.

	Actual Contents.	Guaranteed Contents.
Nitrogen	3.10 per cent.	2 to 3 per cent.
Available phosphoric acid	9.68 "	10 to 14 "
Insoluble " "	2.20 "	
Potash	3.86 "	2 to 3 "

Valuation per Ton of 2000 pounds.

62.0	pounds	nitrogen	$13.64
193.6	"	available phosphoric acid	19.36
44.0	"	insoluble " "	2.23
77.2	"	potash " "	5.60
			$40.83

Selling price, $40 per ton with most agents. Some agents sold it at $38 per ton.

Bowker's Hill and Drill.

	Actual Contents.		Guaranteed Contents.
Nitrogen	2.36 per cent.	Ammonia,	2¼ to 3¼ per cent.
Available phosphoric acid	10.90 "		8 to 10 "
Insoluble " "	1.80 "		2
Potash	1.38 "	Sulphate,	2 to 3 "

Valuation per Ton of 2000 pounds.

47.2	pounds	nitrogen	$10.38
218.0	"	available phosphoric acid	21.80
36.0	"	insoluble " "	1.80
27.6	"	potash	2.00
			$35.98

Selling price, $40 per ton.

Stockbridge Potato Fertilizer.

Manufactured by Bowker Fertilizer Company, Boston. Sampled from stock for sale by Fred Atwood, Winterport.

	Actual Contents.	Guaranteed Contents.
Nitrogen	3.26 per cent.	
Available phosphoric acid	9.08 "	
Insoluble " "	1.64 "	
Potash	4.18 "	

Valuation per Ton of 2000 pounds.

65.2	pounds nitrogen	$14.34
181.6	" available phosphoric acid	18.16
32.8	" insoluble " "	1.94
83.6	" potash	6.06
		$40.50

Selling price, per ton.

Dissolved Bone.

Sampled from stock offered for sale by Fred Atwood, Winterport. Manufactured by Bowker Fertilizer Company.

	Actual Contents.	Guaranteed Contents.
Nitrogen	1.66 per cent.	1.5 to 2 per cent.
Available phosphoric acid	8.08 "	6 to 7 "
Insoluble " "	1.39 "	3 to 4 "
Potash	1.17 "	1 to 2 "

Valuation per Ton of 2,000 pounds.

33.2	pounds nitrogen	$7.30
161.6	" available phosphoric acid	16.16
27.8	" insoluble " "	1.39
23.4	" potash	1.70
		$26.55

Selling price, per ton, $37 to $40, according to quantity.

Bay State Bone Superphosphate.

Manufactured by J. A. Tucker & Co., Boston. Sampled from stock for sale by Robinson & Cony, Augusta.

	Actual Contents.		Guaranteed Contents.
Nitrogen	2.03 per cent.		2 to 3 per cent.
Available phos. acid,	9.31 "	Soluble	7 to 10 "
Insoluble " "	0.74 "	Insoluble and reverted,	1.5 to 3 "
Potash	1.79 "		

Valuation per Ton of 2000 pounds.

40.6	pounds	nitrogen	$8.83
186.2	"	available phosphoric acid	18.62
14.8	"	insoluble " "	.74
35.8	"	potash	2.51
			$30.70

Selling price, $40 per ton.

Bay State Fertilizer.

Manufactured by Clark's Cove Guano Company, New Bedford, Mass. Sampled from stock for sale by Hardy & Bartlett, Bangor.

	Actual Contents.	Guaranteed Contents.
Nitrogen	3.28 per cent.	2 to 3 per cent.
Available phosphoric acid	8.80 "	8 to 11 "
Insoluble " "	1.85 "	2 "
Potash	2.65 "	2 to 3 "

Valuation per Ton of 2000 pounds.

65.6	pounds	nitrogen	$14.43
176.0	"	available phosphoric acid	17.60
37.0	"	insoluble " "	1.85
53.0	"	potash	3.84
			$37.72

Selling price, $40 per ton.

Buffalo Ammoniated Superphosphate.

Manufactured by L. L. Crocker, Buffalo, N. Y.

	Actual Contents.	Guaranteed Contents.
Nitrogen	2.76 per cent.	Ammonia, 3.5 to 4.5 per cent.
Available phosphoric acid	9.70 "	8 to 12 "
Insoluble " "	2.27 "	1 to 2 "
Potash	1.20 "	1 to 3 "

Valuation per Ton of 2000 pounds.

55.2	pounds nitrogen	$12.14
194.0	" available phosphoric acid	19.40
45.4	" insoluble " "	2·27
24.0	" potash	1.74
		$35.55

Selling price, $40 per ton.

Buffalo Ammoniated Potato and Hop Phosphate.

Manufactured by L. L. Crocker, Buffalo, N. Y.

	Actual Contents.	Guaranteed Contents.
Nitrogen	2.49 per cent.	Ammonia, 2.5 to 3.5 per cent.
Available phosphoric acid	7.71 "	8 to 12 "
Insoluble " "	2.30 "	1 to 2 "
Potash	6.38 "	6 to 8 "

Valuation per Ton of 2000 pounds.

49.8	pounds nitrogen	$10.96
154.2	" available phosphoric acid	15.42
46.0	" insoluble " "	2.30
127.6	" potash	9.25
		$37.93

Selling price, per ton, $40.

Soluble Pacific Guano.

	Actual Contents.	Guaranteed Contents.
Nitrogen	2.66 per cent.	2 to 3 per cent.
Available phosphoric acid	7.74 "	8 to 11 "
Insoluble " "	5.66 "	2 to 4 "
Potash	2.0 "	2 to 3.5 "

Valuation per Ton of 2000 pounds.

53.2	pounds nitrogen	$11.70
154.8	" available phosphoric acid	15.48
113.2	" insoluble " "	5.66
40.0	" potash	2.90
		$35.74

Selling price, $40 per ton generally. One locality was found where it was offered for $38 per ton.

Standard Superphosphate.

Sampled from stock for sale by Edwin Chick & Co., Bangor.

	Actual Contents.	Guaranteed Contents.
Nitrogen	1.98 per cent.	Ammonia, 2 to 4 per cent.
Available phosphoric acid	8.48 } "	9 to 14 "
Insoluble " "	3.6 }	
Potash	1.73 "	1 to 3 "

Valuation per Ton of 2000 pounds.

39.6	pounds nitrogen	$8.71
169.6	" available phosphoric acid	16.96
72.0	" insoluble " "	3.60
34.6	" potash	2.51
		$31.78

Selling price, $38 per ton.

Common Sense Fertilizer.

	Actual Contents.		Guaranteed Contents.	
Nitrogen	2.69	per cent.	2 to 3	per cent.
Available phosphoric acid	5.23	"	4 to 6	"
Insoluble " "	1.37			
Potash	1.30	"	3 to 5	"

Valuation per ton of 2000 pounds.

53.80	pounds of	nitrogen	$11.84
104.6	"	available phosphoric acid	10.46
27.4	"	insoluble " "	1.37
26.0	"	potash	1.88
			$25.55

Selling price, $35 per ton.

X. L. C. R. Fertilizer.

Manufactured by Red Beach Plaster Company, Red Beach, Me. Sampled by J. W. Butterfield, from stock offered for sale by M. H. Davenport, Phillips.

	Actual Contents.		Guaranteed Contents.	
Nitrogen	2.95	per cent.	4.11	per cent.
Available phosphoric acid	5.97	"	5.02	"
Insoluble " "	1.17			
Potash	0.33	"		

Valuation per Ton of 2000 pounds.

59.0	pounds	nitrogen	$12.98
119.4	"	available phosphoric acid	11.94
23.4	"	insoluble " "	1.17
6.6	"	potash	.48
			$26.57

Selling price, $40 per ton.

Red Beach Bone Phosphate.

Sampled by Z. A. Gilbert, from stock offered for sale by J. E. Cornish, Bowdoinham.

	Actual Contents.		Guaranteed Contents.	
Nitrogen	2.30	per cent.	2.72	per cent.
Available phosphoric acid	7.44	"	11.70	"
Insoluble " "	0.30			
Potash	0.25			

Valuation per Ton of 2000 pounds.

46.0	pounds	nitrogen	$10.12
148.8	"	available phosphoric acid	14.88
6.0	"	insoluble " "	.30
5.0	"	potash	.36
			$25.66

Selling price, $45 per ton.

Red Beach Bone Phosphate.

Sampled from stock for sale by O. Williamson, Augusta.

	Actual Contents.		Guaranteed Contents.	
Nitrogen	1.46	per cent.	Ammonia, 2.72	per cent.
Available phosphoric acid	9.20	"	11.70	"
Insoluble " "	.56			
Potash	.56			

Valuation per Ton of 2000 pounds.

29.2	pounds	nitrogen	$6.42
184.0	"	available phosphoric acid	18.40
11.2	"	insoluble " "	.56
11.2	"	potash	.81
			$26.19

Selling price in ton lots, $45 per ton.

Sagadahoc Superphosphate.

Manufactured by Sagadahoc Fertilizer Company, Bowdoinham.

	Actual Contents.	Guaranteed Contents.
Nitrogen	2.69 per cent.	Ammonia, 2.5 to 3.5 per cent.
Available phosphoric acid	8.36 "	9.5 to 11 "
Insoluble " "	0.95 "	1.5 "
Potash	1.65 "	2 to 3 "

Valuation per Ton of 2000 pounds.

53.8	pounds nitrogen	$11.84
167.2	" available phosphoric acid	16.72
19.0	" insoluble " "	.95
33.0	" potash	2.39
		$31.90

Selling price, $35 per ton at the factory.

Dirigo Fertilizer for Grass and Grain Crops.

Manufactured by Sagadahoc Fertilizer Company.

	Actual Contents.	Guaranteed Contents.
Nitrogen	1.41 per cent.	2.0 per cent.
Available phosphoric acid	4.90	" 12.0 "
Insoluble " "	5.60	
Potash	1.86 "	1.5 "

Valuation per Ton of 2000 pounds.

28.2	pounds nitrogen	$6.20
98.0	" available phosphoric acid	9.80
112.0	" insoluble " "	5.60
37.2	" potash	2.70
		$24.30

Selling price, $28 per ton at the factory.

Dissolved Bone.

Manufactured by Jennings Brothers, North Wayne. Sampled by D. H. Thing, Mt. Vernon.

Actual Contents.

Nitrogen	1.07	per cent.
Available phosphoric acid	3.74	"
Insoluble " "	1.73	"
Potash	.29	"

Valuation per Ton of 2000 pounds.

21.4 pounds	nitrogen	$4.71
74.8 "	available phosphoric acid	7.48
34.6 "	insoluble " "	1.73
5.8 "	potash	.41
		$14.33

This was an article of home manufacture which has been made and sold in a small way by the above parties. The price has been about $20 per ton. It was made from bone meal, which was cut with acid, and some dry material used as a dryer. The sample was taken in the spring of 1883, but on account of delay it was not analyzed till after the report for that year was made up; hence its appearance now. The claim has frequently been made that such an article was worth as much in practical results as a commercial superphosphate. With the smaller number of pounds of valuable material contained in this such a claim would not likely be found in fact.

Bone Meal for Top Dressing.

Manufactured by Sagadahoc Fertilizer Company.

Actual Contents.

Nitrogen	3.95	per cent.
Insoluble phosphoric acid	22.78	"

No estimate of value is made. The analysis shows it to be a good article. It was fairly well ground.

Selling price, $38 per ton at the factory.

Pure Bone.

Manufactured by Bowker Fertilizer Company, Boston.

Actual Contents.

Nitrogen	2.93	per cent.
Phosphoric acid, total	25.6	"

Selling price, $38 per ton.

The stock from which the sample was taken, was well ground, being fine and even. No estimate of its value is made. The high percentage of phosphoric acid shows it to have been prepared from pure bone of good quality.

C. W. Belknap & Son's Pure Ground Bone was sampled from several parties, but no analysis was made. It is a reliable article, medium fine ground, and even.

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 is slowly 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 ten cents per pound; reverted — not so readily available—at nine cents; insoluble, in fine bone six cents, and in medium bone at five cents. In the computations of the value of raw bone meal there is a distinction made between the coarse and the fine ground, a graduation of values corresponding with the different degrees of fineness.

Lime Ashes.

Sampled from the lime kilns at Thomaston, from the stock of Burgess, O'Brien & Co.

Contents.	
Potash	2.03 per cent.
Lime	49.16 "

This article is a mixture of wood ashes, from the wood used in burning the lime, and of small crumbs of lime. The sample analyzed was nearly half lime. A ton of it would contain 40 pounds of potash in addition to the lime. It is sold at a low price without being very particular about weight or measure.

Dungesalz.

Imported from the Stassfurt mines, Prussia. Sampled from stock sent by A. A. Mitchell, Portland.

Contents.	
Potash	11.28 per cent.
Magnesia	10.40 "

In one ton of 2000 pounds there would be 225.6 pounds of potash, worth $16.36. It is generally understood that an application of magnesia will not add to the productive power of a soil.

Z. A. GILBERT,

State Inspector of Fertilizers.

July 2, 1884.

FARM EXPERIMENTS,

CONDUCTED AT MAINE STATE COLLEGE, BY SUPERINTENDENT G. M. GOWELL AND PROFESSOR WALTER BALENTINE.

EXPERIMENT NO. 7.

Manuring with Different Forms of Posphoric Acid.

This is the continuation of a series of experiments commenced on the farm in 1880, and has for its object the determination of the relative agricultural values of the different forms of phosphoric acid, known as soluble, reverted and insoluble.

The field selected for the experiment was a clay loam soil, that had been in grass for many years. It was divided into plots 38 rods long by 3½ feet wide, each containing one-twentieth of an acre. To each of these plots, except two that were left without manure of any kind, was added a basal mixture of sulphate of ammonia and muriate of potash. To this were added the various forms of phosphoric acid. Dissolved bone black, containing 15 per cent of soluble phosphoric acid, was used for the soluble; dissolved bone black, reverted by mixing with wood ashes and moistening with water, furnished the reverted phosphoric acid. The insoluble acid was furnished in one case by ground bone, and in the other by South Carolina rock.

The fertilizers were all applied in the drill and thoroughly mixed with the soil, and the field planted with potatoes, receiving clean culture throughout. On the following page, in a tabulated form, are given the results of the work.

Plot.	Quantities of fertilizers per plot.	Yield per plot.	Yield per acre.
No. 1.	No manure.	111 lbs.	37 bu.
No. 2.	25 lbs. ground bone, 10 lbs. muriate of potash, 10 lbs. sulphate of ammonia.	198 "	66 "
No. 3.	25 lbs. South Carolina rock (ground), 10 lbs. muriate of potash, 10 lbs. sulphate of ammonia.	201 "	67 "
No. 4.	20 lbs. dissolved bone black, 10 lbs. muriate of potash, 10 lbs. sulphate of ammonia.	271½ "	90½ "
No. 5.	20 lbs. dissolved bone black, reverted with ashes, 10 lbs. muriate of potash, 10 lbs. sulphate of ammonia.	175½ "	58½ "
No. 6.	20 lbs. dissolved bone black, reverted with ashes, 10 lbs. muriate of potash, 10 lbs. sulphate of ammonia.	153 "	51 "
No. 7.	20 lbs. dissolved bone black, 10 lbs. muriate of potash, 10 lbs. sulphate of ammonia.	429 "	143 "
No. 8.	Nothing.	117 "	39 "

Experiment No. 8.

Comparison of Feeding Values of Early and Late Cut Hay.

This feeding test is a continuation of the same line of work reported in Experiment No. 4, College Report, 1883.

In Experiment No. 4 a field of grass consisting mostly of clean Timothy was divided, and the crop upon one half of it was harvested when in full bloom, July 11, 1882, and the balance allowed to stand twenty days longer before cutting, when it had ripened, but not so much as to cause loss of seed in curing. These lots of hay were fed under precisely similar conditions, alternately, to two cows in milk, seventy-two days, with results which showed their comparative values for milk production to be as 100 for the early, to 93.34 for the late hay; while the amount of butter produced from each was almost exactly alike. Desiring to examine the subject further, last July another field of Timothy was divided, and one-half cut when in full bloom, July 13, and the other half twenty days later, when it had become quite ripe and considerably bleached.

Chemical analysis of the hay showed the following composition.

Early Hay.

Moisture	12.2	per cent.
Protein	6.25	"
Fat	2.80	"
Nitrogen-free extract	46.99	"
Crude Fibre	26.81	"
Ash	4.95	"

Late Hay.

Moisture	12.40	per cent.
Protein	5.00	"
Fat	2.50	"
Nitrogen-free extract	49.25	"
Crude Fibre	26.83	"
Ash	4.02	"

During the past winter this hay was fed alternately, as before, to two cows, for eighty-four days. The daily ration of each cow was 20 pounds of early or late hay, 2 pounds of corn meal, 2 pounds of cotton seed meal, and 1½ pounds of wheat bran. The grain used was the same throughout, the only change being in the quality of hay. The early hay ration contained

	Total Nutrients.	Digestible Nutrients.
Protein	2.44 lbs.	1.73 lbs.
Fat	.96 "	.61 "
Carbohydrates	17.89 "	12.12 "

Nutritive ratio, 1 : 7.9.

LATE HAY RATION.

	Total Nutrients.	Digestible Nutrients.
Protein	2.19 lbs.	1.56 lbs.
Fat	.90 "	.59 "
Carbohydrates	18.31 "	12.29 "

Nutritive ratio, 1 : 8.8.

The thoroughbred Jersey cow, Pansy, had been in milk five months at the commencement of this feeding test. For twenty-eight days she received the early hay ration, and during the twenty-eight days following she had the late hay ration. The first seven days of each period was used in accustoming the animal to the changed feed, and in overcoming the influence of the previous feeding. The produce of the last twenty-one days of each period was taken as the result of that period's ration. Princess Alice, a pure cross-bred Jersey-Ayrshire cow, had been in milk seven months when her feeding commenced. With her the periods were transposed so that she received the late hay ration while Pansy received the early, and early hay while Pansy had late, designing by this alternation to overcome the variation in milk yield which might arise from changes of temperature, and the gradual decline which accompanies the advance of the milking season in all animals. The following table shows the results of the feeding in each period:

PANSY.

Periods of 21 days each.	Feed.	Pounds of Milk for Period.	Per cent of Cream.	Pounds of Milk required for 1 lb. of Butter.	Pounds of Butter for Period.	Pounds Gain or Loss in Weight of Cows.
First	Early hay ration	407.8	21.5	19.8	20.6	20 g.
Second	Late "	366.4	20	18.6	19.68	18 l.

PRINCESS ALICE.

First	Late hay ration	326.4	25	19.4	16.8	8 g.
Second	Early "	322.2	22	17.64	18.3	8 l.

It was found that 231 pounds of mixed grain and 840 pounds of early hay produced 731 pounds of milk and 38.9 pounds of butter, and the gain in weight of cows was 12 pounds.

The same quantity and quality of grain fed in connection with 840 pounds of late hay gave 702.8 pounds of milk, 36.5 pounds of butter, and the loss in weight of cows was 10 pounds.

There is such a constant variation in the weight of cows from day to day, even when receiving the same quantity of food, that it is difficult to determine just how much of their increase or decrease in weight is fictitious or actual. Not taking into consideration this phase of the question, the comparative values of these qualities of hay for milk production was as 100 for the early to 96.14 for the late, and for butter as 100 for the early to 93.8 for the late, or, the daily feeding ration of 20 pounds of early hay produced the same quantity of milk that was obtained from 20.8 pounds of late hay. These results are somewhat surprising as the early hay was harvested when in full bloom, at just that time when it has generally been supposed to contain the most nutriment and to have its greatest feeding value, while the late hay was left until it had attained a very unattractive appearance; yet it produced quantities of both milk and butter nearly equal to those furnished by the hay from grass in blossom. The length of time elapsing between the early and late harvest was sufficient to seriously affect the feeding value of the late hay had it been severely injured by ripeness. Had the hay been fed alone, without the addition of grain, the results might have been different.

These tests upon the hay of two different seasons' growth and harvest correspond in results very closely to those obtained by Prof. Sanborn at the New Hampshire State College when feeding growing steers.

While it may be desirable that grass be harvested as soon as possible after blossoming, yet it is evident that the haying season can be considerably extended without serious injury to the feeding value of the crop.

Experiment No. 9.

Practical Comparison of the Feeding Values of Corn Meal, Cotton Seed Meal and Wheat Bran.

This test is substantially a repetition of Experiment No. 6, Report of 1883.

In Experiment No. 6 two cows in milk were employed eighty-four days upon a uniform hay ration, but with changes in provender which consisted of either corn meal, cotton seed meal, or wheat bran, in equal quantities. The results showed their relative values for milk production to be represented by 100 for cotton seed meal, 98.4 for corn meal, 86.7 for wheat bran; and as butter producers by 100 for cotton seed meal, 97.5 for corn meal, and 97.4 for wheat bran.

In the test just completed the hay used was a mixture principally of Timothy and Redtop, and very uniform in quality. The corn meal and cotton seed meal were good samples of these materials as usually found in the markets, and the wheat bran was what is known as coarse St. Louis bran.

Two thoroughbred Jersey cows, Tinnie in milk three months, and Betsy in milk six months, were employed. During the first twenty-eight days of the experiment Tinnie received 20 pounds of hay and 5 pounds of wheat bran per day.

This ration contained

	Total Nutrients.	Digestible Nutrients.
Protein	2.05 lbs.	1.49 lbs.
Fat	.67 "	.37 "
Carbohydrates	15.82 "	10.63 "

Nutritive ratio, 1 : 7.8.

During the second period she received 20 lbs. of hay and 5 lbs. of cotton seed meal daily, which ration furnished

	Total Nutrients.	Digestible Nutrients.
Protein	3.27 lbs.	2.28 lbs.
Fat	1.22 "	.82 "
Carbohydrates	14.84 "	8.98 "

Nutritive ratio, 1 : 4.8.

In the third period she had 20 lbs. of hay and 5 lbs. of corn meal daily. This ration had

	Total Nutrients.	Digestible Nutrients.
Protein	1.68 lbs.	1.13 lbs.
Fat	.73 "	.43 "
Carbohydrates	16.23 "	11.61 "

Nutritive ratio, 1 : 11.12.

With Betsy the same process of feeding was repeated with changed periods.

The produce of the last twenty-one days of each period was taken as the result of the food used during that time and is shown as follows:

TINNIE.

Periods of 21 days each.	Feed.	Pounds of Milk for Period.	Per cent of Cream.	Pounds of Milk required for 1 lb. of Butter.	Pounds of Butter for Period.	Pounds Gain or Loss in Weight of Cows.
First.....	Bran ration	316.	34.5	11.12	28.41	15 l.
Second	Cotton seed meal ration.....	332.1	25.	10.75	30.9	35 l.
Third.....	Corn meal ration.....	292.6	24.	14.5	20.18	18 l.

BETSY.

First	Cotton seed meal ration.....	320.	30.	17.7	18.08	3 g.
Second.....	Corn meal ration.....	242.5	28.	16.	15.34	21 l.
Third.....	Bran ration	265.6	28.	20.8	12.76	48 l.

It is noticeable that there was a constant loss in weight of the cows throughout, with the exception of one period when there was a slight gain. When they came into milk several months previously they were well coated with flesh which they gradually transferred into milk. That there was a general shrinkage in the weight of animal upon all rations is evident; just how much of it to attribute to each ration is not so plain. Leaving this feature out of consideration, we find that 840 lbs. of hay and 210 lbs. of cotton seed meal produced 652 lbs. of milk, 48.98 lbs. of butter; and the cows shrunk in weight 31 lbs.—That 840 lbs. of hay and 210 lbs. of corn meal produced 535.1 lbs. of milk, 35.52 lbs. of butter; and loss in weight of cows was 39 lbs.—That 840 lbs. of hay and 210 lbs. of bran produced 581.5 lbs. of milk, 41.17 lbs. of butter; and the cows lost in weight 63 lbs. The relative values of these foods as milk producers are represented as follows: Cotton seed meal, 100; corn meal, 82; bran, 89.1. As butter producers: Cotton seed meal, 100; corn meal, 72.5; bran, 84.

The average prices paid for cattle foods in our market during the test—March, April and May, 1884—were, cotton seed meal, per 100 lbs., $1.50; corn meal, per 100 lbs., $1.34; bran, per 100 lbs., $1.15. Putting the hay at $10 per ton, its market value at the

time, and the food costs of butter and milk from the different rations were as follows:

RATION.	Cost per 100 lbs. Milk.	Cost per lb. of Butter.
Hay and cotton seed meal.....	$1.12	15 cents.
Hay and corn meal.....	1.31	19.7 "
Hay and wheat bran.....	1.13	16 "

The quality of the butter from the corn meal ration was higher in color and somewhat firmer in texture than that from either of the other rations. No difference could be detected in the flavor of the different samples.

Experiment No. 10.

On Feeding Full Rations and Reduced Rations.

There has been adopted at the College Farm, for mature dairy animals of 800 to 1,000 pounds weight, a daily ration consisting of 20 lbs. of hay of mixed grasses, 3 lbs. of cotton seed meal, 3 lbs. corn meal and 2 lbs. of wheat bran. This ration has given good satisfaction and proved profitable financially. While there has been a decided loss of flesh during the flush of the flow of milk, the animals have returned to their original weight later in the season.

Farmers visiting the farm to examine into the management of the herd of dairy cows have often asked if better results could not be obtained from a financial standpoint by feeding smaller rations. With a view of throwing some light on this question the following experiments were undertaken. In one experiment there was fed the full ration of 20 lbs. of hay, 3 lbs. of cotton seed meal, 3 lbs. corn meal, and 2 lbs. of wheat bran, against a ration in which the quantity of hay and bye fodders was reduced one-fourth, or a ration consisting of 15 lbs. of hay, $2\frac{1}{4}$ lbs. of cotton seed meal, $2\frac{1}{4}$ lbs. of corn meal and $1\frac{1}{2}$ lbs. of wheat bran.

From the analyses of the different fodders used, it appears that the full ration had the following composition:

Protein..	3.03 lbs.
Fat.....	1.13 "
Carbohydrates.....	17.03 "

From the table of digestibility in Armsby's Manual of Cattle Feeding, it was calculated the ration contained of digestible

Protein	2.16	lbs.
Fat	.76	"
Carbohydrates	11.50	"

With a Nutritive ratio, 1 : 6.2.

In the three-fourths ration was contained of

Protein	2.28	lbs.
Fat	.84	"
Carbohydrates	12.75	"

Of digestible nutrients calculated as above, there were

Protein	1 62	lbs.
Fats	.60	"
Carbohydrates	8.64	"

Nutritive ratio, 1 : 6.2.

These rations were fed alternately to two cows through two periods of 28 days each. The first seven days of each period which were allowed for the animals to become accustomed to their feed and to overcome the effects of previous feeding have not been taken into account. The cows selected for the experiment were Clover, three-fourths Jersey, one-fourth Devon, weighing 760 lbs., had been four months in milk; and Juno, a Maine registered Jersey, weighing 875 lbs., had been four months in milk.

For the first period Clover was fed the full ration, and Juno the three-fourths ration. For the second period Clover received the three-fourths ration, and Juno the full ration, with the results given in the following table:

CLOVER.

Periods of 21 days each.	Feed.	Pounds of Milk for Period.	Per cent of Cream.	Pounds of Milk required for 1 lb. Butter.	Pounds of Butter for Period.	Gain or Loss in Weight of Cows.
First	Full ration	389.56	20.0	34.24	11.37	22
Second	Three-fourths ration	330.44	16.0	20.66	16.00	—42

JUNO.

First	Three-fourths ration	491.44	21.5	19.70	24 9	—27
Second	Full ration	534.06	21.0	19.75	27.04	25

An examination of the table shows that Clover produced 59.16 lbs. more of milk on the full ration than on the three-fourths ration, while on the full ration there was also a gain of 22 lbs. in the weight against a loss of 42 lbs. when on the three-fourths ration. For some reason which we are unable to explain, the yield of butter was less from the larger quantity of milk produced from the full ration than from the smaller quantity produced by the three-fourths ration.

Juno produced 42.62 lbs. more milk on the full ration and 2.1 lbs. more of butter, and made a gain of 25 lbs. in weight against a loss of 27 lbs. on the three-fourths ration.

The two cows together while on the full ration produced 923.62 pounds of milk against 821.88 pounds of milk on the three-fourths ration. Together the cows gained 47 lbs. in weight during the time they were fed on the full ration and lost 67 lbs. during the time they were fed on the three-fourths, making a difference of 101.74 lbs. of milk and 114 lbs. in live weight in favor of the full ration.

It is true that the live weight of animals taken with every precaution to avoid disturbing influences cannot be implicitly relied upon to determine actual gain or loss of flesh, but in this case it was noted that during the experiment the general appearance of the animals while on the smaller ration was such as to indicate that they were losing flesh.

It appears then that the full ration was sufficient to keep up a good flow of milk and to cause a considerable gain in flesh, that a slight reduction of this ration might be advisable, but that any radical reduction would not be desirable.

Experiment No. 11.

On Feeding Full Rations and Reduced Rations.

A second experiment on feeding a reduced ration to dairy stock was undertaken in which the bye fodders of the full ration of the preceding experiment were reduced by one-half, so that the reduced ration consisted of 20 lbs. of hay of mixed grasses, 1½ lbs. of cotton seed meal, 1½ lbs. of corn meal and 1 lb. of wheat bran. This ration was fed in connection with the full ration of 20 lbs. of hay, 3 lbs. of cotton seed meal, 3 lbs. corn meal and 2 lbs. of wheat bran.

The chemical composition of the full ration was the same as that of the full ration of the preceding experiment, while that of the reduced ration was as follows:

Protein	2.16 lbs.
Fat	.83 "
Carbohydrates	14.70 "

Furnishing, according to the tables of digestibility, the following quantities of digestible nutrients:

Protein	1.49 lbs.
Fat	.53 "
Carbohydrates	9.92 "

With a Nutritive ratio of 1 : 7.5.

This ration and the full ration were fed alternately to two cows through two periods of 28 days each. The results of the first seven days in each period were rejected as liable to be influenced by previous feeding.

The animals selected for the trial were Maggie, a three-fourths Jersey and one-fourth Short-horn, and Tulip, a full-blood Short-horn. Maggie had been in milk 12½ months and weighed at the commencement of the trial 1015 lbs. Tulip had been in milk 9½ months and weighed 1085 lbs.

During the first period of the feeding trial Maggie received the full ration, and Tulip the full ration of hay and one-half ration of the bye fodder. During the second period this order was reversed, Tulip receiving the full ration and Maggie the reduced ration.

In the table below are given the results of the last twenty-one days of each period.

MAGGIE.

Periods of 21 days each.	Feed.	Pounds of Milk for Period.	Per cent of Cream.	Pounds of Milk required for 1 lb. Butter.	Pounds of Butter for Period.	Gain or Loss in Weight of Cows.
First	Full ration	271.25	25.0	20.9	12.98	35
Second	Reduced ration	191.63	31.0	17.12	11.18	—55

TULIP.

First	Reduced ration	350.50	17.5	24.1	14.54	12
Second	Full ration	341.75	19.0	25.0	13.67	18

It appears that Maggie produced 80 lbs. more milk on full ration and gained 35 lbs. in weight against a loss of 55 lbs. of weight on the reduced ration, while Tulip produced 8¾ lbs. more of milk on the reduced ration than on the full ration, while the gain in weight in each period was about the same.

The two cows together produced 613 lbs. of milk and made a gain of 53 lbs. while on the full ration, and 542 pounds of milk and suffered a loss in weight of 43 lbs. while on the reduced ration. Making a difference of 71 lbs. of milk and 96 lbs. in live weight in favor of the full ration in 21 days.

Experiment No. 12.

Cream Tests.

An examination of different samples of cream has given results which are of value to creamery managers, and especially to their patrons. It has been the custom at creameries, as at cheese factories, with respect to milk, to consider all cream as of equal value.

Twenty samples of cream, from different cows in the College Farm herd, obtained by deep setting in ice-water, having been subjected to precisely similar conditions in ripening and churning, gave results, varying widely, or extremes requiring from seventy-four to one hundred and thirty-six cubic inches of cream for the pound of butter. The following table shows the number of cubic inches of cream and pounds of milk required for a pound of butter, also the amount of milk and butter yielded by each cow upon the day of the test, and per cent of cream shown by the milk:

	Pounds of Milk per day.	Per cent of Cream.	Pounds Butter per day.	Pounds Milk for 1 lb. Butter.	Cubic inches of Cream for 1 lb. Butter.
Cow No 1	37.43	25	2.125	17.61	124
" 2	30.25	21	1.625	19.23	113
" 3	20.06	21	1.5	13.4	79
" 4	16.93	21	.75	22.58	133
" 5	12.	18	.75	16.	84
" 6	16.31	28	1.	16.30	128
" 7	20.56	27	1.5	13.7	104
" 8	14.93	18	1.	14.93	74
" 9	15.62	22	.875	17.74	108
" 10	17.56	30	1.375	12.77	108
" 11	11.43	37	.875	13.7	136
" 12	22.	21	1.25	17.6	104
" 13	13.87	27	1.	13.14	99
" 14	21.75	16	.75	29.	130
" 15	18.93	19	.875	21.64	116
" 16	30.75	32	2.312	13.29	120
" 17	23.5	20	1.437	16.35	92
" 18	14.75	25	1.	14.75	104
" 19	20.62	20	1.	20.62	116
" 20	32.68	18	1.562	17.65	89

These samples of cream prove to be but little more uniform in their butter capacity than was the milk from which they were produced.

REPORT OF COMMISSIONERS ON CONTAGIOUS DISEASES OF CATTLE.

In conformity to the law the Commissioners on Contagious Diseases of Cattle submit the following report of their work for the time commencing June 1, 1883, and ending July 1, 1884:

GLANDERS.

Several cases of contagious Glanders (*Farcy*) have come under our attention during the time embraced in this report.

June 18, 1883, the Commissioners were notified of a case of Glanders in a horse belonging to Mr. —— Girard of Saccarappa. Dr. Bailey, the Veterinary Surgeon of the Commission, immediately visited the horse, when on examination it proved to be a case of Chronic Catarrh, and the horse was discharged.

September 7 notice was received from the municipal authorities of Biddeford, of a diseased horse belonging to Beane Brothers of that city. This proved to be a case of acute Glanders, and the horse was condemned, and appraised and killed according to the provisions of the law. The appraisal was laid at one hundred twenty-five dollars ($125), and the State is holden to refund four-fifths of the sum.

February 18, 1884, the case of a diseased horse belonging to B. H. Hatch of Bangor, was reported by the owner. An examination made by Dr. Bailey showed a case of Glanders, and the horse was condemned and destroyed according to law. The appraisal was laid at seventy dollars ($70).

April 17 notice was received of a diseased horse owned by —— Merrill of Falmouth. An examination made showed indications of Glanders, and the horse was placed in quarantine for thirty days for the development of the disease. At the expiration of the quar-

antine the horse was condemned and destroyed. The appraisal was laid at thirty dollars ($30).

CATTLE.

March 10 notice was received from the municipal officers of the town of Ripley, of the appearance of a contagious disease among the cattle in that town. By direction of the Commissioners, Dr. Bailey visited the locality and made examination of the disease, but found nothing coming under the provisions of the law.

June 23 the municipal officers of Boothbay notified the Commissioners of a fatal disease among the cattle of Kiah Merrill of that town, of which four had died and others were sick. Dr. Bailey visited the premises the 25th, and an examination of the sick cattle showed the disease to be Bloody Dysentery. The Commissioners rule that this disease does not come under the provision of the law, and no further action was taken.

The attention of the Commissioners has been called to many other cases of disease, among both cattle and horses, which were of a character not coming under their jurisdiction. Such cases have been dismissed without cost to the State.

FOOT AND MOUTH DISEASE.

On Saturday, February 2, 1884, the steamer Ontario, from Liverpool, England, landed at the port of Portland twenty-eight head of Hereford cattle owned by George Leigh, Beecher, Illinois. Before landing, these cattle were inspected on shipboard by Dr. E. F. Thayer, Inspector of the United States Treasury Commission, and were pronounced free from disease. Accordingly the cattle were allowed to land, and were driven over the public highway about three miles to the United States Quarantine Station located in the town of Deering. Three days after, on the 5th, Collector Dow telegraphed to Dr. Thayer, requesting him to again visit the herd as they were pronounced by their attendant to be sick with Foot and Mouth Disease. The cattle were visited by Dr. Thayer on the 6th, as requested, and were again pronounced free from disease.

The morning of February 2d, after the imported cattle were driven over the highway, Mr. Jas. L. West of Falmouth drove into the city a pair of oxen drawing a load of wood to near the steamer's

landing, and as the imported cattle were driven up from the wharf, he followed along behind them with his team, a mile or more in distance.

On February 8 Mr. West traded these oxen to Mr. Samuel Rolfe of Deering, and they were placed among his other cattle, ten in number. Mr. Rolfe soon sold them to Mr. Charles Norton of Allen's Corner, who found they were sick, and returned them to their former owner. On their return they were passed on the road by a pair of oxen belonging to Mr. Jas. L. Pierce of Falmouth.

Mr. West's cattle were exposed to the imported cattle on the 2d, and were taken sick on the 8th; and Pierce's and Rolfe's cattle were exposed to West's cattle on the 8th, and were taken sick on the 11th and 13th respectively.

The evening of February 15 the Commissioners were notified, in the person of Dr. Bailey, by Judge Cleaves, council for the towns of Deering and Falmouth, that a disease had appeared among the cattle of Jas. L. West and Jas. L. Pierce of Falmouth, and Samuel Rolfe of Deering. The morning of the 16th the cattle on the above-named premises were visited by Dr. Bailey, and after examination, the disease was pronounced Foot and Mouth Disease; and the cattle and the premises of the above-named parties were at once placed under quarantine, and notice to that effect was publicly given by placards posted in conspicuous places on the streets passing by the quarantined premises, and, subsequently, by notices published in the public papers of the city of Portland.

On February 22 notice was received of sickness among the cattle of Joshua L. Whitehouse of West Falmouth, and an examination at once made showed the Foot and Mouth Disease in this herd also. These were at once quarantined and public notice given as before.

February 24, the Commissioners were notified of the same disease in the herd of John A. Smith of Deering, and they were at once placed under quarantine and notice given as in the other cases. On these five farms, as the sequel proved, there were forty-four cases of contagious Foot and Mouth Disease.

From the above dates strict quarantine regulations over the herds and the premises where they were kept were enforced until the release of quarantine. All communication, in every respect, with the diseased cattle and with the infected premises was prohibited, except by permission of the Commissioners. No visitors were admitted to the sick cattle or to the barns in which they were stabled. No cattle

were allowed to leave the infected premises; no products were allowed to be taken away; no milk from the herds was allowed to be disposed of; the keepers of the stock were not allowed to leave the premises without first changing their boots and clothing.

The public road over which the imported cattle were driven from the steamer to the quarantine station was placed under quarantine by the Commissioners, and all cattle were prohibited from being driven over it until the quarantine was released.

These precautions were believed by the Commissioners to be all that was called for to hold the disease within the limits where it first broke out. To make sure that the action was all that was needed, the highest veterinary authorities in the country were consulted. Among the responses to the inquiries made, the following letter, recommending more stringent measures than had been adopted, was received from the Dean of the Faculty of the Montreal Veterinary College:

MONTREAL, March 3, 1884.

Dear Sir:—In compliance with your request in your letter of the 29th of February, I have much pleasure in submitting the following suggestions with regard to what you should advise to be done to prevent a further spreading of the disease, "Foot and Mouth," which is now prevailing near Portland, Maine.

Such is its contagiousness that nothing short of a close quarantine of the infected district will prevent its further extension. All infected farms or buildings should be isolated and signboards put up in conspicuous places warning all neighbors not to enter the premises. (This you have done). All movement of animals, except for slaughter on the premises, should be forbidden until four weeks after the recovery of the last case. A *cordon sanitaire* should be organized to prevent the movement of animals beyond the infected district, which should include one mile beyond the actual existence of the disease. Especial care should be exercised with reference to railroad cars. No quarantine officer or other person coming in contact with diseased cattle should be allowed outside the infected district, nor should any such be allowed to leave the infected place where he is doing duty, without first disinfecting his hands and changing his clothes, including his boots. No sale, barter, or exchange of animals, except horses, should be allowed in the infected district so long as it is in quarantine. At least no movement of animals so sold should be allowed.

All railroad cars, wagons, steamboats or buildings in which infected animals have been should undergo a thorough disinfection, by scrubbing with hot water and carbolic acid, one pound to four gallons, or where practicable by steam and afterwards whitewashing with hot lime, to which chloride of lime (one pound to a gallon) is added. All the wood-work to a height of seven feet should be so treated.

Any hay, straw or other fodder which has been in the same building should be either consumed in the building or, if sold, it should be delivered under official supervision, for the use of and to be consumed by horses only. If the quantity is small, it should be bought and either consumed on the premises or destroyed.

All halters, covers, bags, etc., should be boiled in a carbolic solution, or destroyed. Manure is dangerous and should be placed in a heap well mixed with lime, carefully fenced in and used only as a dressing on plowed land where it will be covered up, and on no account as top dressing for pasture lands. You should take advantage of the winter, and while it lasts prosecute active suppressive measures, as it is more difficult to manage in summer as animals are more moved then. Impose a heavy penalty on all who fail to report disease in their stock.

All this may to some seem unnecessary, but in consideration of the enormous value of the cattle trade of the United States, which is menaced by the extension of the disease, it will be seen that the temporary inconvenience which such measures may entail are trifling in comparison.

I will be greatly pleased to hear that a rigid quarantine is being instituted, and feel confident that if faithfully carried out it will be successful, if not it will spread not only in your own but to other States, and in the end prove very costly to exterminate.

Yours faithfully,

D. McEachran, *F. R. C. V. S.*

G. H. Bailey, *D. V. S.*,

Veterinary Officer of Board of Cattle Commissioners, Me.

At a meeting of the full Board of Commissioners it was decided that the extreme measures recommended by Dr. McEachran, of quarantining the whole infected district, and to the distance of a mile beyond any known infection, was not called for under the conditions at that time prevailing. This would have shut up a thickly populated farm district of three miles in width and over four miles

in length. Subsequent events proved that the course taken by the Commissioners was all that was called for, and that in adopting it they saved many thousands of dollars to the towns and the State.

Meanwhile the citizens of the county adjacent to the infected farms, without giving the matter that candid examination it called for, became alarmed, and in a public meeting, called for the purpose of deliberation upon the matter, censured the Commissioners in what they were doing, and called for more stringent measures, to the extent of burning the infected barns and killing the diseased cattle; and appealed, through committees raised for the purpose, to the Governor of the State to have their extreme views carried out.

In order to allay excitement and to give to the public the authoritative facts, the following report was made to the Governor:

PORTLAND, March 25, 1884.

To the Hon. Frederick Robie, Governor of Maine:

That the recent importation of Foot and Mouth Disease, together with the culpably defective arrangements for the quarantine and exclusion of animals affected with contagious diseases at this port, should have caused serious apprehensions among the stock-raising and farming communities of the State, was no more than should have been expected from intelligent and thoughtful men. That a disease which had already overrun and devastated the continent of Europe, should demand a vigorous and efficient inspection by the United States officials, and prompt and resolute treatment at the hands of the municipal authorities and State Commissioners, no one will deny.

We wish to call your attention at this time to a summary of what has been already accomplished, in view of the fact that this morning's papers noticed a meeting of prominent citizens and farmers, in which they request the Governor and Council to investigate the official action of the State Commissioners.

As officers of the Board of Cattle Commissioners we heartily concur in that resolution, and we invite the fullest inquiry and investigation of the precautions that have been taken and of the results that have been attained. If incompetent and inefficient men have been appointed to "stamp out" a disease so insidious and active in its contagion that the ocean offers no barrier to its approach, so subtle in its infection that the clothing of attendants can carry and

disseminate it over vast areas, the sooner they are removed the better for the safety and good of all concerned; but as you and members of your Council have recently had an opportunity to personally inspect the quarantine stations under control of the Commissioners, you may possibly be in as good position to judge of the success and efficiency of the regulations they have imposed as those who seem to think the Commissioners and the farmers are separate entities, in which the former are doing all they can to thwart the objects and injure the property of the latter. Allow us to briefly recapitulate the facts as they have occurred since February 2d, when the English steamer Ontario landed the Hereford cattle now at the United States quarantine in Deering, and from which it is now conceded the disease originated.

That the cattle of James L. West of Falmouth were directly exposed to the imported herd the morning of their arrival, and that they in turn directly infected every creature that is now or has been affected with the disease in Maine, is conceded.

On the evening of the 15th of February, the State Commissioners were for the first time notified that contagious diseases were apprehended in the towns of Deering and Falmouth, and on the morning of the 16th, they took possession of the farms of Messrs. West and Pierce of Falmouth, and of Mr. Rolfe in Deering; on the 22d, of the cattle of Mr. Whitehouse of West Falmouth, and on the 24th, of those of J. A. Smith at Allen's Corner. From the first notice to the present moment, strict quarantine regulations have been enforced, public notices have been posted on the infected farms, and when deemed necessary, in the public papers, faithful and competent men have been put in charge of the infected cattle, constant medicinal and preventative treatment, together with an ample supply of disinfectants, have been furnished them; all persons excepting those in authority have been excluded from the premises, the roads over which the imported cattle passed publicly quarantined and the most distinguished and experienced men in the veterinary profession have been daily consulted and advised with, that every precaution might be taken and every suggestion followed out that could add to the security or further the interests of those for whose benefit a veterinary sanitary service has been organized and maintained.

Whatever success has attended the efforts of the Commissioners to suppress a disease that has baffled the skill and ingenuity of the best practitioners of Europe, has been the result of the rigid and constant enforcement of these regulations, and we are willing to rest our case upon the undisputed and uncontroverted fact that although over a month has now elapsed since the last outbreak of the disease occurred in either of the State quarantines, no suspicion of a single case outside of these five farms has been brought to our notice. No animal has died of the disease, and every animal that has been affected is either convalescent or entirely recovered. As the disease runs its course in from fifteen to eighteen days, all direct means of communication has thus expired in both the United States and State quarantines, and would the gentlemen who object to the action of the Commissioners have us remove the cattle from these barns before their period of quarantine has expired? Or would they have us move the manure, thus scattering its volatile properties to the four winds of heaven? At a recent meeting of the United States Veterinary Medical Association, holden in Boston, the subject of Apthous Fever was introduced and it was voted that the whole sanitary system of cattle inspection needs revision, and as managed now an alarming state of things exists.

It has been alleged that the advice of Dr. McEachran of Montreal, one of the ablest men in the veterinary profession, given to the Commissioners on the 4th of March, to establish a "*cordon sanitaire*" which should include one mile beyond the actual existence of the disease, has not yet been acted upon, but it is conveniently forgotten to explain that the very next day after Dr. McEachran's visit the Commissioners were together, and it was then and there decided that if a single new case developed outside of those already existing, his recommendations should be adopted and carried out. But up to this very day that emergency has never arisen, and as a consequence the rule has never been enforced, and while we have been at all times ready and willing to adopt any measures that would enhance the security, or further the interests of those we have the honor to serve, we have entirely disregarded the attacks of those newspapers which, while pretending to represent the agricultural interests of our State, have week after week taken every opportunity to misrepresent and pervert facts, and by narrow minded and ungenerous remarks have sought to poison the public mind by such damaging nonsense as could have no foundation but in the muddled brains of the inventors.

In conclusion, allow us to say that we are decidedly of the opinion that all attempts to control and fully suppress this disease, if allowed to invade our State, as under the present Treasury Commissioners' regulations, will be futile and abortive; and that the only true remedy will be found in the absolute prohibition of the importation of all cattle from countries in which Foot and Mouth Disease is known to exist. We have the honor to be

Very truly yours,

GEO. H. BAILEY, *D. V. S.*

W. B. FERGUSON and Z. A. GILBERT,

Cattle Commissioners for Maine.

At a joint meeting of the Commissioners, the Governor and Council and the municipal officers of the towns of Deering and Falmouth, held at Portland, April 1, Mr. Samuel Bell of West Falmouth was appointed by the Governor a temporary member of the Commission, for the purpose of representing the interests of the locality, and to aid in carrying out the disinfection of the premises where the disease had prevailed. A consultation of the veterinary authorities showed that it requires a period of from fifteen to eighteen days for this disease to run its course in an animal. There is a difference of opinion among these authorities as to the time which should elapse after the disease has run its course, before the animals will be free from all danger of transmitting it, and may, with safety to the public, be released from quarantine. Some authorities claim that a period of thirty days will insure safety, while others claim that sixty days should be allowed. In order to give the public the advantage of the greatest precaution, it was decided to hold the quarantine on each of the infected premises for sixty days after the recovery of the last animal taken.

The sick animals were under the professional care of Dr. Bailey, and were visited by him daily, or as often as they needed attention, throughout the run of the disease.

Foot and Mouth Disease, or Epizootic Aphtha, is a vesicular eruptive, or exanthematous affection, due to a specific ferment, and having its lesions localized in the skin and mucous membranes. The symptoms are readily made out by the cattle getting off their feed, isolating themselves, muscular twitching or shivering, erection of the hair, skin hot and dry, an elevation of temperature, urine scanty and high colored, and bowels usually constipated. There may or may not be mucous discharge from the eyes and nose. In

cattle one of the earliest pedal signs is lameness and frequent shaking of the affected feet, with movements generally stiff and painful. Vesicles are located in the interdigital spaces, varying in size from a bean to a walnut. The vesicles burst within twelve hours, and discharge a limpid, straw colored fluid. The advent of mouth lesions in cattle is marked by smacking of the lips, and profuse dribbling of saliva, and these are always pathognomonic of the disease, and are often the first signs that attract the notice of their attendants. Vesicles form in the mouth, varying in size and character according to the part of the buccal membrane in which they are located, and mastication is attended with much difficulty.

In the treatment of the disease, the prognosis of which is generally favorable, the first thing is to protect the animals against wet or cold. When the mouth is very sore, sloppy food should be given them, easy to masticate, mashes or bran, oat and linseed meal; roots should be avoided, as they are apt to lead to choking. If the disease is protracted, stimulants should be given, and a plentiful supply of pure water. Mild laxatives like Epsom salts may be administered at the outset, and the addition to the drinking of some anti-septic saline, as nitrate or chlorate of potash. Where great weakness is manifested, tonics, as iron, gentian, cinchona, etc., should be ordered. They should also have a good bedding of straw or sawdust. When the vesicles burst in the mouth a solution of (one to sixteen) chlorate potassa, iron sulphas, alum or borax, may be applied by the aid of a soft sponge attached to a stick. If scabs form around the points of the teats, they may be softened with glycerine, but great care should be taken in milking not to wound the teats. The feet should always be kept clean, and if there is any tendency to unhealthy action, or suppuration, carbolic acid or chloride of zinc should be applied, and if the inflammation has extended into deeper structures, and proud flesh is formed, caustics, like dry alum or a strong solution of chloride of zinc, should be prescribed.

The work of disinfecting the infected premises was put in charge of Dr. Bailey and Mr. Bell. The work was begun on the premises of Mr. West, where the disease first broke out, on April 7, forty-three days after the complete recovery of the last case in that herd. The manure from the barn was carted with horse teams to an isolated place in the field and piled in a compact heap; and the yard where the cattle had run was carefully scraped of all surface material and

carted to the same pile. While being piled it was thoroughly mixed with quick-lime, and after the pile was completed, the whole was saturated with sulphuric acid solution. The pile was then covered with fresh earth and securely fenced in, so that no animal could come in contact with it. The cattle were thoroughly washed with a carbolic solution and then removed to other quarters while their stalls were being cleansed. The barn utensils, in use among the sick cattle, and the clothing of the attendants were all burned. The stanchions, floors, partitions, feeding mangers and water troughs were all removed and burned, and new ones from new lumber were put in their places. The walls of the lean-to were washed in hot lime and carbolic acid solution, two coats, and the yard fences around where the cattle had run were treated in the same manner. The floor timbers under the cattle stalls were carefully scraped, and all accumulations under the floors carefully removed to the depth of a foot and a covering of fresh earth placed over all. The entire barns were then fumigated by closing all cracks, openings and doors, and then burning sulphur in iron pots, allowing the fumes to penetrate every part of the barn, and killing all forms of life and all infectious germs that might remain. Subsequent to this work, and after the stock had been wintered out and were ready to run to pasture, all the hay remaining unconsumed was removed and burned.

Fears being expressed by the interested public that the precautionary measures adopted by the Commissioners were not such as would insure the public against the further breaking out of the disease, His Excellency, Governor Robie, applied to the Department of Agriculture asking that a veterinary expert be sent to investigate the situation, and examine the work being done to stamp out the disease. Accordingly D. E. Salmon, Veterinarian to the Department, was detailed for the purpose, and visited the seat of the infection, in company with the Commissioners, on April 16, and reported as follows:

U. S. DEPARTMENT OF AGRICULTURE,
VETERINARY DIVISION,
WASHINGTON, D. C., April 16, 1884.

Hon. Frederick Robie, Governor of Maine:

Sir:—Having visited the herds of cattle in the vicinity of Portland, now held in quarantine by the State authorities, and having investigated the methods of disinfection that are being practiced, I

have no hesitation in saying that these are thorough and that they may be relied upon to destroy all remnants of the disease.

There is a small Jersey bull at the Rolfe place, which has not made a good recovery. He seems to have a tendency to tuberculosis, and this complication of diseases has led to sores and swellings of the limbs, which would render it advisable to prolong the period of quarantine for an indefinite time if he is preserved. I would, therefore, advise his immediate destruction. In case this animal is slaughtered and safely buried beyond the reach of dogs, or otherwise properly disposed of, I think the quarantine might be removed without danger, two weeks later.

After examining the barns and hay, and the exposure which the latter has had to the emanations from the animals, I am of the opinion that all remaining unconsumed by these animals should be destroyed by fire.

The removal of the floors of the stables, and the thorough renovation which these are receiving, as well as the disposition of the manure, seem to be eminently judicious, and I can see no reason for further alarm. Very respectfully,

D. E. SALMON,
Veterinarian U. S. Dept. of Agriculture.

The calf referred to in the above report was killed and buried April 18.

After the completion of disinfection, Mr. West was given a release from quarantine, dated April 25, 1884, being sixty-two days after the disappearance of the disease from his premises.

The same disinfective measures were carried out on each of the farms where the disease had prevailed, and each in turn were released from quarantine in the following order by written notice issued by the Commissioners: James L. West, April 25; Joshua L. Whitehouse, April 26; Lemuel Rolfe, May 8; James L. Pierce, May 8; John H. Smith, May 11; quarantined road, May 5.

The cattle and infected premises of the United States Quarantine Station at Deering, being under the care of United States authorities, did not come under the jurisdiction of the Commissioners further than to see that the measures deemed necessary were faithfully enforced by the department having it in charge.

The work of disinfection having been completed, the following notice, signed by the Commissioners, was issued under date of May 21:

Hon. Frederick Robie, Governor of Maine:

We, the Commissioners on Contagious Diseases in Cattle for the State of Maine, beg leave to report that the Foot and Mouth Disease, which appeared in the towns of Deering and Falmouth, February 15, 1884, has been entirely stamped out. All the infected premises have been thoroughly disinfected, and the hay ordered burned. The quarantine was relieved May 16, just three months from the date of the appearance of the disease. The law having been complied with, and all danger from further outbreak provided against, we now pronounce the State free and clear from all contagious diseases among cattle.

The disease having been stamped out it only remained for the State to meet its obligations under the law to the injured parties. Section 52 of the Statutes reads as follows:

"Section 52. All losses, damages and reasonable expenses sustained in consequence of the execution of the orders of said Commissioners, shall be appraised as provided in section 39, and paid as provided in section 37."

The Attorney General of the State decided that the appointment of appraisers devolved upon the municipal officers of the towns in which the disease was located.

At a meeting in Portland, held for the purpose on May 21, the the parties named in the following notice were appointed for the appraisal in each town:

STATE OF MAINE.

CUMBERLAND, ss., May 21, 1884.

To Wm. L. Prince, of Cumberland; Mark Mosher, of Gorham; and Thomas B. Haskell, of Cape Elizabeth, in said county:

By virtue of sections 39 and 52 of chapter 14 of the Revised Statutes, we, the undersigned, municipal officers of the town of Falmouth, in said county, (all persons, corporations and parties interested having consented thereto) have and do hereby appoint you, three competent and disinterested men, to appraise according to law, all losses, damages and reasonable expenses sustained, by all persons, corporations and parties interested therein, in consequence of the execution, by us, of the orders of the Commissioners appointed and constituted as provided in section 50, chapter 14, and section 6, chapter 58 of the Revised Statutes, and resulting since January, 1884, from cattle therein infected with and exposed to the contagious disease known as the Foot and Mouth Disease. Your appraisal thereof to be made under oath and in writing and signed by you, first giving all persons, corporations and parties interested opportunity to be heard therein, and make return of your appraisal to us as soon as completed, that we may certify the same to the Governor and Council of the State of Maine, and to the Treasurer of said town of Falmouth, as required by section 47, chapter 14 of said Statutes.

BENJ. F. HALL,
D. O. MOULTON,
WM. W. LIBBY,
Municipal Officers of said Falmouth.

STATE OF MAINE.

CUMBERLAND, ss., May 27, 1884.

Personally appeared before me, the subscriber, a Justice of the Peace throughout said State; Wm. L. Prince, Mark Mosher and Thomas B. Haskell, and made oath that they would faithfully and impartially appraise, according to law, all losses, damages and reasonable expenses sustained by all persons, corporations and parties intended therein, in consequence of the execution, by the municipal officers of the town of Falmouth, of the orders of the Commissioners appointed and constituted as provided in section 50, chapter 14, and section 6, chapter 58 of the Revised Statutes, resulting since January, 1884, from cattle therein infected with the contagious disease known as the Foot and Mouth Disease and have been exposed thereto.

W. W. BOLSTER, *Justice of the Peace.*

STATE OF MAINE.

CUMBERLAND, ss., May 21, 1884.

To Wm. L. Prince, of Cumberland; Mark Mosher, of Gorham; and Thomas B. Haskell, of Cape Elizabeth, in said county:

By virtue of sections 39 and 52 of chapter 14 of the Revised Statutes, we, the undersigned, municipal officers of the town of Deering, in said county, (all persons, corporations and parties interested having consented thereto) have and do hereby appoint you, three competent and disinterested men, to appraise according to law, losses, damages and reasonable expenses sustained, by all persons, corporations and parties interested therein, in consequence of the execution, by us, of the orders of the Commissioners appointed and constituted as provided in section 50, chapter 14, and section 6, chapter 58 of the Revised Statutes, and resulting since January, 1884, from cattle therein infected with and exposed to the contagious disease known as Foot and Mouth Disease. Your appraisal thereof to be made under oath and in writing and signed by you, first giving all persons, corporations and parties interested opportunity to be heard therein, and make return of your appraisal to us as soon as completed, that we may certify the same to the Governor and Council of the State of Maine, and to the Treasurer of said town of Deering, as required by section 47, chapter 14 of said Statutes.

GEORGE B. LEAVITT,
DANIEL D. CHENEY,
LEMUEL W. DYER,
} *Municipal Officers of said Deering.*

STATE OF MAINE.

CUMBERLAND, ss., May 27, 1884.

Personally appeared before me, the subscriber, a Justice of the Peace throughout said State; Wm. L. Prince, Mark Mosher and Thomas B. Haskell, and made oath that they would faithfully and impartially appraise, according to law, all losses, damages and reasonable expenses sustained by all persons, corporations and parties intended therein, in consequence of the execution by the municipal officers of the town of Deering, of the orders of the Commissioners appointed and constituted as provided in section 50, chapter 14, and section 6, chapter 58 of the Revised Statutes, and resulting since January, 1884, from cattle therein infected with the contagious disease known as the Foot and Mouth Disease and have been exposed thereto.

W. W. BOLSTER, *Justice of the Peace.*

PORTLAND, May 31, 1884.

Hon. William L. Prince, Chairman Board of Appraisers:

Under R. S., chapter 14, sections 37 to 55.

Dear Sir:—In regard to the losses and damages which are to be appraised and paid under Revised Statutes, chapter 14, section 52, it is to be observed that they are those which have been "sustained in consequence of the execution of the orders of said Commissioners;" that is to say, those which result directly from the action of the Commissioners, not those which result necessarily from the disease itself. We see no intention in these sections to make good to the owner of cattle the loss or damage which results to him from the fact that they become diseased, if that fact is not caused by any interference on the part of the Commissioners. It is only where the action of the public officers is the cause of the damage, or results in increased loss and damage to the owner, that a claim for compensation exists.

To illustrate:—Under sections 38 and 39 provision is made for the appraisal of diseased animals and for their destruction by order of the municipal officers. Now the value to be fixed by the appraisers in such case is not what the cattle would be worth if they were well, but what their value is in the diseased condition in which the municipal officers find and destroy them.

If they could not be cured, or if it would cost all they were worth to cure them, then the loss or damage which the owner sustains by the order of the municipal officers directing them to be destroyed, is nothing;—and so on proportionally.

So, if oxen or horses, fit for labor, are kept from working by order of the Commissioners, there is a damage to be appraised and allowed, but loss of the work of cattle merely by reason of their sickness—not caused by any interference on the part of the Commissioners—is a loss which falls upon the owner by reason of the disease itself, not by any act of public officers for which the public must respond.

Any increased expense of feeding or keeping cattle by reason of the Commissioners ordering them to be isolated, we should say was to be appraised and allowed, so far as the proof shows that the owner has been subjected to such increased expense.

The destruction of diseased milk, not fit for use and having no lawful value, could not be the ground of any claim for damages.

If the milk was not so diseased as to be worthless, but still had a value for some useful purpose, then that value would be the measure of damages.

The same is true of the horses as has already been stated about the cattle. If the Commissioners kept them from working when otherwise they might properly have been employed, that is a loss to the owner for which compensation should be allowed.

In other words, the damage to cattle, or the loss of their labor, so far as it results from the disease itself (apart from any action of the public officers) is the loss of the owner, but when the acts of the officers have been the cause of the damage, or have subjected the owner to still further loss, it is to be allowed.

We think substantially the same rules apply as to similar claims for damages on account of the acts of municipal officers prior to the appointment of the State Commissioners.

It is the direct damage resulting from the acts of the public officers which is to be allowed—not remote, uncertain, or speculative damages.

Yours very truly, SYMONDS & LIBBY.

To Said Municipal Officers:

We, the subscribers, three competent and disinterested men, having first been duly chosen and appointed, and sworn as above, faithfully and impartially to appraise according to law, all losses, damages and reasonable expenses sustained by all per-

sons, corporations and parties interested therein, in consequence of the execution, by the municipal officers of the town of Falmouth in said county, of the orders of the Commissioners appointed and constituted as aforesaid, and resulting since January, 1884, from cattle therein infected with and exposed to the contagious disease known as the Foot and Mouth Disease, and after carefully examining into said losses, damages and reasonable expenses so sustained, and after hearing all evidence concerning the same, and all parties interested therein, we appraised said losses, damages and expenses as follows, to wit:

Signed, { WM. L. PRINCE, MARK MOSHER, THOS. B. HASKELL.

DAMAGES AND LOSSES.

JOSHUA L. WHITEHOUSE.

Nineteen (19) tons hay, at eleven dollars ($11) per ton, two hundred and nine dollars	$209 00
Twenty-two and one-half (22½) cords manure at six dollars ($6) per cord, one hundred and thirty-five dollars	135 00
Fifteen (15) days' loss labor oxen, at two dollars ($2) per day, sixty dollars	60 00
Thirty-two (32) days' loss labor horse, at fifty cents (.50) per day, sixteen dollars	16 00
Sixty-five (65) days' care and custody of stock; thirty (30) days at three dollars ($3) per day, and thirty-five (35) days, at two dollars ($2) per day.	160 00
	$550 00

JAMES L. WEST AND BROTHER.

Twenty-five (25) tons hay at ten dollars ($10) per ton, two hundred and fifty dollars	$250 00
Eighteen and one-half (18½) cords manure, at six dollars ($6) per cord, one hundred and eleven dollars	111 00
Nineteen (19) days' loss labor of four oxen, at four dollars ($4) per day, seventy-six dollars	76 00
Sixty-nine (69) days' care and custody of stock; thirty (30) days, at two and 50-100 dollars ($2 50) per day, and thirty-nine (39) days, at two dollars ($2) per day	153 00
	$590 00

JAMES L. PIERCE.

Forty-six (46) tons hay at ten dollars ($10) per ton, four hundred and sixty dollars	$460 00
Ten and one-half (10½) cords manure, at six dollars ($6) per cord, sixty-three dollars	63 00
Thirty (30) days' loss labor oxen, at two dollars ($2) per day, sixty dollars	60 00
Thirty (30) days' loss labor steers, at fifty cents (.50) per day, fifteen dollars.	15 00
Eighty-two (82) days' care and custody of stock, at one dollar and fifty cents ($1.50) per day, one hundred and twenty-three dollars	123 00
	$721 00

BILLS.

No. 1, Dr. H. Richardson, ten dollars	$10 00
" 2, C. W. Belknap & Son, eleven 96-100 dollars	11 96
" 3, E. A. Jordan, three dollars	3 00

No. 4,	Wm. P. Newman, five 85-100 dollars	$5 85
" 5,	Samuel Bell, one hundred and twenty-one 50-100 dollars	121 50
" 6,	C. F. Randall, eighteen dollars	18 00
" 7,	James L. West, eighty-two 78-100 dollars	82 78
" 8,	Samuel Skillin, twenty 25-100 dollars	20 25
" 9,	Elmer E. Hanson, eight 25-100 dollars	8 25
" 10,	F. F. Hall, fourteen 11-100 dollars	14 11
" 11,	Everett W. Winslow, five dollars	5 00
" 12,	Rufus Deering & Co., eighty-two 04-100 dollars	82 04
" 13,	Maine Central R. R. Co., five dollars	5 00
" 14,	State Publishing Association, two 87-100 dollars	2 87
" 15,	Eastern Argus, fourteen 75-100 dollars	14 75
" 16,	Portland Publishing Co , fourteen 47-100 dollars	14 47
" 17,	Fernald & Sawyer, twenty-three dollars	23 00
" 18,	Symonds & Libby, fifteen dollars	15 00
" 19,	Ruel Small, five dollars	5 00
" 20,	James L. Pierce, fifty dollars	50 00
" 21,	John W. Perkins & Co., forty-two 38-100 dollars	42 38
" 22,	J. L Whitehouse, thirty-six 25-100 dollars	36 25
" 23,	James L. West, eighteen 75-100 dollars	18 75
" 24,	J. L Pierce, thirty-four 50-100 dollars	34 50
" 25,	Appraisers as per bill, fifty dollars	50 00
		$694 71

To the Governor and Council of the State of Maine, and the Treasurer of said town of Falmouth:

We, the municipal officers of the town of Falmouth aforesaid—have caused all the aforesaid losses, damages and reasonable expenses sustained in consequence of the execution, by us, of the aforesaid orders of said Commissioners, to be appraised as above set forth, reported and returned to us by said appraisers, and we hereby certify the same to you as required by section 47, chapter 14 of the Revised Statutes.

Signed, { ——— — ——— / ——— — ——— / ——— — ——— } *Municipal Officers of said Falmouth.*

FALMOUTH, May—, 1884.

To Said Municipal Officers:

We, the subscribers, having first been duly chosen and appointed, and sworn as above, faithfully and impartially to appraise, according to law, all losses, damages and reasonable expenses sustained by all persons, corporations and parties interested therein, in consequence of the execution, by the municipal officers of the town of Deering, in said county, of the orders of the Commissioners appointed and constituted as aforesaid, and resulting since January, 1884, from cattle therein infected with and exposed to the contagious disease known as the Foot and Mouth Disease, and after carefully examining into said losses, damages and reasonable expenses so sustained, and after hearing all evidence concerning the same and all parties interested therein, we appraised said losses, damages and expenses as follows, to wit:

Signed, { WM. L. PRINCE, / MARK MOSHER, / THOS. B. HASKELL

DAMAGES AND LOSSES.

LEMUEL ROLFE.

Eighteen and one-half (18½) tons hay, at ten dollars ($10) per ton, one hundred and eighty-five dollars..... $185 00
Twenty-six (26) cords manure, at six dollars ($6) per cord, one hundred and fifty-six dollars..... 156 00
Twenty-five (25) days' loss labor on oxen, at two dollars ($2) per day, fifty dollars..... 50 00
Eighty-five (85) days' care and custody of stock; thirty (30) days, at three dollars ($3) per day, and fifty-five (55) days, at two dollars ($2) per day . 200 00

$591 00

JOHN H. SMITH.

Thirteen and one-half (13½) tons hay, at ten dollars ($10) per ton, one hundred and thirty-five dollars..... $135 00
Two (2) tons hay, at eight dollars ($8) per ton, sixteen dollars.. ..... 16 00
Twenty-six (26) cords manure, at six dollars ($6) per cord, one hundred and fifty-six dollars..... 156 00

$307 00

GEORGE T. SMITH.

Thirty-nine (39) days' loss labor of horse, at fifty cents (.50) per day, nineteen dollars and fifty cents..... $19 50

JOSIAH W. SMITH.

Eighty-two (82) days' care and custody of John H. Smith's stock. Thirty (30) days, at three dollars ($3) per day..... $90 00
Fifty-two (52) days, at two dollars ($2) per day..... 104 00

$194 00

BILLS.

No. 1, Samuel Bell, sixty-four 70-100 dollars..... $64 70
" 2, Rufus Deering & Co., one hundred and thirty 12-100 dollars.. 130 12
" 3, Amos Abbott, sixty-six dollars 66 00
" 4, Samuel Skillins, thirty dollars..... 30 00
" 5, C. D. Abbott, fifteen dollars..... 15 00
" 6, E. A. Jordan, three dollars.. ..... 3 00
" 7, C. F. Randall, thirty dollars..... 30 00
" 8, O. W. Rolf, sixty 32-100 dollars..... 60 32
" 9, F. F. Hall, nine 42-100 dollars..... 9 42
" 10, A. H. Gurdy, two 50-100 dollars..... 2 50
" 11, Lemuel Dyer, three dollars..... 3 00
" 12, C. W. Belknap & Son, eleven 40-100 dollars..... 11 40
" 13, C. A. Morse & Co., five dollars..... 5 00
" 14, Geo. M. Adams, ten 65-100 dollars..... 10 65
" 15, Legrow Bros., seven 26-100 dollars..... 7 26
" 16, J. F. Libby, nine dollars..... 9 00
" 17, Portland Publishing Co., thirty-six 97-100 dollars.. ..... 36 97
" 18, Eastern Argus, forty-four 77-100 dollars..... 44 77

No. 19, State Publishing Association, six 88-100 dollars	6 88
" 20, Fernald & Sawyer, twenty-three dollars	23 00
" 21, Symonds & Libby, fifteen dollars	15 00
" 22, Ruel Small, five dollars	5 00
" 23, John W. Perkins & Co., forty-two 38-100 dollars	42 38
" 24, J. W. Smith, five 50-100 dollars	5 50
" 25, Leighton & Cobb, seven 55-100 dollars	7 55
" 26, Lemuel Rolfe, thirteen 88-100 dollars	13 88
" 27, John H. Smith, eleven 63-100 dollars	11 63
" 28, Appraisers as per bill, fifty dollars	50 00
	$719 93

To the Governor and Council of the State of Maine, and the Treasurer of said town of Deering.

We, the municipal officers of the town of Deering aforesaid—have caused all the aforesaid losses, damages and reasonable expenses sustained in consequence of the execution, by us, of the aforesaid orders of said Commissioners, to be appraised as above set forth, reported and returned to us by said appraisers, and we hereby certify the same to you as required by section 47, chapter 14 of the Revised Statutes.

Signed, { ——— — ——— / ——— — ——— / ——— — ——— } *Municipal Officers of said Deering.*

DEERING, May—, 1884.

RECAPITULATION OF DAMAGES AND LOSSES.

TOWN OF DEERING.

Lemuel Rolfe	$591 00	
John H. Smith	307 00	
George T. Smith	19 50	
Josiah W. Smith	194 00	
Bills and costs	719 93	
		$1,831 43
Cost to town of Deering		366 28
Cost to State		1,465 15

TOWN OF FALMOUTH.

Joshua L. Whitehouse	$550 00	
James L. West and Brother	590 00	
James L. Pierce	721 00	
Bills and costs	694 71	
		$2,555 71
Cost to town of Falmouth		511 14
Cost to State		2,044 57

TOTAL COST TO STATE.

Deering	$1,465 15	
Falmouth	2,044 57	
		$3,509 72

July 1, 1884.

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