FOURTH REPORT

OF THE

AGRICULTURE OF MASSACHUSETTS.

FOURTH REPORT

OF THE

AGRICULTURE OF MASSACHUSETTS.

COUNTIES OF FRANKLIN AND MIDDLESEX.

BY HENRY COLMAN,

COMMISSIONER FOR THE AGRICULTURAL SURVEY OF THE STATE.

Boston:
DUTTON AND WENTWORTH, STATE PRINTERS.
.....
1841.

TO

JOHN DAVIS,

GOVERNOR OF THE COMMONWEALTH OF MASSACHUSETTS,

THE ENLIGHTENED ADVOCATE OF DOMESTIC INDUSTRY

IN ALL ITS DEPARTMENTS,

THIS REPORT IS INSCRIBED,

WITH THE HIGHEST CONSIDERATION

AND RESPECT, BY

HENRY COLMAN.

Commonwealth of Massachusetts.

In Council, March 16th, 1841.

The Governor having laid before the Council the Fourth Report of the Commissioner for the Agricultural Survey of the State, and the same having been under consideration, it is *Ordered*, that the Secretary cause three thousand copies thereof to be printed for distribution to the individuals and institutions specified in the second chapter of the Revised Statutes.

Attest.

JOHN P. BIGELOW,

Secretary of the Commonwealth.

PREFACE.

This constitutes my Fourth and last Report on the Agriculture of Massachusetts. The Legislature having, in their wisdom, seen fit to repeal the act authorising the survey before its completion, it only remains for me to wrap my robes about me and retire, leaving behind me my blessing for my good old mother, the Bay State. It is a small offering; but there is a treasury, where the mite of the poverty-stricken, if it be the gift of a true heart, will not be disdained even among the splendid offerings of the affluent.

I have given, in this case, an examination only of the counties of Franklin and Middlesex, with occasional references to other counties; but I have treated very fully the topics connected particularly with the agriculture of these two counties, such as the raising and fatting of neat cattle, sheep husbandry, dairy stock, the keeping and fatting of swine, the cultivation of hops, and the reclaiming of peat and bog meadows. I have a large amount of materials on hand in relation to these and to other counties, which I have examined, which I should have been glad to compile and present; but after the resolution repealing the survey, I have not been without fears that I may have transcended my proper limits in giving as much as I have. Should this be the case, I can only throw myself on the candor of an enlightened, and therefore liberal community.

The publication of my Report has been delayed, at the expense of some little impatience on the part of some of my friends. The delay has been occasioned, mainly, from a desire to render it more worthy of the acceptance of my fellow-citizens; and, as I have given to it more than six months' anxious labor, without any compensation, I cannot doubt that my apology will be accepted. The difficulty of selecting, compiling, and arranging it, out of a voluminous mass of materials, has been more than I myself had anticipated. The difficulty of obtaining the information which I sought, can only be appreciated by those who have attempted it. I should be very ungrateful not to acknowledge the kindness, which I have, in many cases, expeperienced. But, in numerous instances, I have applied once, twice, five times, ten times. but without success; and have on hand a large bundle of promises to pay, which have been repeatedly renewed, and new endorsements added, but which, in taking account of stock, I have long since been compelled to mark as "unavailable." By many persons, the Commissioner has been regarded as a kind of tax-gatherer, or his visits supposed to be in some way associated with a pecuniary assessment; and his approach carried their hands, almost involuntarily, to clench their pockets. Some old colts, if he went into the pasture with the measure of oats in his hands, and shook them before their eyes, could not be caught but by coming up the blind side of them; and this, at the hazard of being kicked; and, even if fortunate enough to catch and bridle them, they would not suffer him to mount, or if mounted, they would not go any more than their ancestor, spoken of in the Old Testament, in the time of Balaam. To his great amusement, if it were not unbecoming the gravity of an officer of the Commonwealth to be amused, he was sometimes reminded of the woman in Illinois. who was first visited by the Town Assessors, and next

by the Town Collector; and in a few days afterwards came the Agent for taking the United States census. She immediately, on being apprised of the object of his visit, seized the clock, which hung up by the wall, and threw it upon the fire, exclaiming, that it had been already taxed twice, and should not be taxed again; and when he ventured to ask her the number and ages of her children, she became almost frantic, and the poor things, there was reason to fear, had they not been her children, would have gone where the clock went. Instances, however, of such diseased caution and obtuseness, are rare. In general, his visits have been received with kindness, and with the more kindness as their objects became better understood. To many is he indebted for good deeds; to many more for good promises, which he has no doubt they intended to fulfil, and which he has as little doubt they have, to his great regret, often failed to fulfil from a mistaken distrust of their ability to communicate what would be valuable. In respect to the great majority of the rural population of Massachusetts, the delightful conviction has been only the more strengthened as his acquaintance with them became the more extended, that, taken as a whole, it would be difficult to find a more enlightened, more moral, or more favored population. It has been, too, with singular pleasure he has found, as he went on, that the more the disinterested objects of his survey became understood, the more highly were they appreciated, and the more ready became the co-operation of the farmers, upon which its success so much depended. Should it be hereafter renewed, in more competent hands, some great impediments to its success will, therefore, have been removed.

The survey being now arrested, and, with the popular and severe notions of public economy prevailing, not likely to be

renewed, it may not be unsuitable to inquire what has been done, and of what advantage to the Commonwealth has it been instrumental?

The whole cost of the survey to the State thus far, had it been assessed upon the inhabitants, would scarcely have exceeded a tax of one cent per head; and this for the advancement of the greatest interest of the community, though in many cases the least regarded. Almost all the cost incurred in its prosecution has been expended in the State, and has not gone out of the family. Of the amount (eighteen hundred dollars per annum) paid to the Commissioner, nearly two thirds have gone to the actual expenses of the survey; such as travelling charges, payments for information procured, books distributed, seeds and implements purchased for exhibition and gratuitous distribution among the farmers, and for various incidentals growing out of the commission. The balance, varying from six to eight hundred dollars, can hardly be considered as an over-compensation for the time and labor devoted to this object.

The next inquiry is, what has the Commissioner done in the premises? Candid minds will not fail to reflect that an Agricultural Survey was in this country a novel and altogether unattempted enterprise; that the act, by which it was established, was couched in the most general terms; and that it was left for the Commissioner himself, unaided and unadvised, without chart or pilot, to navigate an untried sea. In respect to most things in life, it is far less difficult, after they have been done, to say how they might have been better done, than before their accomplishment to say how they may be best done, or even how they may be done at all. I ask no exemption from just

and honorable, though it may be severe criticism, as that, should the work be hereafter resumed, will make its execution more easy for those to whom it may be entrusted; but I may claim to have brought to the work the strongest enthusiasm and desire for its success; and to have done what I could to execute it in a creditable manner, and to meet the reasonable wishes of the State. More cannot be had from the highest talents, and it is a consolation to feel that more cannot be demanded of the most humble. A mind actuated by a generous ambition of excellence never meets its own wishes, because, in proportion to its success, its standard of duty and attainment becomes elevated and enlarged. How can it be expected then to meet the wishes and expectations of others? It is no small gratification to me that the survey has been spoken of in terms of approbation in several parts of the country, and by those in foreign countries, whose esteem is a high honor. If among ourselves, from those whose coöperation seemed most naturally demanded, it has failed, through any motive, to receive the encouragement which it had reason to hope, it has been to me an occasion only of unfeigned regret. It is the misfortune of some minds never to look at any thing but through optics clouded or distorted by a grovelling selfishness. To take enlarged and generous views of large subjects and to merge all personal considerations in the good proposed and sought, belongs only to that small and higher class of minds who preserve their purity untainted, in an age diseased to the very core with avarice, party spirit, or personal ambition. It is sometimes extremely mortifying to learn by what influences many of the most valuable interests of the community are affected. It is sufficiently illustrative of the manner in which public business is sometimes managed, objects are brought up or objects put down, to state, that of a large committee of the Legislature, to

whom the inquiry into the expediency or inexpediency of continuing the Agricultural Survey was in one case, if not in more, committed, there is good reason to think that not a single individual of the committee, who objected to its continuance, had ever seen either of the three Reports of the Commissioner, or, in fact, knew what had been done.

The commission having then been closed and my intended removal into another State precluding any reasonable imputation of unworthy motives, I shall speak with freedom of some things which I have done or attempted, leaving it entirely to others to say how they have been done, or with what success attempted.

Of the fourteen counties in the State I have pretty thoroughly explored ten, having visited almost every town, sought the acquaintance of some of the best farmers in the several towns in each of these counties, and examined, as far as I could learn them, the principal agricultural improvements in each of them. I have attended all the cattle-shows and fairs, which have been held during the term of my commission, whether county or town shows, as far as the separate days of holding these shows permitted me to do it. I have held meetings of the farmers for conversation and discussion in several parts of the State. I have maintained an extensive correspondence with farmers in all parts of the State, and in many of the other States. With leave of the Executive, I have travelled several thousands of miles in other States for the purpose of looking at their improvements and gathering information, which might be useful to the farmers of Massachusetts; into Vermont, to see their sheep husbandry; into Connecticut, Rhode Island and New York, to see their improved stock; into New Jersey, to see the application of their marls, and to look at their beet-sugar

establishment; into Pennsylvania, to see the application of lime; and into New Jersey, Pennsylvania, Virginia, and the District of Columbia, to look at their culture of silk. It was understood, and expressly provided for in the Resolve authorizing the survey, that the Commissioner should suggest such improvements as he considered desirable and practicable in the agriculture of Massachusetts. He could hardly be expected to do this to the best advantage without seeing what improvements had been made in other places; and the extraordinary facilities for travelling have enabled him to visit them, without essentially interfering with the examination of his own State. Besides this, by request of the farmers he has delivered, in different parts of the State, at least twenty agricultural addresses, of which seven have been printed and gratuitously distributed. He has published likewise in this time,

1. An extended Circular Letter to the Farmers of Massachusetts, pointing out, in detail, the nature and objects of an Agricultural Survey.

2. A Treatise upon the use of Bone Manure.

3. A Report on the subject of a Board of Agriculture.

4. A Memorial to the Legislature on establishing a Department of Domestic Industry, and the collection of Agricultural, Manufacturing and Commercial Statistics.

5. A Report on the Culture of Spring Wheat, by order of the Senate.

6. The First Report of the Agriculture of Massachusetts, embracing principally the County of Essex.

7. The Second Report of the Agriculture of Massachusetts, embracing the County of Berkshire.

8. The Third Report of the Agriculture of Massachusetts,

embracing the subjects of Wheat and Silk, by order of the Senate.

9. The Fourth Report of the Agriculture of Massachusetts, embracing the Counties of Franklin and Middlesex.

10. An Address to the Farmers of Essex County, on the improvement of their Agriculture.

11. A full Report of the Speeches of Daniel Webster and B. Silliman, on 13th January, 1839, at the Agricultural Meeting, in Boston, with copious notes.

12. A full Report of the Speech of H. A. S. Dearborn, at the Agricultural Meeting, on 28th February, 1840.

13. A full Report of the Speech of George B. Emerson, on the Forest Trees of Massachusetts, at the Agricultural Meeting, in March, 1841.

14. An extended Report of the Remarks of Charles T. Jackson, at the Agricultural Meeting, 30th January, 1840, on Agricultural Chemistry.

Besides these services, he has instituted and provided for a series of weekly meetings of the farmers in the Legislature, and others interested in agricultural improvement, which have been held during three successive sessions of the Legislature, which meetings he has punctually attended, and of which he has constantly furnished full reports for the public papers. These meetings have been the means of eliciting and diffusing a large amount of practical agricultural intelligence, gathered from the experience of some of the most intelligent farmers in this, and in other States. They have been much attended, their utility acknowledged, and they have been visited by many distinguished gentlemen of science and skill, from various parts of the country.

The terms of the Resolve enacting the survey, were so indefinite, and at the same time so comprehensive, that the Commissioner deemed it his duty not merely to report on the condition of the Agriculture of the State, but, by every means in his power, to awaken interest and inquiry on this subject; to diffuse correct and useful information; and devote his time and talents, such as they might be, to the advancement of this great interest of the Commonwealth. He has anxiously endeavored to do this.

The next inquiry is, what has the Agricultural Survey effected? To this, it cannot be expected that a very definite answer can be given. Perhaps, so early as this, much visible and direct effect was not to be looked for. Seed will sometimes lie long in the ground, without germinating; at best, its results are not to be expected at once; and we must wait for the early and the latter rain, before the harvest can be matured. Again, much influence is often exerted, the operations of which cannot be detected, and much of good is often effected, which does not admit of any sensible or definite measurement. This applies particularly to all good of a moral or intellectual nature; and much, which was proposed to be effected by an Agricultural Survey, is of this character. We cannot possibly determine how much knowledge has been communicated, how much zeal for improvement has been kindled up, how much the estimation of the agricultural art and profession has been exalted; nor learn at once, if at all, how many experiments have been made; how many improvements have been carried out; and how far the crops have been increased; nor in what respects, nor to what extent, the Agricultural Survey has contributed to any of these results, if results they are. We may not know, when the rain descends upon the parched ground, by what mysterious process

it will revive the drooping plants; how much of its quickening influence will penetrate the leaves, and how much will be imbibed by the roots; nor what property in the rain water, nor what combination of properties, operates to produce these effects; but when we see the decayed and burnt-up herbage soon quickened into life, and assuming its natural and brightest verdure, it would be useless to deny that the rain may somehow have had its share in this extraordinary and beautiful change. There is no doubt that the thirst for agricultural knowledge, and the spirit of agricultural improvement, have never been so active in our community, as at this very time.

It would be most unjust to charge me with the vanity of presuming that all this, or even much of this, has been effected by my labors. I would not be thought to place my humble services in competition with the influences of the agricultural press, or of the agricultural societies throughout the country, or of many distinguished men; men among the living, whose eminent merits I cordially acknowledge; and men among the dead, the remembrance of whose wide and active usefulness, I cherish with deep and unaffected reverence. I will assume nothing for having devoted my leisure hours, from my professional duties, for nearly forty years, to the study and the direct practice of this art; and for having been more than twenty years a liberal contributor to the agricultural press; but, having for the last four years exclusively devoted myself to the agricultural improvement of the State, and having had direct personal intercourse with the farmers, in their own towns and homes and fields and yards, is it presumptuous to think that I may have had some humble share in the glorious agricultural revival and improvement, that is going on throughout the State and country? Allow me the satisfaction of thinking

that I have done something in carrying the hod, while to others may belong the far higher honor of laying the corner-stone, and of erecting the noble columns, and adorning them with the beautiful embellishments of architectural taste, in this grand edifice of public utility and national honor.

To those persons, who estimate every good in life by a pecuniary standard, will it be discourteous in me to propose a few considerations? Suppose that the Agricultural Survey may have been, or may prove, instrumental in inducing, upon an average, by improved cultivation, an increase of one hundred bushels of corn to every town in the Commonwealth. This, at 75 cents per bushel for corn, and ten dollars per ton for corn fodder, would be upwards of 28,000 dollars. Suppose it may conduce to the production of an average of one hundred tons of compost manure, in each town in the Commonwealth, which must be valued at one dollar per load. This would exceed a yearly income of sixty thousand dollars, to say nothing of the permanent improvement it would effect in the soil. Suppose that it may conduce to the redemption of 1000 acres of peat bog, which is now worthless, converting it into productive meadows yielding two tons of hay to the acre, and keeping up its condition. This would be little more than three acres to a town; and, rating its value by its income, (it cannot be estimated at less than 150 dollars per acre,) this would be an increase of the property of the State, which may be safely called an actual creation of land, to the value of 150,000 dollars, and a permanent income of more than 20,000 dollars per year. Here is no extravagant calculation, to say nothing of many other forms in which the influence of the survey may be felt; and among other testimonials of approbation, in the highest measure gratifying to me, has been the opinion of one of the most intelligent

and best-informed men in the Commonwealth, not uttered to me, nor with the remotest expectation that it would ever come to my knowledge,—that the survey had already been worth three hundred thousand dollars to the State. It is due to the enlightened friends of an improved agriculture, both in and out of the Legislature, who proposed and advocated and assisted this measure of a survey, to refer to such a fact as this, when under other circumstances it might seem indecorous.

It has been a principal object of the survey to call attention to the great subject of agricultural improvement; to disseminate valuable and practical information; to induce farmers to examine their condition, the condition of their farms and the actual results of their cultivation, the cost, the expenses and the returns, and to note them with such exactness as may save them from hurtful errors of judgment and practice; to induce experiments with a view to improvement; to redeem their waste lands; to plant productive and ornamental trees; to improve the races of domestic animals; to make their own habitations more comfortable; to attach them to their own homes, by showing the capacities and resources of the State; in a word, "to cultivate the soil and the mind; to lead the farmers to respect their profession and to respect themselves, and to elevate and dignify both, by mental cultivation and by sound morals." How much, in all these respects, has been accomplished, I must submit to the judgment of others; and no one can immediately ascertain. What has been attempted, in this case, any may learn. Man may sow the seed; and under the unvarying laws of a just providence, no good labor fails of its reward. The wisest may plant; the most diligent may water; the Lord of the Harvest alone can give the increase.

The subject of agricultural improvement is now arresting attention strongly throughout the civilized world. Men on the European continent, so long the arena of bloody conflict and the burial-place of slaughtered millions of the human race, are now delighting in the arts of peace. Those, who hold the destinies of nations in their power, seem more inclined than ever to make some atonement to outraged humanity by multiplying the comforts and improving the condition of the oppressed and injured victims of an insatiate avarice or a guilty ambition. Fields, often reddened with the blood of the slain, now wave with golden harvests; and upon the smouldering ruins which marked the dreadful track of war and hate, have risen again the peaceful and happy villages, resounding with the hum of industry and the choral songs of plenty and contentment. Oh! when will the great and mighty ones of the world love above every thing else the sweetest and noblest pleasure to be found on earth—that, in the presence of which, the pomp and revelry of courts and palaces is an empty bubble, the pleasure of living to do good and to make others happy.

England is waking up from a protracted sleep, and is now prosecuting the subject of agricultural improvement with extraordinary enthusiasm, and an array of the finest talents in the kingdom. France has instituted several pattern farms and schools for agricultural instruction, and has adopted a system of obtaining agricultural information and returns from every portion of her territory. Her methods are most exact, and executed with extreme punctiliousness. Austria is diligently seeking agricultural information at home and abroad. Denmark has now been, for two or three years, prosecuting with great care an agricultural survey; and her reports have already reached eight or more large octavo volumes. One of the most

accomplished scholars in the country, George P. Marsh, of Burlington, Vt., has, at my request, translated from the Danish the inquiries proposed by the Agricultural Commission of that kingdom, which I subjoin.* Agriculture is indeed, in this and in almost every other country, the great and commanding interest, on the enlightened improvement and success of which, more than upon any other, and, I had almost said, all other instruments combined, depend the general comfort and, to a considerable degree, the morals of the community.

Massachusetts must live by her industry. She has reason to thank Heaven for this condition of her being, involving as it does the certain elements of prosperity in the physical, social, and moral condition of individuals and of States. In honest, enlightened, well-directed, persevering industry, there are to be found a means of wealth, an instrument of power, a source of comfort, a security to morals, and a ground of independence, which the underlaying of her whole territory with mines of gold would not supply.

Massachusetts will not neglect her agriculture, this great and vital interest. Having, in a memorial addressed to the Legislature in February, 1840, fully communicated my views on this subject, I shall not enlarge upon them here; but I may be allowed to add, that what seems to me to be wanted in her government is a Department of Home Industry, which should be under the control of a Board of Industry, or left to the conduct of some intelligent, competent and faithful individual, Commissioner, or Secretary, who should have every facility from the government for obtaining information, and who should annually report to the government the condition of his department.

* Appendix Q.

This department, among other things, should embrace,

1. The obtaining of full and exact information of every branch of industry in the Commonwealth; the amount of capital invested; the cost and nature of the raw material used; the number of persons employed: the rate of wages, and the amount of products, with various other material circumstances which I need not enumerate.

2. An account of the condition of the persons employed in any of the arts or forms of industry, with the bearing of these employments upon health and morals, and the bearing and execution of existing laws of the State upon any mechanical or manufacturing establishments.

3. A report of all improvements or inventions by which labor is abridged or its productiveness increased.

4. A full and detailed report of the application of all moneys bestowed by the Government for the encouragement of domestic industry; such as bounties paid to agricultural societies, or premiums upon any article of culture or production.

5. The account of any seminaries of education in the State in any way connected with manual labor, either mechanical or rural.

6. The report of the condition of all penitentiaries or houses of correction in the State, and all pauper and eleemosynary establishments, as far as the inmates of such establishments are supported by their own labor, of whatever description.

7. An annual and general survey of the productive resources of the Commonwealth in regard to her agricultural, mechanical and commercial industry.

I cannot enter into details in relation to these matters; but respectfully throw out these hints for the consideration of en-

lightened and philanthropic minds, bent upon the true honor and welfare of the Commonwealth, the security of the rights of labor, and the elevation and improvement of the industrial classes. The advantages to result from Massachusetts' becoming thus fully acquainted with herself and feeling the right arm of her power, are immense.

What would be the effects of such a measure, if well carried out, has been already seen to a great degree, in the publication of the Statistical Returns of the manufacturing industry of the State, by the excellent officer, who presides in the State Department. It would not fail to secure to her a rank among her sister republics, which those, who now look with disdain upon her limited and rude territory, might well envy. More than this, it would, above all things else, serve to keep her children at home.

The Agriculture of Massachusetts, in comparison with that of many other States, appears a small concern. To her it is a great concern. She may make it far more important. The country does not present a better home market than she will long continue to furnish for all that can be produced from her soil. The facts, which I have presented in my several reports, and which, whatever the sceptical may suggest, rest upon unquestionable authority, fully demonstrate, that the compensations of rural labor are nowhere more ample and certain. It will be seen, too, what abundant room remains for improvement, and the increase of her productive territory, under an enlightened husbandry. My great object has been to collect facts; and I have done it with all the carefulness and caution and industry which I am capable of exercising. I have endeavored to present them in a form, which, while it would in

no respect, impair their weight and force, might, by an occasional playfulness, attract the attention of a class of readers, whose condition may, by these facts, be fixed for life, but who would otherwise be repelled from tables of mere dry details. If, instead of presenting my bundle tied by a coarse birchen withe, I have bound it together with an awkward band of such wild flowers as I could pick up by the road-side, though the correctness of such taste may be questioned, my motives, by the candid, will not be condemned. I have occasionally interwoven such moral and religious suggestions as have sprung up in my own full heart in every contemplation of the Divine Goodness, as manifested in the charms of rural scenery and the unmeasured and immeasurable variety and abundance of the products of the earth, for the comfort of man and beast. If ever man should be religious, it is the privileged dweller in the country. If ever the reflecting mind and the feeling soul are called upon to commune with God, it is in the open horizon, from the darting up of the first ray of light on the eastern sky to the soft hour of twilight, when the sun, drawing his golden drapery around him, sinks into his evening's repose; it is in brushing the dew from verdant meadows enameled with flowers, and witnessing the almost visible influences of the refreshing and life-giving rain; it is in watching the ceaseless miracles of vegetable and animal life, from the opening spring to the close of autumn. All is full of God, and every object and occurrence is resplendent with the reflection of his adorable power, wisdom and benevolence.

"God save the Commonwealth of Massachusetts!" She is my parent, and I would honor her with filial reverence. Her children are my own kith and kin, and wherever I meet one of them I shall grasp the hand of a brother. In her pride, I shall

feel proud. In her honor, I shall feel honored. In her joy, I shall rejoice. My prayers for her prosperity shall go up to the God of her pilgrim fathers day and night; and no time nor distance can ever estrange my affections from her.

Boston, Dec. 20, 1841.

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COUNTY OF FRANKLIN.

COUNTY OF MIDDLESEX.

APPENDIX.

ERRORS AND CORRECTIONS.

Page 77, line 23, for "two," read "one."
" 224, line 17, for "seam," read "season."
" 270, line 14, for "beer," read "wine."
" 270, line 15, for "wine," read "beer."
" 308, line 29, for "supplied," read "applied."
" 375, line 23, for "among," read "with."
" 439, line 28, after "incumbent," read "of the presidency."

FOURTH REPORT

OF THE

AGRICULTURE OF MASSACHUSETTS.

REPORT

ON THE

AGRICULTURE OF THE COUNTY OF FRANKLIN.

I. General Description.—The county of Franklin forms the north-western corner of Massachusetts. On the north, the portion west of Connecticut river lies adjacent to Vermont; the portion east of Connecticut river is bounded on the north by New Hampshire. On the west, this county is contiguous to Berkshire county; on the south, to Hampshire county; on the east, to Worcester county.

The area of the county is about 650 square miles, and is sub-divided according to the last report of the Valuation Committee, as follows:

In tillage,	Acres	20,423¼
English and Upland mowing,	"	32,434½
Fresh meadow,	"	13,399½
Pasturage,	"	116,052
Wood,	"	64,451
Unimproved,	"	80,929½
Unimprovable,	"	59,770½
Owned by towns or other proprietors,	"	3,740½
In roads,	"	6,771
Covered with water,	"	4,731¼
	Total,	402,307¼

The number of towns in the county is twenty-six, and the population in 1837, was 28,655.

The county is watered by the Connecticut river, which divides it through its whole length from north to south. The river is of an average width of one-eighth of a mile, running for a considerable part of the distance between high banks, but in some cases, bordered by extensive tracts of rich alluvion. The Deerfield river, a tributary of the Connecticut rising in Vermont, pursues a winding course through the county, running sometimes south, sometimes north, and sometimes east, and entering the Connecticut at Deerfield. It is navigable for flat-bottomed boats, not more than half a mile from its entrance into the Connecticut. Miller's river on the eastern side of the Connecticut, rises in the northern part of Worcester county, runs through the whole length of the eastern side of Franklin county, and empties itself into the Connecticut about four miles above the mouth of the Deerfield. There are several other small streams in the county, tributaries of the Deerfield or of the Connecticut, which mark their rough and rapid way among the mountains and hills, and furnish supplies of the purest water for cattle, and various mill powers for manufacturing purposes. The hills, likewise, everywhere abound with springs, so that it is extraordinary to find a farm of any considerable extent, which is not well watered in every part.

II. Aspect.—The aspect of the county is broken and mountainous. There are ranges of mountains of red sandstone, extending along the western bank of the Connecticut for several miles, which seem to be broken portions of the range of mountains commencing at New Haven, Conn., on the shores of Long Island Sound, and running in a northerly direction to the southerly line of New Hampshire. In the western parts of the county there are mountains, which belong to the Green Mountain range. The Deerfield river, as you ascend towards its source, after leaving its extensive meadows within the town of Deerfield, seems to have threaded its way through ranges of

high mountains; and, in its upper course, to occupy all the room which was left for its passage. It presents to the eye from some of the eminences, for miles in length, the appearance of a silver ribband lying in a crooked line, and gleaming in the sun between precipitous hills, which are fringed and covered with a thick deep foliage of ever-greens from the base to the summit. In other situations in the county, the mountains are in a single pile like Mount Tobey, between Montague and Leverett, which is seen like a huge animal reposing, with her cubs lying in every direction around her.

There cannot be pointed out a single town in the county without its fair proportion of hills. The northern, however, are much more mountainous than the southern portions of the county. The mountains are in general covered with a thick growth of wood, but the hills, in most cases, though rising almost to mountains, are cleared. In some instances, the farmers have planted their houses on the very summits, and have around them cultivated and productive fields; but usually these high lands are devoted to pasturage. The rocks in the county are principally granite, though green-stone and red sand-stone abound; and in two places at least, there are considerable deposits of lime-stone of an excellent quality.

III. Soils.—The soils are various in kind and quality. On the eastern side of Connecticut river, sand is the predominant element in the soils near the river. On the hills, however, abounding with rocks, the soil is not of a very definite character, but seems chiefly composed of yellow loam, with a fair amount of vegetable mould. On the alluvial lands, of which there is a large extent at Northfield and Sunderland on the Connecticut river, and at Deerfield, on the Deerfield river, the land abounds with fine sand intermingled with much vegetable matter, being the washings from the neighboring hills, and deposits from the occasional over-flowings of the banks, mixed with a considerable portion of adhesive and argillaceous matter, which gives it a strong consistency. The lands on the Deer-

field meadows are not exceeded in fertility by those in any part of the State. The Deerfield meadows embrace an extent of about three thousand acres, and a considerable portion of this is annually over-flowed; and, in some cases, more than once a year. The Connecticut being flooded at the same time with the Deerfield, and the outlet of the Deerfield being small in proportion to the amount of water collected on the meadows to be discharged, a sort of lake is formed at such times, and the water remaining comparatively still, the deposits of the enriching matter held in suspension by the waters are gradually made, and to a large amount. The depth of the alluvial deposits here is not easily ascertained, and varies in different places; but, while these annual floods and deposits continue, the fertility of the lands affected by them must be kept up, and may, therefore, be pronounced perpetual.

The Deerfield presents its most extensive alluvions in the town of Deerfield, where the meadows hemmed in on all sides by high hills, with the river pursuing a very circuitous course among them, presents in the season of cultivation and harvest, one of the most variegated and beautiful pictures the eye can rest upon. There are other patches of alluvial land of considerable richness along the banks of the river, extending to the foot of the Florida Mountains in the county of Berkshire.

The soil upon the hills differs remarkably in different places. In Rowe, Heath, Coleraine, Shelburne, Hawley, and Conway, it is, in most cases, an unctuous mould, abounding in springs, eminent for its fertility, and producing the best of pasturage.

The Green river, a small stream emptying into the Deerfield about a mile above its junction with the Connecticut, flows through a considerable tract of land of excellent quality. All this is alluvial, though but small portions of it are now overflowed by this stream; and there is every reason to believe that this valley, as well as the Deerfield valley, were at one time the sites of lakes, and their richness is owing to the deposits brought from the neighboring hills and mountains by various streams, and left in these extensive basins.

IV. Condition of the Inhabitants.—The pursuits of the inhabitants of Franklin county are in a great measure agricultural. There are several considerable manufacturing establishments; but the amount of the population employed in these is small, compared with the numbers devoted to agricultural pursuits. The condition of the population is that of general comfort and prosperity. They are intelligent and improved. There are few examples of extraordinary wealth.

V. Agricultural Pursuits.—The general objects of husbandry are the raising of neat stock, the production of wool, and the fatting of mutton and beef. Some pork is exported from the county, likewise, though not to a large amount. The principal objects or matters of cultivation, are grass, Indian corn, broom corn, and potatoes. In some parts of the county, hops have been cultivated with considerable success. Hemp has been attempted in the county upon the rich river-soils; but owing to its exhausting nature, the expense attending its cultivation, and the difficulty, perhaps through inexperience, of rotting it, it was soon abandoned. The dairy produce has been little attended to, though many localities are favorably situated for that object; but the fatting of beef and mutton for the market at Brighton may be considered the principal object of agricultural pursuit. Some most valuable experiments on a limited scale, have been made in the production of silk, of which I shall give in the sequel ample details.

VI. Crops.—I shall proceed to speak first of the crops grown in Franklin county.

1. Grasses.—Grass may be considered as the principal crop. In the hill towns, and what may be called the uplands, the artificial grasses are cultivated, such as clover, (*trifolium pratense,*) herds-grass or timothy, (*phleum pratense,*) and red-top, (*agrostis vulgaris.*) In general, three pecks of red-top, one of herds-grass, and four to six pounds of clover-seed are sown, when land, which has been cultivated, is laid down to grass.

The land is laid down with some grain, either wheat, rye or oats; and the grass-seed is sowed with the grain. Barley is scarcely grown at all in the county.

The clover predominates the first year; the herds-grass the second. The clover is nearly extinct at the end of the second year; and the red-top, intermixed with various natural grasses, which spring up spontaneously, furnishes a permanent matting to the soil. In general, not nearly enough seed, particularly of herds-grass, is sown. The consequence is, that the product is very coarse the first and second year, which it would not be, if treble the quantity of seed were sown. Several farmers in the State, whose authority is entitled to respect, practise a much more liberal mode of sowing; and find an advantage in doing it in the improved quality of the hay. The average yield the first year is from two to three tons; the second it may be estimated at two tons; and for a continuance of three years after that, in favorable seasons and locations, it may be rated at one to one and a quarter ton per year. These lands in general, are mowed once only in a season. There is an instance in Conway, of a piece of moist land lying at the side and foot of a hill, where the soil is deep, being a rich mould, resting upon a substratum inclined to clay, on which by copious top-dressings of barn manure, the product has been kept up, and averages yearly nearly three tons to the acre. Of peat lands, I know of no considerable tracts in the county; and as yet, no great attention has been paid to the draining, either by open or under-ground drains, of wet lands. The quantity of this kind of lands is not considerable; but such improvements, where required, would be amply compensated.

The next quality of grass lands are the alluvions on the Deerfield and the Connecticut rivers, and small patches on their tributary streams. The alluvial lands on the Connecticut are rarely over-flowed, excepting at the breaking up of winter; and they are, therefore, subjected to a course of cultivation the same as other arable lands. The rotation on these lands is commonly the first year corn, or potatoes with manure; the

same the second year, and the third year oats, pease and oats, rye or wheat, with grass. Where broom corn is planted, it generally follows a crop of Indian corn; and is continued often two or more years on the same land. The annual deposits made upon these lands by the flood are not of great advantage, and the fertility of the soil can by no means be kept up without manure.

The low alluvial lands on the Deerfield meadows, essentially differ from these from a circumstance already alluded to. The waters on the low Deerfield meadows are set back from the great river, and remain comparatively quiet; and in addition to this, the banks and hills bordering the Deerfield and its tributaries are more steep in general than those on the Connecticut. Much more enriching matter is thus brought down from them to the river in times of rain and freshets. These lands, therefore, annually and commonly oftener over-flowed, constituting the lowest meadows on the Deerfield river, are never ploughed. They require no manure; and being entirely alluvial and receiving the richest deposits, are of extraordinary and inexhaustible fertility. These meadows are always mowed twice; in some cases, three times; and the annual yield is generally estimated at three tons to the acre. The hay on these meadows is of a very fine quality, known there familiarly as the English bent (*agrostis alba*). It is a natural grass, and forms a fine and impervious sward.

The upland intervales on the Deerfield, are devoted to cultivation; and most of this land is seldom suffered to rest. For hay, the main dependence is upon the low flooded meadows; and those low and uneven portions, which it is difficult to reach with the plough.

An example has been given to me of the product of one of these low meadows in Deerfield containing nine acres, at a place called Old Fort.

The first crop of hay was, ...	25,325 lbs.
" second crop, ...	15,120
	40,445 lbs.

The hay was sold and delivered as soon as cured, at nine dollars per ton, ...	182 00
The fall feed, sold for	4 50
	$186 50
The whole labor was performed by contract at four dollars per acre for both crops, ...	36 00
Leaving a balance in favor of the land, of .	$150 50

The hay was considered as sold at a low rate. The same quality of hay in the following winter brought 13 dollars per ton.

The land has been estimated at one hundred dollars per acre. No manure has been put upon the ground. The produce in this case, was not more than an average crop. This yield was at the rate of 4,494 lbs. to the acre. First crop, 2,813 8-9 per acre; second crop, 1,657 7-9 lbs. per acre. This constitutes some of the best land in the meadows. There is that, however, which is deemed even more productive.

The hay from these natural meadows is exceedingly coveted by the cattle and remarkably nutritious. It consists of a very great variety of plants, but what is called the English bent, (*agrostis alba*,) prevails with a slight intermixture of clover. I do not know what has given it the name of English, as it is without doubt indigenous to the soil. It requires to be cut early, otherwise it becomes hard and wiry. Some of the farmers are in the habit of making or drying this hay much less than formerly. It was considered best to dry it as much as possible; but this is not now the case. Hay, wet from external moisture, whether dew or rain, always suffers and becomes mouldy and sour, if packed away with any of this dampness upon it. But hay when perfectly dry may be put away with much of the sap remaining in it; and though it sweats severely in the mow and becomes somewhat discolored from the heat, yet it is not the less relished by, nor the less nutritious to, the fatting cattle. This is the actual experience of some of the

best feeders; but though no evil may come from giving such hay to cattle soon to pass into the hands of the butcher, yet in the condition in which it is often given to fatting cattle, it would be quite pernicious to horses. There is reason to believe, that hay is generally too much dried; and with some farmers, the practice of curing it in the cock is much approved. In this case, the hay being perfectly dry from any external wet, after being slightly wilted in the sun, is made up into cocks. The second day these cocks are opened and afterwards doubled. In good weather it will soon become sufficiently cured to be carried safely into the barn. In bad weather it is in a great degree secure from the effects of rain, if the cocks are made up with care. In this way, the hay is never so much dried as to be broken; nor are the leaves and seeds, as in the common way of making hay by tossing it about a great deal, scattered and lost. Two of the best farmers in the county, residing in Bernardston, are of opinion, that herds-grass should not be cut until it is ripe, and the seed perfectly formed. They speak with confidence in this matter from having made many experiments in the fatting of cattle. They are persons, whose word is above question and whose judgment is entitled to great respect.

2. Indian Corn. (*Zea Mays.*) The next considerable crop cultivated in this county is Indian corn. The hill-towns grow comparatively little. It makes a large product on the alluvial lands of the Deerfield and Connecticut. The largest amount I have known raised in one year by one individual has been fourteen hundred bushels; but many farmers produce from three hundred to one thousand bushels. The judgment of some of the most intelligent farmers in Deerfield places the average yield at thirty-five bushels to the acre, which seems to be underrated. I have known upwards of ninety bushels grown on an acre in Deerfield meadows; an average yield of more than seventy bushels on several acres in Northfield; and other abundant crops, which show at least what might be obtained by good cultivation; and likewise how much more profitable

is good than inferior cultivation. It is difficult to convince the majority of farmers that one hundred bushels of Indian corn can be produced on an acre, for no other reason that I could ever discover, than that *they* have not done it. The incredulous, however, now begin to admit that much larger crops may be produced than they have been in their way of cultivation accustomed to obtain. In producing a crop of thirty or thirty-five bushels, it may happen that this yield makes an inadequate return for the expenses; but the addition to such a crop of twenty or thirty bushels, as the difference in the expenses of cultivation would be by no means proportionately increased, would be almost clear profit. The extent of land employed in such case would be the same; the cultivation not more laborious; and the main difference would consist in higher or more liberal manuring.

The kinds of corn planted in this county are quite various, and designated in different places by different local names. On the meadow lands in Deerfield, a very large kind is grown, eight-rowed, and the ears of which are frequently fifteen inches in length. The kernels are proportionately large, and I have repeatedly measured more than a pint of shelled corn from one of these ears It is generally planted in hills, at a distance of five and six feet each way, sometimes at a space of even nine feet by five between the hills; and it is intended to leave three stalks in a hill. It requires a long season to ripen. The fodder is coarse, and indeed it has nothing to recommend it over a smaller kind of corn of an eight and twelve-rowed variety, which bears much closer planting, and yields more to the acre. The latter was originally introduced from Canada, and, accommodating itself to its new location, has gained in size and lost in earliness. It ripens, however, sooner than the large kind, which I have described. What is called the Dutton corn, though tried in various cases, has not been approved. It is a twelve-rowed variety of flint corn, and yields well; but the cob being large, and retaining considerable moisture after the grain appears to be dry, is liable to produce mouldiness in the crib.

In discussions respecting the merits of different kinds of corn,

the kind with a large cob has been objected to, as not yielding so much grain, in proportion to its size, as the varieties with a small cob. From a careful examination of the subject, I believe that this notion is not well founded. Having, in comparison with the corn of a neighbor in Deerfield, undertaken to examine this matter, I selected, in the ear, half a bushel of an eight-rowed variety of corn which he was accustomed to grow, and half a bushel of a twelve-rowed variety which I had grown myself, measuring them in the half bushel in as equal a manner as I was able. His corn, having been planted early, was sound and in perfect condition; mine, planted from a week to a month later than his, was ripe, but not as sound as his His was saved in small quantities; mine in large. The result, as follows :—

Half a bushel of corn in the ear, of eight-rowed variety, weighed . . . . . 25 lbs.
Half a bushel of corn in the ear, of twelve-rowed variety, weighed . . . . . 24¾ lbs.

This was an uncertain mode of measuring. We designed as much exactness as possible; but a few ears more might have been placed on one heap than on the other without a difference which could be detected by the eye. When the above corn was shelled, and the grain measured, there was not a difference of half a gill—the eight-rowed measuring 1 peck and 3 quarts, the twelve-rowed measuring 1 peck, 3 quarts and a fraction.

It has been said, likewise, that, although on the twelve-rowed there is one third more kernels, yet the cob of the eight-rowed is so much smaller, and the kernel so much larger, (which is indeed not always the case,) that the quantity of shelled corn would be considerably in favor of the eight-rowed. This matter, likewise, I subjected to as accurate a trial as I was able to make.—The cob of the eight-rowed corn above referred to was remarkable for its small comparative size. But the cobs, after the corn was shelled, of the two parcels above, having been weighed, the result was as follows :—

The cobs of the eight-rowed weighed 4¼ lbs.
The cobs of the twelve-rowed weighed 4¾ lbs.

But, in order to determine more exactly the relative proportion of the cob to the grain in the two varieties, I selected two of the best ears of each sort, shaved the butt as closely as possible; and, having carefully shelled the corn, caused the grain and the cob of each parcel to be weighed separately in an apothecary's scales. Of the two ears of the eight-rowed, one measured in length 8¼ inches, one 8½ inches. Of the two twelve-rowed ears, one measured 9¾ inches, the other 10½ inches.

Of the two ears of the eight-rowed,
the grain weighed . . . 8½ oz.—the cob 1½ oz.
Of the two ears of the twelve-rowed,
the grain weighed . . . 13¾ oz.—the cob 2½ oz.

In these cases it will be found, that the proportional weight of the cob to the grain is precisely the same; and this, there is good reason to think, will be found to be generally the fact.

With a view to compare the two kinds still farther, I caused one peck of each kind shelled, well shaken and struck, to be weighed; and the result follows:—
One peck eight-rowed weighed 17 lbs.—68 lbs. to the bushel.
One peck twelve-rowed weighed 16¼ lbs.—65 lbs. to the bushel.

The difference would probably have been less had each parcel been equally well ripened and saved. The season was particularly unfavorable to late-planted corn; and my neighbor's was planted very early.

It will be seen, that both kinds weighed remarkably well;—and this will farther appear from a comparison of this weight per bushel with that of some other corn, the product of the same season and in the same town. These samples had been taken by a shrewd trader, at the highest market price. The measure was hard-shaken and struck. The corn was eight-rowed, with a large kernel.

One peck weighed 15¼ lbs.—61 lbs. per bushel.
One peck weighed 14¼ lbs.—57 lbs. per bushel.

As the selection of the kind of corn to be planted is matter of much importance, as will be seen from the observations already made, I shall give the result of an examination of

several different kinds. They were all selected ears, and well cured. The eight-rowed, excepting one sample, of a very large kind.

No. I. Twelve-rowed.

One ear shelled, the grain weighed	9 oz.
One do. do.	7½ "
One do. do.	7½ "
One do. do.	6¾ "

No. II. Twelve-rowed.

One ear weighed	7¼ oz.
One do. do.	6¾ "
One do. do.	7¼ "

No. III. Eight-rowed.

One ear weighed	8 oz.
One ear weighed	6½ oz.
One do. do.	6¼ "
One do. do.	6 "

No. IV. Eight-rowed.

One ear weighed	8 oz.
One do. do.	6½ "
One do. do.	7½ "
One do. do.	6⅝ "

No. V. Eight-rowed.

One ear weighed	4 oz.
One do. do.	4¼ "

No. V. had been recommended as remarkable for its productiveness: it yielded, with my cultivation, about 40 bushels per acre.

The kind of corn planted will materially affect the result.—Different kinds differ in productiveness, and in time required for ripening. This last matter is of much moment in our climate; where, being liable often to late springs and early frosts, we should plant those kinds which soonest come to maturity, or we may lose our crop. In general, the smaller kinds ripen the earliest, and the smaller the cob, the sooner it becomes dry.—The earliness, however, with which a crop comes to maturity will depend greatly upon a careful selection for seed of the first ripe ears. Some facts have come to my knowlege, which satisfy me that, in respect to productiveness, much will be gained by the habit of selecting from stalks bearing twin rather than single ears. This practice, continued through a succession of years, is admitted to be the secret of the success of Mr. Baden, in Maryland, in producing a variety very remarkable for its productiveness. In respect to the selection of seeds of every description, our farmers, if they have not much to learn, have yet a great deal to do, since it is with seeds as with animals, in order to produce the best, it is indispensable to breed from the best kinds.

It has often been a question by many farmers, whether one hundred bushels of shelled corn can be produced on an acre.—The fact, however, of its having been done has been so repeatedly established, that it can no longer be disputed. If we look at the matter more nearly, we shall see ground to hope that we may do even more than this. If we suppose the hills of corn planted at three feet apart each way, we shall have upon an acre 4840 hills. Now, upon the farther supposition that four bearing stalks should remain in each hill, each producing one ear, and each ear producing seven ounces avoirdupois of shelled grain, the whole amount of the acre would be 8470 lbs. of grain; and, allowing sixty lbs. to a bushel, (50 lbs. are the legal weight,) the yield would be over one hundred and forty-one bushels. Or if, instead of one pound and three quarters to a hill, as above, each ear should average eight ounces, yielding two pounds to a hill, the crop would amount to 9680 lbs.; or, at 60 lbs. to a bushel, to one hundred and sixty-one bushels to the acre. But if this can be done, why is it not done? Only one answer can be given, which is, in general, want of sufficient care in the cultivation. There is want of care and exactness in not making the hills, so that the number mentioned shall be comprehended on an acre. There is too little seed sown, so that little chance is had to select from the hill, for continuance, the most vigorous and thrifty plants. Manure enough is not always given to the land; and by placing the manure in the hill without spreading it upon the land, the plant is prematurely forced in the beginning, and does not find food enough to bear it out in the latter part of the season. In truth, the habits of our farmers are any thing but exact in their cultivation. Few fields of corn do not present many missing hills; and few hills present four thrifty stalks in a hill. We have still much to learn in this matter; but there is every reason to hope, that the time is not distant when, to a careful farmer, one hundred bushels of shelled corn to an acre will be no more uncommon than are fifty bushels at the present time. I remember well when fifty bushels to an acre were considered as the maximum product ever likely to be reached; yet the average yield of a

farm in Northfield in this county has been for years not less than seventy bushels to the acre.

The mode of managing and harvesting Indian corn is a subject deserving of attention. A diversity of practice prevails in this as well as in other parts of the country. The custom of making hills, that is, raising the ground in a conical form round the plant, is well-nigh abandoned. Many go so far as to half-hill it, but many cultivate it upon an entirely flat surface. My own experience has taught me, that no advantage comes from hilling the corn at all, even in respect to that point which was mainly designed to be accomplished by this practice—that of keeping the corn in an upright position and preventing its being blown down. When the surface is flat, the corn may be blown down; but it is more likely to rise again than if it were hilled, as, in the latter case, the hill operates as a fulcrum over which the stalk, in bending, is broken. The roots are the natural supporters of the stalk, and plants spontaneously accommodate themselves to their condition. On a flat surface they throw out more and stronger lateral roots than where the corn is hilled. The crop is cultivated now with a cultivator or triangular harrow with pointed or duck feet instead of the plough, which was formerly used. The cultivation of corn cannot be too cleanly; but it is advisable not to go in among it with a plough or harrow after the grain has begun to be formed. Before that time, I am satisfied that the ground cannot be kept too loose between the rows.

The subject of topping the stalks has been much discussed; and its inexpediency may be considered as settled. A Pennsylvania farmer, highly intelligent and observing, made an experiment with a view accurately to test this point. Taking three equal rows in the same field, topping two and leaving one untopped, the result was as follows:—

"Produce of the row which had not been topped, nine bushels and five eighths of corn in the ear.

"One of the rows which had been topped and stripped,—that is, the blades of the plant taken off,—measured seven

bushels and six eighths; and the other, topped and stripped, measured seven bushels and three eighths of corn in the ear. Thus it clearly appears that mutilating the corn plant before its fruit is perfected, is a very injurious practice."

The experiment of Josiah Quincy, of Quincy, Norfolk county, was to the same effect. This was upon carrots, and I shall give the account in his own words:—

"It was stated confidently, by some English writer on the cultivation of carrots, that the tops might be cut early for the purpose of feeding cattle which were soiled, not only without injury, but even with benefit, to the roots, which, it was said, would in this way grow larger. Mr. Quincy took twenty-six beds of carrots in the same field and of the same size, with a view of fully testing these statements; and in the month of July, when the lower leaves first began to wither, he caused every other bed to be cut as directed, being careful not to crop the crown or the head of the root—so that there was a cut to an uncut bed alternately through the whole piece. They were gathered, and the roots measured carefully, on the 20th October. The total product of the uncut beds was 104½ bushels: the total product of the cut beds was 58 bushels. Judging by the eye, the size of the roots of the cut bed was nearly two thirds less than that of the uncut bed."

But the question may be considered as put to rest by the experiment of William Clark, Jun. of Northampton, Hampshire county. The experiment was conducted with much care and intelligence; and, omitting several of the details, I shall give only the results:—

Row No. 2, on which the experiment was commenced, was as follows, viz:

46 hills on which the stalks had not been cut, gave	42 lbs. 8 oz.
dry shelled corn, equal per acre to . .	bs. 60, 8 lbs.
46 hills from which the stalks had been cut, gave	33 lbs. 7 oz.
dry shelled corn equal per acre to . .	bs. 47, 18 lbs.
The loss by cutting the stalks per acre, was	12 bs. 46 lbs.

The four rows taken together, stand as follows:

No. 1 and 4, on which no stalks were cut, gave an average per acre of . . . . 60 bs. 8 lbs.

No. 2 and 3, from which half the stalks were cut, gave an average per acre of . . . 54 bs. 25½ lbs.

Loss by cutting half the stalks per acre, 5 bs. 38½ lbs.

or cutting all the stalks would make a loss equal per acre to . . . . 11 bs. 21 lbs.

The difference in the result of the two cases is 1 bs. 25 lbs. per acre; or in the two experiments, if it may be so termed, there is an average loss by cutting the stalks, of 12 bs. 3½ lbs. per acre, a loss quite equal to all the expense of hoeing and harvesting. Mr. Clark adds, "if this experiment is a fair test, it seems that about twenty per cent. or one fifth part of the crop is destroyed by cutting the stalks in the way they are usually cut." Another exact farmer in Conway has made a similar experiment in reference to this very point. By a careful measurement he states that the difference between cutting the stalks at the customary time or leaving them uncut until after the corn is ripened was eight bushels per acre in favor of the latter practice.

Mr. Clark advances another opinion, which is quite conformable to my own and to the experience of many other farmers. "This twenty per cent. is not saved at the expense of losing the stalks; they are worth as much, and I think more, all things considered, after the corn is harvested, than they are when gathered in the usual way. If, after being bunched up in a green state, they heat or become mouldy, (a case of frequent occurrence,) they are utterly worthless, except it be for manure; I know of no animal that will eat them. But after they have once been dried by the sun and wind, a subsequent moderate degree of mouldiness, seems to be no injury." This conforms to the opinion of one of the best farmers in Northfield, Franklin co., who is in the habit of gathering his corn and then cutting up the stalks at the ground.

The mode of harvesting Indian corn is of considerable im-

portance. On this subject the opinions of farmers are at variance. Some choose to top the stalks as soon as the corn is glazed, and gather the corn after it has become fully ripened. Others prefer leaving the whole until the grain is sufficiently ripened to be cribbed, then gathering the corn, husking it as it is gathered, and collecting the fodder afterwards. Others choose as soon as the corn is glazed, or is so far advanced that an ear fit for roasting is not to be found in the field, to cut the whole up at the ground and shock it in the field for ripening. This practice is almost universal in New York, but it prevails only partially in Franklin co., where in general the first described mode of harvesting is adopted. In many places the butt stalks after the corn is gathered, are left in the field to be browsed by cattle, a management which is wasteful, and has nothing to recommend it.

I shall take the liberty in this matter to detail my own experience, while a resident in this county. The leaving the corn untopped until it is sufficiently advanced for gathering, and then cutting it up at bottom, allowing it to finish the ripening in the shock, has sometimes with me been attended with success. In some cases, however, I have had by this management so much mouldy and soft corn as to question its expediency. But as I think I have discovered the causes of my failure, this method now commends itself strongly to my judgment.

The summer of 1832 was so cold, that corn generally was three weeks behind its usual condition; and fears were entertained that the crop would be entirely cut off. On the 9th of September there was a slight, and on the 12th and 13th, there were severe frosts. Corn was generally in the milk; and, in many places, much was killed. The fogs on the river near my residence served as a protection to my crop. Under these threatening appearances, fearing through delay the loss of my whole crop, I determined to cut up the whole at the ground as soon as it should be slightly glazed; and the results and facts in relation to it, I took pains to record.

I was desirous to ascertain whether corn cut in the milk and not at all glazed, would ripen. Three stalks with one ear on each were cut in this condition and placed in as favorable a situation as possible for the access of the sun and air. They ripened perfectly ; and to appearance became as fair and hard and heavy as any ; but the experiment on a whole field could not be advised, as so favorable a situation for curing a large quantity could seldom be obtained. I began cutting my corn on the 14th September, after having previously cut out the suckers and barren stalks. In the field which I took first, the corn appeared dead ; but this was occasioned by the rust, not by the frosts. This corn being cut at the bottom and not suffered to be laid upon the ground, several hills were brought together, the stalks were spread widely at the bottom, and were tied by a single band at the top. Much of this corn upon husking, appeared of a pale yellow, and a good deal of it was soft and mouldy. The shocks did not stand firmly, and many were over-turned by the wind. The centre hill, around which the stalks were gathered, should not have been cut until the time of husking, but should have been left as a support to the shock. Another field where the corn was slightly glazed and the stalks very green, was cut, tied in small bundles above the ears and put in small shocks or stooks. This came out better than the former, but not so well as could be desired. It was cut too early, and was not suffered to remain long enough in the shock.

Two other fields were necessarily left to a later period after the corn had become fully glazed, that is in the main every kernel on an ear was well touched, though the stalks were still green and succulent. It was tied near the top in small bundles ; put up in small shocks, and spread at bottom so as to give free access to the air. This corn at husking came out bright and sound, with less refuse than ordinary ; and the fodder was succulent and of the best quality.

There is a small matter connected with this subject to which my attention was directed by an excellent farmer in the coun-

ty. His advice was by no means to shock the corn, thus cut up and gathered, upon grass ground as is often done on the borders of the field, because the grass is likely to exclude the air from the bottom of the shocks. Upon the whole my own judgment, especially liable as we are to early frosts, is to cut up and shock the corn as above described as soon as it is well glazed; and it is a safe error to do it too early rather than too late. The fodder in such case is always of superior quality.

Of the expense of cultivating an acre of corn in this county, having gone fully into this subject in places where the cost of labor and modes of cultivation do not essentially differ from the same here, I shall give but few estimates. Labor is reckoned at one dollar per day.

In Northfield, the estimate was made as follows:

Ploughing,	4 00
Dragging,	1 00
5 cords of manure in the hill,	12 00
Getting out and putting in the hill,	4 00
Seed corn 1 peck planted 3½ feet each way,	37½
Planting,	1 34
1st hoeing with man and horse,	2 34
2d hoeing, $1 17, 3d hoeing, $1 17,	2 34
Gathering and husking,	5 50
	$32 89½
Fodder equal to 1 ton of hay,	10 00
40 bs. of corn, at 1 dollar,	40 00
	$50 00
Balance in favor of corn,	$17 10½

Another farmer in Northfield gives the following estimate of the expense of an acre of corn.

Ploughing, $2 50; harrowing, $2 50; holeing, 50,	5 50
Six bushels leeched ashes,	10

One bushel plaister or gypsum, 65,	65
Seed, 10 quarts, $1 00; putting on ashes and plaister and planting, $1 20	2 20
Harrowing, 30; weeding, $1 50,	1 80
Cultivating twice in a row, 30; 2d hoeing, $1 10,	1 40
Cultivating, 15; last hoeing, $1 20,	1 35
Gathering and husking, $5 00; gathering stalks, $1 50	6 50
	$19 50
Corn fodder equal to 1 ton of hay,	10 00
Crop 50 bs. corn at 1 dollar per bs.	50 00
	$60 00
Balance in favor of crop,	$40 50

It will be seen in the above case that nothing has been charged for manure excepting ashes and plaister. The corn was raised after a stubble clover-crop ploughed in, or a green-sward inverted. I shall give hereafter the rotation of crops practised by this excellent farmer. His corn usually averages seventy bushels per acre.

The estimate of the expense of a corn crop in Deerfield, is thus given by a very careful and successful cultivator.

Ploughing, $2 34; harrowing, 50; holeing, $1 00,	3 84
4 cords of manure, $8 00; spreading manure, $2 67,	10 67
Seed, 25; planting, $1 00; weeding, $2 00; horse, 25,	3 50
2d hoeing, $1 58; 3d hoeing, $1 58,	3 16
Topping stalks, $1 00; husking, 2 50,	3 50
Cutting up, and gathering butts, $1 00,	1 00
	$25 67
Interest on land,	6 00
Dr. the above crop.	$31 67

Proceeds of crop.	
Fodder equal to ¾ ton of hay, $9 00, . . .	9 00
50 bs. corn, ...	50 00
	$59 00
Balance in favor of corn, . . .	$27 33

In Shelburn, the estimate of the cost of cultivating an acre of corn is given me by a farmer, whose skilful and successful cultivation needs no commendation.

Ploughing, $3 50 ; 20 loads manure, (7 cords,) $15 00	18 50
Getting out and spreading manure, $4 50 ; dragging or harrowing, $1 00, ...	5 50
Seed, 1 peck, 38 ; manure for the hills, (8 loads,) $6 00	6 38
Planting and manuring in the hill, $4 00, . .	4 00
Weeding and hoeing, $3 33 ; 2d hoeing, $2 33 ; 3d hoeing, $2 33, ...	7 99
Cutting and shocking, $2 00 ; husking, $4 00, .	6 00
	48 27
Proceeds of above crop.	
Fodder equal to 1¼ ton of hay, ...	12 50
70 bs. corn at $1 00, ...	70 00
	$82 50
Balance in favor of corn, . .	$34 23

I have several other estimates of the expense of cultivating an acre of Indian corn, varying from 14 to 25 dollars, but I do not deem it necessary to add to the above. The above statements are from farmers of the highest respectability for intelligence and exactness, and may be relied upon.

I have already given some general estimates of the average yield of corn to an acre in the county. It seems proper to add some further estimates on this point.

In Warwick, the average yield of corn given is from twenty to thirty bushels per acre. South Deerfield, thirty bushels. Sunderland, thirty-five bushels. The same farmer in Sunderland has produced eighty bushels per acre. In Leverett it is stated that the gravelly plain land will once in four years give an average yield of twenty bushels per acre without manure. In Whately, thirty-five bushels. Another estimate, twenty-five to forty bushels. In Charlemont, fifty bushels. In Rowe, thirty-five to forty bushels. In Ashfield, thirty bushels. In Conway, thirty bushels, and forty bushels. In Hawley, fifty bushels have been produced. In Buckland, fifty to seventy bushels; and, in one case, eighty-three bushels have been raised per acre. The difference between the extremes in this case, between twenty and thirty and seventy and eighty bushels, is deserving the particular attention of cultivators. When it is demonstrated that the expenses of culture are not increased in proportion to the amount of the crop, why should the farmers be satisfied with any thing short of the very best products? An experienced farmer in Deerfield has practised planting corn and potatoes in alternate rows; and has, in this way, obtained in a season, from one acre of land, seventy bushels of corn and one hundred and thirty bushels of potatoes. This method has been adopted by some other farmers out of the county with a success, which induces them to pursue it. It is thought the corn is benefited in this way by a more free access of the sun to the plant, and a larger opportunity of extending its leaves.

3. Oats.—The next crop cultivated in this county is oats. The average yield is thirty-five bushels. In Rowe, the crop is rated, under good cultivation, at from forty to fifty bushels per acre. In Buckland, fifty bushels is stated as the average. Seventy bushels are sometimes obtained. In Hawley, forty to fifty bushels. In Warwick, thirty-five to fifty bushels; sixty are sometimes obtained. The crop is generally taken after corn, and in many instances, grass-seed is sowed with the oats and the land laid down. In some instances, clover is sown with the

oats and ploughed in with the stubble as a preparation for a crop of corn. No manure is applied with the oats.

4. Pease and Oats or Meslin.—The prevailing custom among the Deerfield farmers, is to sow pease and oats together, so as that the crop shall be in the proportion of one quarter pease to three quarters of oats. The pea customarily sowed in these cases is a green pea from Canada, which ripens about the time of the oats, and for which while growing the oats act as supporters. Pease and oats are usually ground together as feed for their fatting cattle, and are deemed valuable, though not so good or so much relished as Indian meal without mixture.

I have only two estimates of the cost of cultivating oats, and these where they come in in the rotation the year after the corn.

Expense of cultivating an acre of Oats.

Ploughing	2 00
Sowing oats and dragging, ...	1 00
3 bushels seed, ...	1 50
Gathering, ...	4 00
Threshing, ...	1 75
	$10 25

Return.

Straw, more than one ton, ...	7 00
35 bushels oats at 50 cents, ...	17 50
	$24 50
Balance in favor of the oats, .	$14 25

Another farmer gives the following account of a mixed crop of wheat and oats in the proportion of half a bushel of wheat with two bushels of oats. This is thought to make an excellent feed for animals. Some of the human family have no absolute distaste for it.

Ploughing, ...	2 34
Seed, half bs. wheat, $1 00 ; seed, two bs. oats, $1 00,	2 00
Sowing and harrowing, ...	50
10 lbs. clover, ...	1 00
Cradling, $1 50 ; threshing by flail, $2 00 . .	3 50
	$9 34

Return.

Straw, ...	3 00
35 bushels at 75 cents, ...	26 25
	$29 25
Balance in favor of the crop, .	$19 91

The crop of pease and oats, when raised together, is ground together ; and the meal is much valued both for cattle and swine when in a course of fattening. Forty bushels of pease and oats per acre would be regarded as a large crop. This has been produced, however, on nine acres, in Deerfield meadows. Some farmers sow at the rate of one third pease and two thirds oats.

5 Rye.—This crop is grown to some extent in Franklin county ; but it receives no pains in the cultivation. It seems very much like a rogue in a crowd, running the gauntlet where every one gives him a kick. If he survives the treatment, it is a just subject of gratulation.

From any inquiry which I have been able to make in any part of the State, I have never found a farmer who took much pains in the selection of his seed rye. It is commonly sown upon the poorest soils, and without manure. The produce in general corresponds with the treatment given to it. The yield varies from seven bushels to forty-seven. In the year 1816, so memorable for the failure of the corn crop, and the abundance of the small grains, oats, rye and wheat, forty-seven bushels of rye were obtained on an acre of rich pasture land new-

ly broken up. I know one instance of forty-five bushels having been obtained on the Connecticut river intervales. The average yield on the Deerfield meadows is twenty to twenty-five bushels. About three pecks are generally sown to an acre ;— but an experienced and successful farmer, of Long-meadow, many years in the habit of cultivating rye, is strongly in favor of sowing more than double the customary quantity of seed ; and says he finds himself amply repaid for doing it. On the plain lands at Bloody-brook, ten bushels are deemed a good crop ; on Pine-plains, six or seven are as much as is expected.

Rye bread constitutes, in many parts of the county, a substitute for wheat ; and, when well made, is nutritious and agreeable to most persons. Some rye is much whiter than other ; and when made into bread, its color can scarcely be distinguished from that of wheat. I am not satisfied that the colors constitute distinct varieties, as is maintained by some farmers ; but are dependent upon the particular character of the soil, or the nature of the manure applied, or the particular cultivation which has preceded it. I wish this could be determined : we have yet much to learn in these matters.

A respectable farmer in Deerfield informs me that his rye crop yielded him at the rate of ten dollars per acre on nine acres.— The price of rye was then 92 cents per bushel. This would be less than eleven bushels to the acre ; quite as much as is often obtained, but much less than what is deemed the general average. In addition to this, he sold his straw at the rate of four dollars per ton. This fully paid the expenses of threshing the crop with a flail. In one case, he raised sixteen bushels to an acre on a large piece. I am at a loss to understand why the rye crop is so negligently treated, excepting that it will live without much care, and make a decent return even on very poor land. Rye has somehow got a bad reputation ; and it is in such matters as in some others, public opinion or more properly prejudice determines, without any reference to intrinsic and substantial merit.

An eminent farmer in Worcester county has used a portion

of rye to great advantage in fattening swine. The Hatfield farmers, some of the best feeders of stock in the country, choose to purchase rye, of which they themselves grow scarcely any, even at a price a third higher than corn, that they may use it in feeding their fattening cattle. The dairy farmers in Cheshire, Berkshire county, prefer it to Indian meal, to give to their milch cows in the spring before they turn them to grass, from a conviction, founded on long experience, that it produces more milk and more cream. The custom of the Dutch farmers, so celebrated for their dairies and the excellence of their dairy produce, is, to give their cows daily, while in milk, a draught of rye meal mixed with water.

Rye is not particularly an impoverisher of the soil. When clover is sown with it, to be ploughed in with the stubble, it is considered a good mode of enriching the land. One of the best farmers in Franklin county informs me, that he has sown rye for seven years in succession on the same ground, with the exception of one year—say the fifth—when he took a crop of corn from the land. The corn was manured in the hill; but, with that exception, no manure was applied. When the rye was sown, from five to six lbs. of clover were sown; and this, in the ensuing year, was ploughed in with the stubble. By this husbandry, the land is placed in a course of gradual improvement. Though this was the method adopted by one of the best farmers in Franklin county, yet I am far from thinking highly of this mode of husbandry. It certainly might be worse; but the crop deserves far better treatment than this. It shows however how well it recompenses even a moderate cultivation.

I have no means of ascertaining the weight of straw which may be expected from an acre of rye. This of course must depend much upon the cultivation, and, in every case, somewhat upon the manner in which the crop is gathered, whether it be cut high or low, or whether with a sickle or a cradle. The general opinion is that the weight of straw is twice the weight of grain. Such current prejudices are not always without founda-

tion, but I have no grounds for speaking with confidence. The calculation of an inquisitive farmer in Conway in respect to oat-straw is as follows:—One shock, yielding one bushel of grain to a shock, will make three bundles after threshing. One bundle will weigh twenty lbs. or one shock will weigh fifty lbs.—then an acre yielding thirty-five shock, or thirty-five bushels, will give 2,100 weight of straw. A crop of wheat yielding five-and-twenty bushels, it is said by some, will yield from one to one and a half ton of straw. This is a loose mode of estimating things. I wish this matter could be ascertained; and the best mode would be, by repeated experiments to determine what relation the weight of straw bears to the weight of grain.

6. Wheat cannot be said to be cultivated to any great extent in Franklin county; and winter-wheat scarcely at all.—New York flour reaches the western and north-western parts of the county directly from Troy, N. Y.; and a great deal comes up the Connecticut and is landed at the mouth of the Deerfield river, from whence it is taken into different towns. Several farmers in the county however grow it in small quantities. I know two farmers who one year produced more than 400 bushels each. These were extraordinary cases; but they show what under good management might be done. There is no essential or insuperable difficulty in growing wheat in the county, and it ought to have its place in every established rotation. The chief circumstances of discouragement have been the rust and the grain insect. One great cause of failure has been, however, a negligent cultivation. The rust is to a considerable degree dependent on the weather; and when it takes place, usually occurs at the time of the most luxuriant growth of the plants when the air is hot and sultry, and there are frequent changes of rain and sunshine. It is likewise somewhat connected with the situation in which the crop is grown. If cultivated in a low and confined situation, it seems more likely to suffer than if grown in a high situation, where the air has a free circulation. Against the grain insect, (*cecidomyia tritici,*) there seems to have been discovered a perfect preventive. I have

already treated this subject so much at large in the Report on the Cultivation of Spring Wheat, and the Third Report of the Agriculture of Massachusetts, that I do not feel at liberty to enlarge much upon it in this place.

I should do wrong, however, to pass over the experience of several farmers in the town of Charlemont, cultivators of wheat, in relation to the grain insect. Lucius Ellis and Josiah Lyman have used lime on their wheat with perfect success against the fly. They applied finely powdered slaked lime on the crop just as it was coming into flower, and while it was wet with dew or rain. The flies had appeared upon the wheat; but their operations were immediately suspended by the application of the lime. They consider the experiment decisive. The experience of Samuel Potter in the immediate neighborhood corresponds with this. Calvin B. Hawkes, likewise, in Buckland, separated from Charlemont by the river Deerfield, details his success in a similar application. He applied at the rate of three bushels to an acre; the lime was newly slaked and warm, and was applied when the dew was on. The field appeared quite white. The evening previous to the application he plucked a few heads of wheat and found twenty worms or maggots. The ravages ceased at once upon the application of the lime, and his wheat crop was saved. The flies, he says, left in a body. This remedy is a most important discovery, and is corroborated by other and strong testimony from different parts of the country.

The wheat chiefly grown in this county has been spring wheat. It is desirable to get it in as early as the state of the ground will admit of it. This may sometimes be done in March, but not in general until the first of April.

One of the best farmers in the county or State considers his wheat as sure a crop as any which he grows, and his average yield is thirty bushels to the acre. His land is manured for Indian corn, and his usual rotation for a long course of years has been, first, corn; second year, oats and pease, or oats and wheat, or wheat, or rye. He stocks his land down to grass with wheat or some other grain.

7. Broom Corn (*Sorghum Saccharatum,*) is the next most important crop grown in the county of Franklin. Its cultivation is chiefly confined to the meadows on the Deerfield and Connecticut rivers, though there have been instances of large crops in the interior. Deerfield, Whately and Sunderland in particular grow large amounts of it; and it is said that the prosperity of the last-named town is mainly attributable to this product.

The average yield under good cultivation is from six hundred to eight hundred pounds of brush or broom. One thousand pounds are not infrequently reached. Six to eight hundred pounds are reported as the average yield in Sunderland and Whately. A crop of seed is obtained about once in four years, and forty bushels of seed are considered a good yield. A respectable farmer in the county informs me that in one instance, he obtained one hundred and fifty bushels of seed to the acre. It is planted in hills at a distance of eighteen inches between the hills lengthwise; and in rows about two and a half feet apart, or at a distance wide enough to pass the plough or the cultivator. By some farmers, broom corn is planted in hills two and a half feet distant each way, and fifteen stalks are left in a hill. It requires good manuring; and is sometimes manured as Indian corn in the hill, or the manure is spread. The cultivation is more expensive than that of Indian corn. No crop is more beautiful than the standing corn, when in perfection; and it frequently reaches a height of twelve to fifteen feet.

The stalks of the plant are long and hard, and therefore difficult to load on a cart. They are generally considered as of no value excepting for manure. This, however, is an error. The Shakers at Canterbury, N. H., among the very best farmers in the country, are as careful to save their broom corn stalks, as their Indian corn stalks for fodder; and, for the feeding of their young stock, deem them equally valuable.

The usual mode of gathering is to table the corn, that is to cut off the top, or tassel the broom as it is called, about two or three feet from the top, and bending the stalks of two rows together, lay it down and leave it until it is seasoned and fit to

be gathered. The brush is then cut, tied in small bundles and carried in. The remainder of the stalks are burnt in the field the ensuing spring, and some little advantage is supposed to be derived from the ashes. Some farmers prefer, after gathering the brush, to cut the stalks and lay them lengthwise in the rows, and plough them immediately under. They will be entirely decomposed by the ensuing spring. A still better mode is to carry them into the cattle and sheep-yards, where they become incorporated with the manure and make a valuable addition to the compost heap. I am satisfied from the experiment of the Shakers, that if properly cured, they might be well applied to the feeding of young stock. It is deemed necessary by the raisers of broom corn to connect with it the feeding and fattening of cattle that the necessary manure may be procured for the cultivation of this crop.

It is considered a profitable crop when the brush will command five cents per pound. The price has been subject to great fluctuations. Formerly, it was common for each farmer to make his brush into brooms, and sell them when and where he could. This was bad for all parties. It brought too many competitors into the market, and often unduly depressed the price. The buyers likewise were often obliged to put up with an inferior article. The growing of the brush and the manufacture of the brooms are now in different hands. The farmer, as soon as his broom is ready for the market, finds in the manufacturer a purchaser at a steady price; and the manufacturer knows that his reputation, and consequently his success likewise, is concerned in the quality of the article, which he furnishes.

The Shakers for a long time almost monopolized the raising of the corn and the manufacture of brooms, which like other manufactures of this industrious community, were always of a superior quality and generally commanded a high price, usually thirty-seven and a half cents a-piece or more. Now, corn brooms are frequently sold from eight to twenty-five cents; but many of them are, like Pindar's razors, "made to sell."

The handles in an unfinished state, made either of maple or ash, are furnished for a cent a-piece. The wiring and tying on are usually done by the hundred. The scraping the seed from the brush is an unpleasant business, and the dust is prejudicial to the eyes. A common flax comb is generally employed; but an improved machine, moved by horse-power is coming into use, performs the work quickly, and greatly lessens the labor. The manufacture, when carried on extensively and with ample capital, has yielded encouraging profits.

The seed is sold at two thirds the price of oats, and is ordinarily of the same weight. It sometimes weighs more than oats, and by some persons is more highly valued. It is by many esteemed good feed for the fattening of swine, when mixed with other grain. Some have used it for fattening cattle and horses, but it is not approved. The saving of the seed of broom corn is, by the best farmers, deemed a matter of much importance. It must be taken from that which produces a full and square head; and not from that which runs up in a spindling form, and "branches like a pine-tree." The difference in the seed is deemed of so much consequence, that while ordinary seed for planting can be obtained at one dollar and fifty cents per bushel, the best always commands four dollars. In no single thing do farmers commit a greater error than in respect to seed. Inferior seed of any kind of plant should never be used; and the difference in the expense between good and poor seed, is nothing compared with the increased value of the crop from good seed.

It is a fact, which certainly deserves mention, that broom corn is taken three, four, and sometimes ten years in succession from the same field without diminution of the crop. I have the testimony of three respectable farmers to this point. Yet this can only be done by high manuring. By many farmers it is deemed an exhausting crop. The brooms made from the brush, cut and dried while green, are tougher and much more durable than those made from the brush, when suffered to become quite dry and yellow. The returns of a crop of broom

corn in Gill are as follows: the land cultivated was one acre seven rods. The crop of brush was nine hundred and thirteen pounds. Of seed, there were one hundred and thirteen bushels; eighty bushels of which, sold for twenty-five cents per bushel. This was at the rate of eight hundred and seventy-five pounds of brush to the acre.

I subjoin also, the exact account of a crop cultivated by Alvah Hawkes, in Deerfield meadows, with which he was kind enough to favor me.

Expense of cultivating one acre of Broom Corn.

One ploughing the 12th of May, ...	1 25
Holeing out, one third of a days' work, . . .	34
Ten loads of manure at 75 cents per load, . .	7 50
Putting manure in the hills, ...	2 00
Planting, one day's work, $1 00; seed, 4 quarts at 75 cents per bushel, ...	1 10
Hoeing first time 3½ days, $3 50; hoeing 2d time, 3 days, $3 00, ...	6 50
Hoeing 3d time, $2 50; horse and boy to plough for the season, $1 00, ...	3 50
Tabling and cutting 4 days $4 00, . . .	4 00
Gathering, carting, and packing away, . . .	2 50
	$28 69

The expense of cultivating one acre is as above $28 69, the labor being rated at $1 00 per day, which is more than the actual cost. The yield was at the rate of 991 lbs. to the acre. If the ground had been fully stocked, the crop would have been more than 1000 lbs per acre. The brush was sold at 8½ cents per lb. The crop of seed was light and poor; at the rate of 50 bushels to 3 acres; and was sold at 16⅔ cents per bushel or $2 77 per acre.

To the above expenses of $28 69 are to be added as follows:

Scraping 1000 lbs. $3 30; board of man 5 days $1 07,	4 37
Rent of land, 1 acre, ...	16 00
	$49 06
The sales of the above brush 1000 lbs. at 8½ cts. pr lb.	85 00
Seed upon above acre, ...	2 77
	$87 77
Net profit per acre, ...	$38 71

This product may be deemed unusual; but there is no difficulty under suitable cultivation in obtaining it. The price is not extraordinary; and had the brush in this case, been kept until the spring, it would have brought 12½ cents per lb.

Another estimate by a good farmer, is as follows:

Ploughing, $4 00; dragging, $1 00; manure, $12 00; seed, 25 cents, ...	17 25
Planting 2 feet by 3½ feet apart, 75, . . .	75
First hoeing, $4 68; 2d hoeing, $2 34; 3d hoeing, $1 17,	8 19
Gathering brush and scraping seed off, . .	12 00
	$38 00

Returns.

700 lbs. of brush at 8 cents, ...	56 00
40 bushels seed at 25 cents, ...	10 00
	$66 00
Net profit per acre,	$27 81

No charge is here made for the rent of the land.

8. Hops.—Hops are raised in one or two towns in the county with considerable success. This cultivation is mainly confined to the town of Northfield. I shall subjoin the returns

obtained from that town; and shall treat the subject of the cultivation of them more at large in my report on Middlesex.

For hops, the land is prepared as for corn. The cost of planting an acre of hops is one dollar. For poling an acre of hops, one thousand six hundred poles will be required, which cost two dollars per hundred. These poles, generally of cedar or spruce, will last with care four years. The expense of setting the poles each year, is two dollars. To keep the stock good, the cost of poles and setting will be twelve dollars per year. Four loads of manure are annually required to maintain the land in good condition.

The expenses of cultivating an acre of hops in Northfield are given me as follows:

Expense of cultivating an acre of Hops.

Expense of poles, and setting each year, . .	12 00
Planting, $1 00; tying up, $1 00, . . .	2 00
Hoeing 3 times, $4 50, ...	4 50
Four loads of manure yearly to the acre, . .	4 00
Picking hops per acre, $7 00; board of laborers, $1 50,	8 50
Man to tend the pickers, $7 00, ...	7 00
Kiln-drying and bagging per 100 lbs. $1 00, say .	7 00
Bale, 45 cents, (3 gunny bags make a bale,) .	45
Expense per acre,	$45 45

A bale of hops weighs on an average, 400 lbs. Cost of inspection is 10 cents per 100 lbs. In New York this is paid by the grower; in Massachusetts by the buyer.

One hundred bushels of coal are required to dry 2000 lbs. of hops. The coal in this case, costs 7 dollars per 100 bushels at the pit. Hard-wood coal is much preferred.

In the case above detailed, the farmer estimated his crop at 700 lbs. to the acre. He has sometimes raised 1000 lbs. and 1500 lbs. to the acre.

Another farmer in the same town, states that he has found plaister (gypsum) in the hill, of great service to the growth of hops.

In 1833, two farmers in company, obtained from four acres, three thousand pounds, which were sold for twenty cents per pound. In 1834, from five and one half acres, they obtained four thousand pounds, which sold for fifteen cents per pound. In the first case, they judged that their land after deducting all expenses, yielded a net profit of one hundred dollars per acre.

Hops are usually planted eight feet apart in the hills. The cuttings are planted, and Indian corn is cultivated among them the first year, the corn being planted about half as thickly as when planted alone. The corn and hops are hoed at the same time. The second year the hops are poled; and a crop gathered.

Green barn manure is considered injurious to the vines. Fall manure or compost is deemed best. The hills are opened in the spring; the vines are then trimmed; the ground loosened and the manure applied to the hill. The field must be kept clear of weeds. The hops are gathered by hand. Women are often employed in the picking at twenty cents per day. The hops require to be kiln-dried immediately, as they are very liable to be injured by being heated in the heap. From forty-five to seventy-five pounds are kiln-dried at a time; and the process of drying a batch, occupies about twelve hours. After drying, they are put into a heap and suffered to sweat a little, and then packed and bagged, which is done by a screw-press. They are packed and screwed for five dollars per ton in this case, and sent to market without delay. The manner and condition in which they are put up is of great importance. If on inspection any are found discolored, the whole bag is condemned. Spruce poles about fifteen feet high are generally used.

The market for hops is very fluctuating. The risk of curing them is considerable; and to do it well requires much care and experience. The quality and condition of the article is of the last importance. Damaged or ill-conditioned hops are worthless.

The subjoined table will show the amount grown in Northfield in one season, 1838, with the prices annexed.

Table of Hops in Northfield, Franklin County, 1838.

	Acres.	Weight.	Price.	Amount.
A. S. - - - -	3	700 lbs.	15½ cts.	$108 50
A. W. - - - -	1	600 "	14½ "	87 00
R. S. - - - -	1½	560 "	15½ "	85 25
H. H. - - - -	8	3500 "	14½ "	507 50
S. M. - - - -	1½	600 "	10 "	60 00
M. C. - - - -	½	350 "	10 "	35 00
N. P. - - - -	2½	1100 "	15½ "	170 50
I. B. - - - -	2½	1400 "	15½ "	217 00
O. H. - - - -	2	500 "	14½ "	72 50
I. S. - - - -	1	450 "	8 "	38 00
B. S. - - - -	2	700 "	12 "	84 00
I. B. - - - -	2	800 "	14½ "	116 00
E. W. - - - -	4	2200 "	16¾ "	402 00
I. K. - - - -	3	700 "	14½ "	101 50
G. H. - - - -	4	2200 "	14½ "	319 00
I. M. D. - - - -	3	1175 "	14½ "	170 37
I. C. - - - -	3	1000 "	10 "	100 00
I. C., Jr. - - - -	2½	800 "	10 "	80 00
D. P. - - - -	1	400 "	14½ "	58 00
Total, - - -	48	19,925 "		$2812 10

9. Barley has been cultivated in this county, but not largely. The cultivation might be extended to a profit. In Hawley, it has yielded thirty bushels to an acre. In Ashfield, forty-

six bushels have been obtained to the acre. A mixture of this meal with Indian meal has been found beneficial in the fatting of swine and cattle.

10. Buck Wheat is cultivated in the county to a very limited extent. A farmer in Whately has cultivated the Tartarian buck wheat, a smaller seed than the common buck wheat and deemed more prolific. Some accidental circumstance has given it the name of Indian wheat. He obtained in one case forty bushels per acre, but deemed the crop uncertain. On grinding he obtained only fifteen pounds flour to the bushel. The bran is worthless. He likes the grain, when ground as feed for stock. The crop has been sown by some farmers in order to be ploughed in as a green dressing; but in one instance, which came within my observation, not with great success. No use is made of the straw or haulm of the crop; but in some places out of the county it is esteemed good feed for young stock.

11. Teasles have been cultivated to some small extent in the county, and have been deemed a profitable crop. The objections to their cultivation are two; first, the danger of being winter-killed; and second, the capriciousness of the market. The cultivation, however, might without doubt be extended to advantage. Having treated the matter of their cultivation somewhat at large in my Second Report of the Agriculture of Massachusetts, I forbear to extend my remarks.

12. Peppermint (*mentha piperita*) was formerly cultivated in Ashfield in this county to a large extent and with considerable profit; it was cultivated with a view to obtain the oil as an article of commerce. An acre of land would sometimes yield enough of the herb to produce fifteen pounds of oil, and thirty pounds have been obtained. The land was prepared as for corn. The roots were then separated and laid in the furrow. It is highly necessary to keep the plants free from weeds. They are to be cut when in flower; partially dried, and then distilled.

The first attempts at cultivating this herb were made more than twenty years since in Lanesborough, Berkshire co. It has become a considerable article of export both to England and France. It is put up in tin canisters, containing 20 lbs. each. The market has been extremely capricious, and the price of the oil has vibrated from seventy-five cents to sixteen dollars per lb.

Forty thousand pounds are supposed now to be annually raised in the country. It is stated that a farmer in Ohio had at one time forty-five acres in mint, and in the course of two years produced 2000 lbs. of oil. The farmers in Ashfield have in a great measure relinquished the cultivation, as it can be produced, it is said, to greater advantage in Western New York and Ohio. In these places it is probably favored by a virgin and unexhausted soil. The climate at the West is deemed more favorable, and the plants are not so liable to be winter-killed.— The land being richer and requiring no manure, the crop is not so much infested with weeds.

The essence is prepared by putting one oz. of oil to one quart of alcohol; sometimes much less oil. The oil which is exported is greatly adulterated. The essence of peppermint has some coloring matter added to it. It is said that a single confectionary establishment in the city of New York consumes 150 lbs. of this oil by the year. It would be well for the health of the community if they used no worse materials.

Other herbs have heretofore been grown and distilled in Ashfield; and many of the ever-green herbs, which grow wild in the pastures and forests. The business of growing, manufacturing and vending medicinal and aromatic oils and essences at one time employed a large number of young persons in this town and vicinity. They went out with all their capital stock in essence-bottles slung in a basket upon their arms; and returned with substantial contributions to the hive. In this humble way the foundation of several considerable fortunes has been laid; not a little knowlege of the world acquired; and the natural shrewdness of these travelling merchants somewhat sharpened.

13. Potatoes are grown in the county as food for man and cattle. The cultivation of this excellent root might be extended to great advantage. The planting and the harvesting are heavy labors, which render the cultivation to many persons objectionable. The cultivation in general is slovenly; and where the fields are manured as is usually done with coarse barn manure, the weeds in general contend so strongly for the mastery that it is often difficult to say which is the victorious party.

Of their value as feed for stock, I shall have occasion to speak presently. The crop through the county does not average more than 200 or 225 bushels. In one instance on the Deerfield meadows, 612 bushels were obtained, and 300 bushels to the acre are not infrequent. This extraordinary crop of 612 bushels shows what may be accomplished. When our farmers will become convinced that the best cultivation is the most profitable, it is not easy to predict.

I shall subjoin the account of the successful cultivator, Dennis Stebbins.

"The land on which this crop was raised lies in the north meadow of Deerfield, and is of a heavy rich loam. In the previous year broom corn was raised upon it and no manure applied; and it had been appropriated alternately to the raising of corn and potatoes except one year a crop of hemp. The year in which corn was raised, there was applied about five loads of manure. The year in which this crop was raised, the field was planted on the 15th of May in drills or rows, the rows three feet apart and the seed dropped in about one foot asunder; there were applied twenty loads of manure, a small shovel-full under each potatoe, which was cut into three pieces. The land was first ploughed and then drilled or furrowed out for the reception of the seed with a small plough and one horse; the seed was then covered with a hoe. Thirty-three bushels were the quantity of seed used, and they were a long red kind known by the name of *merino* (*La Plata*). June 11th, just as the tops began to make their appearance, with a single horse there were turned two furrows on to each row, which nearly covered all the tops, and by the application of a hoe they were completely covered.

June 23d, there were turned two light furrows upon each row, for the purpose of destroying the weeds, not intending to increase the hills or ridges, and the few weeds that remained were subdued by hoeing. July 6th, the few scattering weeds that appeared were pulled up by the hand. They were dug with the hoe and finished October 13th, and the produce was six hundred and twelve bushels."

The measurement in this case was made in baskets and not by weight, and the form of this kind of potatoe does not admit of close packing. These allowances are to be made, but still the crop must be pronounced very large. The quantity of seed sown is large; from eight to twelve bushels is the usual allowance.

14. Of other esculent vegetables, few are cultivated excepting as mere garden products for the table. In one case, carrots at the rate of twelve hundred and ten bushels per acre, were raised on a quarter of an acre of land. I could not learn that any extraordinary process had been pursued in their production. A deep soil, deep cultivation, careful thinning and weeding, and frequent ploughing between the rows, will in ordinary cases ensure a large crop. The time has yet to come when farmers will understand the importance of laying up a store of succulent vegetables for the feed of their winter stock instead of confining them almost exclusively to dry feed.

VII. The Dairy.—The dairy does not enter largely into the economy of the farmers of Franklin county. The river farmers engaged in fatting beef for market or in raising young stock, keep only cows enough to supply their own families with milk and butter; and the farms of a large portion of the hill country in the interior, are devoted to the sheep husbandry.

There are not many dairies which contain more than six cows, and with few exceptions very little butter or cheese are made for a distant market. The average produce of a cow in new milk cheese, is rated at two hundred pounds, but this is an inferior return.

A farmer in Gill whose main object is a butter dairy, gave me an account of his management. The account is not so definite as could be desired, but it may suggest some useful hints.

From twelve cows he one year sold to the amount of three hundred and sixty dollars; two hundred pounds of this were cheese; the remainder was in butter, which brought twenty cents per pound. The price of the cheese was not remembered. He connects with his dairy the raising of pigs, and the year above referred to, he sold two litters of pigs for fifty-nine dollars and seventy-five cents. His sows have two litters each per year. He likewise raises all his calves. With one cow this year he raised four calves. He gives his calves when first taken off, new milk for three weeks; afterwards skimmed milk and meal. He prefers for this purpose, a mixture of rye, Indian and oat-meal. The season I visited him, he had sold ten cows of his own raising, and retained their calves, at a price averaging thirty-two dollars each. From another dairy in the northern part of the county, after supplying butter and cheese for a large family from a dairy of thirty cows, the farmer sold five thousand pounds new milk cheese. A small dairy in Ashfield gave milk and butter for a family of thirteen persons; and besides this the farmer sold from them three hundred pounds of butter, and six hundred pounds cheese, mostly new milk cheese, in the same season. In Buckland it is stated to me, that many farmers on farms of one hundred acres, keep ten cows and lay up three hundred dollars from their proceeds.

The sales of the dairy produce of another farmer in Coleraine amounted one year to twelve hundred dollars. The number of cows I was unable to ascertain. This is without doubt the most extensive establishment in the county. The dairy husbandry in Franklin county must be considered as a small interest, and the produce by no means equals the demands of the county. I will subjoin a statement given me of the butter and cheese received and sold at one store in the town of Rowe in one year, 1836. Under the great difficulties of obtaining the desirable information, I am obliged to avail myself of whatever I can get.

Bought and sold, ... 38,000 lbs. cheese.
Deduct amount bought of individuals out of town, ... 13,000

lbs. 25,000, or 12½ tons.

This, excepting a small quantity of skimmed milk cheese, was sold in Boston at an average price of 10 cents per pound, ... $2,500

In the same year, bought and sold 18,500 lbs. of butter.
Of the above bought and sold of individuals out of town, ... 6,000 lbs.

12,500 lbs.

This was sold in Boston at 20 to 25 cents, or say 22½ cents, which would amount to $2,812 50

In the years 1837 and 1838,
Bought and sold, cheese, . . 40,000 lbs.
Deduct amount from individuals out of town, ... 10,000 lbs.

30,000 lbs.

This 15,000 lbs. for each year, was sold at an average of 9½ cents per lb.

In the same years,
Of butter, ... 24,000 lbs.
Deduct amount from individuals out of town, ... 6,000

18,000 lbs.

This 9,000 lbs. each year, was sold at an average of 20 cents per lb.

The population of this town is about 700.

VIII. Maple Sugar.—This is comparatively a large product in several towns in the county. A very small amount is exported; but what is made goes far to supply this necessary of life, and to prevent the expense of the imported commodity. A large portion of what is produced is made from trees sown or planted within the memory of persons now living, or by their own hands.

The amount of sugar made in Leverett in good seasons, is from 15,000 to 20,000 lbs.; in Shelburne, 30,000 lbs.; in Ashfield two years since, it was ascertained at my request, to exceed 40,000 lbs. I have returns from individual farmers in the county, of their own products, being 800 lbs. annually, 1,000 lbs. and 2,000 lbs. each. The fact has come to my knowledge since my Report on Berkshire county, that in the town of Sandisfield, Berkshire county, with a population of about 1500, 100,000 lbs. of maple sugar have been produced in a year. These extraordinary facts, so little known, show the capacities of the State in this particular, and the importance of cultivating and protecting this invaluable tree.

In general, a good tree may be expected to yield four lbs. of sugar in a season. I have seen a tree, said to have produced twenty-seven lbs. in one spring. A barrel of sap, or thirty-three gallons, will produce eight lbs. sugar. Lucius Field, of Leverett, whose credibility is above question, informed me that in one season he obtained from one tree, 175 gallons of sap. This, if manufactured, would have produced more than forty lbs. of sugar. The quality and quantity of the sap vary in some measure with the age of the tree and the soil in which it grows. A moist soil produces the largest quantity and the best sap. The sap of old trees contains more sugar than that of young trees. The sugar sells usually from 10 to 12½ cents per lb. The color depends in some measure on the cleanliness of the vessels used Sugar burnt upon the kettle discolors the product. The growth of the maple is such, that it may be used for sugar or cut for fuel in twenty years from the planting. The wood makes excellent fuel; and is likewise used to much advantage in cabinet work and for house-floors.

The tree is of rapid growth and of cleanly and beautiful appearance. As an ornamental tree, I know of no handsomer variety. Its plantation in long avenues for the embellishment of the streets and the road-sides is much prevailing in the beautiful villages of the Connecticut valley, where it finds a congenial soil and grows with great luxuriance. Some of the sugar produced, where it is manufactured with care, in color, clearness and brilliancy is equal to the best raw sugar of New Orleans and Jamaica. This variety *(acer saccharinum)* of maple abounds in many parts of the country. The sap from the white or soft maple is not so strong as that from the rock maple; but is yielded in equal abundance and makes equally good sugar.— A sugar orchard of five hundred trees is calculated to yield over a thousand lbs. of sugar, and often much more than this. It is not unusual to find a tree which will yield six gallons of sap per day.

The weather most favorable for making sugar is when it freezes by night and thaws by day. No sap can be obtained with advantage after the buds begin to swell. Sugar is sometimes made in the autumn, but by no means with equal advantage as in the spring. It is advisable to tap a tree on the south side, because it is more likely to thaw there and the sap is obtained sooner in the morning; but no difference is perceived in the sweetness of the sap from either side.

The best mode of tapping the trees, as I learn from some practical men, who have been familiar with the manufacture of sugar for thirty years, is with a narrow chisel. An incision is made in the tree which is technically called a box. If made with care, this incision is thought not to injure the tree. It will soon close; and, after a year or two, the tree may be tapped again in the same place. The tapping of trees, as is often done, by boring into them with an auger to the depth of three or four inches, is much disapproved. Trees tapped in this way do not yield any more sap than those tapped in other ways; and in examining such trees after they have been felled, it is found that these deep borings never heal like the incisions made with a

chisel. Some persons maintain, that trees, if the operation is judiciously performed, so far from being injured by being tapped, gain increased vigor from it.

In the manufacture of the sugar, cleanliness in all the vessels for collecting the sap and boiling and refining it is of paramount importance. Troughs made of new and unseasoned wood and any acidity or mouldiness in the buckets used for collecting the sap are likely to injure the sugar. It has been recommended by some persons, instead of wooden buckets for collecting the sap, to use earthen vessels. These would be more difficult and unsafe for transportation; and liable to be broken by the frost.

I subjoin an account of the manufacture given to me by an intelligent farmer, who has been familiar with it more than forty years.

"No two persons take exactly the same method, yet all think their own the best. I will tell you the course which we pursue. The sap-tubs are made thoroughly clean by scouring with sand and water, and scalding them as soon as they are taken from the trees in the spring. They are housed until the next spring, and we scald them again before they are put to the trees. It is found impossible to make good sugar unless the tubs are cleansed from an acid and mould which is taken from the sap the preceding spring; otherwise the tubs will become black and the sugar will not grain. I tap my trees with an inch and a quarter chisel. We cut into the wood of the tree about three quarters of an inch in a sloping direction, so that the box (as we call it) will hold a spoonful or more. We bore so as to strike the lowest place in the box with a three-eighths of an inch breast-bit. The spouts are made and sharpened to suit the bit. A man who is used to it will box three hundred in a day: another man will bore and set the spouts. Some persons tap their trees by boring into the trees with a half or three-quarters of an inch bit or auger; but I am persuaded that it hurts the tree much more than the chisel. So far as the spout is driven into the wood we get no sap, and of course we must bore into the tree three or four inches, which will occasion it to rot at the

heart. I have known a sugar maple blown down which was two and a half feet through ; and which was found, upon examination, to have been tapped with a chisel for eighty or ninety years, and for the last thirty years perhaps with two boxes each year, which was very thrifty and perfectly sound, excepting what had been cut away with the chisel. This tree was probably tapped first when about eight inches through, for at that bigness we begin to tap our trees.

" I have thought the sugar maple was given to us by a kind Providence to be used in the same way and for the same purpose for which we use them, for no other tree which I know, would bear cutting so much and for such a length of time without injuring its growth. I am speaking of trees standing in open land. Trees standing in a forest will not bear tapping so well. There need be nothing said respecting gathering the sap ; but special care ought to be taken to cleanse the barrels, especially if those are used in which cider has been kept." (Barrels should be kept exclusively for this purpose. H. C.)

" To make good sugar, much depends on the boiling from the beginning to the end. We boil our sugar chiefly in iron kettles, which hold about a barrel, set in arches. To prevent the boiling over of the sap, we put into it a small quantity of butter ; a piece as big as a walnut put into it at several times, will prevent its boiling over for a day. The boiling throws the syrup upon the hot part of the kettle, which is above the syrup, in drops, and these immediately burn upon the kettle ; and as the syrup settles in the kettle by evaporation, this burnt matter is continually gathering upon it. When the kettle is filled again, this burnt matter is washed off, at least the color and taste of it, into the kettle. This gives the sugar a dark color, a bitter taste, and prevents its graining well. The best way to prevent this burnt matter hurting the sugar, is to keep it off the kettle as much as possible, which may be done in part by never suffering the heat of the kettle to be raised to an extreme while boiling, and by scouring the kettle thoroughly once every day. Rubbing the kettle with a piece of brick or stone, will make it

bright and clean. All color gets into the sap after it is taken from the tree. The sap, when it comes from the tree, is as colorless as pure water. I have seen maple sugar, which was dried to sugar by the sun; it was as white as snow, and very pleasant to the taste. I have never thought that an artificial color added any thing to the value of butter, cheese or sugar. I am told that sheet-iron pans, which are much used at present to boil the sap down in, are preferable to kettles; they boil faster, and it never burns upon the pan. Of this I know nothing by experience. We boil the sap down at the rate of twenty to one; it is then set in tubs to settle; and in twenty-four hours, you turn off what is clear. It may be kept several weeks, if you choose, without injury, unless it be very warm weather, which will occasion it to ferment. The dregs left in the tubs may be cleansed in several ways. They may be mixed with sap from the tree and settled again, or saleratus may be used, or milk, or an egg beat up, put into it, and boiled; the filth will rise and may be skimmed off, and so prevent any material loss. The syrup ought to be boiled down to settle once in twenty-four hours; for the less sap is boiled to sugar at a time, the better the sugar will be. One barrel of sap boiled to sugar will be whiter and better than five barrels; five than ten, and so on.

"The operation of boiling the syrup into sugar is better learned by seeing it done than by writing. I will, however, give you a sketch of the way we proceed. We boil the syrup to sugar in a brass kettle, being lighter and easier to handle than iron. We boil about twenty-five or thirty pounds at a time in a common five-pail kettle. The heat should be steady without much blaze. If it is intended for lump sugar, we boil it until it will cleave quickly and easily from an axe or some smooth and hard substance that is cold. We turn it into earthen pans and stir it moderately until it is thoroughly grained, thence into dishes or smaller pans to cool. If for dry lively sugar, we boil it until it will break and fly like rosin, when streamed into cold water or upon an axe. We then pour it into large earth-

en pans; and stir it moderately until it is grained and stiff as dough; after which we put it into a larger vessel, such as a large tray or bowl holding nearly two pails full; and stir it powerfully to prevent its having hard knobs in it, until it is cold and lively. But the stirring of maple sugar to make it good, cannot be learned but by seeing it done, or by a long course of practice. If stirred too fast while graining, it tends to make it fine-grained and clammy; if not stirred enough, it will be knobby."—This account, it is obvious, is that of a plain common farmer, and is given as the ordinary process of manufacture. By an improved method, undoubtedly a very superior article may be made. As yet no attempt has been made to refine the maple sugar on a large scale.

It has been stated that the sugar-maple reaches to the age of one hundred and eighty years, yet seldom measures more than four feet in diameter. It may be tapped when about two feet and a half in circumference; and if done properly, in the manner described, neither the growth nor the duration of the tree will be affected.

A farmer in Pennsylvania gives the following directions for forming a sugar orchard. "To plant out a sugar camp or orchard, let the trees be thirty-three feet apart or forty-six trees on an acre. One acre thus planted, will, in a good season, yield 130 lbs. of sugar. I tapped 160 trees this year, and although I lost as much sap as would have made 100 lbs. of sugar, I made at least 500 lbs. The farmer must not expect to derive any benefit from the land beyond the sugar, as the shade of the tree is very injurious to grass and ruinous to grain."

This subject of sugar from the maple is of great importance and by no means appreciated as it should be. In large portions of our State the tree would find a congenial soil and flourish luxuriantly. There is good reason to believe that by proper attention to this subject on the part of the farmers, the State in comparatively a few years might meet from its own soil its ordinary demand for this useful, agreeable, and now necessary article of life. As an ornamental tree, the rock maple is ex-

ceedingly beautiful ; and might be planted without either great expense or trouble on our commons, by our road-sides, by the borders of our pastures, and in many vacant places on our farms which might, with great advantage, be occupied in this way. As fuel, I have already spoken of its value ; and, in this respect, it ranks next to hickory or walnut. In undertaking a plantation of maple trees for an orchard, it would be well to plant the trees much thicker than it is intended they should stand, in order to guard against failures. They may be thinned for fuel, if they should be found to stand too closely together ; and in this way the farmer be fully remunerated for any trouble it may have cost him. The great objection, which will be made to doing this, proceeds wholly from our selfishness. Few farmers, who should undertake the plantation, would expect to live to realize the proceeds. This, with many persons, must in all human probability be the case ; but can we have no regard for those, who come after us ; and are we to decline every good work by which we ourselves are not to be immediately benefited? This objection proceeds from any thing but benevolence, or religion, or social duty.

The sugar made from the maple, is capable of becoming refined into as agreeable and elegant an article for the table as cane sugar. As yet the modes of manufacturing it are rude and imperfect. If subjected to those improved processes, which the best of cane sugar passes through, it would be equally valuable and valued. The discoloration of it might be completely avoided, if it were boiled in tin vessels or kettles placed in those of iron, and the boiling were conducted by steam introduced between the two, so that the vessel containing the sap would not come directly in contact with the fire. Add to this, much more attention should be paid to the condition of the vessels in which the sap is received. The labor occurs at a season of the year, when in our climate the making of sugar would not interfere with important labors of the farm. The gain to domestic economy of families in the country providing their own sugar would be immense ; and the use of the

article to many benevolent minds, would be unattended with any of those painful associations, which are connected with the use of the products of slave labor.

IX. Live Stock.—1. Neat Cattle.—*Character and Weight.*—The neat cattle, generally prevalent in the county, are of what is called the native breed, which is of such a mixed and accidental character, that it is not distinguished by any fixed or definite properties. The favorite color with the farmers is red and brindle; and the cattle in general are of a medium size, the cows varying, when fatted, from 600 to 800 lbs. when dressed; and the oxen at five and six years old, from 900 to 1600 lbs.

Ten oxen sold by a Deerfield farmer in New York market, produced as subjoined. The hide and tallow, as is customary in that market, are not included in the weight.

One ox weighed	lbs. 1084
" "	828
" "	916
" "	1024
" "	1064
" "	1052
" "	1128
" "	892
Two three years old steers, . . .	1880
	lbs. 9868

The returns of the weight of fatted cattle by another farmer, are as follows:

One pair of steers 4 to 5 years old weighed	lbs. 1868
One yoke of oxen, ...	1972
" " "	1892
" short-horn cow, ...	735

These minutes will give a just idea of the average weight of cattle fatted for market in this county. Many animals of a large size have been fatted in the county. I will give the weight of some few which have come within my knowledge.

A pair belonging to S. C. of Deerfield, weighed in Brighton, when dressed, . . 1791 lbs. and 1666 lbs.=3457 lbs.

In Brighton market, the hide and tallow are included in the weight. An ox fatted by A. S. of Deerfield, and sold at Brighton, weighed as follows: 4 quarters, 1716 lbs.; hide, 154 lbs.; tallow, 250 lbs.; total, 2120 lbs. This ox was five years old in the spring preceding his being killed. He was of the native breed; and was never worked. His live weight was 2630 lbs. The same farmer has since that time fatted an ox, whose live weight was 2550 lbs. and the weight of whose quarters, when dressed, was 1753 lbs. Three oxen sent by R. D. to Brighton, weighed as follows: one ox, 1472 lbs.; one 1487 lbs.; one 1588 lbs.; hide and tallow included in the weight.

A fat bull fed by B. S. weighed, when dressed, 1051 lbs.

A fat heifer fed by E. W. " " 832

These cattle were almost entirely of the native stock, which does not constitute a distinct breed; and, in respect to which, no systematic attempts at improvement have been made in this part of the State. Two foreign bulls, understood to be of the improved Durham short-horn breed, have been introduced into the county. In respect to one of them brought from Hoosic, N. Y., his cross with some native cows has produced excellent milkers. With respect to the other, he has hardly been long enough in the county to test the value of his progeny.

2. Cows.—Some extraordinarily valuable cows have been owned in the county. Two or three of them, which have come within my immediate knowlege, deserve notice.

A cow owned by H. G. Newcomb, of Greenfield, was of native stock and owned by him nine years. Her color was a bright red. She was of common size, well-formed; small head, short horns, neck and leg; always healthy and in good flesh, gen-

tle, easy to be milked, quantity of milk large and quality good; usually kept in common pasture in summer. When eleven to twelve years old, from 27th March to 25th May she produced one hundred lbs. of butter of the best quality; and in the same time, one hundred and sixty quarts of her milk, not skimmed, was reserved for the use of the family. During this time, her feed consisted of the best of hay (excepting the last week, when in pasture) with about four bushels of Indian and rye meal and some boiled potatoes and slops. She was milked three times daily except the last week, and in the last fourteen days produced 29 3-16 lbs. of butter.

A cow owned by David Wait, of Greenfield, produced twenty-five lbs. of butter in one fortnight. The first week twelve lbs.; the second, thirteen lbs. The feed during the first week was hay only; the second week, hay with the addition of half a peck of provender, (oats and corn ground together) per day. This was in April.

During the week ending June 2, the above cow produced $15\frac{3}{4}$ lbs. butter. The milk was weighed, and the average daily weight was forty-seven lbs. per day. It was measured after being strained, and measured twenty-six quarts.

Wm. Dickinson has a native cow which was put upon the fall feed after the Indian harvest. The first week after the removal of her calf, she produced fourteen lbs. of butter; and during the first eight weeks she produced ninety-six lbs. She had grass only while the grass continued; and hay and meal after she was put in the barn. The same farmer is the owner of a cow, from six quarts of whose milk a pound of butter is obtained.

I am not willing to leave this subject without referring to a beautiful example of domestic economy in the management of two cows, which, as it belongs exclusively to one side of the house, gives at least encouragement to believe that the race of good dairy-maids is not wholly extinct.

This example is in Shelburne; and the mistress of the house, who herself took the whole management of the cows and the

milk, besides supplying a family of three persons with what milk and butter were required, sold in one season from her two cows, four hundred lbs. of butter. The feed was grass only. In June she made in one week, twenty-three lbs.; in one week, twenty-five lbs.; in one week, twenty-eight lbs. These were cows of native stock, and this amount does not include the butter packed for the winter use of the family.

I cite these examples of cows remarkable for their productiveness, perfectly aware that no reliance can be placed upon such accidental individuals for the propagation of a superior race. The calves of such animals, according to our careless management of these matters, may be good or otherwise. The chance is certainly in favor of their proving well when descended from a good cow; but no confidence can be placed in the perpetuation of the good qualities of the parents in their progeny, unless by a careful selection on both sides and a judicious crossing, pursued systematically for a length of time with a view to particular and desired improvements. Under such a system, we may do something towards reversing the old proverb, that a good cow may have a bad calf. As yet, however, no approaches towards such a result can be said to have been made in this county. The county, indeed, can hardly be considered to any great extent as a stock-raising county.

3. Stall-fed Cattle.—The fatters of beef depend, for their cattle to be stall-fed, upon animals brought from Vermont, New Hampshire, and New York. In these cases the experienced and practical have great skill and shrewdness in selecting small-boned, neat, and thrifty animals as the best for their purposes. Many of them find great advantage "in turning their cattle soon," rather than keeping them on hand a long time. After graduating a class early in the season, they go into the neighboring hill-towns and purchase fat cattle already far advanced for the market, and finish them so as to have another class to send off in the spring. These cattle are generally fed upon hay and potatoes in the hill-towns, where corn is not

raised to any considerable extent as in the river-towns; but when brought to the river-towns they are fed almost exclusively upon hay and meal, and the change of diet greatly favors their thrift. Another kind of stock much approved for stall-feeding are three and four year old steers, which are kept well in the winter upon good hay; and for about two months in the last of the winter and first of the spring have a moderate allowance of provender, such as the meal of Indian corn, or corn and oats or pease and oats ground together, and are then turned into the pastures as soon as they can get a living. In a good pasture these animals do well, and are generally sent to market in June and July, when they command a good price.

4. Management of Stall-fed Animals.—I shall now proceed to speak of the manner in which stall-fed animals are managed; and what is much more difficult, endeavor to form some estimate of the cost and profits. The difficulty in this case arises from the fact, almost universal, that of all classes of business men, none are less exact, or rather none are so careless as farmers in all matters of accounts. Until by urgent persuasion and entreaty with individuals to make exact observation and experiment, I have never yet been so fortunate as to find a farmer who could tell me, for example, in respect to this very subject of fatting beef, what was the daily consumption of an ox in hay; the ordinary gain of a well-fed animal of any particular description in live weight; and the actual expense of fatting an animal in any particular case. As an intelligent farmer in the county remarked to me, "our farmers," said he, "in the autumn borrow money at the bank to purchase their cattle for stall-feeding; and if on the sale of their cattle in the spring they have something left beyond paying their notes, they deem themselves fortunate."

I shall first speak of the mode of feeding usually adopted; next, of the kind of stock generally preferred; and lastly, enter upon some estimates of the cost and profits of fattening cattle for the market.

The stall-feeding of cattle is carried on to a large extent in the river-towns, and to some extent in the hill-towns. In the hill-towns they are usually fatted upon potatoes; in which case it is not uncommon to tie them in the barn and allow them a bushel of well-washed potatoes per day, given at two or more different times, with as much hay as they will consume, and allowing them no water. It is thought by many farmers that a yoke of oxen put up in good condition may be well fatted or finished off for the market with what hay they will consume and one hundred bushels of potatoes; and that the advance obtained on such cattle is in general a fair compensation for the potatoes given them and the hay required, which will not be large in quantity. Cattle fed upon potatoes will, it is said, in general prove as well, that is, have as much tallow, as those fed in any way, and the beef of such cattle is thought by many to have a peculiar juiciness or sweetness. In driving to market, however, the cattle fed upon potatoes will fall away more than those fed upon hay and corn; and when they come into market by no means appear as well. Several farmers are in the practice of boiling or steaming the potatoes which they give to their cattle, and profess to find a great advantage in it. The experiments which have come within my own knowledge have not yet satisfied me that the advantages are a compensation for the labor and expense incurred by such operation.

The articles usually employed in fattening cattle are hay and Indian meal, or corn and rye meal mixed, or pease and oats, or oats and corn ground together. Besides this, many farmers are in the practice of giving their stall-fed cattle occasionally certain quantities of potatoes. An excellent farmer, of fifty years experience in the fatting of cattle, is of opinion that potatoes are good feed for fatting cattle in the fall and spring, when the weather is warm; but that they do no good in cold weather unless they are cooked. I rely much upon his judgment and experience. The value of potatoes is differently estimated by different individuals; some considering five

bushels, others rating four bushels, as equivalent to one bushel of corn.

M. I. approves highly of potatoes as feed for fattening stock, and deems four bushels fully equal to one bushel of corn. He gives as many as the cattle will bear, and this varies from one to two bushels per day. He put up a steer in autumn which cost him twenty-six dollars, and killed him in March, weighing one thousand lbs. with eighty-seven lbs. of rough tallow. This animal would seldom take more than five pecks per day. The quality of the hay, which cattle consume under these circumstances, he does not deem important; and thinks the straw of grain will do nearly as well as hay.

He purchased a heifer, two to three years old, at eighteen dollars, and put her in the stall in November. She would have been three years old in six weeks from the time when she was killed had she been saved. When dressed she weighed nine hundred and ninety-four lbs. and had one hundred and seventeen lbs. of rough tallow. She was fed exclusively upon potatoes and hay, and eat usually one bushel and a half per day. She was sometimes induced to eat two bushels per day.

In the feeding of cattle for market a great deal of practical skill is required, and constant observation of their condition, otherwise they may be surfeited and their appetite destroyed; or their digestive powers be overtasked and the feed fail of its object.

A farmer in Charlemont, of large experience in the fatting of stock, considers the common English or flat turnip of little value for fattening stock. The cattle fed upon them appear healthy and in fine condition, but yield very little tallow. A pair of cattle fatted by him and much admired by the butchers, which weighed eighteen hundred lbs. when dressed, had only thirty lbs. tallow each.

I presume the experiment has never been fairly tried, of the value of turnips for fattening stock. This is likely to have been only a solitary instance; besides this, we want to know in the case, how many turnips were given; under what cir-

cumstances they were given; and with what other feed accompanied.

The same farmer is of opinion, that oil-meal for fattening cattle is of great value. He is quite content to pay twenty to twenty-three dollars per ton, the current price for it in his town. A farmer in Conway concurs in this opinion; and believes that for a beneficial change a farmer can well afford to buy oil-meal with corn at bushel for bushel. The price here rises sometimes to thirty dollars per ton. The weight of oil-meal is about forty-five lbs. to the bushel.

I shall give somewhat in detail the practice of different farmers in respect to feeding their stock.

C. D. with fifteen oxen in the stall.

Five of them receive one peck of Indian meal per day. Six, six quarts each. Four, which are kept in the stable day and night excepting when turned out for watering, have six quarts of meal each per day, with as much hay as they will eat. They are foddered four times morning and evening. They are tied up about seven o'clock in the morning; their meal is first given to them, and then they are fed liberally with hay until about nine o'clock, when, with the exceptions above referred to, they are turned into the yard and remain until half-past two, when they are again put into the stall, and the same process of feeding gone through with. Their feeding being completed, they are again turned into the yard, which is well littered, where they remain until morning whatever may be the state of the weather. It is the general belief, that the cattle which are kept constantly in the stall, thrive faster than those which thus have the liberty of the yard.

S. W. has twenty-six head of cattle in the stall. Most of them have one peck of meal each per day; some of them twelve quarts. The provender given them consists of two-thirds of Indian meal, and one-third of pease and oats, ground and mixed.

S. S. has fourteen oxen in the stall. The average cost of them was forty-seven dollars each, about the middle of Novem-

ber. In the first week of February, he calculated that many of them would produce twelve hundred lbs. of beef each. The mode of feeding is as described above. He considers a mixture of provender as best adapted to their thrift; but has made no exact experiments.

E. W. a farmer long accustomed to the feeding of cattle for the market, prefers to buy his oxen intended for the stall, in the spring. If early in the season, he feeds them with coarse fodder and two quarts of meal each, until they are turned into the pasture. If he uses them for work during this time, he allows them four quarts of meal each per day.

They are brought to the stall about the 20th of November, and he then begins feeding them with half a bushel of potatoes and four quarts of meal each per day. After a time he quits feeding with potatoes; and gives only hay and meal, from one peck to nine quarts each; and seldom exceeds this quantity. His provender consists of one-third oats and two-thirds corn.

A. R. has twenty head of cattle in the stall. They are of good size and calculated to average over eleven hundred lbs. each, when dressed in Brighton.

He has tried a variety and a mixture of feed, such as oats, broom-corn seed, &c., but he prefers Indian meal to every other feed. He disapproves of excessive feeding; and thinks it a great error to give too much. He deems four quarts with hay ordinarily enough; and ten quarts a day sufficient for any animal. He feeds twice a day with great regularity. His present cattle have never received over eight quarts per day each; and at first putting up a much less quantity. He deems it best to reduce their feed of provender a few days before starting for market. He buys his cattle for feeding in the fall; and his present stock averaged in the cost seventy-five dollars per pair.

S. W. is of opinion that one bushel of corn one year old for feeding any kind of stock, is equal to one bushel and one peck of new corn, or corn before it becomes perfectly sound and dry.

T. C. has in stall, 27th February, five pairs of oxen, which

were purchased in Brighton, in June last. When purchased, they were thin in flesh and were immediately put into good pasture. The cost was as follows :

Two pairs cost 60 dollars per yoke,				. . .	120 00
One pair cost	46 50	"	"	. . .	46 50
"	" 47 00	"	"	. . .	47 00
"	" 45 00	"	"	. . .	45 00

These cattle were put into a good pasture until the 20th of November, when they were brought to the stall. From that time until the 20th December, they were fed with hay only. From that time until the first of January, they received six quarts of provender each daily. From the first of January, they received each eight quarts daily. This provender consists of one half oil-meal, one quarter oats and one quarter corn ; the two last ground together and the whole intermixed when given to the cattle.

The oil-meal in this case cost forty dollars per ton. It weighs about forty-five pounds to a bushel. If ground very fine, it will not weigh more than thirty-eight or forty lbs. to the bushel. It is best, therefore, to buy it by weight. This farmer is of opinion that his oxen, if now killed, would return him one thousand pounds of beef each.

He has likewise in his stalls several fine steers, from two to three years old, which cost him in the fall from ten to twelve dollars each. These will be well fed until the spring ; turned into good pasture early and sent to market in June or July. The average weight of them when dressed may then be from six to eight hundred pounds.

E. W. mentioned above, puts up his cattle in November, and sells them in February, the average time, during which they are stall-fed, being about seventy-five days. He prefers cattle for the stall, whose weight, when dressed, will average about eleven hundred pounds, to those which are larger, as being more profitable in fattening ; and he deems it a great mistake on the

part of farmers to keep their cattle in the stall for a very long term.

The use of succulent vegetables for the feeding or fattening of cattle other than potatoes, has not in Franklin county come within my knowledge. Meal made from the seed of broom-corn is occasionally used, mixed with other provender, but for neat cattle it is not approved by the best farmers. Flax-seed jelly, that is, half a pint or a pint of flax seed formed into a jelly by boiling, as an allowance for a stall-fed animal per day, has been used for fattening cattle by some farmers with remarkable success. It does not supersede the use of meal, but is best mixed with it. It is believed that no article according to its cost, can be used with more advantage than this for this object; and that none is known, which is more nutritious. This jelly, which I have myself used with great advantage, is prepared as follows: "to seven parts of water let one part of linseed be put for forty-eight hours; then boil it slowly for two hours, gently stirring the whole lest it should burn. Afterwards it ought to be cooled in tubs; and mixed with meal, bran, or cut chaff, in the proportion of one bushel of hay to the jelly produced by one quart of linseed well mashed together. This quantity given daily with other food will forward cattle rapidly, but it must be increased when they are intended to be completely fattened."

D. B. a successful feeder of fat cattle, is of opinion that a yoke of good cattle to be well stall-fed, will require from twenty to twenty-five bushels of corn meal. The amount of hay he cannot estimate.

I am not willing to pass over the opinions of another most competent judge in relation to these matters.

E. H. states that in Heath the cattle are fattened mainly on potatoes; the largest allowance to a single ox being one bushel per day. The beef proves of excellent quality. He mentions the case of a farmer in Coleraine, long accustomed to feeding cattle, who has boiled the potatoes for his cattle and found them when cooked well adapted for fattening animals. The animals

thus fed have shown remarkable thrift. He continues to pursue this method with great success.

Some farmers have ground their corn on the cob for their fatting cattle. To the use of this cob-meal E. H. strongly objects. The grain is not completely ground, but only broken, and therefore is not perfectly digested by the animals and is proportionately less nutritious. He thinks that there is no nourishment in the cob itself; and in taking toll at the mill, as the meal of the grain and the ground cob do not mix thoroughly in passing into the receiving trough, the lighter remaining on the surface, that the miller by a sleight of hand is very apt to gather his toll from the lowest part of the heap and get a better share than belongs to him.

A farmer in Shrewsbury, Worcester co. professes to have found the use of cob-meal in fattening cattle matter of great economy, but the point does not seem to be established. One swallow does not make a summer; and this single experiment is not conclusive.

Having been for many years familiar with the Brighton market, this farmer E. H. is strongly of opinion that all pains should be taken to prepare good animals for the market, as they pay a much better profit than those of an inferior description.

He is of opinion likewise that young stock should be well kept and advanced as much as possible. If the markets in the spring are not such as to warrant their sale, their good condition will be so much to their advantage on going to pasture in the spring. He deems it poor economy to stint animals, designed to be fed for the market, in their food, so as barely to keep them along. Under this management they are found in the spring, in point of condition, but slightly in advance of what they were in the fall.

The farmers are almost universally decided that a mixture of provender is best. While Indian meal is to be considered as the basis, certain proportions of rye, or oats, or pease and oats, are always deemed best to be mixed with it. An excellent farmer, whose fat cattle do him much credit, is of opinion that the meal given should always be scalded.

Of the kind of stock to be selected for fatting, oxen from four to six years old are generally preferred. One of the most experienced and successful farmers in the county says he prefers young cattle from three to five years old. He would prefer to raise them himself; but otherwise, he chooses to buy them in the fall or spring; feed them well in the spring with some meal; let them run in a good pasture through the summer; and put them into the stall in the autumn, to be sold the ensuing spring. He always sells his stall-fed cattle before pasturing.

Others, as I have already stated, purchase steers of two to three years old in the autumn. These are kept upon hay only until spring; they have then an allowance of meal, of perhaps four quarts per day each; and are turned early to pasture, from whence they are taken to market in June or July. The practice of others is to give them no meal, but plenty of good hay in winter and spring, and good pasturage in summer; and sell them in the fall without coming to the barn.

Others purchase oxen in the last of the winter; feed them well in the spring upon hay and a reasonable allowance of meal; and they are then turned into a good pasture, and driven to market through the fall months.

S. W. says that oxen about six years old have always proved best for him. D. B. states that he has always been most successful with steers. A. R. chooses steers from three to four years old, or oxen six years old. He does not select large cattle, but prefers cattle of small stature, small-boned, and thick-set, as being most profitable in the stall. Another farmer, of good judgment and skill, prefers oxen at six to eight years old, if they can be purchased at a low rate; and says he has often "doubled his money." In this case he keeps them well on hay and meal; and reckons only the gross result, without keeping any detailed or exact account of the amount of hay and meal consumed.

Where the farmers mainly depend on pasturing, as in some of the hill-towns, farrow cows are purchased in the spring, and sold to advantage in the autumn. One farmer states, that

on ten farrow cows, purchased in the spring, he realized an advance of $8 10 cents each in the fall.

It may not be out of place to mention here the opinion of this excellent farmer, founded upon long experience, that yearlings bought in the fall and sold the ensuing fall usually double their value.

Another farmer, though on comparatively a small scale, yet whose farm throughout exhibits the very best management, states that in one case he purchased four farrow cows late in October, at seventeen dollars each, raised on these cows seven calves, sold from them three hundred lbs. of butter in the season, and sold the cows, the ensuing fall, after one year's keeping, at $30 each. His steers from three to four years old, kept well in winter, and turned into good pasture, to be sold in June, average above fifteen hundred lbs. per yoke.

I submit these different statements without comment to the reader. It is obvious that different kinds of stock may properly be preferred by different farmers, according to their peculiar situation and circumstances. I have said nothing of different breeds of cattle, because, in truth, there is no distinct breed raised in the county. But the small-boned, medium-sized animals, of good length, and strongly marked beyond question with the Devon blood, are those which are chosen. The experienced farmer at once distinguishes, by his own practical and long-practised skill, the most thrifty, in respect to which, indeed, there are differences among individuals of the same breed as well as among whole breeds or races. This is done by the eye, and perhaps still more by the touch. When the hair of an animal is stiff and staring, and the skin is coarse and cleaves to the bone, he will pay little profit in the stall; but when the skin is loose, the hair soft, the eyes bright, and the animal has an elastic touch or feel, you may calculate upon his thriftiness and his profitable returns for good keeping.

5. Expenses and Profits of Stall-Feeding.—I do not know that I can better illustrate this subject than by the par-

ticular accounts which have been given me. Most of these examples will appear unfavorable, and in that case they will only confirm the opinions of many experienced farmers, one of whom, to use his own expression, maintains that the fatting of beef has been a bad business these twenty years. If the examples which I give are true, it is all that can be required. It will be then for every one to make up his judgment from the evidence presented, or otherwise to search for other causes than what appear for the result.

Example 1.—March 25. D. S. sent a fine yoke of oxen to market, which he anticipated would weigh twenty-three hundred lbs. when dressed at Brighton. They were purchased last winter for seventy-five dollars, and brought to the barn about the first of November. Their allowance, as nearly as can be ascertained, has been as much hay as they would consume, and more than one peck of provender, half corn and half broom-seed ground together, per day, and the measure always heaped full. The mixture, as nearly as can be determined, consisted of five quarts of Indian meal and four of broom-corn meal. Corn meal at three cents per quart. Broom-seed at thirty-three cents per bushel. Hay at ten dollars per two thousand lbs.; these being the current prices at the time and place.

Dr.—Cost of the cattle in the autumn, . .	75 00
5 quarts corn meal, at 3 cents, 15 cents; 4 quarts broom meal, at 1 cent per quart, 4 cents; 25 lbs. of hay each per day, at $10 per 2000 lbs. 12½ cents; 15+4+12½=31½ each per day, or 63 cents per day for both, for the term of 145 days,	91 35
Interest on cost, 5 months, at 6 per cent. . .	1 87
Commissions and drift to Brighton, . . .	4 00
	172 22
Cr.—Supposed return 2300 lbs. at 5¾ cents per lb.	132 25
Balance against the oxen, ...	$39 97

Example 2.—I now proceed to an estimate of the cost and returns of the ten oxen belonging to E. W. and referred to on page 51.

Of these cattle, one yoke cost		$84 00
" " "		80 00
" " "		75 00
" " "		73 25
" " "		70 00
Original cost, ...		382 25
Expense of driving to New York market, . .		40 00
		422 25
Returns at $74 68 cents each × 10, . . .		746 80
		324 55
Or advance in favor of each ox, ...		$32 45

Let us now come to the expenses of keeping for each ox.

60 days, 25 lbs. of hay per day, at $10 per ton, 1500 lbs.		7 50
30 days, 15 bushels potatoes, at 20 cts per bushel, .		3 00
30 days, ½ peck provender per day, 3 bushels, 3 pecks, . . .	11 bs. 1 pk.	8 68
30 days, 1 peck provender per day, 7 bushels, 2 pecks, . . .		
or say 12 bushels provender—4 pease and oats, 8 Indian meal.		
Thus 4 bushels oats and pease, at 67 cents per bushel, ...	2 68	
8 bushels corn, at 75 cents per bushel,	6 00	
	8 68	
Cost of feed of each ox, ...		$19 18
$32 45 less $19 18, leaves balance in favor of each ox of		$13 27

Or, estimating the feed at a lower price, though the before-mentioned were the current prices of the different articles at the time, let us see what might then be the result.

Hay at $8 per ton, ...	6 00
15 bushels of potatoes, at 15 cents per bushel, .	2 25
4 bushels pease and oats, at 50 cents per bushel, .	2 00
8 bushels of corn, at 70 cents per bushel, . .	5 60
	$15 85

$32 45 less $15 85, leaves $16 60 balance in favor of each ox.

In this estimate, the pasturage of the cattle from the time of purchase until put in the stall, is not included. The interest is not reckoned. The cost of attendance is considered as balanced by the manure. The term of stall-feeding was short; the markets high.

At my request, a careful farmer was induced to ascertain the amount of hay consumed ordinarily by a fatting ox. In this case, the hay given to them was first weighed, and then the orts or leavings were carefully weighed and deducted from the amount.

Five oxen consumed one hundred and fifty lbs. of good hay per day. Two of these oxen had at the same time twenty quarts of provender—half Indian corn and half broom-seed meal; two of them twenty-four quarts of the same provender per day; and one of them eight quarts per day. Upon a second experiment with the same cattle, fed with meal as above, the five oxen consumed twenty-five lbs. of hay each per day.

It is stated in the Complete Grazier, that an unworked ox for several days together consumed thirty-three lbs. of hay per day. In the New York Memoirs of Agriculture, it is stated that an ox will eat every twenty-four hours, fourteen lbs. of hay, half a bushel of potatoes, and eight quarts of Indian meal. Of course no rule in this case can be exact; as animals differ

much from each other in size, condition, and appetite, by which circumstances, of course, their consumption of food is likely to be affected.

Example 3.—The following experiment came directly under my own inspection. The oxen referred to here were selected by a man of as good judgment as could be found, that the experiment might be conducted with all possible fairness. The pair of oxen cost on the first of December sixty-five dollars; and they were slaughtered the 26th February. They were kept clean; daily carded, and fed at regular hours with care and fidelity. They were eighty-eight days in the stall, being turned out twice a day for watering, and the food consumed at current prices and the result are subjoined.

73 bushels of turnips, or mangel wurtzel, at 10 cents per bushel, ...	7 30
36¼ bushels of Indian meal, at 60 cents per bushel,	21 95
65¼ bushels of potatoes, at 25 cents per bushel, .	16 31¼
Hay not ascertained, but estimated for both at 25 lbs. per day at 50 cents per 100 lbs. . . .	11 00
	$56 56¼
Value of oxen when first put up, $65, added to cost of feed, $56 56¼ cents, ...	121 56¼
Weight when killed 1846 lbs. for which were obtained 5 cents per lb. or $5 per 100 lbs. . .	92 30
Loss upon the oxen, ...	$29 26½

It has been said by some persons in this case, that there was an error in using so many vegetables, and that they should have been fed exclusively on hay and Indian meal. The loss would have been less, but the account then would have stood thus:

Cost of the oxen,	65 00
Hay as before,	11 00
Half bushel of corn per day, for 88 days, amounts to 44 bushels, at 60 cents,	26 40
	102 40
Proceeds of the sale,	92 30
Loss by this feeding,	10 10

The hay consumed in this case was matter of estimate, but from experiments above recorded it will appear to have been greatly underrated.

I am furnished likewise with some other accounts, from a farmer on whose accuracy I confidently rely, which I lay before the agricultural community.

Example 4.—Account with one pair of steers, four to five years old, bought April 2d, and sold the ensuing 24th March.

Cost 2d April,	68 50
9 weeks keeping at hay and meal, at $2 50 cents per yoke per week,	22 50
25 weeks pasturing, at 50 cents,	12 50
Interest on cost 11½ months, at 6 per cent,	3 95
Keeping in stall, 6 quarts meal each per day, at 3 cents per quart, and 25 lbs. hay to each per day, at $10 per 2000 lbs., 111 days, at 30 cents per day,	66 60
Commissions on sale at Brighton,	4 00
	178 05

Supra Cr.

By 54 days' work, at 33 cents per day,	17 82	
Return of sales, 1868 lbs. at 5¾ cents,	107 41	
		125 23
Loss on above,		$52 82

Example 5.—One yoke of oxen bought 13th May, and sent to Brighton 11th March.

Cost of oxen, ...		85 00
4 weeks keeping, at $2 50 cents per week, . .		10 00
24 weeks pasturing, at 50 cents per week, . .		12 00
Interest on cost, 10 months, at 6 per cent, . .		4 15
Keeping in stall 111 days, at 30 cents each per day,		66 60
Commissions on sale at Brighton, ...		4 00
		181 75

Supra Cr.

By 24 days labor, at 33 cents per day, .	8 00	
Return of sales, 1972 lbs. at $5½ per 100 lbs.	108 46	
		116 46
Loss on oxen, ...		$65 29

Example 6.—One yoke of oxen bought 13th May. Sent to Brighton 11th March.

Cost of oxen, ...		78 00
4 weeks keeping, at $2 50 cents per week, . .		10 00
24 weeks pasturage, at 50 cents, ...		12 00
Interest on cost, 10 months, ...		3 90
Keeping in stall 111 days, at 30 cents each per day,		66 60
Commissions on sale at Brighton, ...		4 00
		174 50

Supra Cr.

By 24 days labor, at 33 cents per day, .	8 00	
Return of sales, 1892 lbs. at 5¾ cents, .	97 41	
		105 41
Loss on above oxen, ...		$69 09

Example 7.—Return of short-horn cow, sent to market 11th March.

Expenses of keeping, 6 quarts of Indian meal per day, at 3 cents per quart; 25 lbs. hay per day, at $10 per 2000 lbs., 12½ cents, or 30½ cents per day for 111 days, ...	33 85
Commissions on sale, ...	2 00
	35 85
Supra Cr.	
Weight in market, 735 lbs. at 5 cents, . . .	36 75
	90

Here it seems, after the cost of the feed at current prices was met by the sales, ninety cents were left as the value of the animal.

These are all literal and well-attested facts; but I choose to leave them for the present without comment.

I will subjoin here the calculation of one of the most experienced and observing farmers in the county; but whose name, from respect to his own wishes, I withhold.

W. O. is of opinion that the fatting of cattle can be rendered profitable under the following circumstances, which, with good judgment and a careful use of opportunities, may be made ordinarily to combine.

Suppose your cattle cost in the fall four dollars per one hundred lbs.; that there is an average rise in the market of twelve and a half cents per one hundred lbs. per week; that they be fed with hay and provender, one third oats, or pease and oats, and two thirds corn: corn at seventy-five cents and pease and oats at fifty cents per bushel; one peck of this mixture each per day, and sufficient hay, which he judges will be about fourteen lbs. of hay each per day, the hay estimated at ten dollars per two thousand lbs.; and that they be kept sixteen weeks,

and add to their weight one quarter of their original weight in that time. He believes under these conditions they will make full compensation for cost and attendance. For example:

A pair of cattle, supposed to weigh sixteen hundred lbs. when dressed; purchased at four dollars per one hundred lbs. on the first of December, and sold the first of April, weighing two thousand lbs. dressed, at six dollars per one hundred lbs. Let them be fed with one peck of provender each per day, and hay as they will eat. The account will then stand thus:

Cost of cattle $64,		64 00
Proceeds of sale, at $6 per 100 lbs.		120 00
Advance upon original cost,		$56 00

Expenses of above.

28 lbs. of hay per day, or 196 lbs. per week, at $10 per ton, are	98	
14 pecks of mixed provender, at 67 cents per bushel,	2 33—per week,	3 31
3 31 × 16 for 16 weeks keeping,		52 96
Add commissions and drift,		4 00
		56 96
Add original cost of cattle,		64 00
		120 96
Return of sales,		120 00
Balance against the cattle,		96

The amount of hay which they will consume is in this case much underrated; no interest is charged upon the cost; and the manure is considered an equivalent for the attendance. The interest on the value of any live stock, where all risks are considered, should never be reckoned at less than ten per cent.

Suppose we add 14 lbs. of hay each per day, for 16 weeks,	15 68
Interest and risk, 10 per cent. for 4 months on first cost,	1 60
Add balance against the cattle as above,	96
Loss on cattle at above rates,	$18 24

Now estimate the provender as above at sixty-seven cents per bushel, and hay at eight dollars per ton, and it will make of course a small difference in favor of the cattle. The expense of feed will then be forty-nine dollars eighty-two cents; add interest and risk, one dollar sixty cents, will be fifty-one dollars forty-two cents; add cost, sixty-four dollars, gives one hundred fifteen dollars forty-two cents. This, upon the presumption that the quantity of hay consumed in the first estimate is not underrated, leaves a balance in favor of the cattle of four dollars fifty-eight cents. In case the second estimate of the amount of hay required is correct, the balance against the cattle would be seven dollars ninety-six cents.

These accounts give no strong encouragement to the stall-feeding of beef cattle. Many of the farmers in the county have told me that they expect to get paid in the operation for their grain only, and make no account of the hay consumed. One of the most experienced and most successful farmers in the county states that the fatting of cattle has not been a good business for years. He complains that the price paid for cattle, in the fall, to be fatted, is as high, by the hundred lbs., as that obtained for them in the spring; that the markets are capricious and uncertain; and that the farmers occasionally suffer from gross impositions, practised upon them in the sale of their cattle at Brighton, against which it is difficult to devise an effectual security. The raiser of the cattle and the butcher get the whole profit. He has known it to happen, that where the farmer in the fall borrows money to purchase cattle for the stall, the sale of these cattle in the spring, after being fatted,

will not pay his note. I know so many who have realized these severe results, as to have no doubt of their frequent occurrence.

There are other matters connected with the fattening of cattle, in relation to which some facts, which have come within my knowledge, may be useful. Some respect the gain in live weight in any given time. Others refer to the loss of weight in killing. In all the calculations which we make respecting the advantages or disadvantages, the profit or loss, of stall-feeding cattle, these elements have a particular value.

6. Gain of Stall-fed Cattle.—I will first give some statements in respect to the actual gain per day of cattle. This few farmers have ever taken the pains to determine, and with most of them it is wholly matter of conjecture, and that sometimes very wild.

Example 1.—A pair of cattle owned by S. C. weighed
Oct. 16, 2305 lbs. and 2110 lbs., together, . . 4415 lbs.
Jan. 17, 2435 " 2185 " . . . 4620 "
The gain, therefore, in 3 months and 1 day, was . 205 "

The same cattle weighed on the following March 11th,
One 2590 and one 2345 lbs., together, . . . 4935 "
The gain, then, in this 1 month and 22 days, was . 315 "
The whole gain in 4 mos. 23 days, being . . 520 "
The gain during 146 days was at the rate of lbs. 3,56 per day.

These cattle had, besides hay, a small allowance of meal, and ran in a good pasture through the summer. They were put up to be stall-fed early in the autumn, and were soon brought to receive together one bushel of meal per day, even measure; one third pease and oats, two thirds corn, with a liberal allowance of hay.

Example 2.—A pair of oxen belonging to R. D. weighed
Nov. 8, 1995 lbs. and 1985 lbs., together, . . 3980 lbs.
Mar. 12, ensuing, 2250 lbs. and 2255 lbs., together, 4505 "
The whole gain in 124 days, was 525 lbs. or at the rate of lbs. 4,33 per day.

Example 3.—An ox belonging to R. D. weighed, Nov. 5, 2155 lbs. In the ensuing March 12th, the same ox weighed 2435 lbs. The gain in the time mentioned was 280 lbs.; and for the 127 days was at the rate 2 26-127 lbs. per day.

Example 4.—A pair of cattle belonging to G. D. weighed as follows: Dec. 12, 4002 lbs. March 2, 4425 lbs. Gain in that time, 423 lbs. April 1, 4470 lbs. Gain 55 lbs. Total gain from Dec. 12 to April 1, 478 lbs.

The average gain of the above for 110 days is 4 19-55 lbs. per day.

Example 5.—A pair of cattle belonging to the same weighed as follows: Dec. 12, 3604 lbs. March 1, 4031 lbs. Gain in that time 427 lbs. April 1, 4032 lbs. Gain 1 lb. Total gain from Dec. 12 to April 1, 428 lbs.

The average gain of the above for 110 days, is 3 49-55 lbs. per day.

Example 6.—One pair of cattle fed by R. D. weighed in the first part of Nov. 3765 lbs. Dec. 15, 4220 lbs. Jan. 15, 4410 lbs. The gain in one month was 190 lbs. March 7, weighed 4730 lbs. The gain from the commencement was 965 lbs.; from Dec. 15 to March 7, was 510 lbs.

The average gain of the above, from Dec. 15 to March 7, 81 days, being 510 lbs. is 6,29 lbs. per day. The gain from Dec. 15 to Jan. 15, 30 days, being 190 lbs. is 6,33 lbs. per day.

These cattle were old, and at the time of being purchased appeared to have been hardly driven and poorly fed.

7. Loss of Weight in Driving.—The loss of cattle in driving to market, for example, from Connecticut river, which may be considered as central to the county, is estimated at about one hundred lbs. dead weight. A very good farmer estimates the loss at from fifty to one hundred lbs.; and much loss, he says, may be prevented by care. Cattle fatted upon potatoes lose more than others in the passage, because they

will not eat upon the road. The drover receives two dollars as his commission for the sale of the cattle and their drift upon the road. He is therefore without motive to give them any more or any better hay than they absolutely require, or to drive them with any more care than what is essential to get them to Brighton in fair condition. The actual expense to the drover of getting an ox to Brighton is estimated at one dollar.

8. Live and Dead Weight of Cattle.

Example 1.—One ox, live weight in market 2393 lbs.; quarters weighed 418 lbs., 415 lbs., 324 lbs., 331 lbs.; hide, 150 lbs.; tallow, 173 lbs.=1811. Difference 582 lbs.

Example 2.—Two oxen of A. S. killed at home, weighed as follows:

Live—One 1979 lbs. . . *Killed*—1400 lbs.
" " 1910 " . . " 1341 "

About lbs. 29,4 loss on a hundred of the live weight.

Example 3.—An ox owned by A. S. conveyed to Brighton on a sled, weighed at home about 2630 lbs.; the precise number of pounds not recollected. On being slaughtered, his weight was as follows: quarters, 480 lbs., 479 lbs., 374 lbs., 383 lbs.; hide, 154 lbs.; tallow, 250 lbs. Total, 2120 lbs. Loss, 510 lbs.

Example 4.—Ox belonging to R. D. when he left Connecticut river, weighed 2435 lbs. Weight at Brighton when dressed 1588 lbs. Loss of weight 867 lbs. This is a little more than one third: and is a remarkable result.

Example 5.—An ox weighing on Connecticut river, 2250 lbs. weighed in market 1472 lbs. Loss, 778 lbs.

Example 6.—An ox weighing as above 2255 lbs., weighed in market 1487 lbs. Loss, 768 lbs.

Example 7.—A fat bull of D. S. killed at home, weighed alive 1495 lbs.; dead 1051 lbs. Loss, 444 lbs.

Example 8.—A fat heifer of E. W. killed at home, weighed alive 1120 lbs.; dead 832 lbs. Loss, 288 lbs.

Example 9.—An ox belonging to S. C. weighed on Connecticut river alive 2590 lbs.; at Brighton, dressed, as follows: quarters, 394 lbs., 350 lbs., 362 lbs., 358 lbs.; hide, 120 lbs.; tallow, 207 lbs. Total, 1791 lbs. Difference between live and dead weights, 799 lbs.

Example 10.—An ox belonging to S. C. weighed as above 2345 lbs.; at Brighton, dressed, as follows: quarters, 352 lbs., 310 lbs., 364 lbs., 308 lbs.; hide, 115 lbs.; tallow, 217 lbs. Total, 1666 lbs. Difference between live and dead weights, 679 lbs.

In England, the difference between the dead and the live weight is calculated at eleven-twentieths; but there only the four quarters are weighed; the fifth quarter, as it is there termed, being the hide, loose tallow, and offal, going to the butcher as his perquisite.

With us, the four quarters, the hide and the rough tallow are weighed, and the amount of the whole returned to the owner. That is, the farmer or drover gets his cattle to Brighton; the purchaser turns them over to one of the slaughtering establishments in the neighborhood to be killed and dressed, for which he pays two dollars and the offal per head, and the meat is then furnished to the selling butchers, who are usually the purchasers. The heart and liver are valued at fifty cents, excepting in the barrelling season; the tongue is considered worth forty-two cents; the tripe is valued at fifty cents; the head, which has on it a large piece of the neck, being of late years cut off at the second joint from the crown, and which furnishes some good meat for cooking, and then when boiled is given to swine to great advantage, and also the feet, from which oil and glue are obtained, valued at forty cents, go among the offal, and of course are lost to the farmer or drover. Besides, it is said the butchers have a way by which, after

cutting through the shoulders, in splitting down the chine they turn the edge of the axe outwards, thus leaving a large portion of the neck attached to the head, and lost to the seller. The owner does not see his ox slaughtered or weighed, and depends wholly upon the return given him by the purchaser for its weight. The opportunity for fraud in such case is obviously great; and much disappointment and complaint, with what justice I shall not say, oftentimes exist among the farmers when they receive the weight of the cattle which they have sent to market.

A farmer highly experienced in the case says, that the hide of an ox, which in December, for example, if he were killed, would weigh one hundred lbs., if he were kept until June would not weigh more than eighty-five lbs. The loss of hair in such case is something; and the hide in summer becomes more porous and loses in a measure its consistency.

9. Pasturage.—With respect to cattle fatted in pasture, it is not easy to come at any exact results, as especially the quality of the pasturage differs so much in different parts of the county. In the north-east part of the county, for example, which is very hilly and broken land for pasturage, it is valued at seven to fifteen dollars per acre, but the average price may be considered as seven dollars. Four acres are deemed sufficient to fatten a cow; six acres are allowed to an ox. One farmer, who is remarkable for the number and excellent quality of the cattle which he sends to Brighton in the autumn, kept eighteen oxen the whole season upon one hundred acres of land. Another farmer, upon forty acres, kept ten farrow cows.

In Conway, the pasturage is excellent. Thirty acres keep six cows and two oxen, or would keep twelve cattle, cows and oxen.

Oxen from four to six years of age are taken to be pastured, at from fifty to sixty-seven cents per week. Farrow cows at twenty-five cents per week. Steers, at two years old, at seventeen cents per week each. Sheep are pastured at three cents each per week, and lambs at one and a half cents.

In Buckland, cows are pastured at twenty-five cents per week, including salt. Store-sheep two cents each for sheep and lambs. Wethers designed for fatting, and requiring the best feed, at four cents per week. Pasturing of an average quality will feed eight cows upon thirty acres. A yoke of oxen require half as much again as two cows.

In Hawley, two acres of pasturage are considered sufficient for a cow. The pasturage, it is obvious from these statements, differs greatly in different parts of the county, and as a general remark it may be said, that the pasturage on the west side is much superior to that on the east side of Connecticut river.

In the fattening of cattle, universal experience shows the importance of a scrupulous punctuality as to the times of feeding. Under the influence of that mighty despot, habit, which reigns thoughout the animal creation, these animals measure time with great exactness; and if, at the customary hour, the feed is not ready for them, they become restless, uneasy, and fretful, dispositions exceedingly unfriendly in all cases to thrift. During the time of feeding they should have little given to them at a time, that their food may not become loathsome by being frequently tossed over and blown upon. They should be treated likewise with great gentleness and kindness; and all pains should be taken to give them a dry bed, and to keep them clean. An intelligent farmer in Deerfield is of opinion, that the disease in oxen, vulgarly called the "fouls," lameness in the feet, from which fatting cattle are very liable to suffer, is owing to feeding them with new corn, or corn not sufficiently ripened. This may be the case; but I believe it is not seldom occasioned by their standing in wet yards and wet stalls, and little or no attention being paid to keeping their feet clean. The disease called the foot-rot in sheep, which is an excessively troublesome disorder, I have little doubt is occasioned by the same cause. At least I have observed that it has been brought out and always aggravated by their standing in wet yards. Perhaps there is in such cases a predisposition to the disease; and we know that luxurious living and repletion, as well in

human as in brute animals, tend to produce disease in the lower extremities.

This subject of fatting neat cattle for the Brighton market deeply concerns many of the farmers in Franklin Co.; and especially those in the river-towns. Estimating hay and corn at the prices current, they are almost always losers by the operation. These articles, however, are high because farmers are not willing to sell; or rather they have not the articles to sell because they require them for the purpose of fatting their cattle. If the farmers should choose, instead of fattening cattle, to sell their hay and corn, the supply would greatly reduce the price; and, therefore, in the estimation of the cost of fattening cattle, these articles should be charged at the prices which they would bear if cattle were not fatted. The accounts then would present a different aspect; yet not then perhaps in many cases favorable to the fattener of beef by stall-feeding.

There is another consideration in the case certainly of great weight, and deemed by most farmers of indispensable importance. The consumption of the produce of the farm upon the farm, is thonght the only means of keeping up the condition of the farm and of continuing the crops. This is a very material consideration, if no other means of effecting this object are equally accessible and equally cheap. This inquiry will come presently; and I am now ready to admit, certainly with respect to all long feed, that it is always better to consume the produce on the place, even at a nominal loss of twenty-five per cent, than to carry it off any distance to market; that is, it is better for a farmer to use his hay on his farm, though it will produce him, when thus fed to fatting cattle, but six dollars per ton, than to carry it even a short distance to market and obtain eight dollars for it. There are in the latter case the loss of the manure, which the hay used would furnish, the waste in removing the hay, and the wear-and-tear and toil of carrying it to market. These circumstances seem to require that a lower estimate should be put upon the value of these articles consumed in the fatting of neat cattle than the current prices in the market.

If the hay consumed on the farm nets the farmer five dollars per ton, and the average product of an acre is two tons, it will pay a remunerating profit. The average value of mowing land in the County of Franklin will hardly range higher, if we judge from the sales within a few years past, than seventy-five dollars per acre. In some cases very choice spots have brought one hundred and fifty dollars per acre. One hundred dollars are occasionally given for several acres in a piece ; but a good deal is sold for fifty dollars per acre, and this is deemed a fair price for the beautiful meadows, for example, in Gill and Northfield. Seventy-five dollars, therefore, will be deemed a very high average. At two tons to the acre the income might be put down at ten dollars. From this, however, is to be deducted the cost of getting the hay. Farmers differ considerably in the estimate of this expense. A contract for getting both crops of hay at four dollars per acre, is referred to in page 8th of this report. Here the yield was at the rate of four thousand four hundred and ninety-four lbs. per acre ; the cost of getting was then less than two dollars per ton, and the labor would have been considerably reduced if the crop had been obtained at a single cutting. The hay too in this case was required to be carried more than a mile and a half, and a river was to be forded on the way. In another case, where an exact and minute account was kept, not only of the days, but of the hours employed, and on a farm where one hundred tons of hay were cropped in the season, allowing man's labor and board at one dollar and a quarter per day, and the labor of a boy at half-price, the expense averaged one dollar and ninety-two cents per ton. In this case the situation of the land and the season were favorable, while at the same time it will be seen that the price of labor was high, and more so than it would have been if estimated by the month. If then we consider the cost of getting hay at two dollars per ton, there will be left six dollars as the net return of an acre of land valued at seventy-five dollars. This would be eight per cent on the value. The after-feed would pay the taxes, and perhaps the

expenses of keeping the fences in order. This, to men of reasonable views, must be considered as a fair return, when the security of the investment is taken into the account, and the hay being consumed on the farm, its condition may be fully kept up.

I hardly know how to discuss this subject, without saying what might appear like fault-finding or complaint; and this too in a case where, if error or fault exist, it is extremely difficult to point out a remedy. I shall allude, however, to some points, with a sole view to provoke inquiry after better modes, if better can be found.

The price of cattle for the stall has for several years been very high; as high indeed by the hundred as they will generally sell for when fatted. This price can seldom be afforded by the stall-feeders. The only remedy for this is for the farmer to raise cattle for himself, or to buy them at a year old coming two, when the price is seldom proportionate to their real value. But does it not cost as much to raise stock as to buy it? This is often said, and may sometimes be said with truth. There is, however, on every farm of any extent, a great deal of coarse fodder, hay not of the best quality, the straw of grain, the stalks and refuse of corn, which may be used to great advantage for the keeping of this kind of stock; and if to this could be added a moderate supply of succulent vegetables, turnips, mangel-wurtzel, sugar beets, carrots, rutabaga, or parsnips, the stock may be kept in good condition on this kind of feed and at a reasonable expense. Now, of these stores farmers are in general exceedingly wasteful, either from a low opinion of their value or a disinclination to the labor of gathering and taking care of them. We can hardly go over any extensive farm in the country, where a great deal of fodder is not left to perish, which might be used with advantage for our young stock in our long winters. In many cases the wheat and rye straw are sold off the farm; and sometimes left to moulder away in heaps upon the spot where the grain was threshed. Many farmers are entirely indifferent to the

value of corn fodder; and if even the top-stalks are cut, the butts are left to be browsed with little advantage to the stock which feed among them, or to waste away in the field where they grew. The haulm or fodder of broom-corn has within my knowledge never been saved for the use of stock, excepting in a single instance. The Shakers of Canterbury, N. H., among the most economical, judicious, and thrifty farmers in New England, save it with as much care, and consider it equally valuable for supporting their young stock, as the haulm of Indian corn. If farmers, therefore, would increase the growing of vegetables for their stock, with the help of such resources as these, straw, corn-stalks, broom-refuse, and even buck-wheat straw, they might raise a good deal of stock at a very small expense.

In the next place, it is confidently believed that the farmers might to a great extent increase the products of their farms by cultivation. They might very much increase their crops on the land which they now cultivate, and much extend their tillage. Where now they get one and a half ton of hay to the acre, they should obtain two and a half tons; fifty bushels of corn, they should get seventy-five; thirty bushels of oats, they should get fifty; two hundred bushels of potatoes, they should get four hundred. This can be done because it has been done. The increase of products would enable them to increase their stock; and young growing stock after one year old, will be found under good management to pay as well in their growth as fatting stock. All this will require labor and expenditure; but if the labor and expenditure are amply repaid, what more can we ask for? The farmers in the river-towns, as far as respects the winter keeping of their stock, can afford to keep them as cheaply as in the hill-towns; in truth their hay and corn do not cost them so much. In summer, the hill-towns are more favored in respect to pasturage; but cattle can be driven to pasture a considerable distance without injury; and farmers in the river-towns undertaking to raise or to fat stock, should have pastures, even though they

might be remotely situated, where they may place their growing stock during the pasturing season.

The subject of fatting cattle is of such importance, that it deserves very strongly the attention of farmers in the interior. Many of them are so remote from market, that they know no other method of disposing of the produce of their farms than by putting it into the portable form of beef, mutton or pork. But the result of such operations is in many cases a serious disappointment and loss. Many of them are satisfied if, without reference to the current market-prices of the articles of produce used in the stall-feeding of their cattle, they find upon closing their farm accounts for the year, that after supporting their families and paying the labor hired in the management of their farms they are not in arrears, or perhaps have realized some small gain. In such case likewise they seldom make any charge either of their own labor or superintendence, nor of the interest on the capital invested in their farm and its equipments. This is certainly a very loose way of getting along, and not a little discouraging. Nor can they, under such circumstances, with any certainty calculate that the result may not be a loss instead of a gain. More calculation and more knowledge and prudence ought to be brought to this subject, for losses often occur in respect to it which are very difficult to be sustained, and ultimately terminate in bankruptcy and ruin. The foundation of all true practical knowledge and skill is experience. But the experience of most farmers is so loosely recorded, and indeed the facts on which it is grounded are so imperfectly observed, that much less advantage is derived from this source than might be expected; and conclusions which may be confidently relied on are seldom reached.

Various points remain to be settled; and these can only be determined by extended comparative experiments. As yet, these experiments have scarcely been instituted among us. The importance of a breed of cattle adapted to our climate, condition, and cultivation, is not yet duly estimated. Among different breeds of animals, even of those whose characteristics

are most distinctly marked, and whose blood is most pure, there will be found always accidental individuals deficient in the peculiar properties of the race, or whose characteristic properties seem almost the reverse of those from whom they are descended. So likewise among a stock the most mixed and miscellaneous, as that, for example, which is called our native breed, may occasionally be found individual animals of remarkable excellence for the stall or for the dairy. But notwithstanding these peculiar instances, which seem to transcend or subvert the general laws of nature, it would be idle to pretend that breeding is mere matter of chance ; and prejudicial to the true interest of the farmers to overlook the material and established facts connected with this subject.

The great principle of correspondence between the offspring and the parent, and the settled point that like has always a tendency to produce like, need no confirmation. As yet, however, as already remarked, no systematical attempt has been made in this county with a view to establish a breed of animals for the stall ; but farmers depend altogether upon chance-selections for this object. Franklin County does not produce much live stock. But it is believed that by extending their cultivation, the farmers might raise with advantage many more than they do ; and, either by the introduction of new breeds or a more careful selection of those from which they breed, they might effect valuable and needed improvements.

The introduction of several of the most esteemed foreign breeds into the country presents an opportunity to the farmers in every part of the Commonwealth to avail themselves of the advantages of these improvements, made abroad at an extraordinary expense of money, skill and labor, as far as they may deem these improvements desirable.

In animals designed for the stall, what is first of all things to be sought is thrift, or a tendency to keep in good condition, and to make profitable returns for the care bestowed and the feed supplied to them. In this respect different races of animals differ essentially. I have remarked that individuals

among all races will be found, who are exceptions to the characteristic traits of the breed to which they belong; but these are literally exceptions to a general rule, and make nothing against the established fact that races of animals are to be found remarkable for their thrift, and for the liberal return they give for the food which they consume. The second point desirable is a disposition in the animals to take on flesh and fat on the most valuable parts—on those parts which bring the highest price in the market; and to have those parts which go as offal as small as possible. A third point exceedingly desirable is that they come early to maturity. Some animals obtain their proper growth much sooner than others; and are as large at eighteen months as others at three and four years old. All these points are matters of constitution; and in some of the improved races they have been combined in an extraordinary manner.

In the selection of a breed of animals for our purposes, regard must be had to the condition of our country. The pastures in New England are short, and the winters long and severe, and therefore ill-adapted to a race of large size, of tender habits, and requiring extraordinary keeping and the most particular care to maintain their condition. The most celebrated breeds in England are the Improved Durham Short-Horn, the Hereford, the Ayrshire, and the North Devon. Of these different races, highly improved animals of each sex, for the purposes of breeding, have been introduced into the country and into the State; and each race has found strong advocates, who have preferred it to every other. For dairy purposes, as far as my own limited experience and observation go, I have no doubt that the Ayrshire, or a first cross with the Improved Durham and the Devon, are to be preferred. For early maturity and size as beef animals, the Improved Durham Short-Horn appear to me to take the lead. But they are tender, and require extraordinary keeping and care to maintain their good qualities. They seem better adapted to the rich prairies and feeding grounds of the Western States than to our scanty pas-

tures. The Hereford, of which some remarkably beautiful animals have been imported into Albany, have warm advocates both here and abroad, and come in strong competition with the Improved Durhams. Those of the Herefords, which I have had the pleasure of seeing, seemed to me considerably larger than the Devons, but smaller than the Durhams. These were choice specimens, and were remarkably thrifty and beautiful animals, clean about the limbs, not so straight on the back and square behind as the Durhams, but exhibiting upon the whole admirable constitution and symmetry. Having had no farther personal observation or experience with this breed of animals, I will not venture to speak of them with any confidence. Of their particular qualifications for the dairy I know nothing. For our purposes as working oxen and for stall-feeding, the North Devon cattle are most generally approved. This undoubtedly is the prevalent stock of the country, though diversified and contaminated by various mixtures. No pains have been taken, by systematic efforts, by judicious selection and by perseverance in endeavors to combine the best qualities and to eradicate or remedy defects, in order to form from what we call our native stock a distinct and valuable breed. Indeed, where the improved blood has been introduced, it has been suffered, after a short time, to run out through neglect, or to become degenerate by poor keeping.

With respect to the early maturity of different breeds, that is, their reaching a fitness for the stall sooner than others, from several experiments which have come to my knowledge, I strongly believe that this, to a considerable degree, is matter of keeping almost as much as of constitution. It is certain that no animals of any breed whatever will arrive at early maturity without good keeping. It remains to be seen with us how far any animals of any breed may be advanced with it; for nothing can be worse or more adverse in general to improvement than the treatment of our calves. There is, beyond a doubt, a constitutional tendency in some animals, and in some races of animals, to keep themselves fat and in good

condition. This is what we call thrift, and such animals will be kept in such condition upon even a less quantity of food than others will consume, who do no credit to their keeping.

But while no animals can be kept in good condition without good keeping, I believe that the perfection of any animal depends essentially upon his good keeping from his birth; and that severity or hard fare, or negligence while in a growing state, do an injury to the constitution, and so stint the growth that no after keeping can ever repair it. I do not mean to imply that young animals should be excessively fed and prematurely forced into fatness, for this is another error prejudicial to the breeder's interest;—but that the animal should be so liberally and carefully fed that his growth should be constantly stimulated, and his progress and development, if I may be allowed this term, should receive no check. This is a point, in my opinion, of great importance, which I wish the farmers would seriously consider; which, if properly attended to, would make a most essential difference in the appearance of their live-stock, and do much to redeem the degeneracy which to a great extent prevails among them.

I know no greater mistake that farmers commit in respect to their animals, than in their variable and capricious treatment of them; sometimes filling them to repletion, at other times subjecting them to the most severe usage; taking them, for example, from the pastures in the autumn in high condition, and by hard usage in winter reducing them to mere skeletons before the spring. The animal constitution always suffers essentially by such reverses. It is said that a sheep is never fat but once. There is a great deal of truth in this assertion. Perhaps it is to be received with some qualifications; but I know how very difficult it is to raise an animal from a low condition. The farmers prejudice very greatly their own interest in suffering their milch cows to come out in the spring in low condition. During the time they are dry, they think it enough to give them the coarsest fodder, and that in limited quantities; this, too, at a time of pregnancy, when

they require the kindest treatment and the most nourishing food. The calf itself under this treatment of the cow is small and feeble. He finds comparatively insufficient support from his exhausted dam; and the return, which the cow makes in milk during the summer, is much less than it would be, if she came into the spring in good health and flesh. It requires the whole summer to recover what she has lost. The animal constitution cannot be trifled with in this way.

It is so with all live stock, and especially with young animals at the period of their most rapid growth. They should not be prematurely forced; but, on the other hand, they should not be stinted or checked. It is a very important question, whether it is more profitable to fatten young animals than older ones. I have given the different opinions of different farmers on this subject. In England, it seems an almost universal opinion, that the sooner an animal can be made fit for the market the better, and their fatted animals, especially of the improved breeds, are slaughtered at two and three years old. They are often brought to market at even an earlier age than this; but it is considered, and with reason, that the meat of such animals is not so good as when they have attained a full growth. It is natural to suppose that the animal can only be in perfection when he has ceased to grow, and if killed before that period, there would seem to be a loss of that enlargement of size and weight, separate from an increase of fatness, to which he might attain. While an animal is growing and well fed at the same time, there is evidently a double gain; and if he increases one pound a day by his extra feed, he may be supposed to increase another pound by his ordinary growth. After this period, however, it may be advisable to send him to market as soon as he can be put into condition. Farmers often make great mistakes in keeping their cattle too long. There is a reasonable calculation to be made in respect to the markets, which are generally higher in the spring than in the autumn; but the advance in price does not always meet the increased expense of keeping. It is important, as a general rule, that

the animal should go to market as soon as the gain which he makes ceases to pay the expense of his keeping. I have known an instance in which the gain of a pair of cattle during a whole month, though the feeding was fully continued, was only one pound. (See Example 5, p. 75.) Here then was a loss, which might have been avoided; and it is exceedingly desirable that the cattle should be weighed from time to time, in order to determine their progress. This is easily done by the improved platform balances, now so common in the country.

A second question of some importance is, whether it is better to stall-feed animals of a small or medium size, than those of large frames. In general, the farmers incline to the medium-sized animals. Animals do not consume always according to their size, though in general, animals are kept at an expense in some measure proportionate to their size. The matter resolves itself into this simple question; whether the same amount of feed will produce more amount of flesh in an animal of moderate than in one of large stature. I do not know that any certain rule can be laid down in this case. Small-boned, snug and compactly built animals will be found generally to have a much stronger tendency to fatness, than animals of large and coarse frames. But after all, the main point is the thriftiness of the animal. There is always a much stronger tendency in some animals to grow fat and to keep fat, than in others, and where this disposition predominates, the gain is likely to be in proportion to the size.

The thriftiness of an animal may be in some measure determined by the eye; but experienced men, in their judgment on this point, depend more upon the hand, or what is technically called, the *feel* of a beast. "It is," says one competent to speak in these matters, "the nice touch or mellow feel of the hand, which, in a great measure, constitutes the judge of cattle;" and what you wish to find in an ox, is "a thick, loose skin, floating, as it were, on a layer of soft fat, yielding to the least pressure, and springing back towards the fingers like a

piece of chamois leather, and covered with thick, glossy, soft hair."

The description given in an English treatise of an animal best suited to the stall, is so skilfully drawn up, that I will not forego the pleasure of transcribing it. It follows :—"Attention should be paid to compactness and symmetry of form, deep fore-quarters, wide carcase, fine small bones, moderately thin hide, a protuberance of fat under the root of the tongue, and large full eyes. A well-shaped ox should then have a small head with a placid countenance, as indicating docility, and a consequent disposition to get fat ; a fine muzzle and open nostrils ; the throat should be clean ; long and thin in the neck, but wide and deep in the shoulders ; the back should be broad and straight near to the setting on of the tail, with the rump points fat and coming well up to it ; the barrel should be round, wide across the loins, and the girth deep behind the shoulders, with the space between the hip-bone and the first rib very small ; the fore-legs should be short and wide apart, so as to present a broad appearance to the chest, and the thighs of the hind-legs should be shut well in the twist, the seam in the middle of which should be well filled, and the flanks should be full and heavy. A form such as this is not only the best for affording the greatest weight, but will be also generally found to lay the flesh upon the prime parts, to produce the least quantity of offal with such a large quantity of tallow, as, emphatically speaking, in the butcher's phrase, will cause the animal to die well. These marks, however, are not the only indications of a propensity to fatten quickly. On the contrary, it has been found by experience, that many coarse beasts with large bones and gummy legs, have often proved superior in that particular to other animals of undoubted superiority in point of shape ; but those coarse thick hides handled soft and silky, with a sleeky degree of mellowness, which is the characteristic of a healthy habit, while the skin of the others was wiry, and their flesh felt hard. The state of the hide and flesh, therefore, is of the first importance as the essential property of *handling well.*"

It has been made a question, whether heifers are not more profitable than steers. They are as thrifty, and, in general, pay as well for their keeping. It is the practice of some farmers, to allow them to come in with calves at two years old; if at that time they promise well as cows, a good market can almost always be found for them; but if otherwise, after suckling the calf three months or more, they are turned out to be fatted for beef, and are either sold immediately at the close of the pasturing season, or otherwise, after being stall-fed for a short time. Their meat, if well fed, is always highly esteemed. This proves, in general, a good operation. In England, heifers designed for the stall are very frequently *spayed*, by which their thrift is greatly assisted. This is often done in Kentucky and some other of the Western States; but I have never known more than one instance of its being practised in New England. I do not feel authorized, therefore, to pronounce upon its advantages.

It is sometimes asked, whether oxen are injured in their growth for being worked. If their strength is prematurely and too severely taxed, or if they are subjected to severe usage, undoubtedly it must prove injurious; but, if otherwise, if reasonably worked and carefully and kindly attended, there is no doubt that their health and growth are promoted by it. It is often matter of inquiry, whether fatting cattle should be kept in close stalls, or be suffered to lie out-doors. The experience of all the farmers whom I have consulted, who have made any trial, is conclusive in this case, in favor of the superior thrift of animals kept constantly in the barn, or turned out only for watering and immediately put up again, over those which are kept in open sheds, or tied up for feeding only, and at other times allowed to lie in the yard. No exact experiments have been made in this county in relation to this subject; but experiments made abroad lead to the conclusion, that cattle thrive best in a high and equable temperature, so warm as to keep them constantly in a state of active perspiration, and that their thrift is much hindered by an exposure to severe alternations

of heat and cold. It is certain, that in order to thrift, cattle cannot be made too comfortable ; their mangers should be kept clean ; their stalls be well littered ; and the cattle protected from currents of air blowing through crevices or holes in the floors or the sides of the stables, which prove often much more uncomfortable than an open exposure.

I have known but few trials of the cooking of food for cattle made in the county, and those not exact enough to lead to confident conclusions. The opinions of an intelligent farmer in Coleraine are, from repeated experiments, strongly in favor of cooking potatoes for his fatting stock. The experiments of another farmer in Deerfield, as to cooking vegetables of different kinds and Indian meal, satisfied him that the advantages, if any, derived from it, were not an equivalent for the increased trouble and expense. Some very exact experiments made in Scotland, in relation to this subject, lead to the same conclusions.

Punctuality in the hours of feeding should be most rigidly observed. The animal stomach is a very nice measurer of time. In general, the farmers are in the practice of only two feedings a day, in which case they do not place all the food before their beasts at one time, but stay by them and give it to them as fast as they will eat it up clean. Nothing is more important than to keep the animal as quiet and as well satisfied as possible ; and if the time of feeding is variable, or the usual hour is passed over, he becomes hungry and restless, and his condition will suffer of course.

The loss in driving a fat animal from any part of this county to Brighton market, is generally rated at one hundred pounds. The drover receives for driving to market, expenses on the road, and commissions on sale, two dollars for each animal. Some farmers in the southern part of the county may avail themselves by driving to Springfield of the opportunity of sending their beasts to market in the cars on the Western Railroad, by which, time would be saved, and the animals brought into the market in much better condition than if driven the

whole distance ; but for farmers in other parts of the county, the Rail-road is evidently too remote.

I have gone thus fully into the subject of fatting cattle, because it is one of the great interests of the county. As at present conducted, it certainly is not managed to a profit ; and if pursued extensively and exclusively on any farm, is not unlikely to eventuate in the embarrassment and ruin of the farmer. From the best observation, which I have been able to make, I have found very few instances in which a pair of cattle or a single ox kept for any length of time in the stall, have ever made compensation for the produce which they or he consume, even at prices considerably below the current prices in the market. There are occasional and accidental exceptions, but they are very seldom to be met with. There is sometimes a sudden rise in the market, but this is a matter so entirely capricious, that no calculation is to be made on grounds like these. If the farmers could by superior skill and cultivation double their crops, a result which I fully believe to be within their power, and instead of being satisfied with thirty-five, would raise seventy bushels of corn to the acre, and instead of two hundred bushels of potatoes, would produce four and five hundred bushels to the acre, estimating these articles at their cost and not at the market price, the result would be entirely different, that is, in making up the year's account of the farm.

It has been supposed that farmers by going extensively into the cultivation of esculent roots, such as carrots, ruta-baga, parsnips, or mangel-wurtzel, could fatten cattle to much more advantage, or rather at much less expense than on hay or corn. This deserves great consideration. On this subject we want light, and that which springs from actual and intelligent experience. My belief is, that for the fatting of cattle, where the coarse fodder is well saved, few crops are more profitable to the farmer than a crop of Indian corn at the rate of seventy bushels to the acre. Next to corn, potatoes at the rate of four hundred bushels to the acre, would be a profitable crop. In number of bushels to the acre, there is no doubt that more can be

produced and at a less expense of cultivation and harvesting of common turnips, of ruta-baga and of mangel-wurtzel, than of potatoes. But it is believed that more nutritive matter can be obtained from one hundred bushels of potatoes, than from two hundred of common turnips. Ruta-baga and mangel-wurtzel, have undoubtedly a great superiority over the common white turnip, but these are much inferior to the best and most farinaceous potatoes. Hay is without question one of the best articles which can be given to fattening animals; but where an abundance of meal or of esculent vegetables is given, the nature of the long feed to be given them seems of much less importance. Rye, wheat, or oat straw, in such case, is found to be given with an almost equal advantage as the best hay. Many of the best beasts in England are fatted upon straw and turnips. In England, it is considered as doing well, if an acre of turnips will fatten an ox for market. An experienced farmer here is of opinion, that one hundred bushels of potatoes with a small amount of hay will fatten an ox. Another says, that he allows twenty-five bushels of corn to fatten an ox, and but little hay will be required. A very good farmer in Charlemont, speaks very strongly in favor of potatoes for fattening cattle. A cow fatted by him on potatoes, showed one hundred lbs. of tallow. The experience of many farmers confirms this estimate of their value. Yet one of the best feeders in Deerfield disapproves the use of them. I believe this, however, to be more the effect of prejudice than of careful experience. Oil meal has been used by some farmers and much approved; but it is not estimated as of equal value with Indian meal. These are very loose statements, but I deemed them worth recording in the hope that they may induce to more carefulness of observation and some exact experiments.

It is curious to compare the gain of fatting cattle with the actual cost of keeping. Two pounds live weight per day in an ox are considered a large gain. The largest gain mentioned in this report is a little more than three pounds per day. At seven dollars per hundred, this would be equal to twenty-seven cents.

To make this, we suppose the animal to receive one peck of Indian meal, which, at 66⅔ cents per bushel, would be 16⅔ cents, and 28 lbs. of hay, which, at 8 dollars per 2000 lbs., would be 11 cents and 2 mills, or both about 28 cents. Or suppose him to gain only 2 lbs. per day, which would be 14 cents; and his daily allowance of meal be reduced to 4 quarts, and hay the same as before, the daily cost of keeping would be about 20 cents; in which case, if we place the manure as an offset for the attendance, interest and commissions on sale, &c., there will be a loss of about six cents per day. I believe the result is often much worse than this; and it is much to be regretted that farmers are not willing to look these facts in the face. I do not mean to deny that there are instances of success in this department of husbandry, instances in which the farmer is well paid for his trouble and attendance, and receives a full compensation for the feed supplied to them; but these instances are comparatively rare, and so much matter of contingency, that even the most skilful farmers cannot always rely upon their best judgment. The farmer always feels satisfied, if he can, as he terms it, double his money; that is, if he receives for his cattle in the market, twice as much as they cost him, when he first put them into the stall. This is sometimes done. It is seldom exceeded; and fatteners often fall short of it. But whether this shall happen or not, depends on so many contingencies, as what is the cost of the cattle in the fall, what is the state of the markets in the spring, how long the cattle are to be kept in the stall, and what is the amount of food required to their fattening, that it is extremely difficult to anticipate the result, from a mass of elements so uncertain and fluctuating.

With respect to a business, as it is now pursued so uncertain in its results as this is, the minds of intelligent and observing farmers have long been inquisitive as to the best means of pursuing it, so as to make it if possible productive; or if not profitable, so as to guard against the uncertainties which attach to it, or the serious losses and disappointments which it often involves. Whether this is practicable, and to what extent it is practicable, are highly interesting inquiries.

One point is fully settled, that it is for the interest of the farmer as far as possible to raise his own stock. I have already remarked on this point in speaking of the advantages with which in doing this he might apply to the support of such stock the coarse fodder of his farm. A good deal now is suffered to perish in the field, or is consumed there to very little advantage, which might be applied to the raising of young stock. Much of our straw of grain, which is now applied to purposes of mere litter, might undoubtedly with more advantage be applied as the feed of stock, if, at the same time, we should produce other articles to go with it. If the English can rear stock, and fatten stock of the very best quality upon straw and turnips, why cannot we do the same? I do not mean to speak of turnips in preference to any other crop. I am disposed to think that there are other esculent vegetables, which may be raised for stock in equal amount to an acre, at a not much greater expense, and to a greater profit than turnips. Farmers can only determine this by actual experiment. But I mean simply to say, that the farmers may raise to advantage, some esculent vegetables, such as turnips, ruta-baga, mangel-wurtzel, carrots, beets or parsnips, which combined with straw would enable them to consume their straw with advantage to themselves and to their stock.

Few farmers on the river have pasturage sufficient for the summer keeping of stock, even if they had the means of sustaining them in the winter. But pasturage can always be had at reasonable rates either for the land or the feed, within a distance not great; or such stock could be sent in summer even to a considerable distance, where pasturage might be found at very low rates; and the extraordinary advantages, which a farmer would find in raising his own stock for his stall instead of purchasing them, can admit of no question.

But there is another mode of raising stock, by those who have a small extent of pasturage connected with their farms, which I am persuaded might often be pursued to a great profit; and that is by soiling—that is, by feeding them with green feed

in the barn or the yard. This might be conducted on many farms, I believe, with signal profit; and one very prominent advantage which would come from it, would be the abundance of manure, to be made in this way.

I will not pursue this subject in this place, having already devoted a large space to its consideration; but, with one obvious truth, those who fatten cattle for the market cannot be too strongly impressed, which is, that in fattening a young animal, the farmer has not only the advantage of the gain of the animal in fatness, but likewise his actual growth; the latter may, in many cases, be considered as equal to the former.

10. Sheep.—The next portion of live stock in the county, which deserves our notice, is sheep. Of sheep six months old and upwards, there are returned to the last Valuation Committee, 50,141, and, in respect to numbers, Franklin stands third in the Commonwealth, containing, however, only about five-twelfths as many as are found in Berkshire county. The number returned by Benton and Barry in 1837, amounted to 55,975. These amounts, it is presumed, refer only to store sheep. Besides these, large numbers of wether sheep are purchased annually to be fatted for the market, few of which are kept over six, and many not more than three and four months.

The largest flock of sheep kept by any one farmer in the county within my knowledge does not exceed nine hundred. Few flocks exceed two and three hundred, and many farmers keep only a small number. The sheep are kept almost entirely in the hill towns, where pasturage is abundant. Ashfield, Coleraine, Charlemont, Leyden and Conway are the towns in which the sheep husbandry prevails.

The kind of sheep principally kept are of fine wool, and, generally, three-fourths and seven-eighths blood of the merino. The Saxony have been introduced, and the wool of some of the flocks is of remarkable fineness. The Saxony, however, do not prevail to much extent, as most of the sheep are bred without an extraordinary expense of care or pains in the se-

lection of the finest-wooled, or the preservation of purity of blood. Of the finest-wooled Saxony sheep very little pure stock is to be found in the county. Of the sheep found in this county, generally, the average yield of well-washed wool is about three pounds. This, however, must be considered as a large estimate. From the accounts of the product in wool, given at the time of the introduction of the merino into the country from Spain, when four pounds and more to a sheep were stated as the yield of whole flocks, there would seem to have been a decline in their productiveness. This is, however, with more probability, attributable to the cleaner washing of the wool, than what formerly prevailed. It may be likewise that, at that time, when from their rareness they were exorbitantly valued compared with present prices, they were kept with much more liberality than they now are. The effect of high keeping is to increase the quantity of the wool, while it renders it less fine. It may be owing, in some degree, to another circumstance, which is the suffering the breed to deteriorate from a want of care and selection in the propagation. The yield of the pure Saxony is seldom more than two pounds to a sheep, and, in many large flocks, it is less than this. In one case where the wool was of a very superior quality, the yield was only one pound and ten ounces per head. Yet I know, on the other hand, where extraordinary skill and care are used both in the keeping and breeding of the sheep, at least three extensive flocks, the average yield of which is nearly three pounds of well-washed wool, which has commanded one, and sometimes one and a half dollar per lb.

The hilly portions of the county are well adapted to the sheep husbandry, though of late years the fluctuations and the reduction in the prices of wool have discouraged it. There is, however, as far as the raising of wool is concerned, a compensation for this in the low price of the fine-wooled sheep, compared with that which they formerly commanded. The sheep are kept in general until five and seven years old; and the annual increase of a well-managed flock, may be set down

as from one quarter to one third, that is, one lamb raised to every four or three wintered, including all kinds. The losses, under indiscreet or negligent management, are sometimes very great. Sheep are sometimes suffered to lamb too early; the ewes are, in some cases, very poorly kept; there is a want of provision, as it respects warmth and comfort of the ewes in the season of yeaning; and no provision of succulent food is made for them where they come in before the season of grass. The fine-wooled sheep require particular care; they are more tender than our native sheep or the mixed bloods; but there are, within my knowledge, individuals, whose management is so excellent, that they would think almost as much of losing a lamb through neglect, as of losing a child; and with flocks of the very finest-wooled Saxony sheep, I have known one hundred and one lambs raised from one hundred ewes. Such are the results of superior skill and carefulness, which never fail to bring with them an ample reward.

The cost of keeping a sheep is, of course, differently estimated in different parts of the country. In a report made some years since to a committee of Congress, the cost was put down at one dollar per head through the year. There is no part of Massachusetts where this will nearly meet the expense. Many farmers are in the habit of rating the keeping of ten sheep, as equal to the keeping of one cow. This is an equally loose mode of estimating it. It may not be amiss in this case, to refer to some actual trials of the amount of food consumed in a given time.

Bordley states that a ton (2,240 lbs.) of hay was eaten by 700 sheep in a day, which was equal to 3 2-10 lbs. each, and the supply was scanty. Featherstonhaugh, dating from Duanesburgh, New York, says:—"The winters here, average about 135 days of foddering; and I know, by actual experiment, that 7 healthy sheep during that period, will eat a ton of hay, which, valued at seven dollars, leaves each sheep charged with a dollar per head for wintering. This would be at the rate of 2 10-23 lbs. per day. Fifty-two sheep in a trial of 23 days, be-

sides 31-100 of a quart of corn each per day, consumed 1 12-25 lb. of hay. Twenty sheep in another case, besides a liberal allowance of turnips and corn, consumed 305 lbs. of hay in 7 days, which was equal to 2 5-28 lbs. per day. These experiments give very different results; something is without doubt to be attributable to the kind and condition of the sheep. Sheep of a large size will require more than the smaller kinds, and sheep in a lean condition more than those which are fat. It will be but reasonable to allow, I think, 2 lbs. of hay as the daily consumption of a healthy sheep in the winter. Our sheep in general, require foddering at the barn, ordinarily 5 months or 150 days in the year, which would be 300 lbs. of hay to a sheep. This, at six dollars per ton, would be 90 cts. Add to this 1 bushel of oats, 33 cents, and 30 weeks pasturage at 3 cents per week, 90 cents,—the whole, two dollars and thirteen cents. Add to this, the interest upon the value of the sheep, two dollars, at 10 per cent. risks included, 20 cents. Total, two dollars and thirty-three cents. We may substitute for the bushel of oats, 1½ bushel of ruta-baga, at 10 cents per bushel, 15 cents: and we may reduce the price of pasturage to 2 cents per week, which would be 60 cents. Total, one dollar and sixty-five cents, for the yearly keeping of a sheep. We may consider the manure as an equivalent for the attendance and interest. Now, what is the return for this keeping? Three lbs. of wool, at fifty cents per lb., one dollar and fifty cents; 1 lamb in 4, or one fourth of a lamb, that is, fifty cents, which returns produce two dollars per head. Such a result as this, would be deemed a full and profitable compensation. These calculations are of course necessarily affected by a variety of circumstances, such as the season and state of the markets, and the kind of sheep, so that it is difficult, by any mode of calculation, to arrive at precision in results which may be affected by so many contingencies. The farmer may always feel satisfied if he can get a fair compensation for his produce, making all due allowance for the consumption of it on the place. This, with good management, the sheep husbandry is,

under favorable circumstances, as likely to do as any branch of husbandry which is pursued. It is attended with as few risks as any, and the care of no live stock is more agreeable to a person interested in domestic animals.

Of the different kinds of sheep among us, in selecting those which are to be reared, regard must be had to the circumstances of a farmer's location, and the objects for which he raises them. At present among us, the demand for the very finest kinds of wool is not so great as for those of a medium quality; nor does the price, which is paid for it, bear so fair a proportion to the expense and difficulty of raising it. The yield of the finest Saxonies is not more than $2\frac{1}{4}$ lbs.; and notwithstanding the extraordinary success of some persons in raising them, it must be admitted that they are more tender than other sheep; and more likely to suffer from the severity of our winters. At eighty cents per lb., which would be much beyond present prices, the yield would be one dollar and eighty cents; but there is little prospect of the price of wool being so high again very soon. The Saxony sheep being more common, and the price of wool being reduced, there is, of course, much less demand for the lambs, which were, at one time, readily sold for ten and fifteen dollars each. The inferior size of the Saxony sheep renders them unsuitable for mutton.

The next kind of sheep common among us is the merino. The Saxony may be considered as an improved merino. The true merino, formerly introduced into the country from Spain, is a sheep of considerably larger size than the Saxony, and its wool inferior in point of fineness, yet more adapted to general use. Of the pure merino, very few flocks exist in the country; the seven eighths and three fourths blooded, are the most common. These, in general, give a clip of three pounds; and when the finest Saxony brings a price of eighty cents, this may be expected to command fifty to sixty cents. At fifty cents, it would produce one dollar and fifty cents; at sixty cents, one dollar and eighty cents, which would be equal to the yield of the Saxony at eighty cents, with the advantage on the part

of the merino, of superior hardiness and more certain success in raising lambs. These prices are considerably beyond the present market (1841). Besides these, there have been introduced into the country, the Dishley or Bakewell sheep. These sheep are remarkable for their size, symmetry, and fatness. They have small and clean heads, broad and flat backs, square and full sterns, and round bodies; and, when in high condition, may be said to display the art of breeding in perfection. No animals can be more beautiful. Their wool is long, and adapted for spinning into worsted. The average clip is from six to seven pounds, which, when half-blood merino commands forty cents, will bring about thirty cents per lb. They are of a tender constitution, and require particular care and most liberal keeping. Their mutton is generally highly valued in the market, though it is too much loaded with fat, excepting for the epicurean palate. The four quarters, after being dressed, often considerably exceed one hundred pounds, and, in some cases, one hundred and fifty pounds. Attempts have been made to improve the size of the merino, by crossing them with the Dishley. The first cross has succeeded well, but the second has resulted in the deterioration of both. The short-wooled and the long-wooled being distinct races from each other should not be intermingled.

The next breed of sheep likely to become prominent among us is the South-Down. These are a sheep of medium size, very compact in form, with clean heads and black feet and muzzles; extremely hardy, maintaining themselves in good condition even upon inferior keeping; and affording as fine mutton as can be sent into the market. The average yield of wool on the South-Down is three and a half pounds. The pile is short, and the quality in respect to fineness, inferior to the merino, though it is of ready sale with the manufacturers. There is little doubt that a judicious cross of the South-Downs with the merinos, would greatly improve the hardiness and mutton properties of the latter, and the quality of the wool of the former; and is likely to give us a sheep well adapted to

our climate and mode of keeping and to the production of wool and mutton. As yet, these sheep have been diffused in the State in a very limited degree; but as some of the best of the kind for breeding have been introduced into the country, and are available to the farmers upon reasonable terms, we may hope that this stock will soon be appreciated and greatly extended.

Of what is called our native sheep, we can scarcely be said to have any distinct race. The sheep which our farmers were accustomed to keep, before the introduction of the fine-wooled varieties, were a large, coarse-boned, and coarse-wooled animal, yielding from three to four pounds of coarse wool, extremely hardy, propagating fast, and presenting occasionally accidental individuals of great thrift and size. But the fine-wooled sheep have been so extensively spread in the country, that it is extremely difficult to find any animals, which are not more or less tinctured with their blood. By a selection, however, from what remains of the old stock, individuals are often found admirably suited for stall-feeding for the market.

The demand for mutton within twenty years past has been constantly increasing, and so is likely to continue. This has given much encouragement to the business of fatting wethers for the market; and, in general, this, it is believed, has paid a much better profit than the stall-feeding of beef. The consumption of the produce of the farm upon the farm is, in this way, rendered easy. The manure produced by the folding and stall-feeding of sheep, especially where, as should always be the case, they are abundantly supplied with litter and likewise with turnips, or other succulent vegetables, is equal in value to any which can be produced in its application to cultivated grain crops, or to grass lands; and where the raw material is abundant, may be made in quantities which would surprise the inexperienced. It is in England with sheep, as it is with neat-cattle, that many of their best sheep are fatted upon straw and turnips, without either hay or grain. The fatting of animals by such a process, must undoubtedly require a much longer

time than is given among us to that object; and in our Indian corn and meal, we have an article for this object, which, in nutritive properties, when given to almost any animal, is not surpassed, if it be equalled, by any others. Our sheep, in general, are fed with hay, corn or meal, oil-cake, and potatoes; and if put up in good condition, are in six weeks, under judicious and faithful care, made fit for market. In selecting sheep for fatting, it is indispensable to success, to select those which are in thrifty and good condition. It is in vain to undertake by any mode of feeding, to fat a poor or lean sheep with any hope whatever of profit or success. The greatest profit will always be made upon the fattest and thriftiest sheep; and loss is almost certain to be incurred by any attempt to stall-feed a lean or unthrifty sheep. The best age for selecting wethers to fatten, is from three to five years old. They must be fed with the utmost regularity and exactness; strangers must not be suffered to go among them; and the greatest pains must be taken not to disturb or alarm them. If folded, fifty are as many as should ever be put in one enclosure, and a less number would be better. There should be a shed under which they may take shelter at their pleasure, and where they may always find a dry bed; and their yards, likewise, should be always abundantly littered, because if suffered or compelled to stand in wet yards, where there exists a predisposition, they are liable to become infected with the foot rot, a most troublesome disorder, and fatal to all thrift, separate from its infectious character, which will cause it to diffuse itself rapidly through a large flock. Their feeding troughs, likewise, and mangers, should be kept thoroughly clean, and their yards well supplied with pure water. In selecting sheep for stall-feeding, the fine-wooled kinds often make up for want of size in the superior value of the fleece.

This matter is of so much importance to the farmers in the interior, that I shall go more at large into it, and illustrate it bysome actual experiments, of which I have received an authentic account.

1. Experiment in stall-feeding sheep.

Forty wether sheep from 2 to 3 years old. Cost $1 92 each. Put up 1st December; sold 5th March, at $4 per head in the yard.

Feed.	From 1 Dec. to 15 Dec.	1 gill of corn per day,	600 gills,	
	15 " 29 "	2 gills " "	1120 "	
	29 " 14 Feb.	3 " " "	5640 "	
		equal to	$28\frac{3}{4}$	bs.
From 14 Feb. to 5 March,		1 bs. per day to 40 sheep,	19	
		Total of corn,	$47\frac{3}{4}$	bs.
From 1 Dec. to 10 Jan.		3 bushels of turnips per day,	123	
10 Jan. to 5 March,		between 5 and 6 bs. say $5\frac{1}{2}$	297	
		Total of turnips,	420	bs.

Hay by estimation, 2000 lbs. at 10 dollars.

Corn $47\frac{3}{4}$ bushels at 50 cents,		24 00
Turnips 420 " 10 "		42 00
Hay 2000 lbs. at $10		10 00
Cost of 40 sheep at $1 92 each,		76 80
	$152	80
Proceeds of sale at $4 each, 5th March,	160	00
Balance in favor of sheep,	$7	20

Manure considered equivalent to the attendance.

2. Experiment in stall-feeding sheep.

Dec. 9th.	Put up to be stall-fed	50	wether sheep,
" 17th.	"	" 12	"
" 18th.	"	" 52	"
	114 at $2 50 each,		$285

Feed consumed by them as follows.

Swedish turnips (ruta-baga)	862 bushels at	10 cents,	86	20
English flat turnips	125 "	5 "	6	25
Indian corn	37 "	70 "	25	90
Hay (rowen) 9942 lbs. at 40 cents per 100 lbs.			39	76
			$158	11
Sales of above sheep, 62 at $4 each, and 52 at $4 08 each—advance on 114			175	16
Net balance in favor of the sheep,			$17	05

N. B. It was noted that the thrift of the above sheep was injured by the prevalence of the foot-rot among them; and the sale affected by a large number in the market on the day they were offered. Had they been offered a month earlier, they would have brought as much as at the time they were sold. In regard to circumstances of this nature, no certain calculations can be made; but they illustrate the caprices to which all such operations are liable.

3. Experiment in stall-feeding sheep.

180 wether sheep of superior size and condition were put up to be stall-fed on the 1st of December.

125 delivered on the 11th Feb. were sold at $5 per head.
55 " " 18th " " $5 25 "

Cost of the above sheep.

118 wether sheep at $2 50 per head,		295	00
2 " cosset sheep at $3 00 per head,		6	00
60 " sheep at $3 06½ per head,		183	75
Commissions for purchase and driving, 25 cents each,		45	00
Interest on $530 at 10 per cent. including risks,		13	25
		$543	00

Produce consumed in fatting the above sheep.

519 bushels turnips at 10 cents per bushel, . .	51 90
151 " of corn at 75 " " . .	113 25
Hay at 2½ lbs. per day each, 33,362 lbs.	
Tons 16, 1,362 lbs. at $8 per 2,000 lbs. . .	133 44
	$841 59
Cash received for above sheep, ...	913 75
Net balance in favor of the sheep, . . .	$72 16

Note. The amount of hay charged as above was matter of estimate rather than of measurement. Twenty of the above flock, put by themselves and fed as fully as possible, consumed in three days, 150 lbs.; and in the succeeding four days 155 lbs. or 305 lbs in seven days=2 5-28 lbs. each per day. On a previous trial of this kind of a flock of sheep of a smaller average size, the consumption of hay was equal to 1 48-100 each per day. Amend the account then by allowing 2 lbs. each per day.

From 33,362 lbs. deduct 1-5=26,690 lbs. cost 106 76	
Now 133 44——106 76=26 68 cents, . .	26 86
Call the interest and risk 7 per cent. instead of 10 per cent. $13 25——9 27=3 98	3 98
Estimate the turnips at 8 cents instead of 10 cents, $51 90——41 52=10 38	10 38
Amount of difference in charges in favor of sheep,	41 04
Add former balance in their favor, . . .	72 16
Balance in favor of the sheep,	$113 20

The above sheep, when put up, were in good condition and of a large size taken as a whole. The price at which they

were sold was low compared with many sales at the time. The native blood predominated in them.

These are the most exact experiments which have come within my knowledge in regard to the fatting of wethers. The result is in a degree subject to the same caprices and fluctuations as the fatting of beef; but in general, under good management, it affords a compensatory return. The towns of Shelburne and Conway, are particularly interested in this matter, and they are in the habit of sending annually many very fat sheep to Brighton market. The ordinary commissions charged for driving fat sheep from Connecticut river to Boston, are from twenty-five cents to thirty-three cents each; fifty cents are sometimes charged, where the sheep are remarkably valuable.

I will subjoin some miscellaneous notes, which will serve to illustrate the general mode of keeping sheep.

D. B. has sixty wether sheep in preparation for market. He allows them as much hay as they will eat, and three pecks of corn and two bushels of potatoes daily among the whole. He will, by degrees, increase their feed.

A. A. has seventy-five fatting sheep, and having lately added to their feed, gives them five pecks of corn per day and one bushel of potatoes with as much hay as they will consume, feeding them five times a day. He mentions the case of an excellent flock of sheep which were fatted upon corn, with liberty to go to a stock of poor meadow at their pleasure. To use his own expression, "the corn did the work." The quality of the hay does not seem important.

O. N., one of the best feeders in the country, has fifty-five sheep in one yard. At daylight he gives them a feed of corn, dividing it so as to give the flock about one bushel and a peck in the course of the day; after that, a foddering of hay; at nine o'clock, another foddering of hay; at twelve o'clock, another feeding of corn, the same as in the morning; after which, another feeding of hay; at four o'clock, p. m., another feeding of hay and the same measure of corn as before. He thinks it

best to have them finish their eating by night, so as not to be disturbed after dark; and that they relish their corn best at night.

N. D. and G. D. have one hundred and eighty fatting sheep. Feed with corn and hay; began with one pint and now average about one quart of corn per day. Their sheep are uncommonly fine. The live weight of one, 180 lbs.

I. N. has one hundred wethers; fifty of them of a superior character. To the one hundred, gives one bushel, heaped measure, of oil meal per day with hay. His oil meal costs him twenty dollars per ton, besides the expense of transportation twenty-five miles.

D. N. has sixty sheep. To the sixty gives half a bushel of oil meal and half a bushel of corn per day.

G. S. has fifty-eight sheep. Corn and hay only are allowed. Allows one and half bushel of corn per day to the fifty-eight sheep.

A. R. has three hundred sheep—in pens of twenty-five sheep in each. His aim is to induce the sheep, besides hay, to take one quart of corn each, given at three times a day.

T. R. has one hundred and twelve sheep. Feeds with corn and hay. Fifty of them have one bushel per day. The best and most forward have one quart each. The live weight of one, two hundred and ten lbs.

G. D., an experienced feeder, is of opinion that no advantage is gained by giving the sheep meal instead of unground corn.

E. T., long familiar with the fatting of sheep, prefers wethers to ewes; prefers merinos to other sheep; buys them at different ages, so that they come to the stall in succession; thinks five years old the best age for fattening; and chooses to feed them moderately until a short time before he intends to market them, as, in his experience, they will not pay the cost of high feeding during a long time. He often begins in March to feed sheep, which he designs to send to market after shearing. He is accustomed to keep his store-wethers in the yard with his cattle upon the orts and husks that are thrown out to them.—

He is careful not to suffer his fatting-wethers ever to be disturbed. When he begins to feed with corn, he never permits his sheep to be hungry. He keeps his sheep upon rowen the first part of the season; thinks merino sheep are kept at less expense than native; and deems the fattening of sheep profitable. He mentions a case in which he bought sixty merino wethers in June for 133 cents each; and sold fifty of them in the ensuing March for 600 dollars. His wether sheep, which are not sent to market until after shearing, often give four lbs. of wool at a clip.

1. Weight of Sheep.—The weights of ten Dishley wether sheep, fatted by a farmer in this county and sold in Boston, were as follows. The four quarters only were weighed.—Three of them weighed 100 lbs. each; one, 80 lbs.; one, 82 lbs.; one, 90 lbs.; one, 91 lbs.; one, 95 lbs.; one, 107 lbs.; one, 110 lbs. Total, 995 lbs. The average weight of rough tallow to each was 13 lbs. These sheep were three years old, and were fed mainly upon hay and Indian corn. They consumed, during the latter part of their stall-feeding, more than a pint and a half of Indian corn each per day. Though a quart was, in some cases, eaten by them, yet it was found to be more than they required. Twenty dollars per head were offered for them by the drover before they left the yard; but, owing to an extraordinary change in the market, the owner received only fifteen dollars for them after being driven to Brighton.

2. Early Lambs.—The practice of raising early lambs for market has prevailed with some farmers. One excellent farmer, to whom I particularly refer, has had his native ewes of good size, crossed with a Dishley ram, and arranged to have them lamb in January and February. Having every provision for the comfortable accommodation of the ewes and lambs at that inclement season, he has succeeded in raising very fine lambs for the early market, which have brought him two and three dollars a-piece. In such cases, his sheep pay him a large profit. There is no doubt that the practice might be extended to much advantage.

3. Housing Sheep.—A good deal of discussion has been had among farmers as to the propriety of housing sheep in winter, and the practice of farmers in this respect is various. The question cannot be answered without regard to circumstances. Our own native sheep bear exposure without injury or suffering. Few of them have known any other than the most severe usage, and under such treatment have acquired a hardiness of constitution adapted to their condition. Full-blooded merino sheep, likewise, if they were susceptible to its rigors when first introduced, have become inured to the climate. It is not so, however, with the Saxony, which are a tender race and need very tender treatment. All sheep which lamb early require shelter and a warm cote. The wool, likewise, is rendered coarser by exposure to the weather; and the quantity and compactness of the wool seem to bear a relation to the weather. This is a beneficent provision of the Creator, that the constitutions both of animals and vegetables should become, within certain limits, fitted to their condition.

The practice of farmers in regard to housing their sheep, as I have remarked, is various. I have known a case in which a large flock of fine-wooled sheep have been kept confined in a close stable or barn the whole winter, without ever being let out even for the purpose of watering. An abundance of litter was furnished in this instance, and the sheep were kept as dry as the nature of the case admitted of. But the deaths in this farmer's flock were always numerous, and the health of the sheep suffered without question from a corrupted atmosphere. In other cases I have known farmers—and this appeared to me, when in that part of the country, to be the general practice with many extensive sheep-owners in Vermont and the north-eastern part of New York—not to allow their sheep any shelter in winter but that which they find behind the walls or under a hay-stack. They have insisted upon it that, under this treatment, their losses were many times less than when closely sheltered.

As well as I can judge, from the observations and experience

of different farmers, a medium practice is to be preferred; and that is, to have sheds connected with the sheep-yards and open to the south, where the sheep may take shelter when they choose. It is natural to suppose that they are the best judges of their own comfort. From snow, even from severe snow-storms, sheep suffer little; but heavy rains in winter, where the fleece becomes fully charged with wet and then freezes, are prejudicial to their health, although their thick fleeces are almost as repellent of water as the well-oiled feathers of birds.

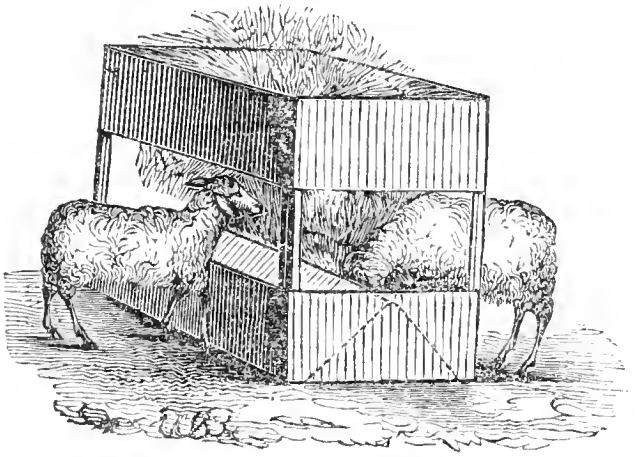
3. Care of the Ewes.—The lambing season, if it be early, demands great care. Most of the farmers are accustomed to arrange for their lambs to come the last of April and through May, when the sheep can get a good bite of grass. The objections to this are, that the late lambs do not go through the ensuing winter so well as those which come earlier; and that, where sheep are sent to a distance from home to pasture, accidents frequently occur which might be guarded against if the shepherd were at hand. On the other hand, if lambs are to come early, and before the sheep leave the barn, it is desirable to have some succulent vegetable food for ewes, such as turnips or potatoes. One of the most skilful and experienced shepherds in the country disapproves the giving of corn or rye to sheep in milk, and considers potatoes the best succulent vegetable which can be given to them. The Shakers consider a bushel of oats for sheep, better than a bushel of corn. I do not know the grounds of this judgment; and after all it may be with them mere prejudice. They are not alone however in this opinion of the superior value of oats to corn for store-sheep. For fatting-wethers corn is far preferable. In old countries abroad, it is the practice for the shepherd, during the lambing season, to sleep in the barn, that, in case of need, he may render assistance to the ewes during the night. It happens in these cases, as in all others in life, that the most careful are the most successful; and that what the indolent and improvident generally denominate bad luck is only the natural consequence of neglect and bad management.

Some farmers are accustomed to turn their sheep into pastures without water, under pretence that they get enough from the dew. There is cruelty in doing this, as sheep require water as much as other animals, and suffer severely from the privation. The habits of sheep, likewise, are particularly cleanly; and pains should be taken, whether in the yard or pasture, that they should have free access to clean water. An extensive sheep-holder in a neighboring county has kept his sheep without salt. There can be no doubt that this is an error, and that salt is an essential condiment to their health. It is advisable to place it in their pastures in small troughs with a roof over them, that the salt may not be wasted by rains, and that the sheep may be prevented from getting into or over the trough which contains it. This is easily effected by a simple contrivance, which will suggest itself. The common practice of throwing the salt upon the ground is wasteful, and on other accounts objectionable.

4. Manger for Sheep.—Among the various racks and mangers which I have seen for feeding sheep, there is a simple form which seems preferable to any other: it is as cheaply constructed as any other, and it prevents all waste. In the common form of racks, where they are inclined outward from the bottom upward, nearly as much hay is drawn out and trodden under foot as is consumed by the sheep.

The manger which is preferable to any other is of such length as to be easily moved by two persons, and is made with four or more upright posts, and with two boards or slats extending the whole distance round its sides and ends. The bottom board on the side may be ten or twelve inches in width; and above that, leaving a space of about a foot or fourteen inches, there may be another board of about six or eight inches in width. The width of the manger or box should be about two feet. It should have a tight bottom, with two pieces of board rising to a point in the centre, say about four or six inches, so as to form a trough on each side, into which when grain or cut vegetables are put, they may be easily reached by the sheep on

the side on which they fall. The top may be left open, or a board may be so placed lengthwise in the centre of it as to prevent the sheep from jumping into the manger. I give a rough sketch of an end view of it, though the form is very common.



5. Diseases of Sheep and Remedies.—The diseases to which sheep are subject among us are not numerous, but some of them are very troublesome. The rot, so much dreaded in England, and in which the liver of the sheep is destroyed by worms, so far as my knowledge extends does not prevail among our flocks. For this disease there seems to have been discovered no certain remedy or preventive; and indeed its origin does not appear to be well ascertained.

The foot-rot is not uncommon, and is said to have been brought into the country by the Saxony sheep. The disorder is of an ulcerous and offensive character, and first appears between the claws of the sheep, from whence it extends up the leg and assumes an aggravated form. It is extremely infectious in its character, and I have known the presence of two or three affected sheep to spread the disease among a hundred in a few days. I do not know its origin, but I believe that the seeds of the disease may lie some time concealed without germinating. I have known a large flock to be extensively and almost contemporaneously affected with it, after standing in wet yards and after a course of high feeding. Various remedies have been tried, but all of them are troublesome in their application and

not always effectual. It is important, on the first appearance of the disease, to separate immediately the sick from the healthy portion of the flock.

In all cases it is advised to cut away the diseased parts and to make the foot as clean as possible. I shall give the prescriptions of three of the largest and most successful managers of sheep in the Union — H. D. Grove, of Hosick, N. Y.; Dr. Jarvis, of Claremont, N. H.; and Sam. Grant, of Walpole, N. H.

1. Use blue vitriol and tar. If the disorder is very severe, use aqua fortis diluted with an equal quantity of water, and apply one or two drops to the lame part. In all cases the foot is to be made as clean as possible.

2. Use ¾ lb blue vitriol, ¼ lb verdigris powdered. Pour on them one pint of strong vinegar made hot; add ¼ lb of soap. Apply this to the feet, particularly between the hoofs, with a sash brush.

3. Take of tar, tallow, and sulphur, equal proportions well mixed, and apply it to the foot. It forms a salve. It must be sufficiently warmed to mix easily, but must not be made hot.

4. The subjoined are the remedies of an experienced English shepherd.

"The lame sheep being separated from the rest of the flock, the hoof must be cut away with a sharp knife (called a sheep-foot knife by cutlers,) as far as the disease has spread, and which may be traced by its becoming divided from the internal parts: this must be particularly attended to; for unless the sore is probed to the bottom, no application will be of service. When this is done, the subjoined ointment will often prove effectual at one application. It is wrong to use too strong a caustic, as it dries up the surface too quickly and matter forms beneath.

Blue vitriol half an ounce; gunpowder one ounce:—rubbed together into a fine powder and mixed with hog's lard sufficient to make the whole into the consistency of a paste.

5. Sugar of lead one ounce; verdigris half an ounce; blue vitriol half an ounce:—formed into a paste the same as the other."

The disease will require prompt attention, and the applications must be repeated while there are indications of it remaining. It has been found beneficial to spread the stables where the diseased sheep stand with newly-slacked lime. If the disease is prevalent among a flock of fatting sheep, all hope of their thrift during its continuance must be given up. If it prevails extensively among store-sheep, it will be expedient, as soon as practicable in some honest way, to get rid of the flock; and caution should be had not to place a new flock in a pasture from which a diseased flock have been recently removed. Let at least one winter intervene.

Sheep suffer likewise not unfrequently from the scab. For this the following remedies have been given to me by experienced shepherds.

1. Take 28 lbs. of leaf or 50 lbs. of stem tobacco, and put them into five pails of water; with two or three junk bottles of spirits of turpentine. Wash with this once in three days for a fortnight, if necessary. When the skin becomes clear, the cure is effected.

2. Take 5 lbs. of hogs' lard; one oz. of corrosive sublimate and some sulphur. Let these articles be well mixed. This is a good application when the wool is short.

3. Take roots of the weed hemlock, (*cicuta;*) make with them a strong decoction; or use the tops in the same way if the roots cannot be found; wash the sheep well with it.

A very good farmer in Conway has found one quart of sulphur mixed with four quarts of salt an excellent remedy for the scab, and generally beneficial to the health of the sheep. It is left in their troughs to be eaten at their pleasure. Another farmer in the same town speaks highly of its efficacy. It is said to be much used in the sheep districts in Vermont.

For snuffles, rub the nose of the sheep with tar.

It is not within my province to go fully into the subject of the keeping of sheep, but to record only such facts and suggestions of a practical character as I have gleaned from the habits of farmers in the course of my survey, and as appear to

me important. For the management of the other disorders of sheep recourse must be had to other authorities. I shall only add that, in respect to many of them, their causes or occasions are to be found in the improper treatment which the sheep receive. Sometimes they are fed to repletion; at other times they are as narrowly stinted. Their food is sometimes of the best, and often, of the worst description. What flesh they gain in summer is frequently lost by the severity of their usage in winter. But few persons take pains to cultivate a supply of succulent food for them, but confine them entirely to dry fodder; whereas ewes in milk particularly require some succulent food.

6. General Management.—The success of one shepherd of my acquaintance is so remarkable that I deem it proper to record even some minute circumstances in his management. He allows one hundred acres of pasture to three hundred sheep. The propriety or expediency of such proportions must, it is obvious, depend upon the quality and condition of the land, and the character of the sheep placed upon it. At the lambing season, he gives the ewes a small quantity of oil meal and oats, and is sure to salt them once a week. The oil meal he regards as very useful. His ewes in lambing, and with their lambs after lambing, are perfectly sheltered in a warm and close stable, and his lambs are all numbered by him on the side as they come, and are fed every evening, late in the evening, from a bottle with cows' milk. Being numbered, he is not so likely to miss serving them. By this extraordinary care and attention he is saved from any loss of lambs, and they come into the pasture vigorous and active. The preparation for marking his sheep and lambs consists of three parts of rosin; one part of tallow; and lamp-black as much as needed.

In washing sheep before shearing he recommends to begin with dipping in succession the whole flock; and, after they have stood some short time, to wash them thoroughly one by one, where it can be done, in running or falling water. The condition of, and price always obtained for, his wool are con-

clusive tests of the excellence of his management; and likewise the remarkable fact that, although his flock is of the finest-wooled Saxony, he frequently raises more than one hundred lambs to one hundred ewes; and a death among his lambs is a rare occurrence. He is of opinion that one ton of hay will winter ten Saxony sheep.

A good farmer in Heath and another in Leyden, experienced and well-skilled in the management of sheep, use boiled potatoes mixed with meal and made into thin swill for their ewes, before and at the time of lambing.

The county of Franklin is in many parts well adapted to the raising of wool, and to the sheep-husbandry generally; to the raising of early lambs for the market, and the fatting of wethers. This applies particularly to the hill towns. Pasturage is there in many cases distant from the habitations, and mountainous; on these accounts sheep are to be preferred to any other stock. It is believed, likewise, that sheep will, upon the whole, yield a better return than any other stock. The low price of wool operates as a great discouragement; but this kind of stock is of easy management, and the returns are, in general, quick and certain. Of the kind of sheep to be chosen, the intelligent farmer will, without difficulty, determine from the facts which I have stated in the preceding pages. Success, however, is certain only to exactness, care, and vigilance. It is, I think, especially to be desired that farmers in the sheep-husbandry should go largely into the raising of roots,—potatoes and turnips especially, both the white flat turnip and the ruta-baga; by this means they will very much increase their ability of keeping, and consequently may extend proportionately the numbers kept; and likewise very much improve the condition of those which are kept.

The use of the ruta-baga is objected to by many farmers on account of their injuring the teeth, or making the mouths of the sheep sore; for this reason they should be cut fine, and not given whole, as is done by some. Several machines have been invented for this purpose, varying in price from two to ten dol-

lars. A machine with a four-sided box tunnel-shaped, like the hopper of a mill, and placed over a cylinder made to revolve by a crank, and with four thin knives placed lengthwise and obliquely upon it, may be made at a small expense, and will be found useful and effectual. The English farmers are supposed to have great advantage over us in their climate allowing them to feed their turnips in the field without drawing them. In this case the field is divided into different compartments by moveable fences, and the sheep placed successively in the different enclosures. The turnips are eaten where they grew, and the manure deposited upon the field. But many even of the English farmers, in spite of the supposed advantages of this method of feeding, deem it better to draw and house the turnips, so as to feed them out at pleasure in well-littered enclosures, where the sheep may be carefully looked after; the straw of the farm converted into most valuable manure; the manure applied when and where it is most needed; and the great waste avoided which must be suffered in the other case from the turnips being scooped out by the sheep, and much of them being trodden under foot, or left to waste.

The introduction of the South-Down sheep, to which I have already referred, into the county, would be a signal advantage, as they seem extremely well suited to this locality, on account of their compactness and hardiness, the ease with which they are kept, and their returns in wool and mutton.

6. Yield of Wool.—The largest average yield of wool that I have ascertained in the county is from the sheep of Polycarpus Cushman, in Bernardston, one among the best farmers in the State. A flock of 200 sheep, of three-quarters Merino and Saxony blood, averaged 3 lbs. 3 oz. each, well-washed wool. Mr. Cushman was anxious to ascertain if any loss was occasioned in the weight of wool by keeping, a matter on which opinions have been various. A large parcel of wool, closely stowed away in a tight building, was found at the end of the year to have lost in weight 13-16ths to one hundred pounds; a little more than 3-4ths per cent.*

* See Appendix, A and B.

XI. Swine.—The county is scarcely at all engaged in the breeding of swine; and beyond the amount consumed in the county, a small quantity of pork is fatted for exportation. I know no large establishment for breeding or fattening swine; and one reason of this is, the small number of dairies which exist in the county. The dairy in all cases may be regarded as the most efficient means of raising and of fattening swine. The opinion of one of the best farmers in the county is, that a pound of pork may be made at much less expense than a pound of beef. It is not uncommon for pork to bring more in the market than beef. The principal part of the swine kept and fatted in the market are brought in droves from the State of New York, and sold, at four to six months old, to the farmers. They are usually confined in styes until they are fatted and slaughtered. I scarcely know an instance in the county of hogs running in the pastures; and the regulations of the towns forbid their going at large in the highway. The rude manners and unfortunate moral developments of this race of animals seem to shut them out from the kindly sympathies of the human family and foreclose any benevolent indulgence, beyond what is dictated by mere interest. It is a problem yet to be determined what effect a course of kind and gentle treatment for half a century might have upon the race, in subduing the natural and repellent rudeness and stubbornness of their character.

What I have to say on the subject of fattening swine is necessarily reserved for another part of my Report. I shall here only refer to a few facts, which have occurred to my observation.

One of the farmers whom I visited had then in his styes three swine, whose average weight would equal four hundred pounds each. They were fed three times a day, with a mess of 12 quarts of meal to each per day, composed of the meal of oats and Indian corn, mixed in equal parts and stirred in cold water. The price of oats at that time was 42 cents per bushel,—of corn, 84 cents per bushel;—6 qts. of oatmeal would be cts. 8.4;

6 qts. of corn meal would be cts. 16.8,—total, 25 cents 2 mills each per day as the cost of keeping. The price of pork at that time was six to seven dollars per 100 lbs. A gain of two pounds a day, live weight, would much exceed the ordinary gain of a fattening hog, although, in a remarkable case, I have known the daily gain, for eighteen days in succession, to exceed three pounds. At two pounds a day, there must be a considerable loss in this feeding. The prices of grain, however, were above the usual prices; and the price of pork was depressed.

Another farmer, in fattening three swine, allowed them one peck of meal each per day. The mess was composed of Indian corn, buckwheat and oat meal, mixed in equal quantities. The price of corn was 84 cents; buckwheat, 56 cents; oats, 42 cents per bushel. One peck of this mixture cost fifteen cents.

One of the most exact and careful farmers in the county fattens his swine chiefly in the winter, so as to have them in the market in March, when pork generally bears a good price. He has close styes, which are kept with great neatness; his swine are fed with exactness and punctuality; and in severe weather, he endeavors, by closing the windows and doors, to keep up a moderate temperature in his styes by a fire in the furnace, where he cooks his food for his swine. Another farmer in Leverett, who makes excellent pork, prefers the winter fattening of swine, but is extremely careful that they shall not suffer from cold, his styes opening to the south, and being always abundantly littered. The farmer first alluded to has made trial of molasses for his swine, having purchased a condemned lot at a low price. He gave at the rate of half a pint per day to each hog, with great advantage as he supposed, though no accurate observation or test was made to determine the gain, and the proportion of that gain, if any, to be attributed to this article of food.

A farmer in Buckland considers ruta-baga, fed raw to swine, of equal value as raw potatoes. This judgment, he says, is the result of his own experience. A farmer in Hawley thinks

swine may be fatted to great advantage, when the price of pork is 10 cents in the market and corn is one dollar per bushel. This is rather a loose estimate, and I should not quote it, but for my great confidence in this farmer's long experience and careful judgment. An excellent farmer in Conway puts up his hogs to be fatted in August, and he greatly prefers pumpkins to potatoes. There is no doubt that the pumpkin is a very nutritious vegetable. A very large amount may be raised upon an acre. The difficulty lies in their preservation; but when they can be used to advantage early in the season, they are a very profitable crop.

A farmer in Charlemont says, that, after twelve years' experience, he deems apples, bushel for bushel or pound for pound, of equal value with potatoes for feeding swine. He prefers sweet apples, but is not confident that they have any advantage over sour apples.

The raising of pigs is spoken of by several farmers as an excellent business. This can seldom be done to advantage unless in connection with a dairy. A farmer of Deerfield sold the pigs from two sows in one season for fifty-four dollars. Another in Gill sold the litters of two sows, in the spring, for fifty-nine dollars seventy-five cents. These results are, to a great extent, accidental; and depend on so many contingencies that no general rule can be drawn from them. A farmer in Northfield, on the 27th September, showed me three fine, thrifty swine, about one year old, nine tenths of whose feed, since the 13th May, had been obtained from one eighth of an acre of clover, cut and given to them in a green state.

XII. Horses.—The breeding of horses is not pursued to any great extent in this county, nor indeed in any part of the State. Farmers, who have a mare for farm or family use, will occasionally take pains to get one or more colts from her, and valuable stud-horses are found for the season in different parts of the county; but no expense is incurred and almost as little pains are taken to improve the blood, or to breed and rear horses

either for field-work, the road, or the turf. The consequence is, that the horses in the county are of any breed and no breed, and are designed for horses of all work. There are occasionally to be met with animals of great spirit and value, but most of the horses belonging to the farmers are of a very ordinary description. What is properly called grooming a horse is hardly known among us; and our farmers have yet to learn how much the value of a horse depends upon his training, his kind management, the regularity of his feed, the comfort of his stable, and the particular care which is bestowed upon him, especially after a hard day's work or drive. Indeed, the inhumanity with which these useful animals are often treated, would bring a severe reproach upon many, if we must, according to the scriptures, judge of a man's mercy by his mercy to his beast. Though the horse is usually as constant at church as his master, he does not always get very christian usage even there; and while the pious master is perhaps taking a comfortable nap in a cushioned pew near a warm stove, the poor horse stands shivering on a bleak hill, exposed to a driving storm of sleet and snow, wishing often without doubt, if he knew how to express the wish, that the sermon was somewhat less orthodox as to its length. Indeed, it is but matter of duty to say, that a good many of the animals who are called bipeds have much to learn in respect to what they owe to those animals who are called quadrupeds. They have yet to learn that they, like themselves, have flesh to smart and bones to ache; are subject to like inconveniences from cold and heat, to fever and ague, to debility, lassitude and fatigue, rheumatism, asthma, colic and consumption; and though it may seem, at first sight, that a horse has a supernumerary set of legs, yet that in truth he can travel with no more comfort upon three than the man can upon one.

Of the comparative expense and expediency of keeping horses or oxen for farm labor, I design to speak, if I have opportunity, in another place. The farm work in this county is almost universally done by oxen. The broken and uneven surface of many of the farms in the county render ox labor

preferable to horse teams, because the gait of oxen is slower and their draught more steady. Another reason operates with many of the farmers who fat cattle for the market, that they often get their spring and summer's work, without injury to the cattle, from oxen which they design for the stall in the ensuing autumn. Indeed, many farmers are of opinion that, in the early stages of fattening, moderate labor, with good usage, is upon the whole favorable to thrift.

It is difficult to say by what means in our community an improvement in the breed of horses is likely to be brought about. Nothing but high prices will effect it; but prices have considerably abated within a few years instead of increasing. The multiplication of rail-roads will, to some extent, diminish the demand for horses; and many large stage establishments have been already broken up. In England, the price of horses is kept up, and the improvement of the breeds made an object of the most extraordinary care, by the general use of horses in farm labor, and the pride which opulent farmers take in their fine teams; by the great number of private carriages and the large studs kept at the establishments of the nobility; and by the public races, where the contests are most spirited and the stakes enormous.

None of these causes operate in New England. Ox-teams, in preference to horse-teams, are in general use. We have no aristocratic establishments to indulge in splendid equipages and expensive horses; and the good sense and good principles of the community, and the laws growing out of them, will not, by permitting horse-racing and the gambling and profligacy to which it leads, encourage the improvement of our breed of horses by the corruption of our breed of men, nor promote even a highly desirable agricultural improvement at the expense of public morals.

What is particularly wanted in the country is an improved system of farriery and a veterinary school of medicine. The shoeing of a horse is an art which deserves to be studied with great care; but many of our blacksmiths, not from want of skill

but from want of education in the art, in the words of the old dialogue, "are not fit to shoe a goat;" and the gait of horses is injured, or they are made to stumble or rendered incurably lame by bad shoeing.

In the art of veterinary medicine we have scarcely a scientific practitioner. There are, in almost every town, some one or more persons who pass under the title of horse-doctors or cow-doctors; but most of them have not even a smattering of the knowledge of comparative anatomy, and their practice of cattle medicine is the grossest of all quackery. Some cases of their prescriptions and practice have filled me with indignation for their cruelty towards the poor dumb animals, who cannot tell their sufferings. In Europe, the governments have established and support veterinary schools, on the most liberal scale; and it would be a most suitable object of encouragement with the government of the Commonwealth, if such an establishment could be got up on a proper foundation in the neighborhood of a large city, where a variety of cases might be presented for study. I do not know why even an educated man should disdain the profession, for any offices to which it might lead would not be more disgusting than many which human medicine often imposes upon a devoted physician and surgeon. It cannot be doubted that the intelligent and skilful practice of the veterinary art would, in many parts of the country, be a source of ample income; and, if humanity and the desire to alleviate suffering in every form, to say nothing of the saving of property in the case, can make a profession respectable, this would be a profession in the highest measure humane and merciful. The profession should embrace, as far as practicable, a thorough knowledge of the construction, constitution, habits and diseases of all domestic animals; and the services should be well paid. Who shall speak for the dumb, unless they, who can speak, speak for them? And who will deny the debt of kindness which we owe to animals, whom God has cast upon our care, and whom we compel to labor continually and to the utmost of their strength for our service and pleasure?

The old horses of the benevolent Howard were regarded by him as old friends, whose declining age, after they had served him faithfully, he endeavored to make comfortable; and this simple fact, in the history of this eminent philanthropist, is a consistent and charming feature in the picture of his expanded benevolence.

XIII. Manures. 1. Lime.—Considerable deposits of lime are found in this county at Bernardston and Whately; but the expense of burning the stone so as to render it applicable to agricultural purposes is too heavy to make it to any great extent available. Lime from the quarries in Whately, and in some small measure from Bernardston, has been applied to the land, and it is said with marked advantage; but the experiments have not been so accurately conducted, or otherwise so accurately reported, as to justify any confident conclusions of its usefulness. A farmer of Bernardston mentions the application of lime strewed broadcast on some light sandy plain-land, the good effects of which were apparent for some years. Neither the quantity nor time of application nor condition of the soil was remembered. In an experiment of the application of newly slacked lime both upon corn land and the wheat crop, at the rate of five hogsheads or twenty-five bushels to the acre upon the alluvial soil of the Deerfield meadows, no effect either beneficial or otherwise was perceived.

2. Gypsum.—In experiments made with gypsum the result has been various. In its application upon grass lands, at the rate of one bushel of finely powdered gypsum to an acre, its beneficial effects have been obvious.

Gypsum, on the sandy plains of Montague, has produced no benefit. In Whately, Gill, Deerfield, and Shelburne, it has been used with great advantage in the hill at planting, with corn and with potatoes. In an experiment made in Gill upon two rows of corn adjoining each other, the row dressed with plaster produced one bushel and a half; of the adjoining row, which received none, the product was only one half a bushel;

in other respects the cultivation was the same. The land, in this case, was a rich unctuous loam and inclined to clay. The effects of gypsum in different parts of the county are variously stated. On Montague Plains, which are almost clear sand, though in some parts strongly marked by iron, and the growth pitch-pine or Norway pine, it is said that no perceptible advantage follows from its application. In South Deerfield, on the opposite side of the river, where the soil is strongly aluminous, the application of plaster proves highly beneficial. One farmer objected to the use of plaster that it increased the stalk of Indian corn without increasing the grain. If it did no more than this—and if it did not diminish the grain or rather prevent its growth, it certainly was not to be complained of. Upon potatoes, when put into the hill at the time of planting at the rate of a small table-spoonful to a hill, its beneficial effects have been repeatedly established; and, as many persons have thought, as well upon the quality as the quantity of the product.

The extraordinary effects of this mineral substance applied as a manure, from its earliest use to the present time, have been matter of just surprize and wonder; and especially when the smallness of the quantity used is considered. The various theories suggested for the solution of its mysterious operation have not been satisfactory. It has not been found to assist in the decomposition either of animal or vegetable substances, but remains inert when applied to them. It is thought to attract moisture from the air; but its obvious tendency is to absorb it, and not give it out for the benefit of plants. It is said by some to act as a stimulus to vegetation. The fact is obvious; but this explanation conveys no meaning beyond the simple fact of its producing an increased growth. In the application of what are called stimulants to the human body the circulations are quickened, the animal heat increased, the brain rendered more active, and the muscular energy invigorated; but no such analogy has been detected between animal and vegetable life as to warrant the application to both of the same terms in the same sense.

"The action of gypsum consists," according to Liebig, "in

its giving a fixed condition to the nitrogen or ammonia which is brought into the soil, and which is indispensable to the nutrition of plants. Water is absolutely necessary to effect the decomposition of gypsum on account of its difficult solubility, (1 part of gypsum requires 400 parts of water for solution) and also to assist in the absorption of the sulphate of ammonia by the plants: hence it happens that the influence of gypsum is not observable on dry fields and meadows. The decomposition of gypsum by carbonate of ammonia does not take place instantaneously; on the contrary it proceeds very gradually, and this explains why the action of gypsum lasts for several years." *

Further inquiries and experiments are necessary in order to establish this theory. Certain plants, such as clover and the vines of potatoes, are found to contain a comparatively large amount of this substance. So far as this fact appears, gypsum would seem to constitute an essential food of the plant in which it is thus found. On the seashore its application seems useless; but its efficiency may be neutralized by the highly saline atmosphere which prevails in such situations. In the interior it operates effectually upon some soils, while in the immediate vicinity it may be unavailing. This would seem to imply that its efficiency has a relation to the particular character of the soil. On this subject we are still greatly in want of more light. One point at present seems to be established,—that the particular soils or places where it will operate well are to be ascertained only by actual trial; but this is not to be regarded as a hardship, since the expense of such experiments need be only very trifling. Such experiments, conducted with observation and care, are exceedingly desirable. Where it operates well, no cheaper manure and none more easily applied can be found.—It was at one time supposed that, by the constant application of it year after year to the same land, the productiveness of the land would be diminished, and it would become, as it is termed,

* Liebig's Organic Chemistry, Webster's edit. p. 144.

plaster-sick. But this is mere prejudice. Other causes, entirely distinct from the effects of the plaster, operate, in such cases, to abate the fertility of the soil. The land most probably in such cases requires cultivation ; or a change of crop ; or some manure, either in the form of a green dressing ploughed in or animal manure, applied to it.

3. Wood Ashes.—Wood ashes have been used upon the land in many cases ; and, as reported, always with success. This conforms, it may be said, to almost universal experience. The practice of one of the best farmers in Northfield, and on a limited scale inferior to no one in the State, was peculiar and successful. On the alluvial meadows after grain, where the stubble was full of clover, in the spring when the clover was dead or decayed, his practice was to turn it in with the plough, and on this ground to plant his Indian corn in hills, putting a small amount of wood ashes and gypsum mixed, in each hill. No barn or animal manure had been applied to the land for years, and his crops of Indian corn averaged from fifty to seventy bushels per acre.

Solomon Reed, of Rowe, speaks strongly of the great benefits arising from the use of leached ashes. The good effects have been apparent eleven years after their application.

Gardner Dickinson, of Conway, applied one bushel of crude ashes per acre to four acres of grass land. The ashes were spread in the spring. The crop was considered as doubled by the application. In Sunderland, Whately, and in various other places, the testimony was equally unanimous and strong in their favor.

4. Clay.—In one or more cases it has been for some time the practice to carry clay on to the mowing land, and after laying it in heaps, when it becomes broken by the frost, to spread it as a top-dressing upon the grass. This has been followed with the best results ; and the application is represented as equal to a dressing of the best barn manure, and in its effects more permanent. The application of a good dressing of clay upon peat lands has, in other parts of the State, been greatly approved, and preferred by some who have used it to any other. A soil

abounding with clay is always favorable to the growth of herdsgrass, which seems to delight in it as the most congenial to its nature.

The practice of many of the farmers in this county is, after planting, or in the autumn, to carry out their manure and leave it in the fields uncovered, to be used in the planting of the next year. No practice is more wasteful or deserves more to be reprobated. Manure, when carried into the field, if not immediately ploughed in, should be covered completely with a thick coat of mould. The enriching gases of the manure, which would otherwise escape into the air, will thus become absorbed by the mould; and this mould itself will be converted into an enriching manure.

5. General Management of Manures.—The subject of manures is among the most important in husbandry. I shall do no injustice to the farmers in Franklin county in saying, that it is not appreciated by them as it should be; nor as it is in many other parts of the State. I do not recollect an instance of a barn cellar on any farm in the county; nor any provision for covering the manure and keeping it excluded from the sun, and rain, and air; nor any attempt at forming a compost heap, and availing themselves of the various materials to be found on almost every farm and by the road-sides, for increasing the stock of manure. The butt stalks of Indian corn, after being browsed by cattle, are usually left to perish in the field. I have already referred to the practice of ploughing in the stalks of the broom-corn in the spring, instead of carrying them into the barn-yard, where they would be broken up by the treading of the cattle, and saturated with the rich liquids of the manure heap, and be thus brought into a condition much more favorable to be applied to the crops. I am not disposed to deny a considerable advantage to the land from ploughing in what remains of the broom stalks, or from the ashes which come from burning them on the ground, as is the practice of some persons; but there is reason to think that this advantage is small compared with what would be derived from carrying

them into the barn-yard for the absorption of the urine and increase of the compost heap. No husbandry can be eminently successful, or be considered as improved husbandry, without the most devoted attention to the increase of the manure heap. Manure, if not, as some choose to denominate it, the right hand of the farmer, may, if so homely a comparison is allowable, be considered as one of his legs, without which he must either stand tottering or unsafely upon crutches, or, what is more likely, not stand at all. The practice of constructing a basement story or cellar under a barn, for the reception of the manure, both liquid and solid, cannot be too strongly recommended. The bottom, in such cases, should be hollowed out and puddled with clay, so that it may hold what falls into it. It should be well stored with mould, or mud, or peat, or some other absorbent material to take up the liquid parts of the manure, which are beyond all question the most valuable parts of it. This mould or mud should be applied at successive times, as the manure is thrown in, so that the manure and absorbents may be interspersed like the leaves of a book, unless where the better practice prevails of keeping those useful laborers the store hogs in the cellar, who, in their philosophical turn of mind, are accustomed to deep investigations and generally go to the root of matters, and will therefore save the farmer the trouble of compounding these materials. If we would keep our manure from evaporation, and preserve not only its quantity but its strength, we cannot too effectually exclude the sun and air. The advantages to be derived from such provision for saving and composting manures, are a fourfold compensation for the expense of making it. A good farmer ought to regard it equally needful as a barn for his hay or a cellar for his potatoes. There is another advantage in the case which deserves consideration. Where such manure cellar is well walled or banked at the north, the manure, being to some extent secured from frost, may be much more early worked in the spring; and in this way, in some cases, considerable and most valuable time may be saved. Too much stress cannot be laid upon this point.

We cannot in any respect contravene the laws of nature. In that unbroken chain of mutual use and dependence, which pervades universal nature, the fertility of the earth can be maintained only by a return to it, in an altered form, of its own products. In a region like the county of Franklin, where there are no extraordinary resources for manure, either vegetable or mineral, the more pains and vigilance are required in husbanding what they have. The manure heap must be considered as the gold mine of the farmer.

In planting Indian and broom corn, the manure is usually applied in the hill. This is not the best mode of application, but is adopted with a view to making it go farther, a less quantity being required when placed in the hill than when applied broadcast over the field. The manure is almost always applied to the first crop in the rotation; and usually at the rate of eight or ten buck-loads to the acre; a buck-load being considered as about forty bushels. No great exactness, however, prevails in any case.*

XIV. Rotation of Crops.—I have alluded to the rotation of crops, a matter which perhaps I should have sooner touched upon. Little of what may be called systematic husbandry prevails in any part of Massachusetts; and the crops which are cultivated, and the manner in which they succeed each other, are rather dictated by accident or convenience than by any well-considered principles of vegetation. Experience has long since demonstrated that the same vegetable cannot be advantageously cultivated, year after year without interruption, upon the same land; that in order to the largest product there must be a change of crop, or the land must be suffered for a year or more to lie in fallow. It has been found that some crops may be repeated oftener than others; and that some cannot be cultivated on the same land oftener than once in five or even twelve years, while others require an interval of only two or three. It is found, likewise, that, although in many cases the replen-

* Appendix, C.

ishing of the soil annually with manure will keep up its fertility, or permit the continued repetition of the same crop for a considerable length of time, yet in other cases the application of the ordinary manures, in any quantity, will avail nothing to the renovation of the productiveness of the land without rest, or without a change of crop, when, after awhile, the first crop may again be resorted to.

The occasion of this obviously lies in the soil. The atmospheric influences are the same, and no change of seed has been found to remedy the evil. Two causes have been assigned for a fact better attested than understood. In the first case it is supposed that the soil, by certain plants, becomes exhausted of the peculiar element necessary to the perfection of that kind of plants, but retains all that is sufficient for another class; in the second place, it is supposed that, as with animals, so plants excrete, or throw off from their roots those portions of the food they receive, which they cannot assimilate; and the soil becoming, by cultivation, filled with these excretions, the same crop being renewed is, if it consumes them, poisoned by them, or otherwise it fails to find the nourishment which it requires. Nor can the crop be repeated with advantage until these excretions become dissolved or decomposed, and again incorporated into the soil. Both these suppositions are compatible with each other, and may operate at the same time. Chemical analysis has determined, as analogy would lead us to believe, that different plants are composed of different elements, and these too in various proportions; and observation equally shows that that which, in the process of digestion or assimilation, has been excreted by an animal or plant cannot, without change, be made again to contribute to the nourishment of the same animal or plant.

It is obvious, likewise, as suggested by a profound observer, that the excretions or excrements of plants may be of two kinds. Plants, it is a well-established fact, are liable to take up by their roots whatever is in their vicinity in a soluble state, the process of absorption being, in this case, purely mechanical,

or the result of what is called capillary attraction. A plant, a portion of whose roots were placed in lead water, or water in which lead was suspended or dissolved, has been ascertained to absorb a portion of it, which, being incapable of assimilation by the vital process, has been afterwards excreted from the roots of the plant. It is evident then that growing plants may take up matters from the soil which are not congenial to them, which are not altered by the vital action, and which, consequently, must be again thrown off. Now these particular substances, though not congenial to the plants then growing, may yet constitute the natural and proper food of another class, which consequently will flourish in succession to them. There is another species of excretions, which are properly the result of the vital action. The substances of which the vegetable organism consists, such as sugar, starch, gluten, albumen, are never found in the soil in a formed or crude state; or, if artificially presented to the plant, will either not be absorbed by it; or, if absorbed by it, will prove injurious or fatal to it, as the blood of one animal transferred to the veins of another, but they are the products of vital action in the plant upon the food presented to it. But as in the animal so also in the vegetable life, that portion of what has been received, which, after having passed through the digestive process, is incapable of being assimilated, will be excreted or passed off by the natural organs. But it is obvious that this species of excretions is incapable, in an unaltered state, of going to the nourishment of any vegetable substance. By the operation of light and moisture and air, assisted by the stirring of the ground, this presently becomes converted into humus, or the enriching mould of the soil.

But besides these effects of the cultivation of the soil in the growth of plants, the earth becomes exhausted of particular elements, which are essential to their growth, and form a substantial part of them, and which are carried off from the soil in the form of seeds, or hay, or straw, or vegetables. These are alkaline substances, such as potash, soda, and the phosphate and carbonate of lime. These are found in very minute quan-

tities,—in some plants more than in others; but are to almost all, in a certain measure, absolutely essential. Now these may be artificially supplied, either in a crude form or in combination with other substances; or they will be gradually supplied by the disintegration or waste of the rocks, under the common influences of the elements, where the soil is suffered to lie at rest or fallow.

These general principles, appertaining to the art of culture, suggest the reasons for a rotation or change of crops. The custom formerly was, to recruit the soil by suffering it to remain idle, or, as it is termed, fallow and unused. An improved husbandry has discovered that this is not necessary; but as different crops require different elements or take different substances from the soil, it is only necessary to substitute such a crop as does not demand what the crop immediately preceding has taken, and thus the land, without injury or impoverishment, under a judicious rotation, may be kept under a continual cultivation.

The rotation of crops in Franklin county is very limited, as the crops cultivated are few. In Buckland, the first year the land is broken up corn is planted and manured; the second year, oats are sowed without manure, and the land laid down to grass. It is continued in grass five years and then broken up, and the same course repeated. The first year of grass the produce is about two tons per acre, and when it yields not more than fifteen hundred pounds it is considered proper to break it up again. In Shelburne, on one of the best farms in the State, the course is, first year, Indian corn on green-sward, manured; second year, spring wheat, and laid down to grass;—the grass seed sowed with the wheat; one peck of herdsgrass and one of red-top to the acre. The land remains in grass ordinarily five years. The average yield of grass is estimated at three tons to the acre, which I think must be an over estimate, and the cost of getting the hay at two dollars per ton. For spring wheat, in the second year of the course is sometimes substituted, rye, or oats, or oats and pease, or oats and wheat.

In Whately, first year, Indian corn; second year, oats, and laid down with herds grass and clover, and remains in grass three years.

On much of the meadow land in Deerfield, the first year the land is in corn; the succeeding year pease and oats, and so on continually. The corn is manured in the hill. The land, after the corn is gathered, is sometimes sown with winter rye.

In some parts of Deerfield, the usual rotation is, first year, corn, usually manured in the hill; the second year, spring wheat, or wheat and oats, or pease and oats, or rye with southern clover; third year, clover; and then plough again.

The best farmers universally advise to sow the southern or June clover with grain, to be ploughed in with the stubble where the land is not to remain in grass, with a view to enrich the land. If the grain is winter grain, the clover is usually sown in the spring before the snow has left the ground, at the rate of a bushel of clover chaff or clover seed not cleaned, or else at the rate of six or seven pounds of cleaned seed. One of the most experienced farmers in the town has been accustomed to sow rye and clover together on the same land for a succession of years; in which case the clover and stubble were always ploughed in together for the purpose of enriching the land for the succeeding crop, and in this process he states that the condition of the land was continually growing better. The crops, however, at best were not large.

I think proper here to mention the statement of another farmer, a man of much intelligence and experience, in confirmation of the experience of two other farmers referred to in a former report, that it is much better that the clover should be withered or dead when it is ploughed in rather than in a green or succulent state.

In some instances, as in Sunderland for example, broom corn is repeated several years in succession on the same land, and, as it is stated, without a diminution of product. In these cases, the crop is manured in the hill every year; and the corn stalks, after the brush is gathered, are burnt upon the land.

Potatoes have no determined place in any rotation. They are not frequently taken upon sward land broken up, although this is sometimes the case; in general they follow corn and are commonly manured in the hill with the coarsest manure which the barn-yard affords. Turnips are frequently sown among Indian corn at the last hoeing, and in this way one hundred bushels or more are in many cases obtained to the acre. With the exception of potatoes, no succulent vegetables are cultivated to any extent excepting for family use. I cannot have a doubt that the farmers in Franklin county would find a great advantage in going extensively into the cultivation of turnips, ruta-baga, mangel-wurtzel, sugar-beet, and especially carrots and parsnips, for their store, milking, and fatting stock; and that these will presently find their place in a judicious rotation of crops. The farmers would soon perceive the advantage in their manure heaps; as there are no means by which so much valuable manure can be made, where there is plenty of straw or of other substances to litter the yards as absorbents, as by the free use of succulent vegetables. There cannot be a question likewise that the health of every kind of live stock would be greatly promoted by the occasional or daily use of succulent vegetables, even in small quantities, instead of keeping them, through our long winters, wholly upon dry fodder. I have mentioned above parsnips, as among the vegetables which might be advantageously cultivated for stock. I know no case in which this has been done to any considerable extent, though practised and greatly approved on the islands of Guernsey and Jersey in Great Britain. An experiment on a small scale has fully satisfied me that no feed will more increase and enrich the milk of milch cows, or conduce more to the thrift of fatting animals. They are of very easy cultivation; the seed is of trifling expense; they are not known to be subject to the depredations of any insect; they may be as well sown in the autumn as the spring, which would be in many cases matter of great convenience; and they may be left in the ground, where it might be expedient, to be taken out in the spring as the cattle

might require them, and at a season when such feed is particularly desirable. The great objection to them, the difficulty of getting them out of the ground, may be in a great measure obviated by sowing them on ridges, so that when they are to be raised, by passing a plough near them the roots will be so much uncovered that they may be drawn out by the hand. Whether they gain or lose anything in nutritiousness by remaining in the ground, chemical analysis, or experiments in the use of them, must determine. There is no vegetable within my knowledge of which cattle seem more fond.

In English husbandry, the cultivation of vegetables for stock makes an essential element. Labor, with the English, is much cheaper than with us; and their cultivation is much more exact and minute than our habits would permit us to submit to. But especially, they have not our Indian corn, one of the richest vegetable products which the earth yields; which is so simple and easy of cultivation and likewise of appropriation, and at the same time, under the best culture, yields so large an amount of the most nutritious food for man and beast, and where its produce is well managed returns so much to the soil, that it is extremely difficult to persuade our farmers that any substitute is to be preferred to it.

XV. Particular Results.—Facts are in general so interesting and so important, that I am always desirous of recording them, leaving it to others to make such inferences from them as they may deem proper. My principal solicitude is, that they should be well attested, and of such a character as to suggest useful instruction to others. They are the only infallible teachers and their lessons cannot be controverted. It may be safely asserted that there is nothing which has been done which cannot be done again; and under the same circumstances and influences, the same results will follow. These established truths render facts of so much importance, and make them the safest of all teachers.

Example 1.—Management of seven and a half acres of land

in Northfield. The land is alluvial; of good quality; on the banks of the Connecticut.

In 1828, the land was leased; the proprietor to furnish fifty buck-loads of manure from his barn-yard; and to receive, as rent of the land, half of the whole product. He received half the top stalks, all the bottom stalks, and twenty-five bushels of corn per acre.

In 1829, the land was leased on the same terms, and he received as above the coarse fodder, and twenty-two and a half bushels of corn.

In 1830, the proprietor leased it for broom corn, and stipulated to deliver on the ground six loads of manure to the acre. The brush, prepared for market, one half the crop, which he received as rent, amounted to twenty-seven dollars per acre; price at which the brush sold in this case not ascertained.

In 1831, he leased it again for broom corn, delivering upon the land six loads of manure to the acre, at a cash rent of sixteen dollars per acre.

In 1832, without manure, he sowed it with oats, and obtained from thirty-three to thirty-five bushels to the acre, which he sold at forty-two cents per bushel.

In 1833, without manure, he obtained an average yield of twenty bushels of sound wheat to the acre, valued at one dollar fifty to one dollar seventy-five cents per bushel.

The land was valued at sixty dollars per acre; at which price, at that time, land of the same quality in the immediate vicinity was sold.

Summary per Acre.

In 1828, 25 bushels of Indian corn, at 75 cts. per bush.	18	75
" 1829, 22½ do. do. do	16	87½
" 1830, returns from broom corn sold, . .	27	00
" 1831, rent of land in cash, ...	16	00
" 1832, 24 bushels of oats, at 42 cents per bushel,	10	08
" 1833, 20 do. of wheat, at $1 50 cents, .	30	00
	118	70½
Six years' interest upon 60 dollars, price per acre,	21	60
Net profit of six years upon each acre, . .	$97	10½

The manure was furnished on the farm, and the stalks and straw may be considered as a full equivalent for the manure, seed and threshing.

2. Produce of three and a half acres of land in Deerfield-street, in 1833.

Hay, 3½ tons, at 12 dollars per ton, . . .	42 00
Winter wheat, 11 bushels, at $1 50 cents per bushel,	16 50
Stubble and clover, one ton, at 4 dollars per ton, .	4 00
Corn fodder, three tons, valued at	10 00
Indian corn, one hundred and twenty bush. at 80 cts.	96 00
Potatoes, one hundred and seventeen bush. at 20 cts.	23 40
Apples, sixty bushels, at twelve and a half cents per bushel, ...	7 50
Pumpkins, one cart-load, ...	0 00
	$199 40

3. I give, in the subjoined case, the actual expenses of cultivating several lots of land on the same farm the same year, with the returns. The expenses include every thing until the delivery of crops in the barn, with the exception of threshing the grain, and the interest upon the value of the land. I have myself affixed the value of the crops, as nearly as I could ascertain it at the prices then current in the county.

1. Four acres and 106 rods in Indian corn.

Whole expenses of cultivation, ...			$90 83
Returns. 352 bush. of corn, at 75 cents,	264 00		
Corn fodder, ten tons, at 4 dollars,	40 00		
			304 00

2. Three and a half acres in corn.

Whole expenses of cultivation, ...			109 75
Returns. Corn, 236½ bushels, at 75 cents per bushel, ...	177	37½	
Fodder, 9 tons, at 4 dollars, .	36	00	
			213 37½

In the former case, gypsum and ashes only were used, charged at $5 50 cents; in the latter case, 35 loads of barn-manure were used, charged at one dollar per load.

3. Five acres in oats.

Expenses of cultivation and seed, ...			35 50
Returns. 280 bushels oats, at 42 cents, .	117 60		
Straw, say four tons, at 3 dollars,	12 00		
			129 60

4. Five acres in rye.

Expenses and seed, ...			21 50
Returns. 60 bushels, at one dollar per bushel,	60 00		
Straw, say four tons, at 3 dollars,	12 00		
			72 00

5. Two and a half acres in winter wheat.

Expenses and seed, ...			13 75
Returns. 20 bushels wheat, at $1 50, .	30 00		
Straw, two tons, at 3 dollars, .	6 00		
			36 00

6. Two and three fourths acres in spring wheat.

Expenses of cultivation and seed, ...			15 58
Returns. 38 bushels of wheat, at $1 50 cents per bushel, . . .	57 00		
2 tons of straw, at 3 dollars, .	6 00		
			63 00

7. Fourteen acres in grass, home lot.

Expenses of getting two crops, in both 45 tons, .			65 00
Forty-five tons of hay, at 8 dollars per ton, . .			360 00

8. Seven and a half acres in grass, in meadow.

Expenses of getting the hay, 15 tons, . . .			20 75
Value of the hay, 15 tons, at 8 dollars, . . .			120 00

The foregoing may be considered as examples of extraordinary success. I give them as such. They are examples of extraordinary success and extraordinary skill and good management. The success is the result of the good management. The good management others can command; and consequently

the same results are within their power. Men pretend that there is a great deal of "good luck" in these cases. There is very little of what may be termed good or bad luck in this world's affairs, and these terms are mainly used to soothe a conscience troubled with a sense of its own recklessness, negligence or indolence.

XVI. Reports of Farms.—I shall now give several returns of particular farms in the county, selected promiscuously and with a view to present the average results.

1. Sunderland.—Acres, 152. Of these, 30 are in wood; 30 in pasturage; 10 waste.

Products.

English hay,	25 tons.	Beef fatted,	3000 lbs.
Fresh meadow hay,	20 "	Pork,	1400 "
Wheat,	10 bush.	Butter,	300 "
Indian corn,	250 "	New milk cheese,	500 "
Rye,	150 "	Wool,	100 "
Potatoes,	200 "	Maple sugar,	100 "
Winter apples,	30 "	Cider,	15 bls.
Broom corn,	2000 lbs.	Wood used,	20 cds.
Straw,	5 tons.	Manure made,	100 "
Corn fodder,	5 "		

The stock on the farm consists of 1 horse, 4 oxen, 5 cows, 30 sheep, 4 swine, 12 young neat stock.

The soil is loamy, dry and level. The English mowing consists of 15 acres. The manure bought, 5 cords.

The amount of labor is not given. The cost of man's labor by the year, board included, is 216 dollars; per month, 22 dollars; per day, one dollar. The price of board of man, per week, is rated at $1 75 cents.

Broom corn is deemed the most profitable crop. The expense of cultivating an acre of Indian corn is rated at 14 dollars; of wheat, $7 50; of oats, $4 00; of rye, $5 50; of potatoes, $15 50; estimating man's labor at one dollar per day, and a yoke of cattle the same.

The value of land is, mowing, $50 per acre; pasture, $20; woodland in pine, $30; in hard wood fit to be cut, $50.

Average weight of hogs fatted, at 18 months old, 350 lbs.

2. Ashfield.—Acres, 88½. Tillage, 3; English mowing, 10; pasture, 60; wood, 12; waste, 3. Soil described as loamy, sandy, dry and hilly.

Stock—1 horse, 7 cows, 12 sheep, 5 swine, 4 young neat cattle.

Products.

English hay,	15 tons.	Pork,	930 lbs.
Fresh meadow hay,	10 "	Butter,	950 "
Indian corn,	30 bush.	Wool,	50 "
Buckwheat,	20 "	Maple sugar,	100 "
Potatoes,	30 "	Corn fodder,	1 ton.
Beets,	25 "	Wood used,	12 cds.
Swedish turnips,	50 "	Wood sold,	72 "

The value of land per acre given here, is, mowing, $25; pasturage, $15; land in hard wood, fit to be cut, $30.

The sales from this farm in 1838 amounted to $350; the value of produce used, or on hand at the time of the return, to $381 50.

The cost of labor amounted, at one dollar per day, to $250.

This farming is on a small scale, but it seems proper to give well-attested examples of every description.

3. Heath.—Acres, 110. In tillage, 6; English mowing, 20; pasturage, 70; wood, 10. The soil is described as loamy and hilly.

The stock—horses, 2; cows, 4; sheep, 250; swine, 4; colts, 2.

Products.

English hay, 2¼ tons per acre,	45 tons.
Wheat,	20 bush.
Indian corn,	20 "

Oats,			200 bush.
Potatoes,			1000 "
Swedish turnips,			20 "
Flat turnips,			20 "
Pork,	1200 lbs., sold for		$120 00
Butter,	400 " "		66 67
New milk cheese,	400 " "		28 00
Wool,	900 " "		675 00
Cider,	10 bls. "		10 00
Winter apples,	20 bush. "		5 00
Manure made,	500 loads.		
Wood used,	50 cords.		

The sheep are described as a mixed race of Saxony and merino blood, and the average yield of wool as 3 lbs. 10 oz. This, presuming that it was well washed, is an extraordinary yield. The size of the loads of manure is not given; we can only infer it from the facts that the team was light, the land hilly, and the number unusually large.

The whole amount of sales reached $1075. Value of produce used or reserved, $200. The cost of labor, $200.

Man's labor, board included, is rated at per year, $200; per month, $17; per day, 75 cents. Board of man at $1 50 cents per week.

This farmer states that five acres of his land produces annually an average of four tons of hay to the acre at one cutting. The situation of the land is not given. He mentions a farmer in his neighborhood having produced, the current year, from seven cows and one two-year old heifer, which calved in June, 2150 lbs. of new milk cheese and 725 lbs. of butter.

4. Conway.—Acres, 145. Of tillage, 25; English mowing, 25; pasture, 65; in wood, 30; waste, 5 acres.

The soil is represented as loamy, gravelly, dry and hilly. The hills in Conway furnish some of the best pasturage in the county; and the character of the soil, wherever capable of tillage, is very good.

Products.

Eng. hay,	1¼ tons pr ac. 40 tons.	Beef fatted,	7000 lbs.
Wheat,	18 bus. " 14 bus.	Pork "	1000 "
Ind. corn,	30 " " 75 "	Butter,	400 "
Rye,	30 " " 30 "	New milk cheese,	600 "
Barley,	40 " " 50 "	Skim milk cheese,	200 "
Beans,	3 "	Wool,	100 "
Potatoes,	250 " " 250 "	Maple sugar,	400 "
Beets,	110 "	Cider,	10 bls.
Carrots,	1 "	Winter apples,	30 "
Turnips,	10 "	Straw,	2 tons.
Swedish turnips,	20 "	Corn fodder,	3 "
Broom corn,	100 lbs.	Manure made,	100 loads.
Hops,	5 "		

The live stock on the farm consists of, horse, 1; oxen, 6; cows, 3; sheep, 30; swine, 5; young neat stock, 10.

Amount of produce sold in 1838, $630; amount used or on hand when the return was given, $689; cost of labor, $220; incidental expenses, $150. The poultry sold amounts to $15 yearly.

The cost of cultivating an acre of Indian corn is estimated at $24; of oats, at $12; of rye, at $13; of potatoes, at $30. The price of man's labor, besides board, $150 per year; $14 per month; $1 per day. Man's board is rated at $2 per week.

The value of tillage and mowing land is set down at $40 per acre; of pasture, $25; of woodland in pine, $20, in hard wood, fit to be cut, $30; of hard wood per cord, $2 50; pine do. $1 50; merchantable pine boards per M. $10; charcoal, 6 cts. per bushel.

The average yield of a cow in milk is 800 gallons; in butter, 200 lbs.; in new milk cheese, 300 lbs. Average weight of a hog fatted at 18 months old, is 400 lbs. Average yield of a sheep—native, 3 lbs.; merino, 2½ lbs.

For tillage land this farmer uses about ten loads of manure per acre; and for grass, about fifteen loads, spread on in the

fall. He speaks of having derived great advantage from spreading leached ashes on grass, and on spring grain after it is up; and in the hill, mixed with good manure, for corn and potatoes.

He deems himself, in respect to crops, most successful in the cultivation of rye, for which his practice is to turn over green-sward in June; in August, drag and cross-plough the land; and, about the first of September, sow about one bushel to the acre. He thinks that his grass land and the raising of live stock yield him the largest profit. He has found great advantages in raising early lambs for market, having the most comfortable quarters for the ewes, which yean early.

The management of this farm is excellent; and if a general rule did not forbid, I should certainly pay my respects to this farmer by name. His buildings are not expensive but exceedingly well contrived; and every part of his premises, as well as the live stock under his care, show an exact order and carefulness.

5. Shelburne.—Acres, 130. In tillage, 6; English mowing, 15; wet meadow, 10; pasture, 65; wood, 31. The soil clayey, dry and uneven.

The stock—horse, 1; oxen, 2; cows, 6; sheep, 40; swine, 7; young cattle, 6.

Products.

English hay, .	30 tons.	Pork, . . .	900 lbs.
Fresh meadow hay,	10 "	Butter, . . .	469 "
Wheat, 25 bush. pr acr.	40 bush.	Skim milk cheese,	600 "
Corn, 50 " "	80 "	Wool, . . .	120 "
Potatoes, . .	200 "	Winter apples, .	150 bu.

The amount of sales in 1838 was $600; value of produce used and on hand, $500. The expense of labor was $400.

The proprietor mentions that, in cultivating wheat, the seed is washed and soaked. At sowing, he turns off the brine and mixes with it as much lime as will adhere to the kernel. His wheat is sown on the land on which he had corn the preceding year, and is merely dragged or harrowed in the last of April.

After the wheat is up, he spreads upon the crop about 20 bushels of ashes to the acre. In this way his success has been very good.

6. Shelburne.—Acres, 285, exclusive of woodland.

Rotation of crops.—First year, corn; second year, wheat, oats or barley, and stocked down with grass seed. The land remains in grass usually six years. The grass seed is usually sowed with the spring grain, at the rate of twelve quarts of herdsgrass and redtop to the acre. Spring wheat is sowed at the rate of two bushels to the acre. Of rye, three pecks of seed are sowed to the acre.

Plaster is applied as a top-dressing on all the stiff loams. The moist grass land, which is unsuitable for tillage, is dressed with barn and compost manure once in three or four years,—about 20 or 25 loads to the acre.

Twelve to fifteen acres of this farm are usually in tillage. Eight to ten loads of manure to the acre are applied when Indian corn is manured in the hill; and from twenty to twenty-five loads when it is spread.

Greensward, for planting, is usually turned over in April. Twenty or twenty-four loads of manure are spread and harrowed in; but care is taken not to disturb the sod during the cultivation.

The mowing land consists of 36 acres upland, and the average crop exceeds two tons to the acre. Six acres of the mowing land are occasionally irrigated. The crop and the quality of the hay are greatly improved by this process. There are mowed, likewise, eight or nine acres of low land, averaging two tons of English hay to the acre. Five acres were planted in corn. One and a half acre planted on oat stubble; the stubble was turned under in August; the land ploughed again in the spring. Ten loads of well-rotted manure were put in the hill. The crop was 86 bushels of corn.

Another piece in greensward was turned over in April, containing one acre and twenty-five rods. Twenty-five loads of

green yard manure were spread and harrowed in lightly. Nine loads of well-rotted manure to the acre were put in the hill. It produced 116 bushels of corn, averaging 100 bushels and 10 quarts per acre. Another piece of worn land, about the same size, produced 84 bushels of corn.

Another piece, containing a few rods over an acre of pasture land which had never been manured, was turned over a little while before planting, harrowed lightly, and ten loads of green stable manure put in the hill. The produce was 67 bushels of corn.

This farmer's whole crop, of which he was kind enough to keep an exact account for me, averaged 70 bushels and 6 qts. per acre. The corn was planted in hills three feet apart each way; four stalks were allowed to stand in a hill. The seed was planted without preparation. The corn was hoed three times, and a cultivator used each time.

Two and a quarter acres were in potatoes, on greensward ploughed in May. Ten loads of green manure were put in the hill. The season was unfavorable for potatoes, and the yield only 250 bushels. On a part of the potatoe lands, prepared as above, a third of a gill of gypsum was dropped on the manure upon the seed. Two rows in this same piece were left without plaster. The effect was, that the two rows without plaster did not produce half as much as the adjoining rows with plaster. The soil here was a stiff loam; and this farmer is of opinion that plaster has little if any beneficial effect on a light loam.

The stock on this farm is—oxen, 14; cows, and heifers that brought calves, 8; young stock, 23; horses, 3; colts, 2; sheep, 8; hogs, 14.

The calves are taken from the cow at three days old and taught to drink milk; kept on new milk four weeks; and then skimmed milk will answer, if half a gill of rye or oil meal be added to two quarts of milk. They are weaned at twelve weeks old.

Five calves were raised. Seven hundred lbs. of butter and

five hundred lbs. of new milk cheese (exclusive of the free use of milk in a large family) were made.

The quantity of pork fatted was 3600 lbs. The swine are a mixture of the Byfield breed.

The swine run in the pasture in summer, and are fed with the slops from the house and dairy. The fatting is commenced with apples and potatoes boiled together, in the proportion of one-third apples and two-thirds potatoes. After being well boiled, about ten or twelve quarts of Indian or mixed meal is added to a barrel. For four or five weeks before killing, the hogs are fed with a clear provender of meal.

The labor employed consists of three men in winter, with some extra help in the haying season. Wages from ten to twelve dollars per month by the year ; eighteen or twenty dollars per month in the season of haying and harvesting, besides board.

7. Bernardston.—Acres, 300. In tillage, 10; English mowing, 20; wet meadow, 3; pasture, 100; wood, 75; waste, 90.

Live stock—horses, 2; oxen, 4; cows, 7; sheep, 120; swine, 11 ; young neat cattle, 9.

Products.

English hay,	37 tons.	Beef,	1100 lbs.
Fresh meadow hay,	3 "	Pork,	2100 "
Wheat,	32 bush.	Butter,	600 "
Indian corn,	100 "	New milk cheese,	100 "
Rye,	75 "	Wool,	250 "
Oats,	80 "	Honey,	160 "
Potatoes,	150 "	Maple sugar,	100 "
Swedish turnips,	270 "	Cider,	50 bls.
Winter apples,	12 bls.	Wood used,	40 cds.
Straw,	10 tons.	Manure made,	40 "
Corn fodder,	6 "		

Value of produce used or on hand, $1266. Cost of labor, $675. Incidental expenses, $75.

The expense of cultivating an acre of Indian corn is put down at $25; of wheat, at $10; of oats, at $5; of barley, at $8; of potatoes, at $20; of ruta baga, at $20.

The expense of man's labor by the year, board included, is estimated at $225; per month, at $18 50; per day, at $1. The price of board is estimated at $1 50 weekly.

The value of tillage and mowing land is rated at $50 per acre; of pasture, at $20; of land in hard wood fit to be cut, $15.

The average yield of a merino sheep or Saxon merino is three pounds; of a cow in butter, 100 lbs. The weight of a hog fatted at 18 months old is 350 lbs.

The item of labor, in this account, makes a large figure. I am not aware of the particular causes, which render the charge so heavy. It will be obvious to every candid mind that, for many of these accounts, we must claim an indulgent judgment. Few farmers keep any accounts whatever. Those who do keep them, and are very competent to instruct the community, suffer their modesty or diffidence to overbalance the claims of the public good, which might be essentially served by the exhibition of faithful and exact accounts. In some cases, even in New England, farmers are not capable of keeping any orderly accounts; and to attempt to arrange their miscellaneous memoranda is like trying to find your way in a dark night through a dense forest where there is no path and there are no blazed trees. Even a lanthorn, in such cases, is of little value. By mere chance you may get through; but you are most likely to be "brought up standing" or to be sloughed. I mean no disrespect to the farmers, whose improvement as a class of men I desire above that of every other. But I want the opportunity to say that this is the fault of our public schools, where the systematic keeping of accounts is seldom taught, but where book-keeping both by double and single entry, for females as well as males, should be an established and indispensable branch of education. It would prove of rather more practical importance than to be able to work embroidery and paint artificial flowers; to understand the geography of the moon and learn

from a wood-cut all its continents and volcanoes; or to be able, in answer to printed questions, to inform us how the Esquimaux clothe themselves in the skin of the white bear and the Kamschatkians grow fat upon blubber and train-oil.

It is to be added, that agricultural operations seldom admit of that exactness of account which belongs to mercantile transactions; and that it is, in most cases, only an approximation to accuracy which can be expected. The importance of this subject to the farmers cannot be overstated and should not be overlooked. Farmers cannot be too strongly urged to keep exact and faithful accounts with their farms, their animals, and every crop which they raise. It would immensely assist the improvement of their farms and their own personal comfort and self-respect. It would enable them to decide intelligently and with confidence what they had best cultivate and what avoid. It would reveal to them their true condition, the knowledge of which is essential to their safety, and sometimes save them from embarrassment, mortgages, bankruptcy and ruin. Accurate accounts of expenses, capital employed, labor applied, seeds, utensils, improvements, products and final results, are as important in agricultural as in mercantile transactions.

8. Bernardston.—Acres 300. Of tillage, 15; English mowing, 36; pasture, 100; in wood, 75; waste, 75. Soil characterized as loamy, clayey, gravelly, and hilly.

The live stock comprises—horse, 1; oxen, 4; cows, 5; sheep, 300; swine, 18; young neat stock, 9.

Products.

Eng. hay, 1½ ton pr acr.	55 tons.	Beef fatted,	700 lbs.
Wheat,	12 bus.	Pork "	1500 "
Ind. corn, 40 bus. "	200 "	Wool,	800 "
Rye, 10 " "	43 "	Cider,	30 bls.
Oats, 35 " "	100 "	Straw,	8 tons.
Buckwheat,	40 "	Corn fodder,	8 "
Potatoes, 67 " "	200 "	Wood used,	25 cords.
Rut. bag. 575 " "	360 "	Manure made,	100 "
Winter apples,	20 bls.		

The value of produce used or on hand is $2100. The cost of labor, $300. Incidental expenses, $150.

The price of labor (board included) per year, is rated at $225; per month, $18; per day, $1. The price of board is $1 50 cents per week.

The expense of cultivating an acre of corn is rated at $25; of wheat, at $10; of oats, at $5; of rye, at $8; of potatoes, at $20; of ruta baga, at $20.

Average weight of a hog, at 18 months old, is 350 lbs. Average yield of a merino sheep, 3 lbs.

9. Bernardston.—Acres, 515. In tillage, 12; English mowing, 50; pasture, 150; wood, 200; waste, 100 acres.

Live stock—horses, 2; oxen, 6; cows, 6; sheep, 450; swine, 8; young neat stock, 19.

Products.

English hay,	75 tons.	Beef,	2500 lbs.
Fresh meadow hay,	10 "	Pork,	2000 "
Wheat,	12 bush.	Butter,	500 "
Indian corn,	200 "	New milk cheese,	340 "
Buckwheat,	25 "	Wool,	1250 "
Potatoes,	300 "	Maple sugar,	200 "
Swedish turnips,	100 "	Cider,	18 bls.
Straw,	4 tons.	Winter apples,	33 bush.
Corn fodder,	5 "	Wood used,	25 cords.
Manure made,	150 cds.		

Value of tillage and mowing land per acre, $50; pasture, $20; woodland in pine, $10; in hard wood fit to be cut, $20

Average yield of wool to a sheep, per year, Saxon merino, 3 lbs.

10. Northfield.—Acres, 150½. In tillage, 24; English mowing, 21½; pasture, 45; wood, 60; soil loamy; the tillage land chiefly alluvial.

Stock—horses, 2; cows, 2; swine, 3; oxen, 29, with a view to stall-feeding.

Products.

English hay, .	60 tons.	Potatoes, . .	32 bush.
Wheat, . .	58 bush.	Winter apples, .	200 "
Indian corn, .	588 "	Straw, . .	18 tons.
Rye, . . .	60 "	Corn fodder, .	19 "
Oats, . . .	280 "	Wood used, .	25 cords.

The amount of sales from this farm is not given; the produce was mainly consumed in the fattening of beef cattle, which were usually purchased in the autumn and sold at Brighton in the spring. By this process, as the farmer expressed it, he usually doubled his money. But the result in such cases must depend on various circumstances; as the rate at which the cattle were purchased; the length of time they were fed; the amount consumed; and the condition of the markets when they were to be sold.

This farmer, whose whole management was exceedingly judicious and careful, was in the habit of sowing clover with his wheat; and after mowing it one year, and sometimes when in stubble, ploughing in the clover after it became dead, planting corn on this land without other manure than a small amount of gypsum and ashes mixed and put in each hill. His corn crops, planted three feet apart by two and a half, averaged a yield of seventy-five bushels to the acre. His yard manure, in such cases, was applied to his grass land as a top-dressing.

I might extend such examples; but those which I have presented will give fair specimens of the general management in the county. I shall leave it to the careful reader to make such remarks respecting them as may suggest themselves to his own mind,—observing only by the way that, while the yield to an acre is in several cases large (though in none has it nearly reached its maximum), yet in most instances the amount of land cultivated, in proportion to the size of the farm, is small. No one more entirely than myself acquiesces in the position that it is better to cultivate a little land well than to cultivate a great deal poorly or imperfectly; yet it would seem, where profit is

the object, that it is advisable to extend the cultivation as far as the means of the farmer will allow him to go—this, however, always upon the supposition that the crops which he cultivates pay a profit. This is obviously the case with those crops to which we have referred. In a systematic and improved agriculture the same rules hold as in any branch of trade or art. Where the stock in trade is small, and the attention and labor bestowed upon its management are likewise small, the gains will be proportional. There is this advantage however in agriculture that, although it is not wholly without its risks and uncertainties, under judicious management they are less than in almost any other business whatever.

XVII. Domestic Economy.—In travelling over New England, one is frequently struck with examples of thrift, comfort and humble independence, the direct results of industry, sobriety and frugality, as instructive as they are beautiful. A benevolent mind always contemplates them with unmingled pleasure. They present themselves often in circumstances to ordinary view the most inauspicious. The conditions, which appear most unfriendly to success, seem to constitute the very grounds or occasions of it. The courage is kindled and the resolution strengthened in proportion to the difficulties to be met; and, in a manner the most encouraging to honest labor and strict temperance, they show the power of man, in a high degree, to command his own fortune. Massachusetts is full of these examples. I do not know that they are not as common in other places. It is impossible however that they should exist but in a condition of freedom, where a man has a freehold in the soil; where, unawed either by overgrown wealth or oppressive power, he wears the port and has the spirit of a man; and where, above all things else, he has the voluntary direction of his own powers, and a perfect security in the enjoyment of the fruits of his own toil.

Example 1.—It will not be without its use, if it does no more than present to the imagination a charming picture of ru-

ral comfort and independence, if I refer particularly to one instance which strongly attracted my attention. In one of those beautiful valleys in which the county abounds, where the surrounding hills in June are covered to their summits with the richest herbage and dotted over with the rejoicing herds, at the foot of the hills, near a small stream which here and there spreads itself like a clear mirror encased in a frame of living green, and then at other places forces its gurgling waters through some narrow passes of the rocks, you may find an humble unpainted cottage, with the various appurtenances of sheds and styes and barns around it. Three or four stately trees present themselves in front of it. The door-yard is filled with flowers and shrubs; and the buildings seem to stand in the midst of a flourishing and full-bearing orchard, the trees of which are clothed with living green, with no suckers at their roots, unadorned with the nests of the caterpillar, unscathed by the blight of the canker-worm, and with their bark clean and bright, indicating alike the health of the tree and the care of the proprietor. Every part of the premises exhibits the most exact order and carefulness. No battered axe lies at the wood-pile; no rotten logs, no unhoused sled, no broken wheels, no rusted and pointless plough, encumber the roadway; no growling sow, with her hungry and squealing litter, disputes your entrance into the gate; no snarling dog stands sentry at the door. The extended row of milk-pans are glittering in the sun; and the churn and the pails are scrubbed to a whiteness absolutely without a stain.

The house is as neat within as without; for such results are not seen but where harmony reigns supreme, and a congeniality of taste and purpose and character exists among all the partners in the firm. The kitchen, the dairy, the bedrooms, the parlor, all exhibit the same neatness and order. The spinning wheel, with its corded rolls upon its bench, keeps silence in the corner for a little while during the presence of the guest. The kitchen walls are hung round with the rich ornaments of their own industry—the long tresses and skeins of yarn, the substantial

hosiery of the family, and the home-spun linen, emulating the whiteness of the snow-drift. The floors are carpeted, and the beds are made comfortable, with the produce of their own flocks and fields, all wrought by their own hands. The golden products of the dairy; the transparent sweets of the hive, obtained without robbery or murder; the abundant contributions of the poultry-yard, the garden, and the orchard, load the table with delicious luxuries. There are books for their leisure hours; and there stands too the reverend bass-viol in the corner, constant like its owner to appear at church on Sundays, and kind always to assist in the chant of the daily morning and evening hymn. Better than all this, there are children trained in the good old school of respectful manners, where the words of age, and grey hairs, and superiority, still have a place; enured to early hours and habits of industy, and with a curiosity and thirst for knowledge stimulated the more from a feeling of the restricted means of gratifying it. There is another delightful feature in the picture; the aged grandmother in her chair of state, with a countenance as mild and benignant as a summer evening's twilight; happy in the conviction of duty successfully discharged by training her children in habits of temperance and industry; and receiving, as a kind of household deity, the cheerful tribute from all of reverence and affection.

Some may call this poetry; it is indeed the true poetry of humble rural life, but there is no fiction nor embellishment about it. The picture is only true; and if it were not a violation of the rules which I have prescribed to myself to mention names in such cases, and that I might offend a modesty which I highly respect, I would show my readers the path which leads to the house, and they should look at the original for themselves.

The owner, when I visited him, was forty-five years old.—At twenty-one years old, he was the possessor of only fourteen dollars, and with the blessing only of friends no richer than himself. His whole business has been farming and that only. He married early; and though he did not get a fortune *with* a wife, he got a fortune *in* a wife. They have comforted and

sustained their parents on one side of the house. They have brought up three children; and, with the co-labor of the children, they have given them a substantial and useful education, so that each of them, now of sufficient age, is capable of keeping a good school, as they have done, with a view to assist their own education. He began with thirty-five acres of land, but has recently added fifty-five more to his farm at an expense of nearly thirteen hundred dollars, for which there remained to be paid five hundred—a debt which, if health continued, he would be able to discharge in two years. The products of his farm are various. He raises some young stock; he fattens a considerable amount of pork for market, and occasionally a yoke of cattle. He sells, in a neighboring village annually, about one hundred dollars worth of fruit, principally apples and peaches. Such a situation may be considered, in the best sense of the term, as independent as that of any man in the country.

Now what are the causes of such success? Persevering industry; the strictest and most absolute temperance; the most particular frugality and always turning every thing to the best account; living within his own resources; and above all things, never in any case suffering himself to contract a debt, excepting in the purchase of land, which could be made immediately productive, and where of course the perfect security for the debt could neither be used up, nor wasted, nor squandered.

Example 2.—I met with another example of domestic economy as interesting, but I cannot dwell upon it. The house was filled with beautiful and substantial fabrics, the products of domestic industry; and the matron of the household, though she had completed her sixty-ninth year, still plied at the wheel and the distaff with all the energy of youth. These are pictures of what rural life once was in New England; but of which, in their original simplicity, instances are more rare than formerly. Such men need have no envy of the city millionaires, whose slumbers are often broken in upon by the whistling storm which forebodes destruction to their floating barks,

or the fluctuations in fancy stocks which alarm them with the horrors of coming to want; nor of the planter, with his thousands of acres and his hundreds of slaves, who barricades his door at night and lays his pistols at his bedside in terror of an insurrection, and does not hear an unusual rustling of a leaf or barking of a dog without a shudder, and without the mother's hugging her children closer to her bosom.

I shall not enter upon the question whether, in a mere pecuniary estimate, the supplies of a family may not be more cheaply obtained by purchase than by product. But it must be considered as an established principle in domestic economy that every farmer should look to his farm for all that his farm can furnish him. Though it may seem better to sell his wool and buy his bread, yet in all such cases he pays a double commission, to the purchaser of the wool and the seller of the bread, who must both get their living out of the operation. But besides this, the improvement of the farm, in such cases, generally comes to a stand; habits of industry are not formed, or are broken up; habits of luxury and expenditure are engendered; and, with this, comes generally also the habit of getting trusted and running in debt. This is the fatal snare; and the farmer presently finds himself irretrievably enfolded in the meshes of bankruptcy; and assignments, and mortgages, and writs, and executions, those great curses of life, bring up the rear, with a black cloud of mortification and misery. But besides these considerations, in the resolute habit of living within one's own means and depending mainly upon one's own exertions, there is a moral gain, which can scarcely be overvalued. The first lesson to be taught to every child is a lesson of self-dependence. I know very well the advantages springing from a division of labor, and as well, that every general rule must be modified by various qualifications; but it is a sound maxim in personal, domestic, and, I may add, public economy, never to depend on others for that which you can do for yourselves. This is that element which more strongly marks the Yankee character, and gives them that shrewdness and adroitness for which the

New Englanders have always been distinguished. These qualities may sometimes degenerate into troublesome impertinence and low cunning and overreaching, but these instances are much less the peculiarity of our people than in general they have credit for. On the other hand, the instances are far more numerous in which they prove themselves the foundation of the highest intellectual power, the noblest personal independence, and the most distinguished public usefulness.

XVIII. Silk.—I should have adverted earlier to the culture of silk in this county had I not gone largely into this matter in my Third Report. Since the publication of that Report farther experiments have been made, which, if they have not met the high-wrought expectations and the golden dreams in which some have indulged, fully demonstrate that, under certain circumstances, the culture of silk may be made a profitable branch of husbandry; and where a certain kind of labor abounds which would be unavailable in severer employments, the culture of silk may become a most valuable branch of domestic economy. The time, I believe, is not distant when much more than this may be looked for; and it may become a specific and independent article of culture, yielding an ample remuneration for the labor and capital employed.

In many cases the last year the cultivators of silk experienced severe disappointments in the destruction of their worms by disease. I regretted that I had no opportunity of seeing this disease; but it is understood to be a disease well known among the silk culturists of Europe under the designation of *muscadine;* and that an efficient remedy is found in sprinkling the worms with newly slacked lime. The experiments of the present season will undoubtedly furnish most valuable information on this subject.

An invention likewise of an ingeniously constructed frame, by Edmund Morris, of Burlington, New Jersey, by which the care and cleaning of the worms are much facilitated, promises great advantages.

It is the tendency of what is called public opinion to change, and to vibrate from one extreme to another. There are few men at any time capable of forming and maintaining a just and independent judgment on any subject of much importance. The public are moved by impulse, by caprice, by acclamation, by accident, by sympathy, by fashion. In no case has this caprice been more exemplified than in respect to the culture of silk. Over estimates of its productiveness, made under the influence of the imagination stimulated by an inordinate avarice, first kindled the fire. The introduction of a new plant into the country promised extraordinary facilities and advantages in its cultivation. The enthusiasm, when the public mind from other causes was in a state of feverish excitement, every where became inflamed. There were those sagacious enough, not to say wicked enough, to take every and sometimes the basest advantage of the public credulity; and to seek, on the top of one of the high tides which occasionally occur in the affairs of men, to float into fortune. But it was one of those unnatural swells whose ebb soon follows its flood, which, leaping over all natural barriers, forebodes only destruction, and many a pitiable and forlorn wreck was left high and dry upon the shore. My allusions are well understood. The Morus Multicaulis speculation is a most extraordinary chapter in our history, blotted and blurred all over with folly, credulity, delusion, imposture, fraud, disappointment, bankruptcy and ruin. The chagrin and disgust growing out of these miserable results extended themselves most unreasonably to the cultivation of silk itself. But after the smoke and dust of the excitement have cleared away, men will look at the subject with a more just discrimination; and silk will find its place in New England among its valuable products.

The importance of this subject is very imperfectly appreciated. How few among us are not, in one form or another, indebted to the silkworm for some portion of our dress, furniture, comfort or luxuries. An importation of silk amounting to more than twenty millions of dollars a year, and for a large

portion of which specie only is paid, makes a formidable item in our national expenditures. If then, without reference to the production of raw silk for exportation, upon which many sanguine persons have calculated with a confidence much more reasonable than is generally allowed, by the employment of labor at present not available we can to any considerable extent prevent this expenditure or supply this want, the pecuniary gain will be great, but it will not equal the moral gain. To all the arguments of the utter impracticability of doing any thing to advantage, and to the sneers with which many persons always meet the subject, it is enough to point to the little town of Mansfield, in Connecticut, where, under very ordinary and limited facilities and against many disadvantages, the culture of silk, for more than half a century, has been a source of large and substantial income and a full remuneration of the labor employed in its production.

In Charlemont, the silk culture has been prosecuted by Joseph Field with moderate but with uniform success. For feeding, he has cultivated only the white mulberry; and it is well known how much this tree may be improved by culture. James Deane, of Greenfield, has continued his experiments with great intelligence and zeal, and has produced to a fair profit as beautiful an article of raw silk as any market can show.*

XIX. Flax.—Flax has been sometimes cultivated to considerable advantage in Sunderland and Gill. In Sunderland, 500 lbs. and from twelve to fifteen bushels of seed have been obtained to an acre. In Gill, upon four acres of land 1600 lbs. of flax and 50 bushels of seed have been produced. Flax undoubtedly might be cultivated in many places to advantage. It has generally been considered an exhausting crop, and that it would not bear repetition on the same land oftener than once in five or seven years. In some towns in New York, where it is largely cultivated, the farmers repeat it once in three years, as they think without disadvantage. This practice is compara-

* Appendix, D.

tively modern. The value of flax seed for fatting cattle is not yet by any means justly appreciated. I should have inserted flax more properly among the crops of the county; but its production is so rare that it seemed hardly entitled to a place among them.

XX. Experiments, Improvements, &c. 1. Freezing Seed Wheat.—Polycarpus L. Cushman, one of the best farmers in the county, tried an experiment which has been often recommended in the public papers, of freezing in water his seed wheat, keeping it frozen until the spring, and then sowing his winter wheat in the spring. It had been confidently stated, that by this process winter wheat might as well be sown in the spring as in the autumn. The seed in this case came up well, but from some cause unknown the plants soon after perished. One bushel sown produced a crop of only two bushels.

2. Value of Corn Stalks.—Gardner Dickinson, of Conway, made a trial of keeping cows entirely upon corn-stalks several weeks in December and January. The stalks were purchased at 1 cent per bundle or 175 cents per acre. He preferred purchasing at that rate by the acre. I would not record the name of the individual willing to sell them so, if I knew it.—They would be cheaply bought at that rate for manure only.

Five cows were kept exclusively upon these top-stalks, and the ordinary allowance of each cow was five bundles per day. Their condition was as good as when kept upon hay. They preferred stalks to hay. The cost of keeping these cows, at the price at which these stalks were purchased by the acre, was 28 cents each per week. Hay at this time in Conway was at 15 dollars per ton. A cow, by actual trial, requires about 25 lbs. of hay per day. This would be worth 13¼ cents per week.

3. Double Crops on the same Land.—Orlando Ware, of Deerfield, approves of cultivating parsnips; they remain in the ground over winter to be given to his cattle in the spring. He sows pease among them, for family use in summer, in the same rills in his garden.

4. Time of Cutting Herdsgrass.—I have already referred, in page 9th, to the opinions of Polycarpus and Ralph Cushman, of Bernardston, founded on long experience in feeding cattle and horses, that herdsgrass should not be cut until it is ripe and the seed perfectly matured. This conforms to the results given in the experiments ordered by the Duke of Bedford to test the nutritiousness of different grasses, and to ascertain the season of their growth when they yield the largest amount of nutritive matter. These tables may be seen appended to Davy's Agricultural Chemistry; and they show that much the largest amount of nutriment is to be found in herdsgrass when it is fully ripe. The farmers in the neighborhood of the capital are accustomed to cut their herdsgrass early, when it is in early flower. It has then a peculiar greenness and brightness, which render it more saleable in the market; but, if the above statements are to be received, and they are confirmed by the experience of many farmers in the interior, it is less nutritive than when cut in a condition of perfect ripeness.

In general, the cutting of grass is much later in the interior, and especially in the western parts of the State, than on the seaboard. The farmers there are of opinion that in this way they obtain more grass, and it is made into hay with much less trouble, than when an earlier cutting is practised. In Deerfield meadows, where two and sometimes three crops are to be taken in a year, the first crop is necessarily mowed very early; and the kind of grass usually obtained there, the English bent, if not mowed early, is said not to be relished by the cattle. It is the opinion of several intelligent farmers, however, that many of the farmers in Deerfield cut their grass too early; and that it would be better, in many cases, to take one crop only, where two are now taken. Long-established habits are changed only with great difficulty and reluctance, and are to be primarily presumed to be founded on the sound dictates of experience—but they are not always well founded. It is desirable that this point should be settled by fair experiment. The question is, whether as much hay, by postponing the mowing and allowing the

grass to thicken at bottom, would not be obtained, in many cases, on the Deerfield and other alluvial meadows at one cutting as is now obtained at two ; or if not, whether the abatement of labor in cutting but once instead of twice, and the superior ease in making the hay when fully ripe rather than in an unripe condition, would not be more than an equivalent for the smaller amount of crop. It is said that cattle prefer early to late-cut hay, and that their taste is the best criterion of its nutritiveness. I am not quite disposed to admit either of these positions. Taste is with all animals very much a matter of habit and cultivation. Instinct is not always an infallible guide, or we should never find sheep nibbling laurel,* nor cows killing themselves by browsing the wild cherry,† nor children poisoned in eating hemlock.‡ I know that some men insist with great pertinacity that nature is always a safe guide in all these matters. If so, we might go back to the practice of Bruce's Arabs, and cut and eat our steaks out of the cow as we drive her along. If so indeed, matters in civilized life have come to a strange pass, and the human animal at some of our city tables and our French *restaurants* must be sadly in error.

William Pomeroy, of Northfield, to whose authority in this case I should yield as much deference as to that of any man in the county, is in the habit of not topping the stalks of his Indian corn, nor of cutting the plant at all until he has gathered the ears. He leaves every thing until the corn is fully ripe ; he then gathers the ears, sometimes husking them on the stalk and sometimes carrying them into the barn. He then cuts up the stalks at the bottom, which are then in a condition to be put away, and immediately bundles and houses them. His cattle eat them well and do well upon them. He prefers this management to any other mode. Many farmers say that their cows show as good thrift and yield as much milk when fed upon the leaves and husks of the corn-butts, which are of course dried late in the field, as when fed with the top-stalks cut early, and saved in a green and bright condition.

* *Kalmia angustifolia.* † *Prunus Virginiana.* ‡ *Conium maculatum.*

5. Natural and Artificial Grasses.—In general, what are called the natural grasses on the Deerfield meadows are much more highly valued than the artificial grasses, such as herdsgrass, red top and clover. A highly intelligent and experienced farmer is of opinion that the Deerfield farmers might cultivate the artificial grasses, herdsgrass and red top, to advantage; and states that some of the best beef cattle ever produced in the county were fatted by —— McCrellis, of Coleraine, upon potatoes and coarse herdsgrass hay.

6. Seeding Potatoes.—G. Dickinson planted two rows of potatoes, five rods in length, and the hills three feet apart. In some of the rows he put two potatoes in a hill; in the others, one potatoe only. The former yielded four quarts in a row more than the latter; but the extra yield was not deemed a sufficient equivalent for the extra expense. This can hardly be considered as very decisive. Indeed, the results in experiments on the planting of potatoes, sometimes planting whole potatoes, sometimes cut, sometimes the eyes, and sometimes the sprouts merely, are so variously reported that it is difficult to speak with confidence. If the root, as can hardly be questioned, depends for its first nourishment upon the decay of the bulb out of which it starts; and if it is most important, at the starting of the plant, that this nutriment should be abundantly supplied, it would seem to be much better to plant whole than cut potatoes; and this point may be considered as established.

7. Redeeming Land.—One experiment in Deerfield, in redeeming peat meadow, is worth recording as a caution. It was ditched, and pared, and burnt; but from the fire being set when the meadow was too dry, it was essentially injured, many large holes being burnt in it.

An improvement is going on in Whately and Hatfield on a large scale, which promises most valuable results. The Connecticut river, by a narrow inlet, flowed in upon a very large and low piece of land, keeping it saturated with water, making a mere swamp of it, covered with alders, reeds, and aquatic grasses, and rendering it comparatively worthless. Heretofore,

it has been in the hands of various owners, and it was difficult in all such cases to effect any plan of general improvement. Most of the rights have been purchased by some spirited and enterprising individuals. They are ditching and draining the land, clearing up the bushes, and have erected a dam and sluice-gate at the narrow inlet, so as to exclude the river, and will, in this way, bring into productive use an extensive and most valuable tract of land.

8. Irrigation.—It is to be regretted that there is not more of a spirit of agricultural improvement prevailing in the county than appears; and that in a region, where water is so easily commanded and where the hills abound with permanent springs, the subject of irrigating lands has not attracted more attention. But I hardly know a case in the county where it has been attempted. The pasture as well as the mowing lands admit in many places of being essentially benefited in this way.

9. Large yield of Grass.—The largest yield of grass reported to me in the county was by Dr. Lyon, of Gill, on his own farm. He states it to be five tons to the acre. In this case the land receives the washings from the house and barn. This is an extraordinary product, but the authority on which this statement rests is entitled to confidence.

XXI. Miscellaneous Matters.

1. Manual Labor School.—At Shelburne Falls a school has been established, connected with which are workshops, and a considerable and valuable farm, it being intended that the pupils, by devoting a portion of their time to mechanical and agricultural labor, should in this way defray in part the expenses of their support and education. The number of pupils has averaged, since the foundation of the school, about ninety, and the experiment may be considered so far as successful. The cost of board at the institution is for females, one dollar; for males, one dollar and twelve and a half cents per week, washing not included. The price of tuition, three dollars per

quarter. Labor on the farm is credited per hour; in mechanical employments, at some specific rates. It is thought that an industrious young person can give three hours per day to labor without interfering with his studies. This is not, properly speaking, an agricultural school; but it would be easy to combine with it instruction in scientific and improved agriculture, and a course of agricultural experiments in a high degree beneficial to the pupils and the community.

Every benevolent mind must rejoice in the extension of the means of knowledge among all classes, and especially among those whose humble and limited circumstances would otherwise render it impracticable for them to acquire an education. I do not accede at all to the opinion that a poor education, meaning by that an imperfect or limited education, is worse than none. I believe that any measure of education whatever is a great deal better than none. You cannot let a little knowledge into the mind without awakening a desire and impatience for more, and, by giving any, you confer a proportionate power of acquiring more. There is an advantage likewise, than which nothing is more obvious in this and other departments of life, in making any good that we desire to a large extent dependent upon our own exertions to acquire it. The combination likewise of physical with intellectual effort and labor is a most wise and useful union. The growth and vigor of the mind are essentially dependent on physical development and energy. But at the same time, in all our establishments for instruction, we should aim to give the best education which can be reached; and in our community we should not make the attainment too cheap lest we should render the education inferior and much below the standard to which we ought to raise it. In our attempts therefore to make, as has sometimes been attempted, these manual-labor schools altogether self-supporting schools, we do more than the wants of the community demand, and we impair our power of furnishing the best instruction and the best means of knowledge. There are few young persons of either sex among us, who are deserving of an education, who cannot do a great

deal for themselves toward attaining it; and all purely eleemosynary establishments of education deserve no support from the community. They are likely to be the resort of the idle, inefficient and worthless. I do not mean to utter a word in disrespect of this institution. Its location is extremely favorable, and under good management it will prove a signal blessing to that community; but it seems to me an attempt, doubtless well intended, to make an education too cheaply attainable;—likely therefore to lower the standard of education, and certain not to afford means of increasing the literary advantages of the institution or of adequately compensating the toil of instruction.

2. Scythe and Snaith Factories.—There is at Shelburne a magnificent water-power, where the Deerfield river, after a union with its two principal branches, makes in the course of a short distance a descent over a broken ledge of rocks, I should judge, of more than twenty-five feet. This presents a most valuable water power, and the village in its neighborhood is destined to become the seat of many factories.

There is a scythe factory established, where the business is carried on to a considerable extent. The scythe made here has a deservedly high reputation. There is an improvement in its form, which consists in the usual concave bottom of the blade being rejected and a raised edge formed on the upper and under side, by which great stiffness is given to the blade. The blade appeared to me too narrow; but they are much approved by those who use them. The English scythes are in general much wider in their blades than ours; they are consequently not so soon ground down and the motion of them is much steadier;—they are not, on this account, so liable to be bent, and their cut is more even and close.

There is likewise here, in the immediate neighborhood, an extensive manufactory of snaiths. The particular form of a snaith, or scythe-handle, was formerly matter of chance or sleight of hand. It was scarcely possible to find two alike; or, after a man had made one, to be sure that he would make another of the same pattern. It is said that in Hingham for-

merly, where the manufacture of pails was carried on extensively, the bucket-makers could cut out the bottoms of their pails successfully only at the time of a full moon. The snaith-makers had not even such an advantage, unless they had taken one of the constellations, but were obliged to proceed as it is said by guess, or to depend on mere skill to fashion two alike or even to fashion one well.

Every good mower knows how much the character of his work and his own ease in working depend upon the *hang* of his scythe, and these improved snaiths are on every account a valuable invention. The difference between one of these beautiful and graceful frames by which the scythe is balanced like a feather upon the hand, and the old-fashioned almost straight handle by which it hung like a dead weight, is remarkable.

These snaiths are made of the wood of the white ash. They are split out and sold in the rough at five dollars per hundred. The nibs or handles are made of black or yellow birch, and cost $2 50 per hundred. The irons for the nibs and ends are finished at fifteen cents a set. Men finish the scythe-snaiths—that is, after they are taken from the oven—at two cents a-piece, being boarded in addition; and a man will finish forty, or sixty, or sometimes one hundred, per day.

About 75,000 are manufactured per year. The article in the rough state is first steamed three hours; then placed in a cast iron frame to give it the proper shape, four being put into one mould at a time. A number of these moulds are then placed in a frame, which moves upon a railway, and is shoved directly into a drying-room or oven, where they remain forty-eight hours. They are then taken out, shaved smooth, and rubbed with sand paper, and returned again to another drying-room, to remain forty-eight hours longer. The nibs or handles are then put on, and the work finished.

The article is very beautiful. Great improvements have been made in fitting the ring to the scythe, by which it can be driven tight without the use of wedges, always objectionable in former modes; in sinking an iron socket to receive the claw

of the scythe, so that the scythe does not become loose by the wearing away of the wooden mortice, as was formerly the case; in so fitting the nibs or handles that they can be loosened, or driven tight, or removed one way or another, or placed at any inclination, at pleasure, and this without the trouble of moveable wedges; and in so fitting the bottom of the handle to the snaith, that the strain is brought upon the snaith instead of the iron, which passes through the handle, and is therefore much less liable to be broken.

Students of the school, above spoken of, are often employed in this shop in different operations, at ten cents an hour. They are at liberty to work three hours a day, and may still keep up with their classes. Some of the students in this way defray all their expenses.

Two lads were pointed out to me, then at work rubbing the snaiths with sand paper, who earned in the shop the last year one hundred and fifty dollars. They were brothers, one seventeen years old, the other younger; and were the children of a deranged parent, who was unable to provide for them. This was a beautiful example of most commendable industry, and evinced their worthiness of the education they were seeking.

XXII. Price of Land.—1. The alluvial meadow land in Deerfield, that which is of the best quality and annually flooded, commonly when sold commands one hundred dollars. If very favorably situated, it would bring a much higher price. The price of good pasture land, in the interior of the county, is from ten to fifteen dollars.

2. In Sunderland, the meadow land of the best quality, near the village, has been recently sold for one hundred and twenty dollars per acre; farther from the town, land of the same quality commands sixty dollars.

3. In Warwick, pasturage land is valued at seven to fifteen dollars.

4. In Gill, the price of meadow land varies from twenty-five to fifty dollars per acre.

5. In Shelburne, farms have been sold recently for twenty-four dollars per acre.

6. A farm of 200 acres recently sold in Charlemont, with excellent buildings upon it and in fine condition, for six thousand dollars, or thirty dollars per acre.

7. In Buckland, the average price of farms is put at twenty-five dollars per acre. The price of land here has very greatly increased within a few years; and it was stated to me by an intelligent authority that farms which, eight or ten years since, were sold for less than $2500, would now command $5000.

8. The cost of clearing wild land, as in Rowe for example, so as to fit it for the harrow, is ten dollars, though of course something must depend on the amount and nature of the growth upon it.

9. The value of tillage and mowing land in Whately is put down at thirty dollars per acre; of pasture land, at twenty dollars; of wood land in pine, at twenty-five dollars; in hard wood, fit to be cut, at forty dollars.

10. In Bernardston, the price of tillage and mowing land is rated at fifty dollars per acre; of pasturage, at twenty dollars per acre; of wood land fit to be cut, at ten to twenty dollars; the land, the year after the wood is cut off, at ten dollars.

11. In Ashfield, tillage and mowing land is estimated at twenty-five dollars per acre, and pasturage at fifteen dollars.

12. In Conway, tillage and mowing land is estimated at forty-five dollars, and pasture land at twenty-five dollars per acre. Land in hard wood, fit to be cut, at thirty dollars per acre.

It is difficult to arrive at any fair average of the value of lands, either in a county or a town, so much depends upon a variety of circumstances of time, place, aspect, and condition; but many of these estimates are based upon actual sales; and others, the judgment of respectable farmers, and will serve to give some general idea of the price of real estate in the county.

It ought to be remembered that the price of an article and the value of it are not always the same. The price depends on

various circumstances; on the number of purchasers, the abundance or scarcity of money, the necessities of the seller, and sundry other things. The value of land is to be determined by what it can be made to produce. If an acre of land, after all expenses of labor, manuring, care and taxes are paid, will, on an average of years, produce a crop worth six or seven dollars, and, at the same time, furnish the means of keeping up its condition, it must be considered as worth one hundred dollars; and, as such, may be regarded as a secure and eligible investment of capital.

XXIII. Buildings.—The general growth of the county is maple, hickory, yellow and grey oak, beech, ash, white and yellow pine. The county, to a considerable extent, is cleared; and though there is still an exportation of boards and timber to a small amount, yet it is largely dependent upon a foreign supply for its building materials. The buildings are principally of wood. Brick houses are very rare, and stone houses, though the material is abundant in all parts of the county, are more rare. This conforms to the almost universal taste of New England. The difference in the first cost between buildings of rough stone, or of wood with its finishings, is not great; and when the superior comfort, both in winter and summer, of a well-built stone house is taken into view, together with its durability and the repairs incessantly incidental to a wooden building, this material ought to be preferred. There is an objection which has its effect to buildings of stone, which is likely to continue to have an influence; and that is, in the perpetual change of estates, residence and profession which prevails among us. Our habits are too much habits of adventure. Few estates remain in the same family through three generations; and many of them change owners almost with the facility with which a conjurer changes his cups and balls. We have no law of primogeniture; and, much as it is to be regretted, few farmers find their sons willing to follow the profession of their fathers. Employments, presenting prospects of larger and

more rapid gains, seduce them from the farm; and, in the settlement of the estate among several heirs, the homestead, with a view to the division of the property, is sold and passes into other hands. There is therefore much less inducement to build permanent and durable structures, that may last for centuries and go down to a distant posterity, than prevails in older countries.

XXIV. Wood and Fuel.—The price of hard-wood fuel in the county, if bought and delivered at the door, varies from one dollar seventy-five cents to two dollars fifty cents, and in some cases three dollars, per cord. Wood is the only fuel used. Of peat there are few deposits, and none which have been ever opened for fuel, and mineral coal can be had only at a heavy expense. It is the opinion of an observing farmer in Conway that there is as much wood now growing in that town as there was twenty years since. I cannot think however that such a remark is applicable to many towns in the county. Since the introduction of stoves, much greater economy prevails in the consumption of fuel than when it was burnt in fire-places capable of admitting sticks of four feet in length, and at the same time of accommodating a small—perhaps I should say *the* small—portion of the family in the corner in a cold winter night. The increase of his wood ought to be a subject of much care and consideration with every farmer who has a Christian feeling for those who shall come after him. Plantations of the rock maple and locust, both of which flourish well in this climate and soil, might be made to very great advantage and ultimate profit.—The former would supply both sugar and fuel; and the latter would furnish most valuable timber for fencing, posts, ships' knees and treenails,—and is of rapid growth.

XXV. Orchards.—Fruit is cultivated in the county at large to a comparatively small extent; and since the progress of the temperance reformation throughout the country, cider has fallen into almost entire disuse; apple orchards are neglected, and

young orchards are not planted as frequently as formerly. This is greatly to be regretted. Ripe fruit, as one quaintly observes, was the food of Paradise. It is nutritious, and highly conducive to the health of children and adults. But besides this, I have the opinion of several farmers in the county, and of one after twelve years' experience in the use of them, that, for fatting both cattle and swine, apples are of equal value with potatoes. This corresponds with the opinions of a great many farmers in other parts of the State.

XXVI. Agricultural Implements.—The common implements of husbandry do not differ from those in other parts of the State.

1. A roller is scarcely known in the county; but the farmers would every where find great advantage from its use. The farmers in the intervale lands object to its use; the soil being aluminous, they are of opinion that it would tend to consolidate it too much. There is not much in this objection, unless the land is wet when it is rolled. Where it is dry and in a proper condition the roller will serve to break the clods and reduce them to fineness, and thus effectually cover the seeds which may be sown. On other lands its effects are always beneficial, both in covering the seeds, in pressing the small stones into the earth, and thus rendering the soil smooth for the scythe, and oftentimes beyond a doubt in crushing and destroying large numbers of pernicious insects. It is of great advantage to pass it over the fields of young grain in the spring, thus giving a firm hold to many plants which have been thrown out by the frosts and might otherwise perish.

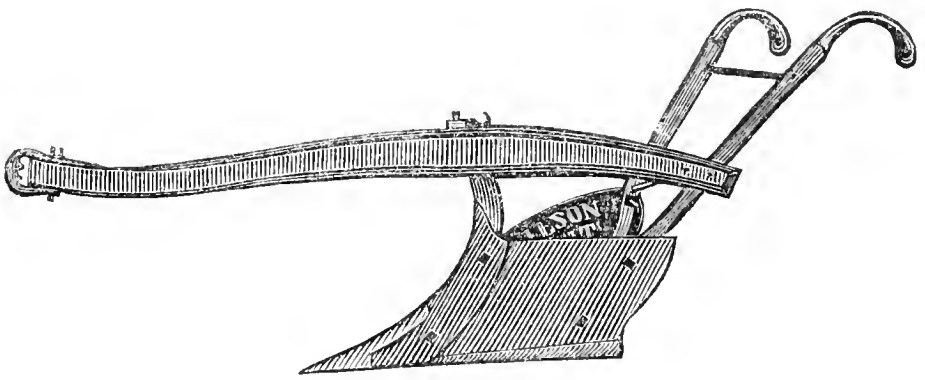
Any farmer, familiar with the use of an axe and saw, may soon supply himself at a trifling expense with a very useful roller. But the most approved forms are of a large diameter, made, for example, of four cast-off forward wheels of a common wagon, and covered with plank in strips of three inches thickness. In such cases, the axle should have a joint in the middle, so as to render the turning at the ends of the

field more easy. The large diameter of the roller proportionately diminishes the weight of draft, makes it less likely to drag the dirt before it, and leaves the work smoother.

2. Wagons.—The vehicle in general use for farming purposes is the common four-wheeled wagon, a heavy and clumsy vehicle. A horse-cart is scarcely known in the county; but where manure is to be carried to a considerable distance on a comparatively level road, as on the intervale lands for example, and, when there, distributed in hills either for broom or Indian corn, two horse-carts which in many cases, in going a distance, might easily be managed by one driver, would accomplish much more than could be done with a wagon drawn by four oxen, as is customary. The superior ease likewise with which they are unloaded deserves to be considered.

3. A plough has been constructed by John Wilson, of Deerfield, which is much approved. It is, in my opinion, well adapted for the turning in of stubble, or the ploughing under of green crops.

As it properly belongs to the county and is much used, I subjoin a drawing of it, and likewise a statement of its designed advantages, in the words of Mr. Wilson.



"Some of the most important improvements attempted are the following. The share enters the ground with a most easy and gradual slope; and forming with the mould-board a regular curve, the furrow slice is raised and turned over with the least possible resistance."

"The share being twelve inches wide, cuts the full width of the mould-board at the heel, by which the whole width of the furrow is raised and mellowed. The land-side of the plough is of equal height with the mould-board, which makes greater resistance to the lateral pressure on that side, giving steadiness to the plough in its course, and preventing obstructions of every kind from hanging on that side or falling into the furrow."

For the ploughing of greensward, where it is desired completely to invert the sod, this plough is not so well adapted.

4. Hay-Knife.—The farmers here use a long knife, in the shape of a ditching-knife, for the purpose of cutting down their hay as they feed it to their cattle. I refer to it, not that there is any thing remarkable in its construction, or that it is unknown in other places, but for the sake of recommending a practice which is somewhat peculiar to this part of the country. The mow of hay, when it is fed to the stock, is carefully cut down in slices of three or four feet width, as exactly as a loaf of bread would be cut, and the hay is not, as in most cases, pitched off as it is wanted promiscuously from any part of the mow. This slice is used from the top to the bottom as it is needed; it is in this way more easily handled; the top of the whole mow is not turned up and exposed to the air, and to be trodden upon; and besides the neatness of the practice, the hay is undoubtedly expended with more carefulness.

XXVII. Condition of the Rural Population.—The condition of the agricultural population of Franklin county is comfortable, and upon the whole prosperous. Some few years ago the debts of the farmers in the county were understood to be large; but they are known to have been greatly reduced and are in the process of gradual extinction. In some of the towns not promising most, it is said that the farmers, after paying all their bills and expenses, will lay up two hundred dollars a year; in other towns, from two to six hundred, to eight hundred, and in some cases to a thousand. It is understood in this case that the farmer charges himself with all his hired labor and all he

purchases for his family, but does not charge his own or that labor in his family, for which he is not obliged to pay. It is obvious that, in all such cases, the returns must depend upon the size of the farm, the amount of capital employed, and the labor expended, as well as the kind and disposition of the products.

1. When Bernardston received its share of the surplus revenue, amounting to $2000, it was agreed that it should be loaned upon interest; but no borrowers could be found. Much land was in Bernardston, a few years since, devoted to the production of rye for distillation: then a crop of rye was taken once in four years; and in the meantime the land was left untouched, in order to recruit itself until another crop of rye should be taken. This miserable husbandry, miserable in respect to the course of cultivation and still more so in respect to the application of the products, has been for a long time abandoned; rye is now cultivated solely for family use; and the husbandry of the town is fast improving.*

2. Sunderland is represented as eminently prosperous, and appearances confirm these statements. It for a long time languished under the annual visitation of a fatal fever, which baffled the best medical sagacity and skill both as to its cause and cure. It was generally supposed to be connected with the stagnant waters of a swamp in the rear of the village, which has been carefully drained. The health of the town is now good, and the cause of sobriety is triumphant, It is said that not a single farmer in the whole of this beautiful village uses ardent spirits. Temperance, united with industry and safe enterprize, are as sure to be followed by all reasonable success and prosperity as careful and skilful cultivation is by a certain and abundant harvest. These things are not quite so much matter of chance as the idle and reckless and profligate would have us believe.

3. Rowe, in the north-western part of the county, formerly had a whisky distillery which, in the time of the late war, yielded large profits. The liquor was obtained from potatoes; and potatoes sold for 20 and 25 cents per bushel, a bushel of potatoes

* See Second Report for Agricultural Returns from Bernardston.

yielding from 3 to 4 qts. of whisky—somewhat dependent, as in the case of city milk, upon the proof of the spirit, or the convenience of water. Whisky and war are generally very good friends to each other in private as well as public life; and out of whisky the parties interested contrive to manufacture a spurious product, which passes for courage and patriotism. It is a melancholy infatuation; and what were called profits in this case were all stained with human blood. The good people of Rowe have reason to thank God that the curse of this distillery has ceased from among them; that, as one remarked to me, "their tavern died a natural death;" and that temperance, and its ordinary consequences, universal comfort and independence, prevail among them. Their mountain air gives vigor to their minds and energy to their muscles; and the crystal springs from their own hills refresh them under fatigue and toil.

4. Shelburne produces more than sugar enough for its own consumption; the greater portion of its bread; and a large amount of its clothing. Broken and rough as it is, there are few towns where the indications of general comfort and thrift are more emphatical.

5. Leverett, in its aspect among the most unpromising of any of the towns in the county, rough and mountainous in its surface and rocky and hard in its soil, has, under its rude exterior, a respectable population, industrious and frugal in their habits, enjoying a full measure of the means of subsistence, and abounding in the common comforts of life. Leverett produces its own bread and meat; its own sugar; and likewise a great portion of its own clothing, and buys but little. It presents many examples of humble but substantial independence. One farmer stated to me, that he sometimes gathers from his orchard one thousand bushels of winter apples, for which he finds a market in some of the neighboring villages. These are among the many littles, which, according to the Scotch proverb, "make a meikle." It is delightful to the reflecting and benevolent mind to contemplate the compensations, which abound in the arrangements of the divine Providence, and serve to equalize the va-

ried conditions of human life; and, as it would sometimes seem, cause the scale to preponderate in favor of those whose external advantages seem fewest and least auspicious. It is an old proverb, that "necessity is the mother of invention." The inhabitants of very cold climates in general suffer much less from cold than those of milder temperatures, because, in their dress and dwellings, they much more carefully fortify themselves against it. So too in restricted circumstances, where men are under the necessity of contending with adverse influences of climate and hardness and barrenness of soil, by increased energy, enterprize and skill they compel the reluctant earth to yield her supplies; and these efforts give sharpness to the wits and strength to the hands; and, above all, a richer zest to the enjoyment of the fruits of toil.

6. Gill is represented as making rapid advances in agricultural improvement and productiveness. In its location it is one of the most beautiful towns in the county and in the State, and has a large proportion of excellent land, both upland and intervale, capable of great improvement. Gill likewise was once cursed with a cider-brandy distillery, whose liquid fires, wherever they spread themselves, carried with them a worse blight than rust or mildew, than frost or flood. The habits of the town, since its removal, have greatly improved; and the improvement of their farms and condition goes on with an equal step. I have referred to these towns in particular, in different parts of the county, because these circumstances were pointed out to me; or they otherwise strongly attracted my attention. I might give as favorable a picture of other towns in the county, though not of all.

It would seem at first blush very extraordinary that, in New England, a farmer, who has for example his farm free of incumbrance, should ever become bankrupt. So intimately connected is this subject with the prosperity and respectability of the agricultural profession, that some remarks in reference to it will not, I hope, be deemed misplaced. Among the Romans, six acres were considered ample for the support of a family;

with their hundred acres, some of our farmers grow poor, and become hopelessly insolvent. In many cases not a tenth part of such farms is cultivated. Instead of asking how he can make every acre of his farm productive, the farmer inquires how he can subsist with the least possible expenditure of labor in its cultivation, or of capital in its improvement. No good in life can be attained without labor; and sometimes, oftentimes, large and valuable tracts of land lie unproductive and worthless, because the farmer is unwilling to expend any thing in their redemption and improvement.

Then again in the families of many farmers there are too many unproductive hands. In the changes which, since the introduction of extensive manufactories of cotton and woolen among us, have taken place in our habits of domestic labor, some of the internal resources of the farmer have become dried up, and new occasions of expenditure introduced. I cannot better illustrate this matter than by a recurrence to a conversation, which I had with one of the most respectable farmers in this county. "Sir," said he to me, "I am a widower, and have only one daughter at home. I have gone to the utmost extent of my limited means for her education. She is a good scholar, and has every where stood high in her classes, and acquitted herself to the satisfaction of her instructers. She is expert in all the common branches of education. She reads Latin and French; she understands mineralogy and botany; and I can show you with pleasure some of her fine needle-work, embroidery and drawings. In the loss of her mother, she is my whole dependence; but instead of waiting upon me, I am obliged to hire a servant to wait upon her. I want her to take charge of my dairy, but she cannot think of milking; and as her mother was anxious that her child should be saved all hardship, for she used to say the poor girl would have enough of that bye and bye, she never allowed her to share in her labors; and therefore she knows no more of the care of a dairy, or indeed of housekeeping, than any city milliner; so that in fact I have sold all my cows but one. This cow supplies us

with what milk we want, but I buy my butter and cheese. I told her, a few days since, that my stockings were worn out, and that I had a good deal of wool in the chamber, which I wished she would card and spin. Her reply was, in a tone of unaffected surprize,—Why, father! no young lady does that; and besides, it is so much easier to send it to the mill and have it carded there. Well, I continued, you will knit the stockings if I get the wool spun? Why no, father! mother never taught me how to knit, because she said it would interfere with my lessons; and then, if I knew how, it would take a great deal of time, and be much cheaper to buy the stockings at the store."

This incident illustrates perfectly the condition of many a farmer's family, and exhibits a serious drawback upon his prosperity, and a serious impediment to his success. The false notions, which prevail among us in regard to labor, create a distaste for it; and the fact that, if the time required to be employed in many articles of household manufacture be reckoned at its ordinary value, the cost of producing or making many articles of clothing would be more than that of purchasing them at the store, is deemed a sufficient reason for abandoning their production at home. In many cases, however, this time is turned to no account, but absolutely squandered. But yet the clothing, if not made, must be bought; and they who might produce it must be sustained at an equal expense, whether they work or are idle.

Another great occasion of many a farmer's ruin is the credit which he easily obtains, and a practice of dealing at the village store for barter. The fact, so common and notorious, that the owners of most of our village stores obtain liens in the form of mortgage, attachment, or forced sale, upon many of the farms in their vicinity, shows how great is the danger of the almost universal system of store trust and credit. Few farmers keep any accounts, and before they are at all aware they have a long score on the trader's books, and that not only for the current price of the goods, but enhanced by an additional charge for the

delay of payment. But there is another circumstance in this case which is not always considered. In many instances, the trader will purchase the produce of the farmer only upon what is called store pay—that is, making his payment in goods from his store. The farmer, in this way, is not only obliged to sell at the lowest market price and pay the trader his profit upon his goods, but he and his family are induced to purchase a great many things which they do not need and which they would be better without. This leads likewise to the keeping of an open account; which, if not most rigidly watched and frequently settled, is as sure as fate to surprize the farmer with an unexpected and heavy balance against him. This usually produces ill blood between both parties, leading to vexatious lawsuits and all their miserable consequences; and so far as any further comfort or success in life are concerned, a farmer might as well see at his elbow a personage, whom it may not be civil to name, as get into the fangs of the law, or have a sheriff upon his premises. They are alike, equally ruthless and inexorable. Unless therefore in the rare instances, and there are some such, of men disposed to deal with perfect honor and integrity, a village store in the vicinity of a farm must but too often be regarded as a precursor to debt and ruin to the neighborhood.

The farmer should as far as possible sell only for cash; and endeavor to supply his wants, and those of his family, wholly from the farm. He should beware of debt under all circumstances, excepting for property—such as land for example—whose value is not likely to be reduced, and which is susceptible of immediate improvement and profit. He must recollect that, at least in New England, the returns of his husbandry come in various and small forms; and that it will never be easy for him to discharge any large debt but by a slow and gradual process from the products of his farm. Especially must he remember, that his principal capital is labor; that he can never afford to support many hands which are idle, inefficient or unproductive; that the drones do not only not fill but exhaust the hive and consume the products of the working bees; and that an expense avoided is a double gain.

XXVIII. Agricultural Society.—The counties of Hampshire, Hampden and Franklin formerly composed the single county of Hampshire, and remain embraced in one agricultural society. The funds of this society are such, that it receives from the treasury of the State six hundred dollars annually, to be disbursed in premiums, and in other forms, for the benefit of the agricultural interests. The annual meetings and cattle-shows of this society are usually held at Northampton, though they have in some instances been migratory; in one case having been held at Greenfield in Franklin county, and in another at West Springfield in Hampden county. This change of place for holding the annual show is attended with expense and inconvenience; and Northampton being more nearly central than any other town in these counties, it is most commonly holden there.

The distance however of Northampton from the remoter parts of the county of Franklin being in some places nearly forty miles, the attendance becomes inconvenient, and much less interest is taken in the matter than should be. From a jealousy, likewise, too apt to grow up among neighboring villages and towns, it has been insinuated, I believe without a shadow of justice, that competitors living within the immediate vicinity of the customary place of meeting were always particularly favored in their competition for premiums. But the only advantage which they ever had arose, without a doubt, from their proximity and the greater ease with which they could bring their animals and produets to the place of exhibition. It will not be denied however that the farmers in Franklin county, to whatever reason it may be attributed, have been most censurably negligent in this case and have shown a culpable want of interest in the management and success of this society. In the hands of the few individuals to whom its affairs have been entrusted, its management has been conscientious and faithful; and the farmers of Franklin county, so little labor or attention have they been willing to bestow on its concerns, have neither right nor reason to complain.

The territory which it embraces is generally admitted to be

too large, and it would be advisable to form a society expressly for the county of Franklin. In order to a county society's receiving the patronage of the State, the county must contain at least 25,000 inhabitants, and the population of Franklin county now exceeds this number. In this case, it might be advisable to attach several of the towns in the north-western part of Worcester county to this association, to whom, for these purposes, it would be more easy to reach the centre of Franklin than of Worcester or Hampshire county.

An Agricultural society established in this county, and conducted with spirit and intelligence, would be productive of the highest benefits. The county is to some extent engaged in the rearing of cattle and sheep. The farmers are largely interested in the fatting of beef animals. The exhibition of the best specimens of animals of every kind, and the comparisons to which this exhibition would lead, would kindle a strong competition and result in immediate and general improvement.— Franklin county is likewise to a considerable degree engaged in cultivation. The exhibition of the best products of her soil in grain, vegetables and fruits, would powerfully stimulate competition. Besides this, a committee of a county society, with power to award liberal premiums, who should go through the county twice a year to inspect such crops and farms as might come under their observation, would stir up inquiry and observation, and create an ambition of agricultural excellence and improvement, in the highest degree conducive to the enhancing the value of property and the general prosperity of the county.

Agricultural associations have been formed in some of the towns for mutual inquiry and information, and for the establishment of social and circulating libraries, embracing chiefly books of an agricultural character. These associations promise essential benefit; and if, in the meantime, while there is no general agricultural show in the county, the inhabitants in some of the principal towns would bring out on some fixed day once a year, their best cows, oxen, sheep and swine for exhibition in their own towns; and the best products of their gardens and fields; and

try their skill in ploughing-matches and in the management of their cattle, the day would be well devoted to such objects, and afford to the farmers, with the exception of Sunday, the best holiday in the calendar. This experiment has been successfully tried in several towns in the State—in Barre, Hardwicke, Westborough and others; and though committees should be appointed who should impartially examine and report upon the merits of the different animals and objects presented for exhibition, and upon the ploughing and drawing matches, it is not at all necessary, as experience has fully attested, that there should be any pecuniary premiums to be awarded in order to excite a spirited and wholesome competition.

XXIX. Public Roads.—The public roads in the county, considered at large, are quite too much neglected and their condition by no means creditable. This however does not apply to all the towns; but it would be invidious to particularize. In some of the towns, where the making of good roads is most difficult and the expenses for repairs are necessarily the largest, the expenditures have been most liberal and the roads are in the best condition. The county commissioners have, within a few years past, made some essential amendments and improvements in straightening the roads, in shortening distances, and reducing hills. These improvements, while they strikingly indicate how much more is to be done, will stimulate the desire for its accomplishment, and better satisfy the people in having more done. Our boards of commissioners for the laying out and surveying of public highways are altogether popular institutions and elected directly by the suffrages of the people.—This circumstance, and the fact likewise that, by the provisions of the law, when a new road is laid out or an old one amended by their authority, half the expense of doing this falls upon the town in which the improvements take place, tend greatly to limit their power, or at least prevent its free exercise. The desire of conciliating public favor, which may be expected to

influence in some degree those who want the honors and emoluments of office, too often induces them to forego important improvements because of their expense: or, with a view to disarming opposition and securing good will, to adopt a sort of half-way measures, which fail of their proper object and serve essentially to defeat, for years, the substantial improvements desired. It was much better under the early provisions of the law, when the appointment of commissioners rested exclusively with the Executive of the State, and they were in a great degree independent of the people; but this did not suit the temper of the times. Private rights should be always sedulously protected; but where the public good obviously demands their surrender, there should be no hesitation in compelling it. This is the only ground on which we can rest for the security and advancement of the general welfare. Where a just compensation is made for any sacrifice required, there may be reasons for regret but no just cause of complaint. In all matters wherein private interests conflict with the public good, it is important that such questions should be decided by an impartial and independent tribunal; but a tribunal can scarcely be expected to be impartial and independent where power rests directly upon private interest or popular caprice. The importance of good roads to a town or county is seldom sufficiently appreciated. The convenience, the saving of time and the saving of expense, are considerable; but more than that, the condition of its roads and of its schoolhouses, and of every thing else of a public nature, materially concerns the character of the people and essentially affects the value of property.

XXX. Natural Scenery.—I am unwilling to close this report on the agricultural condition of Franklin county, without adverting to the charming and picturesque scenery of this region. Its hills are beautiful, its valleys are beautiful; and within my knowledge it would be difficult to find a country, of no larger extent, combining more of what is attractive in the natural world and presenting more objects to please the

sight and delight the imagination. The man of refined sentiment and cultivated mind, with a taste for rural scenery, might pass at least a month in this county with continually new and rich gratification in exploring its many agreeable rides and varied objects of curiosity.

The Connecticut river cuts this territory through its whole breadth. Standing on an eminence in Gill, near its banks, and contemplating its course through the valley of Northfield, with its wide and fertile meadows, its hills crowned with verdure, its grand mountain scenery in the distance, and the village of Northfield with its modest steeples and its white houses in the centre, worn as it were like a gem on its bosom, the prospect is one of remarkable interest and beauty. Following the river in its course, you soon reach its junction with Miller's river, and its transit over Turner's falls, a rocky barrier which seeks in vain to impede its progress, and over which, at periods of high water, it pours its broken and impetuous stream with peculiar grandeur and magnificence. Here too the mind and heart are stirred by the recollections of the perils and struggles of former and yet not very distant days, when a body of the aborigines were driven from the shores in their canoes by their enemies in pursuit, and, swept away by the current, perished in their terrific descent down this foaming cataract.

As you descend the river, which, after its passage over the falls, spreads itself out into a quiet and placid stream, you soon reach the foot of Sugar-Loaf mountain, which, on the side towards the river, rears its naked and perpendicular front of red sand-stone; and on the road round its base seems, in its overhanging cliffs, to threaten the destruction of the unwary traveller. This mountain, which appears to form a part of the upheaving which first presents itself at New Haven, in Connecticut, and extends far into the interior, in several of its aspects is one of the most picturesque objects any where to be found. On one side, the mountain is not difficult of ascent, and the view presented from its summit is sufficient to compensate for the toil of the ascent, if it were a hundred times more

difficult than it is. At the foot of the mountain lies the handsome village of Sunderland, with its long and straight street, its white houses, its steepled church, its cultivated fields, its rich gardens, its regular orchards, and its ornamental trees everywhere interspersed, with here and there a laborer, a herd of cattle, a team, a wagon, a chaise, reduced in the distance to so miniature a size that they seem like children's toys, the whole presenting a picture of exquisite beauty. The river is seen winding its quiet way, sometimes hiding and at other times disclosing its mirrored surface, through fields of the richest cultivation and of eminent fertility. At the sun-setting, the whole picture is lighted up with dazzling brilliancy. The village and college at Amherst, with its glittering windows and tower, is a fine object, and occupies a commanding position. The town of Northampton, with its splendid eminences crowned with rural palaces, delights the eye. Here and there you see the spires of the village churches lifting their proud tops among the trees, and their vanes sparkling in the sunbeams, appearing like so many stars. On the left, rises Mount Toby, reposing in its grandeur, with many smaller prominences, as it were its offspring huddling around it, covered with its rich maple forests, so thick and so even that it seems as though you might walk upon them as upon a carpet, and, when clothed in the variegated mantle of the decaying year, exhibiting an unsurpassed gorgeousness and splendor. At the east and south are the fine ranges of Mount Holyoke and Mount Tom, bounding in that direction this magnificent valley, and opening between themselves a narrow and guarded passage for the exit of the Connecticut in its silent but steady movement to the ocean. On the west are seen distant ranges of green hills, in some cases cultivated to their summits, and in others covered with their original forests. Here and there is a solitary dwelling or a cluster of dwellings, the abodes of laborious but healthful toil, of humble, peaceful, and happy life. When on such a scene the glittering sun goes down, brightening every summit with his radiance, pouring his shower of

golden light upon river, hill and tree, giving as it were new life to every leaf and flower, and, like the human eye in the hour of death, sending forth its softest and brightest radiance at its closing, I ask where is to be found a nobler temple, and where is the human soul more loudly invoked to pay its homage to the mighty architect of nature, the exhaustless fountain of all this beneficence, the Lord of all life, the divine painter of all beauty!

The Deerfield valley is separated from the Connecticut by a high range of hills, of which the Sugar-Loaf forms one extremity, and the Indian name Pocumtuck, further up, designates one of the highest prominences. In proceeding up the valley to the north, you soon pass the memorable field of battle at Bloody Brook, "where the flower of Essex fell," now converted into fertile fields, and the seat of the pleasant village of South Deerfield. Passing farther on the Deerfield valley, lying between two high ranges of hills, there opens upon the view a wide-spreading tract of meadow and intervale, of extraordinary fertility and the richest cultivation, once the favored resort of the Indians and the haunt which they quitted with the greatest reluctance, with the village of Deerfield lying in the very centre of this magnificent basin, and the village of Greenfield, one of the most tasteful and beautiful on the banks of the Connecticut, appearing on an elevation in the distant perspective. From Pocumtuck, a hill in the rear of the village of Deerfield, the view is perfectly charming, and can only be appreciated by being seen. Deerfield, with its neat private dwellings, its academy and churches, and, above all, its magnificent ranges of ornamental trees, the rock maple and the elm, lies directly at your feet. The fields are spread before you like a figured carpet, in all the richness of cultivation, with their different shades of green and the varying colors of the crops in their progress to maturity. The lines of cultivation are every where distinctly marked. The intervale meadows, which are seldom or never ploughed, marked by a depth of coloring which cannot be surpassed, with here and there a

scattered elm rising in the midst of them, its spreading limbs extending themselves in forms of the most graceful expansion, and the river distinctly traced in its curious meanderings, as it were doubling itself continually in its progress from one end of the valley to the other, where it soon mingles with the Connecticut, and the forest-covered hills, which on three sides enclose this valley, present altogether a landscape of transcendant richness.

The road through Erving's Grant, now the town of Erving, by Miller's river, following the course of this swift and brawling stream under a long range of high and beetling cliffs, of singular and extremely picturesque formation; the cave at Sunderland, on the north side of Mount Toby, a remarkable fissure in the rocks; the Shelburne defile, where the road from Greenfield to Coleraine, following a small and rapid branch of Green river, finds its way among steep hills, which, at every few rods, gather in and seem to defy all passage; the road from Leyden to Bernardston, of a similar character and extremely beautiful; the glen in Leyden, where the Green river appears to have forced a passage through a deep chasm in the rocks, and at last makes a sudden escape by a cascade of surpassing brilliancy and beauty; the junction of the two great branches of the Deerfield river in Shelburne, and the grand passage of the river over the Shelburne falls; and the whole road of most remarkable interest and picturesqueness of natural scenery by the banks of the Deerfield river, for a distance of perhaps twelve miles, through Charlemont and Zoar, to the foot of the Hoosic mountains, are all suited to charm the man of taste, and want nothing but the fictions of romance to make this region the true home of poetry. Ascending the Hoosic mountain, and from its summit looking back upon the country which you have traversed, mountains and hills, combining the highest forms of grandeur and elegance, crowd upon the sight. The Deerfield river is seen for a long distance, like a narrow thread winding its silver current among these mountains, covered with the thickest foliage from the base to the summit, with here and

there a cultivated spot to relieve the picture, and to show the triumph of human labor and enterprize over the roughness and fierceness of nature, and the whole view is one of innumerable attractions and great magnificence. A gentleman of distinguished intelligence and cultivated taste, who has more than once made the tour of Europe, has pronounced it scarcely inferior in interest to any view which he has seen abroad. It seems to want nothing but the fallen battlements of some ancient castle, or the moss-grown walls of some deserted château, or the bloody exploits of some ancient bandit, or the thrilling tale of some love-sick damsel, borne away as a prize in the chivalrous arms of some iron-clad knight-errant, to convert it into a perfect region of romance. Or, perhaps, it only needs to be farther removed from us, and to demand for the sight of it the expense and toil of a voyage to Europe, to attract admirers from all parts of the country.

I hope I shall be pardoned for departing from the proper gravity of an agricultural report to speak of the enchanting scenery of this delightful region; but the pleasures which I have myself enjoyed in its exploration, I am anxious to recommend to others. The kind residents among these hills and along these sequestered valleys will be happy in knowing how much pleasure they afford to those who traverse them; and even the plain matter-of-fact men, the most grovelling and mercenary, may not deem it labor lost if, by the beauties of the country, we can honestly attract the summer visits and residence, or even the passing tours, of the inhabitants of our cities, who may thus furnish a quick and generous market for their surplus produce.

REPORT

ON THE

AGRICULTURE OF THE COUNTY OF MIDDLESEX.

I. General Description.—Middlesex is one of the largest and most populous counties in the State. On the east it is bounded by Essex county and a portion of Suffolk; on the south, by Norfolk; on the west, by Worcester county; and its northern line is, throughout, contiguous to New Hampshire. Its population in 1837 was 98,565, and to a square mile, 123. It embraces forty-six towns, among which are the city of Lowell, and the large towns of Charlestown, Cambridge, Brighton, Watertown, Waltham, Groton and Concord. It is watered in different parts by several rivers, as the Merrimack, the Concord, the Nashua, the Medford, and the Charles rivers; and Charlestown, Cambridge and Medford lie upon Charles and Medford rivers, which are connected with and form a part of Boston harbor. Medford, on Medford river, has long been celebrated for the building of ships, the hulls of which are, at seasons of high water, got down, not without considerable labor, into Boston harbor; but excepting in such cases Medford river is used but to a small extent for the purposes of navigation. Flat-bottomed boats sometimes proceed as far as Watertown, on Charles river. Sloops and schooners, loaded with lumber and lime, discharge at Cambridge; and Charlestown, below its bridges, affords some of the best anchorage in the

world. A considerable portion of its marine shore is occupied by the navy-yard of the United States.

Middlesex county is intersected by rail-roads in a manner which renders the communication of its different parts with the capital extremely easy and expeditious. The southwestern part of the county is traversed, to a considerable extent, by the Worcester rail-road, soon to be transformed into the great Western rail-road. Towards the northeast, the Lowell and Nashua rail-road, and, connected with it, the upper Eastern rail-road, traverses the whole breadth of the county. Besides these, the Middlesex canal, the first work of the kind of any considerable extent in the country, lies wholly in this county, and connects the waters of the Merrimack river with Boston harbor, thus opening a free communication between the interior of New Hampshire and the capital of Massachusetts, and furnishing a convenient transit for a vast amount of goods and produce, and especially of lumber and fuel. No part of the State presents so many good markets for agricultural produce, and so convenient means of access to them, with such facilities of general intercourse.

II. Aspect of the County.—The general aspect of the county presents nothing interesting or picturesque, but the neatness and good condition of the buildings and appendages on the farms, the ample evidences of wealth and abundance, and the general appearances of industry and thrift, indicate a condition of distinguished success and prosperity, if we put aside the commercial cities, not to be found in the same extent of territory any where else in the United States. The extensive manufacturing capital invested here and in active operation; the expensive and useful public improvements; the fairs at Brighton, where so many thousands of cattle are sold weekly, and vast amounts of capital are kept in active use; the liberal institutions for education in Harvard University and other seminaries; the provision for the relief of the insane at Charlestown; the establishment for the purposes of penal justice in the State's

prison, at the same place, hardly less an establishment for the insane, or for those afflicted with the most pitiable of all kinds of insanity, a moral unsoundness; the United States navy-yard, at the same place; the extensive nurseries and botanical gardens at Brighton and Cambridge; the monuments of taste at Mount Auburn, and of patriotism at Concord, and Lexington, and Bunker Hill; and the innumerable beautiful private dwellings, may I not say palaces, which crown the hills and adorn the valleys in Brighton, Cambridge, Watertown, Waltham, Medford and other places,—conspire to render the county of great interest. Perhaps no spot in the United States has connected with it so many marked and stirring associations in reference to the great events of our national history; few places have more at stake in the great interests of national industry; and from none are there sent out influences which operate with more power upon the intellectual and moral condition of the community. It does not, properly speaking, fall within my province to go largely into these views; yet there are few of the interests of any community which are not directly and intimately connected with its agriculture. The population and the employments of that population; the numbers devoted to the production of the fruits of the earth, and the numbers concerned in their consumption; the agricultural products used in various branches of manufactures and commerce; the variety and demands of the various markets accessible; the facilities of communication with different markets, and the influence of general employments and the means of education enjoyed upon the character of the rural population, are all circumstances entitled to consideration in the present case.

The surface of the county is in general flat, and not marked by any great elevations. In looking at the present condition of the county, and especially the vicinity of the capital, it is instructive and impressive to contemplate the changes which have been effected in a period comparatively not long. In proceeding northerly from Boston or Cambridge, in the course of a very few miles the country becomes somewhat broken, and a

range of hills stretches to a considerable extent from west to east. When our ancestors made their settlement at Shawmut, now Boston, it is said that they sent out a number of persons to examine the country to the north. These persons, having reached this first range of hills, then covered with forests, returned and reported, that, having reached a mountainous and rocky country, they deemed it best to come back, as there was no probability of the settlements ever extending beyond these mountains. How short-sighted are all human calculations, and how far and how widely, destined to be checked only by the waters of the great Pacific, has the tide of population rolled beyond these limits!

III. Area of the County and its Divisions.—The area of Middlesex county includes 800 square miles, and its territory is thus divided, according to the last report of the Valuation Committee:

In tillage,	acres,	30,019
English and upland mowing,	"	59,600¼
Fresh meadow,	"	36,977¼
Salt marsh,	"	2,322¾
Pasturage,	"	136,241½
Wood,	"	71,567½
Unimproved,	"	112,678½
Unimprovable,	"	12,031
Owned by towns or other proprietors,	"	13,302
In roads,	"	12,625½
Covered with water,	"	16,573¼
	Total,	503,938½

IV. Soil.—The soil of Middlesex county is in general hard and rocky. This remark applies particularly to the elevated parts of it. The rocks abounding in the county are granite. There are deposites of clay slate in the southern part of the county of unknown depth, and which furnish to their vicinity

excellent building materials; but there are no extensive tracts of soil which come under that denomination. Clay soils are found in the neighborhood of the great estuaries, and on the banks of the Merrimack. In the centre of the county and in some other parts are extensive tracts of sandy soil. There are very large tracts of fresh-water marshes, the drainage of many of which is now rendered impossible by the dams of the manufacturing establishments. Bog and peat meadows are frequent and extensive throughout the county, furnishing large supplies of fuel, and many of them, under highly skilful improvements, transformed into most productive meadows for vegetables and grass. The soil of the county, considered as a whole, must be pronounced hard and unproductive. The abundant and profitable crops which are gathered from it—and in many instances the agriculture of the county for its success and returns is not surpassed in the State or country—are the result of distinguished skill and well-applied and indefatigable labor.

V. Pursuits of the Inhabitants.—The pursuits of the inhabitants are various, and trade and manufactures greatly predominate over the agricultural interest. Property to a vast amount is invested in the different manufacturing establishments, and especially at Lowell and Waltham. Many persons engaged in trade and commerce in the capital have their residences in the vicinity in this county; and though in general their occupations are on a small scale, yet their means give them the power of free expenditure and their establishments do much to improve and adorn the country. The capital, with the large towns in its vicinity and the several villages and manufacturing towns in the interior, afford a ready and quick market for all the products of agriculture. This condition determines in a great measure the character of the agriculture of the county—which is confined rather to the production of vegetables, fruits, butter, and articles that find an immediate sale in the towns, than to products on a large scale, to be sold in great quantities or consumed upon the farm. Large amounts of hay are produced in

many of the districts; but of this likewise no small part is sold in the towns, at taverns, to stage and wagon establishments, and not consumed upon the farms. In the immediate vicinity of the capital, the cultivation would rather come under the designation of garden culture than of field culture. In some parts of the county, this cultivation is carried to a high degree of improvement. A considerable portion of the rural population are themselves marketers, sending directly to Boston or other principal markets daily or weekly; and through every part of the county market-wagons pass at regular times, taking the produce of the farmers in butter, eggs, poultry, veal, &c. and selling it upon commission.

In addition to this, a large number of farms are devoted to the production of milk, which is sent to Boston daily, in some cases a distance of twelve or fourteen miles; and the small farmer, the keeper of four or six cows, disposes of his milk to the large dealer, who receives it on his route or to whom it is sent in order to be taken to market. It is difficult to form an estimate of the amount exported, or the cash received in this way and from these innumerable and various sources of income; but it must be very large. Sales of fifteen hundred dollars' worth of turnips from a single farm in one year; from another, of more than twelve hundred dollars' worth of winter apples; from another, three hundred dollars' worth of peaches; and another, of nearly eight hundred dollars' worth of strawberries, and early potatoes to the amount of six hundred dollars from two acres, have been reported to me under circumstances which do not allow me to doubt the truth of these statements.

VI. Crops and Products.—The crops cultivated in the county are to a certain extent the same as in other parts of the State: Indian corn, rye, oats, barley, wheat, potatoes, carrots, ruta-baga, mangel-wurtzel, and common turnips. Every variety of culinary vegetables which the climate allows is produced in all parts of the county. Grass is raised to a great amount for market; and hops, heretofore much more than at present, have been cultivated for exportation. With the exception of hops, apples,

and some garden vegetables, no agricultural produce is grown for foreign exportation, and the produce grown is not sufficient to half-satisfy the wants of the county. Much of it indeed goes into other counties; but a great deal more is brought into than is carried out of the county. Considerable amounts of pork are fatted, but few hogs are raised in the county; and of beef and mutton a small amount is either raised or fatted. Occasionally, a farmer is found who fattens a yoke of cattle after they have become too old to be worked; but in no case within my observation is the fatting of cattle made a regular part of the farming operations.

Of the crops raised it will be expected that, as in other counties, I should give some statements of the expense of cultivation and the yield; and this I shall do from farmers in the county who have communicated them. I have to regret, however, that, notwithstanding many promises of full and detailed reports, my returns are few and stinted.

1. Indian corn is raised, to a greater or less extent, on every farm, but it is cultivated exclusively for home consumption. It would be difficult, when all circumstances are considered, to name a plant whose uses are more numerous, or whose value is greater; and the cultivation of it might be extended to great advantage. Crops of one hundred and sixteen bushels have been produced in the county. Under good cultivation fifty and sixty bushels are obtained, but the average yield is not more than thirty-five bushels. When it is seen what can be done and what ordinarily is done, it would seem as though the comparison must have its natural effect.

I shall give the statements of particular farmers as to the amount of their own crops; probably in this case the highest yield is given.

In Chelmsford, 70 to 80 bushels per acre. In Tyngsborough, 50 bushels and 70 bushels; the average yield through the town is supposed to be 40 bushels. In Dunstable, 30 to 40 bushels. In Tewksbury, 35 bushels. In Shirley, 35 bushels. In Lexington, 75 bushels. In Westford, 30 bushels. In Framingham, from 40 to 60 bushels. In Marlborough, 30 to 40

bushels; sometimes 50 bushels. In Pepperell, 40 to 50 bushels. In Groton, 50 bushels. In Townsend, 25 to 30 bushels; sometimes 40 bushels. These results are quite various; but I must leave them as they are given.

1. In Groton, the expenses of cultivating an acre of corn, allowing, as in all other cases, one dollar per day for labor, are given as follows:

Ploughing, 3 50; rolling and harrowing, 75, . .		4 25
Compost manure, 15 loads, consisting of 3 loads of dung mixed with loam, clear barn manure being not approved, ...		12 00
One man and one yoke of oxen, 1½ day putting manure in the hill, ...		3 00
Seed, 25; first hoeing and horse, 2 50, . . .		2 75
Second and third hoeing and horse, . . .		4 00
Topping stalks, 1 50; cutting up and gathering, 2 00,		3 50
Husking, 3 50, ...		3 50
		32 50
Returns—Stover = 1 ton of hay, . .	12 00	
50 bushels corn, . . .	50 00	
		62 00
Balance in favor of corn,		$29 50

2. In Chelmsford, the expense of cultivating an acre of corn is estimated as follows:

Ploughing, 3 00; furrowing and planting, 1 50, .		4 50
Manure, 5 cords, 35 00, ...		35 00
Three hoeings and horse, 4 00; topping stalks, 1 50,		5 50
Seed, 25; gathering, 1 75; husking, 2 50, . .		4 50
		49 50
Returns—Corn, 40 bushels, at 1 25, .	50 00	
Stalks and butts, . . .	12 75	
		62 75
Balance in favor of corn,		$13 25

The value of manure, as rated above, is enormous. It is charged as distributed in the field. To most persons, the price will appear incredible; yet I have known it sold in the county, delivered at the stable, at $6 50 per cord. The amount of crop, likewise, is small for such manuring. The price of the corn, also, is above the average price. I give the amount as I received it from a respectable farmer, but it obviously deals in extremes.

3. In Tewksbury, the expense of an acre is rated as follows, by a most careful and successful farmer:

Ploughing, 2 75; planting and manuring, three men and one yoke of oxen,		6 75
Manure, 12 buck-loads = 3 cords, half manure and half dirt, taken from head-lands,		9 00
Two hoeings, 3 50; topping stalks, 1 00,		4 50
Gathering, 2 00; husking, 2 00,		4 00
		24 25
Returns—Corn fodder equal to half a ton of hay,	7 50	
35 bushels of corn,	35 00	
		42 50
Balance in favor of corn,		$18 25

4. In Marlborough. Expense of an acre of corn.

Ploughing, two yoke of oxen, boy and plough,	4 00
Four cords of barn manure, at 4 dollars per cord,	16 00
Three cords of compost, at 2 25,	6 75
Getting out 12 loads, spread broadcast,	3 00
Manuring in the hill, 3 00; harrowing in manure, 1 00,	4 00
Furrowing, 50; planting and covering, 1 50,	2 00
First hoeing, including horse, 2 00; 2d and 3d hoeings, 1 50,	3 50
Topping stalks, 1 50; cutting up and gathering, 1 25,	2 75
Husking, 3 00,	3 00
	45 00

Returns—Stover on an acre = 1 ton of hay,	15 00	
50 bushels corn, . . .	50 00	
		65 00
Balance in favor of corn,		$20 00

The cultivation in this case is quite expensive, and the return of stover, in value, large. The cost of manure is great; and the crop is not so large as this cultivation should make it.

5. In Pepperell, the expense of cultivating an acre of corn is represented as follows. In this case, it is understood to follow potatoes. This reduces the expense of ploughing.

Ploughing, 2 00; furrowing and harrowing, 50; seed, 25, ...	2 75
Manure, 12 loads, equal to 4 cords—carrying out and manuring in the hill, ...	16 00
Three hoeings and horse, 4 00; topping stalks, 1 00,	5 00
Gathering, 1 50; husking 40 bushels, 2 25, . .	3 75
	27 50

Returns—Corn fodder, ...	10 00	
Corn, 40 bushels, . . .	40 00	
		50 00
Balance in favor of corn,		$22 50

6. In Dunstable. Expense of an acre of corn.

Ploughing, 3 00; harrowing, planting, and getting out manure, 4 00, ...	7 00
Fifteen loads or four cords of manure in the hill, .	20 00
Harrowing, both ways, 1 00; first hoeing, 1 50, .	2 50
Second and third hoeing, 2 50; topping and tying up stalks, 1 50, ...	4 00
Cutting up and getting in, 1 00; husking, 3 00, .	4 00
	37 50

Returns—Corn fodder, ...	15 00	
40 bushels corn, ...	40 00	
		55 00
Balance in favor of corn,		$17 50

7. In Tyngsborough, the expense of cultivating an acre of corn is given as follows:

Ploughing, 4 00; seed, 12½; planting, 2 00, . .		6 12½
Ten loads compost manure, 25 00; getting out and applying manure, 6 00, ...		31 00
Hoeing twice, well, 7 00; topping stalks, 1 00, .		8 00
Gathering, 2 00; husking, 5 00, ...		7 00
		52 12½
Returns—Stalks and butts, . . .	18 00	
50 bushels corn, . . .	50 00	
		68 00
Balance in favor of corn,		$15 87½

The expense in this estimate is very extraordinary. Manure constitutes the great item; but it is to be remembered that only one crop is manured in the rotation, and the beneficial effects of the manure are felt through four years at least. A fourth of the expense only then should be properly charged to the corn. The estimate of the corn fodder is high, but the farmer rated it, when well cured, as equal to one and a quarter ton of hay. My own opinion, when the crop is fifty bushels, would place it at three fourths of a ton.

Another estimate of an acre of corn, given me in this town, is subjoined.

Ploughing, 3 00, ...	3 00
Manure, 16 loads, equal to 5 cords ploughed in, .	20 00
Getting out and spreading manure, . . .	3 00
Two loads compost, put in the hill, . . .	2 00
Manuring in the hill and planting, . . .	2 00

Hoeing, 4 00 ; horse to plough, 75, . . .		4 75
Topping and binding stalks, 1 00, ...		1 00
Gathering, 1 50 ; husking, 3 00, ...		4 50
		40 25
Returns—Value of corn fodder equal to 1¼ ton of hay, ...	18 75	
40 bushels corn, . . .	40 00	
		58 75
Balance in favor of corn,		$18 50

8. In Shirley, the subjoined was given as the expense of cultivating an acre of corn.

Ploughing, 4 00 ; manure, 15 loads or 3 cords, 12 50,		16 50
Manuring in the hill, with two men and one yoke of oxen, ...		3 00
Furrowing, 75 ; planting and covering, 1 50, . .		2 25
First hoeing, 2 50 ; second and third hoeings, 4 00,		6 50
Topping stalks, 1 00 ; gathering corn, 1 50, . .		2 50
Husking, ...		2 00
		32 75
Returns—Value of corn fodder, . .	14 00	
35 bushels of corn, . .	35 00	
		49 00
Balance in favor of corn,		$16 25

Of two of the largest crops of corn ever raised in the county it may not be amiss for me to give the particulars of the cultivation.

The land had been used for pasture ground for nearly thirty years. In the fall it was ploughed. In the ensuing spring it was again well ploughed, and planted with corn in the hills, in the common form ; but well manured in the *hill* with a mixture of horse-dung, lime and ashes. When the corn was fit for weeding, half a pint of unleached ashes was applied to each

hill; a part, however, was left without any ashes. The difference between the corn which had ashes applied to it and that which had none, was very apparent. The corn had a slight ploughing when it was weeded, and was half-hilled early on account of its rapid growth. After this, a plough was not suffered among it, nor had it any more hoeing, except to destroy the worst of the weeds, and to stir in the turnip-seed which was sown among it. The product of this corn was at the rate of 78¼ bushels to the acre.

The same field was ploughed again in the fall after the gathering of the crop; and again well ploughed in the spring and harrowed out at a distance of four feet, leaving each furrow one foot wide. The furrows were well manured with a compost of horse-dung, lime, ashes and dock-mud. The seed raised the last year was planted in the drill on every furrow, making three rows to each. Care was taken to drop the seed about six inches apart. When the corn was at a proper stage, it was carefully thinned; and after weeding, it was dressed with unleached ashes through each drill or furrow. It was half-hilled early in the season on account of its rapid growth, being undoubtedly strongly stimulated by the high manuring of the land the previous season.—It had a slight ploughing at this season; and soon after half-hilling, the suckers or barren stalks were all carefully cut off.

The corn was planted in the latter part of May; the stalks topped the first week in September, at which time most of the corn was dry enough for grinding. On the 13th of October it was gathered, and a measured acre of this corn produced one hundred and eleven bushels and one peck. The soil was deep black upon a yellow loam, and that resting upon a gravelly and clayey pan. It will be found that, by this mode of planting three rows to each furrow, there will be more than double the stalks of corn on the same surface than if planted in the usual way.

I subjoin an account of the cultivation of another field of corn in the county.

The soil is a deep yellow loam. It was manured with ten

cart-loads of green barn manure spread on the ground, and eight loads of compost manure put in the hills, and a crop of corn taken from it. The ensuing year it was twice ploughed in the spring, and twenty cart-loads of green barn manure spread on it. It was then furrowed in rows about three feet and a half apart; and about twenty cart-loads of barn, hog and slaughter-yard manure were put in the rows: with the last manure was mixed a hogshead of lime. The kernels were planted eight inches apart in the rows. The corn was hoed three times; all the suckers were pulled out in July; and in August were taken away together with the false and smutty stalks. On the 1st of September the stalks were topped; and on the 26th the corn was harvested and spread on a floor, under the roof of a long shed, that it might dry well. On the 14th Nov. the whole was shelled:—it measured one hundred and sixteen bushels, and three and a half pecks of clear sound corn. Weight of the corn 56 lbs. to a bushel.

The value of the stalks and suckers was considered equal to two tons of English hay. The expenses of the cultivation were estimated as follows:—

Ploughing, 2 50; manure, 25 00; seed, 50, . .	28 00
Furrowing and planting, 4 00; hoeing, 4 00, .	8 00
Suckering and topping, 4 00; harvesting, 4 00, .	8 00
	$44 00

This, it must be admitted, is an extraordinary crop, but the account is well attested.

It has been made a question whether more corn can be obtained from an acre planted in hills than from an acre planted in drills or rows. In an experiment to test this point, made with much care by an intelligent farmer, half an acre, planted in drills, gave twenty-eight and a half double bushels of ears; and the adjoining half-acre gave twenty-three and a half double bushels of ears, making a difference of five bushels in favor of the half-acre planted in drills. This does not, in my opinion,

settle the point: the result must depend on the question, by which method the largest number of plants can be produced upon an acre—allowing to each plant ample room for its culture and the expansion of its roots and leaves, with sufficient space for the free admission of the sun and circulation of the air. Where corn is intended to be ploughed both ways, it must be planted in hills at a distance of not less than three feet each way. Corn planted in rows three feet apart, and in double lines in alternate distances eight inches apart, would give many more plants than if planted in hills at three feet square, leaving from three to four plants in a hill. The produce from a field thus planted in rows is likely therefore to be considerably larger than if planted in hills. Where manure is spread likewise on the field, the separation of the plants, which is more likely to be provided for in drills as above than in hills, where the seeds are commonly thrown into close proximity, will enable their roots to come more immediately at the manure. Where the corn is manured in the hills, there of course the plants come directly upon the manure. The land is not benefited equally by manure put in the hills only, as by manure spread broadcast, and the planting is in a trifling measure more expensive; but then, on the other hand, as much manure is not applied. For the benefit of the land, the manure should always be spread: at the same time, where manure is abundant, it is well to put some directly under the corn at planting, that the development of the plant at its first starting, when all its nourishment is derived through the roots, and before the leaves are unfolded in order to gather food from the air, may be as much as possible assisted and stimulated. The largest crops of corn which have come within my knowledge have been raised in drills, with manure placed under the drills and likewise spread liberally broadcast upon the field. At the same time, I know farmers in the State whose crops average seventy-five bushels to the acre, who always plant in hills because they deem the cultivation easier. I submit these facts to the judgment of the reader.

On the culture of this crop, to which I have repeatedly refer-

red, I do not fear being too strenuous. It should be considered as the great crop of New England, and its cultivation ought to be increased tenfold; that is, where a farmer now cultivates one acre of corn he ought to cultivate ten acres. This, in most parts of the State, is practicable and may be done to great advantage. Of the actual amounts produced to an acre under high cultivation I have mentioned several instances so extraordinary as to stagger the belief of many farmers. Their belief or unbelief, however, does not affect the facts in the case; and these facts are authenticated beyond all reasonable question. In this county, one hundred and twelve and one hundred and sixteen bushels have been raised to the acre; in other parts of the State even larger crops than these; in New Hampshire, one hundred twenty-nine and one hundred thirty-two bushels; and in New York more than one hundred and seventy bushels have been produced to an acre. These statements ought to stimulate every farmer to improve his cultivation so that he may increase his crops to their utmost extent. Many farmers, intelligent and skilful, in their attempts to produce a hundred bushels of corn to an acre, have failed to do it and therefore maintain that it cannot be done. I do not see that this inference necessarily follows. Why they have failed in attempts which have been apparently well conducted, it is not easy to say. But their failure, although it may affect the intrinsic credibility of the statements of others, does by no means disprove the evidence by which such statements are authenticated. The real causes of their failure deserve the most critical inquiry and experiment.

It has been made a question whether, on a farm where the supply of manure is very limited, it would be best to apply the whole of the manure upon one acre only and produce one hundred bushels of corn, or upon two acres and produce fifty bushels to the acre. If the object be merely to obtain a single crop, undoubtedly it would be best to get the crop from a single acre, as the cultivation would be but half the expense of cultivating two acres. But if it be desirable, on account of the condition of the farm, at once to turn up more land with a view

to its renovation and to succeeding crops, it may be better to apply the manure and labor to two acres than to one. Notwithstanding such exceptions, it may be laid down as an established rule that the best cultivation, and, consequently, most productive cultivation, is to be preferred; and that whatever land we cultivate should be cultivated to as high a degree as possible. I confess the only substantial objection which I ever heard made to producing, where practicable, one hundred bushels of corn to the acre, was that made to me by a farmer in Franklin county, that "it was too much trouble to husk it." To how much consideration such an objection is entitled, I leave to the judgment of others. The amount of corn annually produced in Massachusetts is reported by the Valuation Committee at 1,775,073¾ bushels. The fraction in this case would seem to imply an extraordinary degree of exactness in ascertaining the quantity; but persons familiar with the manner in which these returns are made, will regard this only as an approach to exactness. It probably falls considerably short of the actual amount; but the amount, whatever it may be, ought to be largely increased. Acres and acres of land, now comparatively unproductive, might be placed under a course of productive cultivation; and the estimates and accounts already given of expenses and returns show conclusively that Indian corn, at prices which it usually bears among us, is a most profitable crop.

The practice of hilling corn has now generally gone into disuse. The labor of cultivating the corn was considerably increased by the practice of half-hilling and hilling; and, so far from the heaping up of the earth round the plant strengthening it against violent winds, it seemed to serve only as an edge or fulcrum over which the stalk of the corn was the more easily broken. The corn being cultivated on a flat surface, without this artificial support, accommodates itself to its situation by throwing out the more abundantly and strongly those natural roots or shoots by which it establishes itself against the wind; and is ordinarily able to right itself after being blown over.

It may not be improper to mention here that an enterprising farmer in Hampshire county has practised laying down his land to grass while in corn, sowing the grass seed among the corn at the last hoeing. The corn serves to shade the young plants of the grass against the summer's heat. The corn in such cases was not hilled at all; and the experiment has proved eminently successful.

Experiments have been made to test the advantages, if any, of suckering corn; that is, cutting or pulling off the suckers from the plant, and the barren stalks. In respect to the suckers, the experiments which have come to my knowledge, in a form to be relied upon, have shown no advantage whatever, or none which would compensate for the labor and for the injury which the corn almost inevitably suffers from cutting the suckers and carrying them out of the field.

A very observing farmer in Groton, however, is of opinion, after several years' experience, that great advantage is obtained from suckering corn before it is in flower; but after this, it is unadvisable to sucker it. The cases which have come under my observation have been, where the suckers were taken out after the corn had flowered. The opinion of this farmer deserves much regard.

One of the best cultivators of this crop in the State never suffers the plant to be topped or suckered; and when the corn is ready to be harvested, the plant being entirely dead and dry, he then gathers the corn in ears; and afterwards cuts up the plants at the bottom, puts them in bundles, and stows them immediately away in his barn. He says the fodder is equally well relished by, and equally nutritious to, his cattle as if the stalks had been topped, or the whole cut up in a less ripe state and dried in the shock. I cannot come so strongly to the same conclusion; but there is a considerable saving of labor in this management, and his own experience speaks well for the practice.

2. Wheat is cultivated on a limited scale, and I have the testimony of several respectable farmers in the county that

they raise wheat with equal success and certainty as Indian corn. This is the opinion of E. Phinney, of Lexington, and we can have no higher authority; and of William Adams, of Chelmsford, who has grown wheat twenty years with but a single failure in that time, and whose crops average thirty bushels to the acre. Forty bushels have been grown. The crop of wheat usually gives twenty bushels. Spring wheat is the kind planted. It is commonly taken after corn, sometimes with a good manuring of compost manure, but generally without manure in the year of the wheat.

1. The following estimate of the expense of cultivating an acre of wheat was given me in Shirley. This was taken after corn.

Ploughing, 2 00; sowing and harrowing, 1 50, .		3 50
Seed, 1¼ bushel wheat, 2 50; cradling and getting in, 3 00, ...		5 50
Threshing by machine, 1 50, ...		1 50
		10 50
Returns—Wheat, 18 bushels, (25 have been produced,)	27 00	
Straw, three quarters of a ton, .	3 00	
		30 00
Balance in favor of wheat,		$19 50

2. In Groton, the following estimate is given of the cultivation of an acre of wheat:

Twenty-four loads of compost manure, (no green dung applied,) estimated at 6 cords, at $2 per cord,	12 00
Carrying out and spreading, 3 00; 1¾ bush. seed, 5 00,	8 00
Ploughing shallow upon the old sward so as not to break it, ...	1 67
Reaping and harvesting, ...	2 00
Threshing, with machine, 10 cents per bushel, .	2 00
	25 67

Returns—20 bushels of wheat, at 1 75, .	35 00	
Straw, 1¼ ton, . . .	5 00	
		40 00
Balance in favor of wheat,		$14 33

The items here are extraordinary. The wheat in this case followed corn. It is not usual to manure for wheat as in this case; the manure which was given to the corn, where wheat follows corn, being deemed sufficient. The compensation for this extra manuring is not to be found in the crop returned, but in the permanent improvement of the soil. The price paid for seed, likewise, is enormous; and the wheat is valued at a high price. I have known these and indeed higher prices paid, but they are not common.

It is the practice of this farmer, when breaking up land for corn, to invert the sward completely, laying it as flat and close as possible. His corn is cultivated without breaking the sward. The second crop, which is wheat, rye or oats, is sown with a light ploughing or harrowing, without disturbing the sward, and grass seed is sown with the small grains. The vegetable matter thus turned over becomes gradually converted into humus or mould, and remains protected from evaporation by the sun and air for the nourishment of the plants cultivated upon it.

3. In Tyngsborough, wheat has been successfully cultivated. In one case, 1⅛ acre produced 22½ bushels; in another case, 1¼ acre gave 32½ bushels. Another farmer speaks of having raised wheat for fifteen years in succession, and with advantage, having in that time had his crop injured twice only, and that by blight. In Littleton and in Pepperell the farmers reported to me a uniform success in raising wheat for several years; and speak highly in such cases of the application of ashes.

These are all the estimates I shall now give on the culture of wheat. Having gone so fully into the subject in my Third Report, and in the Report on the Culture of Spring Wheat, prepared by order of the Senate, it would seem superfluous to treat the subject more at large. There is no natural impediment

in Middlesex to its cultivation. The soil most favorable to wheat is one strongly aluminous. This kind of soil does not prevail in Middlesex county, and but to a comparatively small extent in Massachusetts; yet there are few places where the natural deficiencies may not be supplied, or the natural difficulties overcome by cultivation; and wheat, at twenty bushels to the acre, may be considered as one of the most profitable crops in the ordinary rotation. What seems mainly wanting to success is cleanness and carefulness of cultivation, liberal manuring for the previous crop, and a plentiful supply of ashes to meet the deficiency of potash in the soil. Some experiments have been made in the application of saltpetre, sown broadcast over the growing crop. The effect apparently has been to increase the luxuriance of the growth of the plant without increasing the product of the grain; but few trials have been made, and those not conducted with much exactness, so that in the present imperfect state of the inquiry no great confidence can be placed in the conclusions supposed to be reached.

3. Oats are frequently made the second crop in the rotation. They are not grown to much extent, compared with the population and demand, though nearly one hundred and three thousand bushels are given as the annual amount to the Valuation Committee. The crop is rated upon an average at forty bushels to the acre. The price is generally about three eighths the price of Indian corn. This is almost always above their intrinsic value, but the convenience in using and transporting them, and the constant demand for them in livery stables, secure a large price.

They are generally taken as a second crop, after corn or potatoes, the manure being applied to the previous crop.

1. The subjoined is one estimate of the cost and returns of cultivation.

Ploughing, 2 00; seed, three bushels, 1 50, . .	3 50
Cradling and harvesting, ...	2 00
Threshing, ...	3 00
	8 50

Returns—40 bushels of oats, 20 00; straw, 7 00, .		27 00
Balance in favor of oats,		$18 50

2. In Dunstable, the charges of cultivation are as follows:

Ploughing, 1 50; 3½ bushels of seed, 1 75, . .		3 25
Sowing and harrowing, ...		75
Cradling and stooking, 1 50; threshing, 4 00, . .		5 50
		9 50
Returns—40 bushels of oats, . . .	20 00	
Straw, one ton, . . .	8 00	
		28 00
Balance in favor of oats,		$19 50

3. In Tyngsborough, the cost is thus given. The crop is taken after corn.

Splitting corn hills, sowing and harrowing, . .		2 50
Seed, two bushels of oats, ...		1 00
Cradling and tying up, 1 00; threshing, 2 00, .		3 00
		6 50
Returns—40 bushels of oats, . . .	20 00	
1 ton of oat straw, . . .	8 00	
		28 00
Balance in favor of oats,		$21 50

This is very light cultivation; and the land is ploughed once only for the whole course. The seeding too is small; very few farmers allow less than two bushels to an acre. Crops of sixty bushels and more are frequently raised, where the land is in high condition. In Worcester county, I have the assurance of the present Governor of the Commonwealth, that he has produced one hundred bushels to an acre; and in Berkshire county, a crop of eight acres has averaged ninety-six bushels to the acre. The general yield through the State, however, does not exceed

forty bushels. Two kinds of oats are cultivated in the State,—the common oat, with a branching and spreading top, and the Tartarian or horse-mane oat, so called from the seed hanging together in clusters on one side. The plants ripen at different times, and it is therefore improper to mix them in sowing.—The Tartarian oat is generally of stouter growth than the common oat, and is about equally productive, the crops of one farmer within my knowledge, who has cultivated it for several years, averaging sixty bushels to the acre. His cultivation throughout, however, is of the best character, and his other crops correspondent.

4. Rye is frequently sown by the farmers, in the place of oats, as the second crop in the rotation.

1. In Tyngsborough, the expense of cultivation, and returns, are thus estimated :

Ploughing, 2 00; 1 bushel of seed, 1 25, . .		3 25
Sowing and harrowing, 1 00; reaping, 2 00; threshing, 2 00, ...		5 00
		8 25
Returns—Rye, 20 bushels, at 1 25, .	25 00	
Straw, ...	6 00	
		31 00
Balance in favor of rye,		$22 75

There is no crop, the cultivation of which in general is so negligent and slovenly as that of rye. Twenty bushels are much beyond the usual yield. The product always commands a good price, so little is raised among us, and that which is imported from other parts of the country too often abounds in ergot or smutted rye. The straw of rye commands in general, in the city, a price which seems quite disproportionate, so little is brought to market and it is so desirable for litter. I have known forty-five bushels of rye produced on an acre. In my opinion few crops would pay better for improved cultivation. On newly

ploughed land in Dunstable, it is said to produce from 15 to 20 bushels to the acre ; in old fields long under cultivation, where it is repeated from year to year, it yields 7 and 8 bushels. On pine lands, on which a crop is obtained once in four years, the product is stated to be from 10 to 15 bushels: 15 must be the maximum, for no manure is applied in such cases, and the land is left by rest to recruit itself. This must be considered as very bad husbandry. In such cases clover should be sowed with the rye, in order to be ploughed in, in the second year of its growth. Gypsum and ashes should be tried upon such land. Ashes seldom fail to be beneficial ; of gypsum it can never be said whether it will be efficacious or not without a trial, but a trial is easily made. If the grass seed do not take readily on such land, the application of only a small quantity of manure, or even of rich loam, will remedy the evil ; and after the clover has once a firm footing in such soil, its improvement is easy and certain. This land is valued in Dunstable at ten dollars per acre. In many parts of the State such land may be purchased for seven. Though under this management it pays a fair profit, yet such husbandry deserves condemnation. There are thousands of acres in the Commonwealth of this kind of soil, which are capable of being made quite productive, suffering, if not under the original curse, under the present curse of neglect and occasional severe croppings.

2. In Groton, rye is represented as subject to blight ; from what local cause, if any exists, is not known. Here it is obtained on pine-plain land once in three years, the average crop being from 10 to 12 bushels. Spring rye only is cultivated. In Tewksbury, rye is taken once in three years, and gives eight bushels to the acre.

3. An estimate of the cultivation of rye in Dunstable is as follows :—

Ploughing and harrowing, 2 00 ; seed, 1 bush. 1 00,	3 00
Reaping and binding, 1 50 ; threshing, 1 25, . .	2 75
	5 75

Returns—15 bushels of rye, . . .	15 00	
Straw, ...	4 00	
		19 00
Balance in favor of rye,		$13 25

This is the estimate of an intelligent and respectable farmer; but he must pardon my distrust in suggesting that fifteen bushels is an extraordinary yield for such cultivation. Farmers in general are of opinion that, with the same cultivation and on the same land, they can get as much wheat as rye. The superior value of wheat therefore gives it a decided preference. The seed of wheat is more expensive; the dangers of blight and failure are more numerous. Rye is considered a more hardy plant than wheat. Wheat would repay a much more careful cultivation than it receives, and so undoubtedly would rye.

5. Barley is sometimes raised, but is not to be considered in any part of the county as an established crop. In Marlborough, the yield is rated at from 25 to 30 bushels: in Groton at 35 bushels. These estimates are to be considered rather as individual than as general facts; as, in a crop of this nature, very much must depend on soil, manuring and cultivation.

1. Its cost of cultivation in Marlborough is thus given:

Ploughing, 2 00; seed, 2½ to 3 bushels, at 80 cts. 2 40,		4 40
Sowing and harrowing, ...		1 50
Mowing and getting in, 2 50; threshing, 2 80, .		5 30
		11 20
Returns—28 bushels of barley, at 80 cents,	22 40	
Straw on an acre, . . .	5 00	
		27 40
Balance in favor of barley,		$16 20

This crop was the third in the rotation; first, corn; second, potatoes; third, barley. The corn and potatoes were both manured.

2. In Bedford, the expense of a crop of barley is thus given:

Ploughing, 2 00; sowing, harrowing and rolling, 1 50,		3 50
Two bush. seed, 2 00; mowing and harvesting, 2 00,		4 00
Threshing by machine, at 5 cents per bushel, . .		1 00
		8 50
Returns—20 bushels barley, . . .	20 00	
Straw, ...	10 00	
		30 00
Balance in favor of crop,		$21 50

3. In Groton, the culture of an acre of barley is thus rated:

Ploughing, 1 67; manuring, 15 00; 3 bush. seed, 2 25,		18 92
Reaping, 2 00; threshing, 2 00, ...		4 00
		22 92
Returns—35 bushels barley, at 75 cents,	26 25	
Straw on an acre, . . .	5 00	
		31 25
Balance in favor of barley,		$8 33

4. Fifty-four bushels of barley have been raised upon an acre in Sherburne. The land in the previous year was in Indian corn, and received about twenty loads of barn-yard manure, spread and placed in the hills. The soil is a dark rich loam, level and moist. The crop of corn was forty bushels. The ensuing spring it was ploughed early, and eight loads of barn-yard manure were spread on the land and ploughed in. This ploughing was about eight or nine inches deep. It was then ploughed a third time with a horse plough, and fifty quarts of clean seed were sowed upon the furrows and harrowed in. It was harvested in July, and the product was fifty-four bushels of sound barley. The amount of seed here sowed was about half the usual quantity, but it was thought the crop would not have been increased by sowing more seed; and the large yield was attributed to the excellent preparation of the land.

5. Ninety-seven and a half bushels, or at the rate of sixty-five bushels to the acre, have been raised in Townsend on an acre and a half. The particulars of the cultivation I have not been able to obtain.

6. Buckwheat is seldom cultivated. One of the best farmers in the county obtained, in one case, ninety-six bushels on three acres. This was upon an intervale meadow on the Merrimack river, considered an inferior portion. The production in the county is however so limited that it is hardly entitled to a place among the crops grown.

7. Potatoes are raised as matter of course by all the farmers in the county for family use, and by the market-gardeners in the vicinity of the large towns for sale.

In Dunstable, the average yield is rated at 150 to 200 bushels. In Tyngsborough, one farmer rates his crops at 200 bushels to the acre; another at 300 bushels. In Chelmsford, a farmer reports having raised 490 bushels to the acre. They are often planted upon greensward newly broken up, and frequently follow corn as the second crop in the rotation.

A Middlesex farmer reports having made an experiment in the cultivation of potatoes with two different kinds of manure. In one field he applied "a compost manure of a year old, made up of about one half of clear cow and horse dung; and the other half of the best meadow mud, and put in the hill the same quantity that was used for corn." In another field he used "coarse and long dung, being the moist and newly made manure from the barn-yard and cellar, with a good mixture of old refuse hay and straw and nothing else." The field planted with the coarse manure produced a third more potatoes than that planted with the old manure.

Early potatoes are cultivated with great pains in the vicinity of Boston, where, at their first coming, they sometimes command fifty cents a peck. I have known six hundred dollars obtained from two acres of early potatoes, but such a case is very extraordinary. The earliest kind in this case are selected and laid upon a bed of hot manure from the stable, early in the

spring, on the sunny side of a hill, covered with a very light covering of loam. In this way they sprout early, and are then transplanted into the rich and warm ground, where they are intended to remain. They must be transplanted with much care; and are yet liable to be cut down by frosts. The first potatoes brought to market command a high price.

It would be difficult to enumerate the various kinds of potatoes cultivated, and more especially as the same potatoes are differently designated in different places. The early potatoes are a small white flattened potatoe; the Chenango or Pennsylvania blues are a kidney-shaped potatoe, and are much valued for their eating qualities, their earliness, which places them soon after the first which come, and their continuing good for the table even until quite late in the season. They are likewise good bearers. The La Plata, or long red potatoes, are much cultivated for an eating potatoe late in the spring, as they are scarcely in an eating condition until that time. They are likewise good bearers. It seems however scarcely possible, in a comparatively old country like this, to produce as good eating potatoes as are found in a new soil and in a cold and moist climate.

1. I give an account of the cost of cultivating potatoes; in Shirley, for example.

Ploughing, 4 00; manuring in the hill, 15 50, .	19 50
Seed, 20 bushels, 5 00; two hoeings, 4 00, . .	9 00
Digging, ...	10 00
	38 50
Returns—200 bushels potatoes, ...	50 00
Balance in favor of potatoes,	$11 50

2. In Pepperell the account is thus:

One acre of potatoes.

Two ploughings, 6 00; furrowing, 50, . . .	6 50
Twelve loads of manure spread, six put in the hill, .	16 00

Ten bushels of seed, 3 33; covering and planting, 4 00,	7 33
Hoeing twice, including ploughing, 5 00; digging, five days, 5 00, ...	10 00
	39 83
Returns—Produce, 150 bushels, at 25 cents, . .	37 50
Loss,	$2 33

Of the best method of cultivating potatoes, whether in hills or in drills, the question is not yet determined. I believe that more may be produced to an acre, and that upon the whole they are more easily cultivated, in drills than in hills; yet some excellent cultivators advise to plant them in hills, to plough both ways, not to raise the earth round them, but to leave the hill formed by the passage of the plough both ways in a flat or rather concave state, so that whatever water falls upon the surface may be directed to the centre of the hill, and consequently to the roots of the plant.

8. Mangel Wurtzel, &c.—Of other vegetables raised in the county it cannot be necessary to go into a particular account. The usual varieties are produced in all parts of the county; and the market in Boston is supplied with some of its earliest and best vegetables from the gardens in Middlesex. It would be interesting and useful to point out the particular modes of cultivating and forwarding these different varieties, but this would occupy more time and space than I now feel at liberty to devote to it. The details in these cases would excite surprize; and it might stagger the credulity of some persons to tell them that horse-radish, to the amount of sixty dollars, has been annually sold from two rods of ground; and that the cultivation of the common dandelion is a source of considerable profit. Many statements of this kind which have been made demonstrate how much may be accomplished by minute, concentrated, and well-directed labor.

A crop of mangel wurtzel obtained in Charlestown deserves particular observation. The soil on which this crop was grown

is described as a black loam with a clay bottom, on a gentle slope to the northeast. The year previous to the crop of mangel wurtzel, three fourths of the land was planted with potatoes, with a moderate supply of manure in the hills; the residue was in mangel wurtzel and grass. Early in May, in the succeeding year, there was spread on said land about eight cords of compost manure, and ploughed to the depth of eight inches and harrowed in the usual way. About the twentieth of May, the seed was sown in rows about twenty-two inches apart, and the plants, when about the size of a goose-quill, were thinned to about eight or twelve inches apart. The thinning would have been done earlier, but the crop was threatened with wire-worms. The soil was kept loose about the roots and the land clear of weeds. The under-leaves were frequently cropped, from which much excellent food was obtained for swine and cattle, and the sun and air were freely admitted to the roots. It was desirable to do this by the middle of September, that the crown of the roots might have time to heal. They were harvested in the third week in October. The crop produced 1433 bushels, or 86,961 lbs., or 43 short tons and 961 lbs. The actual expense of producing the crop was thirty-five dollars. The cost was not quite two and one half cents per bushel. The quantity of land, one acre.

9. Beets are often a very profitable crop. They are raised in considerable quantities; are packed in barrels and shipped to the south. One dollar and a half is a common price for a barrel containing two and a quarter bushels. The farmer giving this statement has often produced 600 bushels to the acre. They are planted on ridges about four feet apart, in double rows; and the intermediate spaces are often sown with turnips. The ridge planting is decidedly preferred here for all vegetables of this kind. In my opinion, and so far as my own experience goes, which has not been small, it would be better to make the ridges about twenty-seven inches apart, plant the beets in single rows, and cultivate them with a plough. A very useful machine for planting beets is a wheel, set like that of a wheel-

barrow, with pins projecting from the rim two inches, and placed eight inches apart, which is passed along on the top of the ridge, and the seeds dropped by hand into the holes marked by the pins. They may then be covered by drawing a rake-head along the top of the ridge. Too much care cannot be taken to perform all operations in planting, where the vegetable is afterwards to be cultivated, in straight lines. The work is by this means greatly facilitated.

Since making the above account, I have received a statement of a crop of sugar-beets grown this season on Nahant, Essex county, by Frederick Tudor, which I have no hesitation in laying before the agricultural community, though it may seem out of place. I shall give the account with which Mr. Tudor has favored me in his own words.

"In the spring of 1840, I caused about an acre of land of the pasture lands of this place (Nahant) to be fenced in and trenched 20 inches deep. The ground had never before had an agricultural instrument of any kind in it. It was a pasture of indifferent soil, with many stones in and upon it.

"The trenching consisted in reversing the soil for 20 inches in depth with the spade, and afterwards putting in all the stones (which were found) in the bottom; three inches of muscle-mud were put on them, followed by the turf and best of the soil; then two inches of rock-weed and kelps fresh from the shores, or cut from the rocks; then the less rich part of the soil and more muscle-mud—the top left with the poorest and most gravelly soil. In all, there were about eight inches in perpendicular height of manure added to the soil, which, when pressed, might have been five to six inches in perpendicular height; so that the land had been moved with the spade a depth of little more than two feet. In the spring of 1840 it was sown with sugar-beets, but did not do very well, the top-soil being extremely poor. In the spring of 1841 I had it ploughed about six inches deep, but the plough did not reach any of the richer parts of the soil below, exhibiting little more than yellow loam and gravel. I caused 93 rods of this to be again sown with

sugar-beet seed this spring ; and after the beet seed had come up, had the land dressed on the surface, merely spreading it on, with fifteen cords of rich cow-yard manure. This caused the young plants to grow greatly. There has been no particular care given them, and indeed several patches in the ninety-three rods were to be seen where the seed had failed, and which should have been filled with plants if the object had been to try the utmost possible. During the dry weather in August, the tops of several of the rows were cut off for fodder for the cows. My own belief is, it would have been possible to produce on the same piece of ground, if much care had been taken, sixteen hundred bushels.

"I think the crop on my land has not been caused by trenching but by the looseness of the soil and the top-dressing of rich manure of which I have spoken. The usefulness of a top-dressing, more especially in a dry seam, is undoubtedly great."

The whole crop was carefully weighed and sold by weight. The amount 42,284 lbs. This would be at the rate of 36 tons 746 63-100 lbs. net weight to the acre, or about 1300 bushels per acre at 56 lbs. per bushel. One of the roots, cropped and cleaned, weighed 31 lbs.

This is a highly interesting experiment and result. I have long desired an opportunity of witnessing, on actual trial, the beneficial effects of a thorough trenching ;—but have never seen it except in the case of asparagus beds formed after the prescriptions of former times. The practice of subsoil ploughing is in fact trenching. I am much better satisfied with Mr. Tudor's result than with the philosophy of his explanation. I believe much is due to the trenching of the soil, whereby it was rendered permeable to air, moisture and warmth. The partial failure of the first crop after the trenching may be in a degree accounted for by the fact that the subsoil had been so recently brought to the surface that it had not been acted upon and enriched by atmospherical agency. The deposit of the stones at the bottom in a kind of bed served to draw off and to retain the moisture, which had its effects upon the growing

crop. The bed of manure, though buried as deeply as described, since the earth above was light and porous, undoubtedly, in the evolution of its gases, contributed its full share to the growth of the crop. The top-dressing certainly was not without its great advantages, not only in supplying the necessary nutriment to the plants, but likewise, as is suggested, in protecting the soil from the severe drought.

It will be questioned by some whether so expensive a cultivation can be afforded. The price of manure is not given. If it were not overvalued, the first crop, even at five dollars per ton, or more than 180 dollars to the acre, would undoubtedly pay the expenses of culture and leave a large profit; but in the next place it is to be remembered that the land is now in condition for at least six or eight years' profitable cropping without any additional manuring.

10. Hops.—One of the great crops of the county is hops, although within a few years the cultivation has been somewhat reduced. This may be considered as the only crop raised for exportation, and at one time it is said that more hops were grown in Middlesex than in any other part of New England or in the whole United States.

I have already, in the report on Franklin county, spoken of the culture of hops to some extent. I have little to add to that account excepting what is furnished me by a Middlesex farmer experienced in the cultivation and well acquainted with the whole subject of culture and curing.

The hop plant, in the county of Middlesex, succeeds best on a deep yellow loam and on soils well adapted to Indian corn; but the burr seldom has a bright straw color, it is pale and insipid on a deep black soil. Light sandy loams, or pine plains, produce a small amount to the acre, but the hops are frequently of a good straw color and well suited for pale ale; but not so strong in resinous properties as those grown on a deep yellow loam.

To form new plantations, the ground is to be prepared as for Indian corn; sets or cuttings of roots are used for planting.—The hills should be eight feet apart, giving sixty-four square

feet to each hill; this will make about 680 hills to the acre. Air, light, and the full influence of the sun, are very important to the perfection of the flower and the forming a good portion of the lupulin, the yellow flower in which nearly all the essential properties of the plant consist.

The first season of planting, Indian corn, potatoes, beans, &c. may be planted in the same field, in the vacant spaces, as the hops will occupy only a quarter of the ground. Hops once planted frequently do well for ten years in succession, if the roots, in the month of April or early part of May, are well dressed and pruned.

The second year after planting, the poles are set. Two poles go to each hill and two vines to each pole, selecting four of the best and most thrifty vines; and when about two feet long they are to be trained to the poles by some slight fastening. About 1360 poles are required to the acre, which in this county are worth three dollars per hundred or about forty dollars for an acre. Cedar, spruce, hemlock and larch poles, with proper care will last from seven to ten years; it will require an annual expense, not exceeding six to seven dollars, to keep the poles good. Pine, maple, oak, birch, and other kinds of wood, are used for poles; but these do not last so long as those first mentioned.—The length of the poles varies from 16 to 22 feet. They should not be too stiff, but a pole with considerable elasticity is to be preferred. They must be firmly placed in the ground, so as to stand against the wind. Strong winds injure hop fields, and especially if the poles, as is sometimes the case, are from 25 to 30 feet long; but the height of the poles should bear some relation to the strength and richness of the soil. It is desirable, other circumstances being equal, to select a situation not exposed to the violence of the winds.

The best way of manuring hops is to spread the manure on the ground and plough it in when the vines are dressed. In this way it affords gradually and universally the nourishment which the roots require. By applying it directly to the hill it forces to an excess the growth of the stem and leaf, and its effi-

ciency is abated, when it is deemed most necessary in the formation of the burr. When the manure is applied to the hill the worms are more likely to injure the plant.

The ground should be ploughed and hoed, and be kept free from weeds, but the roots and fibres of the plant should not be disturbed after the blossoming commences. Frequent attention is requisite to keep the vines to the poles. The time of beginning to pick usually varies a few days. There are not more than fifteen days at most in a season, when hops are in a fit condition to be gathered. This is generally from the 1st to the 15th of September. Many are in the habit of picking before the burr is fully ripe, to great loss both in quality and weight. Hops should be picked free from stems and leaves; and decayed and bruised hops should be separated from the good.—Some of the best cultivators place the poles over a box and carefully pick off all the decayed, bruised or inferior qualities; then pass the pole to another box, where the best qualities are picked. Hops should not be gathered when wet with dew or rain; and green hops, if left in the boxes after being picked five or six hours in any considerable quantities are liable to be heated, which should be guarded against. The forenoon's picking should be put on the kiln at noon; the afternoon's picking at evening.

The kilns in common use are built with sides of common rough stone, about twelve feet square; the inside is filled in at the bottom to about three feet square, forming an inverted cone; the walls are about seven or eight feet high; some joists and lathes are placed across the top, over which a thin cloth is stretched, and upon this cloth the hops are placed to dry. On the front side, at bottom, is a flue to put the fire in. For fuel, well-charred coal is to be used. It is said that a furnace has lately been constructed for using wood, with a flue to carry off the smoke, which promises well.

Much attention is required to keep the degree of heat regular, in order to evaporate the watery fluid; this may be ascertained by occasionally placing the hand on the cloth under the

hops. Two hundred pounds of green hops, when dried, produce only 50 to 54 lbs. If the heat is too great, the lupulin is destroyed. If the heat is not sufficient, a partial fermentation takes place and injures the lupulin. The best-cured hops are generally from eighteen to twenty-four hours upon the kiln.

Much care is requisite in removing the dried hops from the kiln and placing them in a dry loft, so as not to break them. When properly cured they may be laid in this loft three or four feet thick for some months before packing. In this situation they pass through a slight fermentation and "make," as hay "makes" in the mow, and become very aromatic and resinous. It is a bad practice to pack them soon after drying.

Many of our cultivators have erected expensive and close buildings over their hop kilns. These close buildings are injurious. They prevent the vapor from freely passing off; it lodges on the sides of the building. When the hops arrive to a certain degree of dryness, they attract moisture and absorb some of this vapor, to their very great injury in this warm state. This moisture cannot be perfectly extracted again. In the case of a bag of hops set endwise on a green plank and allowed to remain in this position three or four weeks, the hops at the end of the bag next to the plank, to the depth of six or eight inches, became entirely rotten from the moisture attracted from the plank.

The mode of packing within a few years has been improved. Formerly, they were trodden into round bags, but are now pressed by screws into square bags. There is an evil however in that many of the screws are too short, and it is necessary to tread the hops in the box, which breaks and bruises them. It is highly important that the hop should go to the consumer as whole and sound, with the exception of evaporating the water, as when taken from the poles. The essential properties of hops for brewing consist in the lupulin; when this is injured or dissipated the value of the hop is much diminished. The properties of the hop are subtle and concealed; the best chemists have not been able to extract and concentrate it's essence for the

purposes to which the hop is applied. It would be an improvement to have a long screw, or a box sufficient to hold the usual quantity put into a bag, so as to avoid treading upon them; and it would be desirable to find some better method to take them from the kiln than that which is now practised, in shoving them off the kiln while warm and very brittle.

This farmer suggests farther a plan for removing the hops from the kiln, which he thinks would be useful. To a kiln twelve feet square, on the top make eight boxes or cribs three feet by six; put laths on the bottoms of them and some short pieces of rope in the corners of these cribs, for handles. Fill them in with green hops; place the boxes, when filled, over the kiln to be dried, and when dry carry these boxes with the hops into the loft where they are to be deposited. Leave these boxes there unemptied, and have another set of boxes to place upon the kiln; when the second course becomes dry take them to the loft and leave them as before, emptying the first set of boxes, and using them for the third kiln, and so on alternately. In this way the hops, with care, may be kept nearly as whole as when plucked from the vines; and this would add much to their value.

The packing machine should be directly under the loft, so as to avoid the necessity of moving them beyond the putting them down through a scuttle into a bag to guide them into the box. The head of the screw should come up into the loft and there be turned by a large lever.

The hop is an uncertain crop and liable to many casualties; but it will be seen by the table given in the Appendix,* that, for more than thirty years, it has been among the best crops grown, averaging a profit of more than $100 per acre. The crop exhausts the soil less than almost any crop usually grown. After hops have been cultivated several years on a particular spot, the soil is in a condition to bear large crops of grain, roots and hay.

The consumption in the United States is estimated at one

* Appendix, E.

million five hundred thousand pounds. The greatest crop grown in the United States, in any one year, is about three millions. Our surplus hops are chiefly sent to the north of Europe, and sometimes to England when their crops fail.

The above information of the hop culture, given me by the intelligent and exact inspector of hops in Massachusetts for many years, embodies such full information on this subject that I know it will be read with interest. In England, there are known several different kinds of hops, distinguished by local names, of different qualities, suited to different soils. The plants there are manured every year with dung, hair, rags, wool-clippings, or lime, but good dung is preferred to every other kind of manure.

A careful farmer in Littleton is of opinion that the price of hops should be twelve and a half cents, in order to pay expenses. Another farmer, in Bedford, is of opinion that they cannot be raised to advantage under fifteen cents per pound.

An excellent farmer in Littleton, long familiar with the culture of hops, was kind enough to give me the following memoranda. The land is to be prepared and planted in corn, excepting every fourth hill, which is to be set with cuttings two in a hill of seven or eight inches in length. It is important to select the best varieties, as hops differ both in quantity and quality. Hops, the flower of which is open and loose, are subject to blast. Hops of small size are not productive. Those which are large and close are to be chosen; the white vine hops are to be preferred. The cultivation is to go on the same as for corn. The hops are to be poled the second year; two poles to a hill. Birch poles cost one cent each, and will last two years. When prepared for setting, the cost is two cents each; and the expense of setting an acre is one day's work, one dollar. In the second year beans may be planted among the hops, but such management is of questionable advantage. He has sometimes obtained six or seven bushels to the acre. It is advisable to cultivate hops exclusively. The hills of hops should be eight feet apart.

They should be ploughed and hoed three times in a season; this will be two days' work, or two dollars each time. One thousand pounds of hops to an acre is a fair yield; and one pound to a hill is the general average. Sometimes more than two pounds are obtained to a hill; and there are about eight hundred hills to an acre.

Three girls, at fifty cents per day each, will ordinarily pick one hundred pounds per day. During the time they are occupied in picking an acre, the service of one man to take down poles, &c. will be required for two days.

The kiln for drying is eleven feet square; seventy-five to one hundred pounds are dried at a time. One hundred bushels of coal are required to dry a ton of hops; the coals cost eleven cents per bushel. Hops are taken to dry at one dollar and twenty-five cents per one hundred pounds, including coal. Thirty-three and a half cents are paid for packing, pressing and sewing bag. Two hundred pounds are put in a bag; the cost of gunny-bags is ten to eleven cents each, and four gunny-bags will make a pack; the bags will weigh from four to six pounds; this weight is included in the weight of hops, and this pays for the bag. Three cords of manure are required annually to an acre. Hops must not be poled too early, and the poles must be proportioned to the size of the hop. Small hops do not do well on large poles. Half a cent per pound is paid for the inspection. This farmer has contracted for five years to sell his hops at thirteen cents per pound.

He speaks of a neighbor in another town who produced four thousand pounds on two acres. The price was then very high. He sold his crop for forty cents per pound, making sixteen hundred dollars. This is a remarkable case. The price is capricious and fluctuating.

An experienced and excellent farmer in Groton states, that hops cannot be raised to advantage for less than fifteen cents per pound. With him, hemlock poles cost four dollars per hundred, and with care will last seven or eight years. He places seven hundred hills to an acre; they will usually average one

pound of hops to a hill, though he has sometimes obtained more than two pounds. Success, he says, depends on high manuring; but the quality of the hops is not so good where the land is greatly enriched. Hops, in his opinion, do not impoverish land; their roots extend to a great distance, as he has sometimes followed them to a distance of fifteen feet. He says they may be planted fifty years in succession; that the hops in such case will deteriorate, but the land not.

11. Grasses.—The grasses cultivated in Middlesex county do not differ from those cultivated in other parts of the State, of which I have already spoken; they are herdsgrass, *(phleum pratense;)* redtop, *(agrostis vulgaris;)* and red clover, *(trifolium pratense.)* Lands are generally laid down to grass with a second crop, and that a crop of small grain, such as wheat, rye, oats or barley. Some of the best farmers for this purpose prefer barley to oats, but on no very obvious ground, unless it is that the greater thickness of the barley-stubble better protects the young plants of the grass.

The amount of grass seed sowed in laying down land by one farmer, a good cultivator, is—herdsgrass, one peck; redtop, half a bushel; clover, seven pounds. The price by his estimation, when this statement was given, was for the herdsgrass, 75 cents; the redtop, 50 cents; the clover, $1 05—or for the acre, $2 30. Another farmer, in Bedford, sows twelve quarts herdsgrass, half a bushel of redtop, and three pounds clover seed to an acre. In Wilmington, a respectable farmer, but quite of the old school, sows six quarts herdsgrass, twelve quarts redtop, and six pounds clover to the acre—sometimes less clover and more redtop; the land light and favorable to redtop.

It will be seen by these various statements, of which I might give many more, that the ground is very lightly seeded; too lightly I have no doubt. Where more seed is sown the grass is of a finer quality and makes better hay; besides that, the land, where the grass is thick, does not suffer so much from drought. It is questionable with many farmers, whether any

clover should be sown or not. An observing and experienced farmer, who has given much attention to the cultivation of grasses, is of opinion that, in the immediate vicinity of the capital or a large town, from which manure is brought to the farm, there will be in general sufficient clover seed in the manure; but farther off, he advises to sow from six to eight lbs. to an acre. He likewise insists upon sowing at the rate of at least half a bushel of herdsgrass seed, and an equal quantity of redtop. I have great respect for his authority, as his crops have measured more than four and a half tons to the acre of well-made hay, upon his best lands. The farmers in Essex county, as may be seen by my first report, who were in the practice of omitting to sow clover when they laid down their lands to grass, have returned to the practice—as otherwise, they say, they get a comparatively inferior first crop.

Much discussion has been had as to the time of sowing grass seed, whether with the grain in the spring, or in the fall after the crop is taken off, sowing it by itself as early in September as it can well be got in. The latter method is, by the best farmers, almost universally preferred. It gives them an additional ploughing, but this is compensated by the ploughing in the stubble as manure, and in general the better manner in which the grass takes. The grass seed sowed with the small grain in the spring often perishes by the heat of the sun after the grain crop is removed: in September the temperature becomes moderated and the usual autumnal rains give the young plants a favorable start. In such cases, where the herdsgrass and redtop are sowed in the fall, some persons prefer sowing their clover on the same in the spring, as the young clover plants are more likely than the others to be killed by the severity of the winter.

The tall meadow oat *(avena elatior)* has been cultivated in the county. This grass is not familiar to our farmers, but the success which has attended its cultivation encourages its extension. A Virginia farmer of the highest authority speaks of it, after fifteen years' experience, as a hardy plant bearing drought and frost, heat and cold, better than any other grass known to

him. A Pennsylvania farmer pronounces it of all other grasses the earliest, latest, and best for green fodder or hay. It blossoms about the middle of June and is preferred to all others by horned cattle. It must be cut seasonably or it becomes hard like straw. A Middlesex farmer, who has cultivated it several years and whose authority is of the highest character, confirms the above statements of its excellence both for grazing and hay. He says, from its early flowering it is adapted to be sown with red clover, and is fit to be cut about the first of June. His own account is as follows:

"In the spring he sowed with barley a field of four acres, and put on 2½ bushels of oat-grass seed, 5 lbs. of red clover, and 2 lbs. of white clover seed, to the acre. The soil was thin and had been exhausted by long cropping. On the 3d of June in the following year it was cut, and gave two tons to the acre of the finest and best hay, either for cattle or horses, he ever had in his barn."

He thinks three bushels of seed should be sown to the acre. It is well adapted for grazing on poor and exhausted lands, as well as on those of a richer quality. It is a fortnight earlier than the common grasses, and throughout the dryest weather exhibits a green appearance. From three fourths of an acre, in good condition, he obtained over twenty bushels of well-cleaned seed.

The late John Lowell, a man behind no other in his intelligent, successful and disinterested efforts to advance the cause of an improved agriculture in Massachusetts and New England generally, says that "under his cultivation, it has proved a most valuable grass and fully sustained its high character. It is a very early and tall grass, yielding a good burden. It will start rapidly after cutting. It is a perennial and enduring grass, and on his first experiment it lasted seven years without the necessity of renewal."

A farmer in Waltham objects to sowing the tall meadow oats and the herdsgrass together, as they do not ripen at the same time. The tall meadow oats, when I visited him, would be

ready for the scythe in ten days, or about the middle of June, while the herdsgrass, at the same time, had not begun to show its head.*

The opinion of the farmers generally in this county is in favor of cutting herdsgrass early rather than late; perhaps for the reason that the hay is then of a bright green, and on this account commands in the city market a higher price. If we can rely upon chemical examination in determining the nutritive properties of grasses, it will be found that the gain in this respect, in cutting herdsgrass when its seed is ripe over cutting it when in flower, is as 86.1 to 37.2.

Red Clover *(trifolium pratense)* is sown extensively in the county, with other grass seeds, when land is laid down to grass; seldom is it sown by itself. As I have before observed, where manure is brought to the farm from the city stables, there is usually clover seed enough in the manure without applying any more. The seed usually sown in the county is the large northern clover; and in general the growth is so rank and the hay so badly made, that the fodder is worth little. It would be a great deal better, in many cases, if the June or southern clover were sown instead. This is smaller and more easily cured; and makes, when well cured, an excellent fodder. Two of the

* "This grass—*avena elatior*, tall oat grass—sends forth flower-straws during the whole season; the latter math contains nearly an equal number with the flowering crop. It is subject to the rust, but the disease does not make its appearance till after the period of flowering. It affects the whole plant, and at the time the seed is ripe the leaves and straws are withered and dry. This accounts for the superior value of the latter math over the seed crop, and points out the propriety of taking the crop when the grass is in flower. The nutritive matter afforded by this grass, when made into hay, according to the table is very small."—*Geo. Sinclair.*

J. Buel speaks of his "field experiments with this grass not being so successful as he expected—owing partly to the seed not vegetating well; and partly, he supposed, to the soil (a light sandy loam) not being sufficiently strong and tenacious."

Taylor, of Virginia, says that, "according to his experience, it will not succeed in lands originally wet, however well they are drained."

best farmers in the county, and it would be difficult to find their superiors in the State, who keep a milk farm in the neighborhood of the city, prefer clover to any other hay for their milch cows; and their clover hay, as I saw it, is of a very superior quality. It is cut early: after a very little drying, and without any tossing about or spreading, it is put into moderately sized cocks, where it is left to make by its own fermentation: when it is deemed sufficiently dried, the cocks are turned bottom upwards, and as soon as all dampness is dried off, they are carried into the barn. While they are in cock, even a considerable rain upon them does not so materially injure them as many would fear, provided they are attended to on the weather's becoming good. This is the account given me by these farmers, whose management of their farm in Medford is a model of good husbandry.

The yield of grass per acre in Middlesex is, as was to be expected, variously estimated by different individuals, the soil and cultivation differing much in different places. In Westford it is put down at $1\frac{1}{8}$ ton per acre. In Concord, at $1\frac{1}{2}$ and 2 tons to the acre. In Lowell, at $1\frac{3}{4}$ ton. In Marlborough, $1\frac{1}{2}$ to 2 tons per acre.—In another estimate it is thus given: first year of being laid down, $2\frac{1}{2}$ tons; second year, 2 tons; third year, 2 tons; fourth year, 1 ton: or about $1\frac{7}{8}$ ton per year during the course. In Groton, first year, 1 ton; second year, $1\frac{3}{4}$ ton; third year, $1\frac{3}{4}$ ton; fourth year, $1\frac{1}{2}$ ton. In Tewksbury, first year $1\frac{1}{2}$ ton; second year, $1\frac{1}{2}$ ton; third year, 1 ton. In Weston, 1 to 2 tons. In Burlington at less than 1 ton. In Woburn, $1\frac{1}{4}$ ton per acre. In Reading, first year 2 tons; second year, $1\frac{1}{2}$ ton. In Bedford, first year, $1\frac{1}{2}$ ton; second year, 2 tons: another estimate, first year, 2 tons; second year, 2 tons; third year, $1\frac{1}{2}$ ton; fourth year, 1 ton. The above returns will enable the reader to form an estimate of the crop. The ton with us is 2000 lbs net weight. In this account of the average yield of grass in the county, I have left out all large and extraordinary returns, of which I have many, and shall speak of them when I come to treat of agricultural improvements and redeemed meadows.

The average price of hay in the various markets accessible to the farmers of Middlesex is not less than 15 dollars : the cost of getting per ton is considered as two and a half dollars, and the expense of marketing as two and a half dollars. This would leave the worth of the hay to the farmer ten dollars per ton ; and, placing the average yield of an acre at one ton and a half, it would give a net profit per acre, in hay, at fifteen dollars.— The elements of this calculation are unquestionable and the results therefore equally certain. The grass crop must be considered, where there is a quick market for hay, as eminently a profitable crop. How far is it an impoverisher of the soil ?— This is a question which deserves consideration. In this respect different grasses will be found to differ from each other.

Although, from the absolute and inherent obscurity of the subject, it certainly is not placed beyond doubt and question, yet it seems generally admitted that plants which mature their seeds exhaust the soil much more than those which are cropped before the perfection of the seed ; and this on the assumption, that that which goes to the formation of the stem and leaves of the plant is derived from the air, while that which goes to the formation of its seeds is derived from the soil. This may be so, but must, I believe, be considered at present as purely theoretical. It will not be questioned however that, the larger the plant and the longer it continues growing upon the soil, the greater demands it must make either upon the earth or the air for the supply of its food and the perfection of its growth.— Grass, being cut early and usually in the season of flowering, exhausts the soil less than those plants which are allowed to remain until they are perfected.

Grasses, whatever they take from the earth, necessarily leave a large portion behind. Their roots are abundant ; and, the oftener they are cut, seem the more to extend themselves and become the more thickly matted. The tap-root of the clover plant leaves a large amount in the soil ; it contributes likewise to loosen the soil and render it the more permeable to moisture ; and its expansive and abundant leaves gather a large

amount of food from the air. Clover likewise, and the finer grasses, after being cut, soon start again; and, if not closely depastured, leave a large amount of vegetable matter on the surface, which decays in the winter and goes to enrich the soil.—In this respect, herdsgrass is very inferior to the clovers and the finer grasses. Clover however is not a perennial grass. Its period is little more than two years; and it is an established fact that, if too long repeated on the same land without intermission, it will cease to flourish.

The turning in of clover has always been found materially to benefit the land; and so likewise the turning under of any grasses, or greensward which abounds in vegetable matter, (a large proportion of which beyond all question has been drawn from the atmosphere,) must essentially contribute to enrich the soil. It has been supposed by some persons that in this way the fertility of the soil may be continually kept up without artificial manuring. The soil will become exhausted of its alkaline ingredients, which must be supplied; and the effect of ashes applied broadcast upon greensward, as well as when it is sown, as it is by many persons at the rate of thirty or forty bushels to the acre with their grass seed, is often very remarkable. Some persons, accordingly, when their manure has been insufficient for planting a crop, have simply turned over the sward, and, cultivating it thoroughly with a harrow and roller, have immediately sowed it with grass seed. This I have seen done in Essex and Middlesex counties with decided advantage. In the latter county it was, in one instance, in the case of a low piece of land covered with coarse and worthless grasses, which through this process were succeeded by a fair crop of English grass.—It is not however to be expected that the condition of land can be permanently kept up in this way; and yet the case of the farmer referred to in Franklin county, who applied no barn or compost manure to his corn land, but simply ploughed in his stubble and clover and applied leached ashes and gypsum in the hill,* obtaining ordinarily seventy bushels of corn to the acre,

* See pp. 21, 27.

and that of another farmer who year after year sowed rye upon the same piece of land, always sowing freely clover with the grain, to be turned under with the rye-stubble, and by this husbandry found his land continually growing better,—are examples which show that a good deal may be done in this way where there is a deficiency of barn manure. How well such an experiment would succeed, if long persisted in, actual trial only can determine. Without a question, where land has become, as it is termed, bound out, the sward matted, and the herbage fine, small and stinted, much would be gained by simply turning it over, keeping the sward unbroken, harrowing it and freely sowing grass seed upon it, especially with the application of ashes or plaster, or some other alkaline substance. But it is alike settled that, in order to the greatest yield, an occasional manuring, and the cultivation of the soil so as to break up its tenacity and expose it freely to the influences of sun and air, are indispensable. The coarse grasses will soon come in again if the land is not cultivated and manured. The produce of the farm cannot be continually carried off without some means are taken to replenish the soil for the substances thus abstracted, and for the supply of that vegetable matter which, in a course of nature, the decay of these products would furnish. In a forest the soil is not injured by the growth of the wood but rather is enriched; that is, the vegetable matter, or humus, is increased, because the annual decaying matter from these trees, their leaves and rotten limbs, is continually accumulating on the ground, passing into a state of decomposition, and increasing the vegetable mould.

One of the best farmers in New England, resident in this county, is in the habit of turning up his greensward when he deems the crop of grass less than it should be—rolling it, manuring it thoroughly, harrowing it well, and then immediately laying it down to grass, without taking any other crop. Doing this in April, he gets a good crop of grass the same season, averaging at the rate of two tons to the acre. The same practice, as I saw in repeated instances, was pursued by Ichabod Nichols,

of Salem, in Essex county, since deceased, a brave and good man, whose farm lay on the Salem turnpike, land at one time very aptly denominated the "abomination of desolation," but on which he, with an indomitable perseverance and great sagacity, effected as extraordinary improvements as have ever been made in the State; and converted this pasture, deemed scarcely worth the fencing, into a most productive farm. He found, among the rocks and bushes, many peat bogs, which having drained and cleaned, and inverted the sward, he applied compost manure largely mixed with loam, and sowing freely of grass seed in the spring, obtained an abundant crop the same season. The Middlesex farmer to whom I have above referred is in the habit of renovating and recruiting his grass lands in the same way.

VII. Rotation of Crops.—The usual rotation in the county is generally limited to two shifts, and sometimes to only one ploughing, seldom more than two. Greensward is generally broken up when it ceases to produce more than one ton of grass, and corn is planted, manured with barn manure either in the hill or spread broadcast; and very often, where a large crop is desired, manure is placed in the hill and spread also. Sometimes the corn crop is repeated, and not unfrequently potatoes are taken as a second crop after corn. The next crop is commonly oats, barley, rye, or wheat; and the land is stocked down to grass.

A eminent farmer in the county has been in the habit of ploughing once only, completely inverting the sward and rolling it: on this he plants corn manured, the manure either in the hill or spread; and the ensuing spring he simply harrows the ground very finely and sows his grass seed with small grain.—His success certainly commends this practice. Where the autumnal sowing of grass seed is preferred, the crop of corn is not always removed in season to do this.

The usual rotation then is,—first year Indian corn; second year oats, wheat, rye or barley, with grass seed; third, fourth,

fifth years, grass. Or sometimes, first and second year Indian corn and followed as above; or otherwise, first year corn, second year potatoes, third year small grain and grass seed, fourth, fifth and sixth years grass. The cultivation of esculent vegetables, such as ruta-baga, mangel-wurtzel, carrots, &c. may be considered as accidental. These crops form no part of a regular or systematic rotation. Several farmers having entered with me into some calculation of the proceeds of their farms under this system, I shall subjoin some of these estimates. The expenses of cultivating several of the crops, such as corn, oats, wheat, barley, &c. having been given in detail in previous parts of my Report, the results only will be subjoined. The cost of manure is always included in the account of the first crop; but its benefits extend through several years.

1. In Tyngsborough, the rotation is—1st year, corn; 2d year, rye, with grass seed; 3d, 4th and 5th years, grass.

Balance in favor of corn, 50 bushels per acre, all expenses allowed,	15 87½
Balance in favor of rye, 20 bushels per acre and straw, all expenses allowed,	22 75
3d year, 2 tons of hay, expenses of getting deducted,	25 00
4th " " " " "	31 00
5th " 1½ " " " "	23 25
	117 87½
Interest on land, valued at $100 per acre, 5 years,	30 00
Net profit on a five years' course upon one acre,	$87 87½

Tyngsborough.—I add the amount of another farmer in the same town. These estimates were obtained without one farmer's knowing what return any other had made.

Balance in favor of Indian corn, 40 bushels, expenses deducted,	18 50
Balance in favor of oats, 40 bushels and straw, expenses deducted,	21 50

3d year, hay, 2 tons, getting deducted, . . .		15 00
4th " " " " . . .		18 00
5th " " 1½ " " . . .		19 50
		92 50
Interest on land, at $100, five years, .	30 00	
Cost of grass seed, ...	1 50	
		31 50
Net profit on five years' course, ...		$60 00

The cost of grass seed in this case was—1 peck herdsgrass, 75; clover, 5 lbs. 62½; redtop, 12½. The value of the hay is placed at a lower estimate than before. The improved quality of the hay is understood to render it more valuable per ton the second than the first, and in the third than in the second year.

2. Dunstable.—Corn, oats, grass—3 years.

Balance in favor of corn, 40 bushels, expenses deducted, ...		8 75
Balance in favor of oats, 40 bushels and straw, expenses deducted, ...		19 10
3d year, hay, 1½ ton, expense of getting deducted, .		15 50
2d " " 2 tons, " " .		25 00
3d " " 2 " " " .		25 00
		93 35
Grass seed—1 peck herdsgrass, 75; half a bushel redtop, 37½, ...	1 12½	
Interest on land 5 years, at $100 per acre,	30 00	
		31 12½
Net profit on five years' rotation, ...		$62 22½

Dunstable.—Corn 2 years, manured; 3d year, rye; 4th, 5th and 6th years in hay.

Balance in favor of corn, 40 bush., expenses deducted,	17 50
" " " "	14 87½
" " rye, 15 bushels and straw, expenses deducted,	13 25
4th year, hay, 1½ ton, getting deducted,	11 75
5th " " 1½ " "	19 25
6th " " 1 " "	15 00
	91 62½
Interest on land six years, at $100 per acre,	36 00
Net profit on six years' rotation,	$55 62½

3. Shirley.—The industrious and skilful family of the Shakers have furnished me with the subjoined estimates. To a considerable degree this sect may be considered as model farmers.

First and 2d year, corn; 3d year, wheat; 4th, 5th and 6th years, hay.

Balance in favor of corn, 35 bush., expenses deducted,		17 75
" " " "		17 75
3d year, balance in favor of wheat, 18 bushels and straw, expenses deducted,		21 00
4th year, hay, 1¾ ton per acre, at $12 per ton, expenses deducted,		17 50
$3 50 is considered the cost of "getting" an acre of grass.		
5th year,		17 50
6th year, crop diminished one third,		11 50
		103 00
Expense of grass seed—1 peck herdsgrass, 75; clover, 6 lbs., 75; half a bushel redtop, 37½,	1 87½	
Interest on land, at $100 per acre, 6 years,	36 00	
		37 87½
Net returns on an acre for six years,		$65 12½

4. PEPPERELL.—The following account has been given me in this town. First year, potatoes; 2d, corn; 3d, oats; 4th, 5th and 6th years, grass.

First year, potatoes—yield, 150 bushels, 37 50; cost of cultivation, 39 83. Loss on potatoes, $2 33.

Second year in corn.

Balance in favor of corn, 40 bushels per acre, . .	19 50
3d year, oats, 20 bush. and straw, expenses deducted,	6 00
4th " hay, 2 tons, getting ($4) deducted, . .	16 00
5th " " 2 " " " " . .	26 00
6th " " 1½ "	19 50
	87 00
Loss on potatoes, ...	2 33
	84 67
Interest on land valued at $40 per acre, six years, .	14 40
Net profit for six years, ...	70 27
Or value land at $100—interest for six years, . .	36 00
Net income for six years, ...	$34 27

5. READING.—The subjoined is from a farmer on whose judgment and exactness I should place entire reliance.

Rotation. Corn; potatoes; oats; grass, two years.

Balance in favor of corn, 50 bushels per acre, expenses deducted, ...	17 25
Balance in favor of potatoes, 250 bushels per acre, expenses deducted, ...	22 70
Balance in favor of oats, 40 bushels per acre, (straw included,) expenses deducted, ...	19 00
Hay—first year, 2 tons; second year, 1½ ton. 3½ tons grass, sold standing, at $15 per ton, . .	52 50
Net proceeds of one acre in five years, . . .	111 45

Land valued at 100 and 200 dollars per acre; say interest on 150 dollars for five years, . . .	45 00
Net balance in favor of land, ...	$66 45

6. In Wilmington, the following account is furnished.

Rotation. Corn; potatoes; oats; hay, two years.

Balance against the corn, 40 bushels per acre, less expenses, 87½ cents.	
Balance in favor of potatoes, 250 bushels per acre, at 25 cents, less expenses, ...	29 90
Balance in favor of oats, 40 bushels at 50 cents, less expenses, ...	19 40
Hay—first year, 1½ ton; second year, 1 ton, sold standing—2½ tons, ...	30 00
	79 30
Deduct balance against corn, ...	87½
	78 42½
Five years' interest on land, at $50 per acre, . .	15 00
Balance in favor of land, ...	$63 42½

7. In Bedford, I have the following statement from a skilful and successful farmer.

Rotation. Potatoes; corn; oats; grass, two years.

Balance in favor of potatoes, 200 bushels, price 33 cents, less five cents per bushel paid as commission for marketing, ...	15 50
Balance in favor of corn, 30 bush., expenses deducted,	17 50
" " oats, 40 bushels at 55 cents, and straw, expenses deducted, ...	22 40
4th year, hay, 1½ ton, getting deducted, . . .	18 00
5th " " 2 tons, " . . .	24 00
	97 40
Interest on land at $50 per acre, ...	15 00
Net proceeds, ...	$82 40

This land was top-dressed the fifth year, but the expense not estimated. The after or fall feed in these cases is, in general, an equivalent for the taxes.

This farm presented an example of neat husbandry. The labor was performed by the father and two boys, his sons,—the extent of land fifty acres. The owner is a farmer only, without trade or profession; and has paid for his farm from his labor. The estate is now valued at $2000, and he has supported his family from his farm besides. This is a beautiful example of good husbandry and sound economy.

A second example is given in Bedford.

Rotation. Corn; potatoes; barley; grass, three years.

Balance in favor of corn, 50 bushels, valued at $1 16⅔ per bushel, expenses deducted, ...		6 00
Balance in favor of potatoes, 200 bushels at 30 cents,		7 48
" " barley, 20 bushels and straw, .		21 50
4th year, hay, 2 tons pr acre sold at $12 pr ton, standing,		24 00
5th " " 2 " " " "		24 00
6th " " 1½ " " "		18 00
7th " " 1 " " " "		12 00
		112 98
Interest on land seven years, at $50 per acre,	21 00	
Grass seed sowed—7 lbs. clover, 87½; half a bushel herdsgrass, 1 50; half a bushel red-top, 37½, ...	2 75	
		23 75
Net proceeds in favor of land, ...		$89 23

These are certainly remarkable results; yet they are the statements of men long experienced and familiar with the whole subject, and made altogether independently of each other. But if the results are so favorable, I shall be asked why it is that farmers do not become rich oftener than they do; and why it is they are continually complaining that their farming runs them

in debt? I shall not go fully into this subject here, but I will offer a few suggestions, in regard to the matter, which may be entitled to consideration. First, then, the crops are badly spent, or expended without judgment and carefulness, so that their actual value is by no means realized. There is often a great deal of waste in feeding stock; and the more abundance there is, there is commonly the more waste. A horse is, for example, a great consumer, requiring, as horses are ordinarily kept, from four to five tons of hay besides grain. Now, two horses are often kept when one would suffice; and on small farms, one is frequently kept when none is needed. Besides the saving of feed in keeping a horse, by great care in not giving him more at a time than is necessary, and in not suffering him to waste any, a saving of at least one third might be made by cutting his food and giving him a mixed provender. In the next place, farmers often keep supernumerary oxen and cows, which are a great drawback upon their prosperity. Our winters are long. The cost of feeding a yoke of oxen through the winter is very great. So it is with a cow; and she perhaps is dry for three or four months, and it may be for three other months does not yield enough to pay her keeping. In many cases a yoke of oxen is kept through the six months of winter at the farmer's mow, when there is hardly work enough to be done to keep them in health, far less to pay anything towards their support. In such cases, to use a phrase well understood among the farmers, these animals, before the spring, will have "eaten their own heads off;" that is, the hay and provender consumed in keeping them will have been of more value than would purchase others in the spring. Sometimes, in the next place, the farmer, rather than sell a yoke of cattle in the fall, which he proposes to turn off, for a low price, or what he deems less than their value, will undertake to fat them in the stall, and but too often gets, in the market for them in the spring, little more than he could have obtained for them in the previous autumn.

These are some of the ways of disposing of the products of the farm so as to make farming a losing business. The far-

mer who would farm to profit should keep no animal which does not, either in growth, labor, or produce, fully pay for its keeping; and if he is unwilling to part with a favorite cow, or a favorite yoke of oxen, or a favorite horse, even when the keeping of them is a loss to him, he must not charge against the farm that which he voluntarily sacrifices for the gratification of his fancy or caprice. If the cow, for example, does not through the year much more than pay for her keeping, though he may admire her breed, or her color, or her horns, or any other quality which pleases his fancy, if profit is his object, she is not to be kept. If he chooses to keep a favorite yoke of oxen, when he has not sufficient work to employ them, or the luxury of a supernumerary horse, instead of carrying this item to the farm loss, it would be proper to credit the farm with their keeping, and charge the loss to his own misjudgment, or pleasure, or pride.

But another source of error in calculating the profits of farming arises from neglecting to credit the farm with what it contributes to the support of a family. In estimating the yearly proceeds of a farm this is seldom taken into the account. The farmer frequently obtains from his farm his house-rent, fuel, bread, vegetables, wool, pork, beef, mutton, poultry, eggs, milk, butter, cheese, fruit, and the services of a horse for himself and family; yet in making up the account he credits the farm with that only which he sells, and which is returned to him in the form of money.*

In the third place, while the profits of land in grain and grass are comparatively large, the aggregate return to the farmer is small, because in truth his acres are few and his cultivation extremely restricted. I knew in one case, on a farm of three hundred acres and much of it land susceptible of great improvement and productiveness, not more than eight acres to be under tillage and a very small amount in grass. The rest lay unimproved and unused. Supposing each of these improved acres to have yielded a large return, yet, compared with the

* Appendix, F.

size and value of the farm, the aggregate would be small. The gains of the merchant, if his business is profitable, will be in proportion to the capital employed which he can manage to advantage. In order that the profits of a farm should be large, the farm must be as large and as much of it must be cultivated and improved as the farmer himself can well superintend, and as his means enable him to bring into culture and use. We have no right to demand impossibilities; and the same rules which apply to commercial and manufacturing pursuits apply to agriculture, as far as we look to it as matter of pecuniary loss or gain.

VIII. Dairy and Milk Establishments.—Middlesex county is not a dairy county. Properly speaking, there are no large farm dairies. No cheese is made unless in very small quantities for family use; and the butter made, of which in the aggregate there is a considerable amount, finds a quick and weekly market in the capital and the other large towns in the county. A very large proportion of the population of the county are engaged in commercial, manufacturing and professional pursuits, who, of course, must have their bread buttered for them as they have no time to do it for themselves. The farmers of Middlesex therefore find a ready and a cash market for every thing which their farms or gardens produce.

I have many returns of the average yield of cows in butter, some of which I will give. From the nature of the case, so various are the animals, so different their feed and condition, so great or so little the skill employed in their management, that it becomes difficult to infer any general rule as to their product. I can only present the different statements and leave to my readers to draw their own conclusions.

In Waltham, the cows in June average six lbs. of butter each per week; this upon grass only. One farmer in this town states the average yield in June at seven lbs. butter per week, and from June 1 to November 1, at five lbs. per week. In South Reading, in the best of the season, the average is from

seven to ten lbs. In Reading, in the best of the season, one pound of butter per day. In Billerica, for three months, six lbs. butter per week. In Wilmington and Billerica, the yield of a cow for the season is rated at one hundred lbs. of butter. In Bedford, the yield is rated at four lbs. per week, or one hundred lbs. per season. The above are similar to returns given me in other parts of the county, which need not therefore be referred to.

I will subjoin a few particular results.

1. In Framingham, the farmer had twelve cows. The calves were fatted and sold to the butcher.

From April 1 to January 1 ensuing, there were sold, as the produce of these cows, 1627 lbs. The cash received in the same time is for butter sold, $328 43; and for milk sold in the same time he received $46 48—total, $374 91.

The cows were wintered upon coarse feed; in the spring they received English hay. The expense of pasturage in the summer was fifty cents per week for each cow. The commission for selling the butter in the market was two cents per pound. This is the statement of a farmer distinguished for his general exactness, and yet the amount of butter and milk consumed in his own family, from these same cows, is not reckoned; nor what amount of pork ought in justice to be carried to their credit.

2. In Waltham, at a dairy to which I referred in my second report, the owner made a trial of his cows for thirteen weeks. He had two cows in milk the whole time and two heifers, two years old. The whole of the milk of one of these heifers was taken by a calf during six weeks out of the thirteen, and besides, this milk was used for the family, but the amount not ascertained. In fairness, therefore, the stock cannot be considered as more than three cows for the thirteen weeks. The cows were soiled in the barn-yard upon green feed cut for them, and were never out of the yard in the time. They had likewise three pints of meal each per day. From them were made in that time 389 lbs. butter—one additional pound would have

made it 30 lbs. each week. One of the cows was one quarter Denton improved short-horn blood; the rest native stock.

3. Another farmer in Waltham, distinguished for the excellent butter which he brings to market, deems the average yield of a cow through the year as four lbs. per week. Eleven of his cows in milk in the best of the season have produced 75 lbs. of butter per week. Thirteen cows produced in the year, 1500 lbs. butter and 1600 lbs. cheese, partly skimmed or three meals milk. He obtains a second rising of cream from his milk; the butter is not so good as the first made, but of tolerable quality. The cream is salted and the churning takes place once a week. He is of opinion that butter should be made soon from the milk, as the fresher the cream the better the butter. Tin pans are preferred to any other. He considers clover as the best feed for butter, and as much better in winter as in summer. One pint of salt is used to twenty lbs. of butter. I am thus particular in this account of his management as his butter is greatly esteemed in the city; and either by good butter, good customers, or good address, he gets forty-five cents a pound for all his fresh butter in winter, certainly a very unusual price in our market.

On another farm in this town one cow and two heifers, besides furnishing two gallons of milk per day for sale, and exclusive of some milk used in the family, produced 27 lbs. butter in the month of September. This farmer's three cows had produced 30 lbs. of butter per week. It is his opinion that vegetables given to cows are injurious to the butter.

4. A dairy farmer in Weston, from fifteen cows, produced in the season 1500 lbs. butter. I could not ascertain how long the season was understood to be, nor what amount of milk was used in the family; but this is a specimen of the returns with which one is compelled to put up. They are very indefinite, but they are worth something. The butter of this farmer commands the best price; and he urges strongly the importance of churning cream while it is fresh. The butter in the French

market, he says from personal observation, is always churned from fresh cream, and commonly churned daily.

Of the amount of milk required to make a pound of butter, quite various accounts are given. The milk of some cows is much richer than that of others. The milk of a cow in general increases in richness from the time of her calving. The richness of a cow's milk is in some measure dependent on the food she receives. The milk first drawn is quite inferior in richness to that last drawn from the cow, known as the strippings. All these circumstances will of consequence affect the amount of milk necessary to make a pound of butter. It may be well however in this case to give the statements of different farmers. In one case 7 quarts, in another 8, in another 9; in another case, 12 quarts are required for a pound of butter.—In S. Jaques's stock, which he designates as the cream-pot breed, two quarts of the strippings, by his account, have produced one pound of butter. I have already referred to this fact in my Second Report.

Middlesex county, in the vicinity of the capital and the large towns, abounds in milk establishments, at several of which as many as forty cows are kept—in some cases more—and their produce is daily carried to the market. It used to be the practice to milk the cows before the departure of the cart in the morning. This obliged the farmers, in some cases at considerable distance from town, to begin their milking between one and two or two and three o'clock in the morning, and was otherwise objectionable. A different course is now in many cases adopted. The milk of this morning, for example, is not carried until to-morrow morning, and the milk of to-night will go at the same time. The milk after being drawn is thoroughly cooled off, and kept in the cans in iced water until it is taken in the morning to the market. After this thorough cooling, the customers find, especially in the warm season, that the milk retains its sweetness longer than when put into the cans and brought to the market warm from the cow.

I believe there is no city supplied with better milk, or

in a more cleanly condition, than Boston. The milkmen are in general a respectable class of men, and pride themselves on supplying their customers with good milk; and the Bostonians are in general equally particular in requiring pure milk for their money. Several of the milkmen who come daily to town are substantial farmers who have attended the market for forty years. A milkman who, in his visits to the city, should be found taking improper liberties with any pump or well on the road would soon be likely to have some inconvenient questions put to him as to the breed of his cows and his mode of feeding them. In New York city it is not so. With the exception of a few milk establishments, where a sacred pledge of pure milk is given, a system of fraud is almost universally practised. The milk is twice watered; first in the udder of the cow, who is fed upon distillers' swill, of which she has two or three barrels per day with only hay enough to form a cud for rumination;—and next, after it is drawn, it is a very general rule to add one quart of water to every four quarts of milk. It is not easy to prevent this; as, where the proprietor is himself honest, the carrier, who may be otherwise, may be tempted to increase his quantity, that he may appropriate to his own use the proceeds of the amount sold beyond that for which he has to account. In the arrangements at the celebrated Harleian dairy, in Glasgow, Scotland, the most remarkable establishment of the kind ever known, the cans were so constructed and fastened with a lock (the key of which was retained at home), that there was no possibility of introducing anything into them after they were taken from the milk-house; and there such various checks were applied, that it could hardly be done without detection. Indeed I have been let into the secret, at New York, of the actual manufacture of milk at a grocery store, where hardly real milk enough was used to "swear by," and this compound was sold to the poor and miserable for three cents a quart. The grocer, though he kept no cow, offered to supply the milkman with what he required whenever his quantity was insufficient to meet the demands of the day.

There is no such thing to be had in Boston, within my knowledge, as distillers' swill, the refuse grain after the whisky has been extracted from it; but some use is made of brewers' grains, the malted barley, where they can be had. They increase the quantity of the milk but injure the quality. English hay and corn fodder are the general feed, with sometimes carrots, ruta-baga, or mangel-wurtzel. The ruta-baga, and all the turnip family, are apt to give a turnip taste to the milk, which I never knew to be otherwise than disagreeable to every person excepting William Cobbett, who had ruta-baga seed to sell, and so, perhaps honestly, thought the flavor and odor pleasant. A milkman of my acquaintance, however, remarkable for his carefulness, says he finds no objection of this sort to the ruta-baga, if they are given to the cows directly after and not before being milked. Before the next milking comes, he says the disagreeable odor is entirely got rid of. The best milkmen prefer good clover hay for cows in milk to any other. Potatoes and mangel-wurtzel increase the quantity without improving the quality of the milk. Carrots, parsnips and sugar-beets improve the quality.—A milk farm, well situated and with a good custom, is a profitable husbandry where the milk brings 5 cents in summer and 6¼ cents in winter. A good deal of milk is sold by the farmers to the milkmen for three cents per quart, of the profits of which management to the farmer I have strong doubts. If we suppose that it requires 10 quarts of milk to make one pound of butter, this at 3 cents per quart would be 30 cents. Suppose the milk to be made into butter, there is a pound of butter worth 25 cents, and, if of superior quality, 33; there are the skim-milk and butter-milk remaining, worth certainly for young pigs 1½ cent per quart—say 9 quarts, 13 cents; and there is the manure made by the swine kept, which is of considerable value.

The amount of milk furnished by a herd of cows through the year is very differently estimated by different persons.—Rare individual cows may be occasionally met with, giving ten, and perhaps, in some remarkable case, even eleven quarts of milk per day through the year—that is, 365 times 11 quarts,

or more than 4000 quarts per annum ; but such cases are very few in number. In Curwen's dairy of 28 cows, kept and fed with great care for 220 days, the average was eight wine quarts per day, or a little more than six beer quarts. In the Harleian dairy, where a hundred cows were kept, it is said that twelve wine quarts were about the daily average ; but the statement, in the form in which it is made, is very imperfect and doubtful. Twelve wine quarts would a little exceed nine beer quarts. Nothing could surpass the pains used in the selection of these cows, the care taken of them, and the abundance with which they were fed. If the statement were positive, I should regard it differently ; but as it seems to be rather matter of conjecture than of proof, I place little dependence upon it. In a private letter to a respected friend from the celebrated Fellenberg, it is stated that, at that institution, the cows, which are considered among the best milch cows in the world, average through the year about six quarts per day. But here again we are left at a loss to know, whether the year includes only the season while they are in milk, or 365 days. These are foreign statements. I wish I had those from among ourselves, on which entire reliance can be placed. Men in these cases are so in the habit of dealing in conjectures instead of facts, that it is exceedingly difficult to arrive at the truth. I have been so often deceived in these matters that I place little confidence in any thing which is not matter of actual measurement and positive verification. The most intelligent and careful milkmen whom I have consulted are of opinion, that their cows average about six quarts per day for 365 days, and go dry in that time from two to three months. A very careful milkman, who may be entirely relied on, from 20 cows produced 11,131½ gallons of milk in a year. This was at the rate of 6⅛ quarts per day for 365 days, or 7½ quarts per day for 300 days. These cows were native stock, extremely well selected and well fed. Successive trials on this same farm give about the same result.

On a milk establishment in Medford, under excellent man-

agement for many years, with twenty cows in summer and more than thirty in winter, the average product for 365 days is from five to six quarts to a cow per day. The cows are fed in winter upon clover hay made in the manner described in p. 236, an allowance of a peck and a half each of succulent vegetables, and some Indian or oil-meal cake. The summer feed is not stated, but great advantage has been derived from green Indian corn fodder. Oil-meal cake is not considered of equal advantage with Indian. It is deemed too dear if more than $25 per ton. Carrots are preferred to all other vegetables when the quality of the milk and the condition of the animal are regarded. Since the use of the most powerful hydrostatic presses in extracting the oil from the flax seed, the cake is by no means so valuable as formerly, and the price should be proportional.

In the case of a milk establishment in the vicinity of Salem, on an average of thirty-five cows in milk, the product in one year was 17,171 gallons of milk, beer measure; in another year, it was 17,530 gallons. In the first case it would be about $5\frac{1}{3}$ quarts to a cow; in the latter, $5\frac{1}{2}$ to a cow per day through the year.

At Lowell, connected with the manufacture of printed goods, was an establishment of fifty cows, kept for the special purpose of obtaining their manure for fixing some of the colors employed. The milk of the cows was sold to persons concerned in the factories at a low rate, and an exact account kept of the yield, and the amount and cost of feed. With this account I have been favored, and deem it well worth preserving. Fifty cows have been the average number kept, and kept constantly in the barn upon hay and green vegetables, such as potatoes, &c. The average number of cows giving milk has been thirty-five. The quantity of hay spent for two years was 418 tons, at an average cost of $18 50 per ton; and for green vegetables, &c. during the same time, were paid $1018. The average yield of the cows was four quarts daily. The amount of hay required for a cow was 4 9-50 tons, exclusive of vegetables.—The quantity of milk obtained in the two years from the whole

stock, was 99,705 quarts; or, rating the average number of cows in milk at 35, it would be, for 365 days, 3 31-35 quarts per day to each cow. No calves were raised. The whole sum expended in this case for feed, exclusive of attendance, milking, &c., was $8751. The value of the milk obtained, at five cents per quart, was $4985 25—leaving a balance against the establishment of $3765 75. This would be a serious result to any common farmer. The keeping of the cows through the year upon dry feed, and the high cost of the hay, go largely to swell the expense. The large number of dry cows kept, averaging fifteen through the year, is a heavy drawback upon the returns. In the New York city milk establishments, as soon as a cow ceases to give milk more than sufficient to balance her cost of keeping, she is sold. It is the aim of the cow-keepers to keep their cows so well, and in so good condition, that, after a few weeks extra feeding, they may be fit for the butcher. Their place is then immediately supplied with new milch cows. In the Lowell establishment, as the object was not milk, cows were probably kept long after they had ceased to give milk enough to pay for their keeping. To whatever it may be ascribed that the balance was so heavy on the wrong side of the page, the experiment is a highly instructive one, and may induce farmers engaged in the milk business to look more carefully into their own results.

IX. Dairy Stock.—Middlesex county, though very poorly suited to grazing, and, on account of the high prices of all cattle feed, not at all adapted to the raising of stock, has yet several individuals of intelligence and public spirit engaged in this patriotic object.

Some years since, (about 1830,) a number of gentlemen associated for the purpose of establishing a stock farm, and purchased in Charlestown a valuable property for this object. "It was proposed to establish a stock farm in the vicinity of Boston, devoted to the important objects of breeding and rear-

ing the best breed of horses, neat cattle, sheep and swine; the receiving and selling on commission all kinds of live stock; and combining also with these the business of agriculture and horticulture, upon the most approved and economical system. This farm consisted of 222 acres, was made up of a variety of soils, and was well adapted to the purposes either of summer or winter feeding of animals, yielding a great quantity both of English and salt hay." Samuel Jaques, a man well experienced and of excellent judgment in these matters, took the farm with this view; and has succeeded, by judicious selection and crossing, in rearing a milking stock of extraordinarily valuable properties for the dairy. Of this stock I gave a full account in my Second Report, and, as far as appears, there is no reason to withdraw the commendation there bestowed on them. Their cheese properties have not been tested; nor have I been able to ascertain the quantity of milk afforded by them in any given time; but the quality of their milk for butter is not surpassed by any animals which have come under my observation. There can be no doubt that cheese from their milk would correspond to its superior quality. Mr. Jaques informs me that they still maintain their excellent character in this respect. My only regret is that I have not been able to induce him to make such continued experiments of their yield in milk or butter, for a week, or month, or three months, as would warrant me in speaking with more confidence. Without any personal reference whatever, I may be allowed to say that, in my opinion, intelligent farmers, who have valuable animals, owe it to the agricultural community to make such trials as will fully test their distinguishing properties. All conjecture and guess-work in this case ought to be utterly rejected. The trial of a day or a week is a small matter, and will seldom warrant any confident conclusions. In the case of a valuable cow or race of cows, the age and condition of the cow should be stated, her breed and pedigree, her feed and treatment, with the utmost particularity; the times of milking, and the amount

yielded for one, or two, or three months, in pounds and in cubic measure; the actual amount of butter or cheese produced in the time, and the quantity of milk and of cream required to make a pound of butter or of cheese. There may be some trouble in making these observations and experiments, but the satisfaction of this exact knowledge is an ample compensation for any trouble which it might cost. I am compelled to say, that, in respect to most of the statements which men make in regard to their stock, unless they are founded upon some such exact measurements and observations continued for a length of time, no reliance can be placed upon them.

Another breed of cows has been introduced into the county, from which great improvements in the dairy have been anticipated. These are the Ayrshire, the most celebrated dairy stock of Scotland. The Massachusetts Agricultural Society, with that eminent liberality and single desire to advance the agricultural interests of the community which have always marked all the proceedings of their board, imported an Ayrshire bull and three cows. The gentleman empowered to select them was well qualified for that object, and took particular pains to carry the patriotic designs of the society into effect.

The bull has been placed successively in different counties of the State, and the cows distributed with different individuals, P. C. Books, of Medford; Elias Phinney, of Lexington; and Daniel Webster, of Marshfield.

John P. Cushing, of Watertown, whose public spirit and regard for the agricultural interests of the country have been displayed in the management of his farm, in the importation of some of the best animals from abroad, and the gratuitous distribution of their progeny among the farmers with a view to improve their stock, has likewise imported some of the finest animals, which skill and money could select, of the Ayrshire stock.

It does not lie in my way to go into a history of this stock in this place. They are generally agreed to be the best dairy

stock in England. They are reputed to yield large quantities of milk and produce large amounts of cheese and butter; besides keeping themselves in good condition and being easily made ready for the butcher. The cows are eminently beautiful. In size, however, and symmetry, they are decidedly inferior to the improved Durham short horns; but there is good reason to think them a hardier race of animals.

From some of the gentlemen to whose care the society's animals were committed, I have been unable to obtain as full information as is desirable. Mr. Webster's foreman, in his absence, informed me that the cow was quite superior as a milker. Mr. Brooks says, "My cows give about the same quantity each, but I cannot boast of their doing like many which I have heard of. My Ayrshires do not, I think, give more than thirteen or fourteen quarts at best, and the milk no richer than others with the same feed. It is however a valuable race in our State, as doing well in our common pastures and not running to fat like some. They are very gentle."

Mr. Phinney, in a recent letter, thus writes: "I have given the Ayrshire stock a pretty fair trial, considering my limited means,—enough however to satisfy me of their valuable dairy properties, and of their capacity for enduring the cold winters and short keep of the northerly part of the country. In the month of June, 1840, I selected from twenty cows my best native cow, for the purpose of making a trial with my Ayrshire cow as to the quantity of butter each would make. My old pastures, for I had then done little to improve them, afforded but a very short bite of grass. These two cows ran with my other stock, and had no other food than what they could get in these dry pastures. The quantity of milk from the Ayrshire was not greater than that from my native cow; but the Ayrshire made nine and three quarter pounds of butter in a week, while the native cow in the same time made but eight and a half pounds; besides, the quality of the butter from the Ayrshire cow was decidedly better than that from my other cow.

The trial was made with great care, and the correctness of the result may be relied on. The Ayrshire cow has been kept with my other stock and fared no better than the rest; still she appears in better thrift than any of my other cows, and endures the cold of winter quite as well. She has given me three fine calves; the first a bull, which I now have, a very fine animal; the second I sent into the county of Essex, and is owned by Mr. Marland, of Andover, and at the cattle-show in that county in 1840, the first premium offered by the State society on bulls was awarded to him. The third is a heifer, now little more than a year old, and is a beautiful creature. Upon the whole, from the little experience I have had, I cannot doubt that the Ayrshire, for its dairy properties, is greatly superior to the Durham for this part of our country."

Mr. Cushing has been kind enough to favor me with an exact account of the produce of four Ayrshire cows on his farm for the times therein specified, which I here subjoin.

1. *Memoranda of Milk given by imported Ayrshire cow Flora, for one year*, 1837.

From 17th of May, to 1st of June,	. . .	608 lbs.
" 1st of June to 1st of July,	. . .	1192 "
" 1st of July to 1st of August,	. . .	1064 "
" 1st of August to 1st of September,	. .	841 "
" 1st of September to 1st of October,	. .	718 "
" 1st of October to 1st of November,	. .	489 "
" 1st of November to 1st of December,	. .	409 "
" 1st of December to 1st of January,	. .	432 "
" 1st of January to 1st of February,	. .	442 "
" 1st of February to 1st of March,	. .	388 "
" 1st of March to 1st of April,	. . .	484 "
" 1st of April to 1st of May,	. . .	419 "
" 1st to the 20th of May,	. . . .	242 "
		7728 lbs.

At 10 lbs. per gallon, 772 gallons.

2. *Memoranda of Milk given by imported Ayrshire cow Juno, for one year*, 1837.

From May 23d to June 1st,	243	lbs.
" June 1st to July 1st,	796	"
" July 1st to August 1st,	845	"
" August 1st to September 1st,	600	"
" September 1st to October 1st,	475	"
" October 1st to November 1st,	313	"
" November 1st to December 1st,	340	"
" December 1st to January 1st,	394	"
" January 1st to February 1st,	401	"
" February 1st to March 1st,	326	"
" March 1st to April 1st,	328	"
" April 1st to May 1st,	216	"
" May 1st to 7th,	30	"
	5307	lbs.

At 10 lbs. per gallon, 530 gallons.

3. *Memoranda of Milk given by imported Ayrshire cow Venus, from June 20th to May 21st.*

From 20th June to 1st July,	283	lbs.
" 1st July to 1st August,	805	"
" 1st August to 1st September,	693	"
" 1st September to 1st October,	567	"
" 1st October to 1st November,	498	"
" 1st November to 1st December,	319	"
" 1st December to 1st January,	403	"
" 1st January to 1st February,	406	"
" 1st February to 1st March,	351	"
" 1st March to 1st April,	368	"
" 1st April to 1st May,	319	"
" 1st May to 21st,	151	"
	5163	lbs.

At 10 lbs. per gallon, 516 gallons.

4. *Memoranda of Milk given by imported Ayrshire cow Cora, from November 17th to May 21st.*

From November 17th to December 1st,	. .	388 lbs.
" December 1st to January 1st,	. . .	834 "
" January 1st to February 1st,	. . .	846 "
" February 1st to March 1st,	. . .	776 "
" March 1st to April 1st,	. . . .	704 "
" April 1st to May 1st,	. . . . .	670 "
" May 1st to 21st,	. . . . .	405 "
		4623 lbs.

At 10 lbs. per gallon, 462 gallons.

The mode in which these cows are fed is as follows: "Our Ayrshire cows, during the winter, have half a bushel of sugar beets or potatoes; with the former, about a pint of rye meal mixed with the cut beets; but when they have potatoes, the meal is omitted. With the above, they have as much English hay as they can eat. In the summer they have nothing but what they get in the pasture. They are driven, morning and night, from the pasture to the barn to be milked, and after that operation are driven again to the pasture."

In addition to these statements, I am favored with an account of the produce of an Ayrshire cow imported and owned by George Randall, of New Bedford. His letter to me is as follows, dated Sept. 9, 1841.

"My thorough-bred full-blooded Ayrshire cow, Swinley, was imported by me from Scotland in 1839. She was six years old in May last. She calved on the 31st of last March. She was milked regularly three days previous to dropping her calf; and had drawn from her in the time from 45 to 50 quarts. Commenced setting her milk for butter on the first day of April.—The calf was not allowed to touch a teat, was fed on new milk for nine days, and after that on skimmed milk. In all April, the quantity made from her was 43 lbs. 6 oz. The quantity in May was 42 lbs. 4 oz. In this month her milk decreased.

Quantity in June was 44 lbs. 7 oz. In July and August, her milk was not kept separate from that of other cows. Weighed her milk (for one day, H. C.) on the 7th of April; it weighed 43 lbs. 9 oz. On the 2d of September commenced weighing her milk; in four days it has averaged 25 lbs. 8 oz. and has made in four days just five lbs. of butter. My pasture through the season has been very poor and short, owing to the dry weather and having too much stock for the quantity of pasture.* From the time this cow was turned to grass until this day, (9th Sept.) she has had by measure two quarts of Indian meal per day regularly.

The Ayrshire bull belonging to the Society has been kept in Berkshire, Hampshire and Worcester counties; and a fair opportunity will soon be had of testing the qualities of his stock. One of the best farmers in Berkshire county speaks to me of their promising extremely well. In my opinion, the only certain test of the dairy properties of a cow is in the milk-pail and the churn.

Of the Improved Durham Short Horn race we have undoubtedly had some of the best animals ever brought into the country, both with high aristocratic pedigree, and without pedigree, of uncertain and plebeian origin. In some parts of the country, large expenditures have been incurred in the importation of this stock; and Admiral Coffin, of the British Navy, in grateful remembrance of the land of his nativity, presented to the Massachusetts Society several fine animals of undoubted

* When such farmers as Messrs. Phinney and Randall say, as does the former, "that his pastures afforded but a very short bite of grass, and that these two best cows ran with his other stock and had no other food than what they could get in these dry pastures;" and the latter, that his pasture, where he kept his Ayrshire cow, was poor and short and overstocked, I cannot but hope they had a few twinges of conscience for presenting such an evil example to their brother farmers, who are looking to them as fuglemen. This is certainly not the way they treat their other friends; nor are they at all suspected, from appearances, of subjecting themselves to the same penance. The general treatment of the cows in New England would not be an inapt subject of presentment by a grand jury.

pedigree of the improved Durham short-horn race, which were some time kept for the improvement of the breed. In addition to these, we have had a valuable bull imported by a merchant of Boston, understood to be the sire of Mr. Jaques's cream-pot breed; and the superior bull BOLIVAR, imported by John Hare Powell, of Pennsylvania, from J. Whitaker's stock in England, celebrated for its extraordinary dairy properties. This bull was the finest animal of the kind which I have ever seen.—A full-blooded short-horn bull (DENTON) was likewise imported into Worcester county, whose progeny has been highly esteemed. Several other animals of the same breed have been imported and kept in the State; and their blood has been considerably diffused throughout the country.

In point of size according to their age, in respect to symmetry and perfection of form, these animals are in my opinion not surpassed, indeed not equalled, by any which have come under my observation. The Herefords are extremely beautiful; in neatness and fineness of form perhaps superior to the Improved short-horns. The Devons likewise, though considerably smaller in size, yield, in compactness of shape, in quickness of movement and muscular strength, and in softness of hair and beauty of coloring, to no other race known among us.—They are the prevalent race of our country; and in an extraordinary instance, when I had the singular pleasure of seeing three hundred yoke of these cattle—that is, all more or less of this breed—in one team, in Connecticut, I could not resist the conclusion that a finer team, of the same number of cattle, could not be found in the whole country. Yet I am ready to admit that I have seen some few yokes of oxen of mixed blood, of the Improved Durham, as fine in appearance, and in reputation as good animals for work, as any that I have met with; and some individual animals of the Improved Durham Short Horns, both pure and half blood, bulls, oxen and cows, when all points have been considered, have surpassed anything which I have seen. They have approached as nearly to what I imagine the perfection of form in this race of animals as is to be looked

for. With good keeping, they come early to maturity, and attain a large weight. The butchers, however, whom I have consulted, give it as their opinion that they do not tallow so well, in proportion to their size, as our own smaller cattle. In my observation, no animals degenerate sooner under neglect and poor keeping; and they require extraordinary feed and the most careful attendance to keep up their character and condition.

The progeny of Bolivar, from some of our best native cows, according to the testimony of a farmer who probably has had many more of his stock than any other man among us, have not proved remarkable for milk or butter; to use his own expression, "they are, upon the whole, above mediocrity." The progeny of Cœlebs has been quite various; in some cases very good, in others inferior. Mr. Jaques is of opinion that the excellence of his cream-pot breed is principally to be ascribed to a cross with Cœlebs, but on what rational grounds it is difficult for me to discover. Their beautiful color is certainly derived from the dam; and as the distinguishing feature in this stock is the richness of their milk, and this being precisely the quality for which the dam, the Haskins cow, was distinguished above all others, and it not appearing that any stock of Cœlebs but when connected with this cow has ever been remarkable for this quality, it would not seem difficult to determine on which side of the house this excellence belonged.

So much sensibility exists in reference to this subject, the dairy properties of the Improved Short Horns, and so much of private interest and speculation is now mingling itself in the judgments which are formed or the opinions given in the case, that, if it is not difficult to speak with calmness and sobriety, it may be unreasonable to expect to be heard with candor and impartiality. My business is however with facts; and having no prejudices of which I am conscious to warp my own views, I shall, as fairly as I can, state those facts which have come generally within my own observation and leave the conclusions to the honest judgment of my readers. I have already touched on this subject in my First and Second Reports, and the reader

will not have a full view of the case, as intended here to be presented, without a reference to them. As to what these cows are stated to have done abroad, it would lead me too far to treat much of that here. When a bull will bring at a public sale one thousand guineas, cows more than four hundred guineas each, and heifer calves over one hundred guineas apiece, we may infer that guineas are more abundant than with us. It would not be an unreasonable suspicion that a fever of the same type which prevailed to so alarming a degree among us in 1835–6, &c., and known here as the *multicaulis fever*, may have infused itself into the veins of some of the bidders and competitors on these occasions.

It may be premised that a very large number of these animals have been brought to this country, and those of the highest character, both as to pedigree and attested merits, since persons of the greatest skill have been commissioned to make the purchases, without any restriction as to cost or expense of transportation. As early as 1825 fifty-six of these animals, all of them of high blood, had been exhibited at the cattle-shows in Pennsylvania, and before and since that time large importations have been made into Maryland, New York, Ohio, Connecticut and Massachusetts.* I have seen large numbers of these cattle, and have to regret that I have not been able, after repeated private and public solicitations, to obtain more exact and authentic accounts of their products. From this backwardness on the part of the owners and importers I think there is reason to infer that some disappointment in respect to their dairy properties has been experienced. My belief is, that our expectations in this matter were too highly excited; and that qualities, for which some extraordinary animals among them were remarkable, I mean particularly the quality and yield of milk, were deemed invariable characteristics of the race. In a former report I quoted the opinion of a distinguished Scotch farmer, Mr. Shirreff, and the authority of a private letter from a competent judge in England. Shirreff pro-

* One hundred and fifty of Improved Short Horns and grade cattle were exhibited at the Fair of the American Institute in New York, Oct. 1841.

nounces them, in an off-hand way, "the worst milking breed in Britain." The private letter stated "that this breed of stock has not been held of late years in great estimation for milking. Short Horns are only calculated for the best and most powerful land; on poor soils they will do nothing." To these I now add the remarks of George W. Featherstonhaugh, in a letter to Mr. Powell, of Pennsylvania. Mr. Featherstonhaugh, from his acquaintance with the farming interests both in this country and abroad, will be deemed a competent judge. He says "the property of being very deep milkers, therefore, is to be considered accidental, rather than one which can be continued with any certainty in the breed. Take one short horn with another, no breed is more valuable for its milk, or keeps in better condition under the same circumstances; or goes to beef at less expense; or furnishes more money and manure* in a given time. In order to keep up these great qualities we must remember that, in their native country, it is considered indispensable to keep them extremely well, and in a very different manner from the general custom prevailing here; which is, in summer, to leave cattle to help themselves to what they can find, even in the most severe droughts; and, in winter, to give them a moderate quantity of hay and straw. In England, where they are less troubled with dry weather than we are, they have always green crops and roots to give them, and they give them in abundance. It is there considered that the higher this sort of keep the better the health of the cow, the richer her milk, the stronger her calf, and the greater the quantity and value of her dung. If all this provident attention be necessary in that moist climate, it is certain that the breed will degenerate with us if it is not kept in high condition. Hot

* This "furnishing more manure in a given time" is rather an equivocal recommendation! It has once happened to me to know a case where the sale of the manure at a livery stable more than paid for the cost of the hay given to the horses; and the litter was furnished gratuitously by the purchaser to the stable-keeper. I will save the reputation of the farmers in this case; the manure and litter were wanted for a particular use in the arts. This was certainly a novel and economical application of *horse-power*.

climates produce shallow milkers; and where exceptions occur, they get poor very fast when indifferently kept, and it becomes more expensive to recover their condition than to keep it up. The wear and tear of condition in deep milkers is very great, and is only to be checked by abundance of succulent food and roots; or, when these are not to be had, by occasional feeds of meal with their hay."

These remarks are so well founded and so much to the purpose that I have given them at large. That this highly improved race of animals is of all others best suited to our climate, soil, mode of husbandry, and general condition, is a question I shall now pass over; but on the subject of the milking or dairy properties, I will give the most exact returns of which I have been able to avail myself, and shall subjoin an account of what we call native cows, that any one may compare them at his pleasure.

It may be said that the native cows to which I refer are all select animals. I admit that they are remarkable animals; some of them very extraordinary; but, in respect to the large majority of them, I have met with them accidentally; and I can find in the State hundreds and hundreds equal to them, if any justice were done to their keeping. But the truth is, that, in general, nothing can be more negligent and mean than the manner in which a large portion of our cows are kept. On the other hand, it will not be denied that the Short Horns to which I refer are selected and highly fed animals. It seems not a little remarkable among the many hundreds which have been brought to and produced in the country, if extraordinary dairy properties are the characteristic of the breed, as many of their advocates maintain, and when there is such an extreme eagerness to establish this point, that more of these distinguished examples should not have been given to the public.

Let us look, however, at the facts in the case and make up our judgment accordingly. In all matters of inquiry or debate our object should be truth, not triumph.

1. An improved Durham short-horn cow (Belina), imported

by John Hare Powell, of Pennsylvania, produced in three days eight pounds and thirteen ounces of butter, which would be at the rate of 20½ lbs. per week. The cow was fed with slop of Indian meal, clover and orchard grass. She has yielded repeatedly by measurement, and so far as can be ascertained by the bucket, twenty-six quarts within twenty-four hours. One quart of her cream produced one pound five ounces and one quarter of an ounce of butter. In one case two minutes, in another case only three seconds, were required to convert the cream into butter.

The butter trial was certainly a short one, and it is to be regretted that it had not been longer continued. The quantity of milk was very great, though we are left at a loss whether it were wine or beer measure. If it were beer measure, one fifth is to be deducted to bring it to wine measure. The measurement of milk in the bucket is always a very uncertain measurement. This cow was a most extraordinary animal, and it were to be wished that we had returns from others of Mr. Powell's fine stock, and some particular information of the progeny of this cow.

2. The celebrated cow Blossom, an improved Durham shorthorn cow, owned by Mr. Canby, in Delaware, is stated to have given in 1840, in one week, 247½ quarts of milk, or more than 35 quarts per day—from which were made 13¼ pounds well-worked butter. This summer, (1841,) two months after calving, she gave in one week 253½ quarts, or 36 quarts per day, which yielded 17¼ lbs. of superior butter. On the 13th July, fourth month after calving, the following is a record of one day's milking:—Morning, 12½ quarts; noon, 11½ do.; evening, 11 do. = 35 quarts. She gave 16 quarts per day up to the time of calving. The measure is understood to be wine measure. This is one of the largest products on record.—In the first case it seems to have required 18 44-53 quarts to make one pound of butter; in the latter case, 14 48-69 quarts. This is a large amount. For the difference in the two cases it is not easy to account. The mode of her keeping is not stated

with any explicitness. The owner of the cow is not known to me, either in person or by reputation.

3. My next account is from Paoli Lathrop, of South Hadley, in this State, a farmer distinguished for his intelligence and success, and on whose statements, made on his own knowledge or observation, entire reliance may be placed. I give an extract of a letter, which I have recently received from him :—

"We have now twenty-five head, which are thorough bred improved Short Horns, without the least mixture of other blood, and are, beyond question, as pure blood as can be produced.—These animals generally possess great weight and are very perfect in symmetry. At two and a half years old the heifers will average about 1200 lbs., and I have raised one bull calf which weighed 1020 lbs. the day he was a year old. Our stock has been fed upon grass and hay only, with the exception of a small quantity of roots in the winter months. One of our cows is sixteen and two others fourteen years old, and they now exhibit the appearance, so far as constitution is concerned, of being young animals, which I think is conclusive evidence of this race of animals being well adapted to our cold climate. They mature early and take on fat easily, and, in these respects, have a decisive advantage over our native stock. To test an experiment between a native and a short-horn, I took a cow of each of about the same age, dried them from milk at the same time, tied them side by side at the same manger, and fed them both exactly alike on hay only through the winter. The result was, that the Durham, in spring, had gained flesh and was in high condition, while the native was in only ordinary condition.*

"Their product, in both butter and milk, is much better than I have ever been able to obtain from native cows with the same keep. We have one cow which made more than twelve pounds well-worked butter per week in April last, and I have repeatedly converted the cream of this cow into butter in fifteen seconds. She gave in June last, upon grass alone,

* To have made the trial exact, the two cows should have been weighed at the beginning and end of the experiment. Their food likewise should have been weighed at least for a portion of the time.

360 lbs. milk in a week, having been milked but twice a day, and she averaged 51 lbs. per day for two months. We have another cow which gave 48 lbs. milk per day through the month of June; and we have still another, (now quite old,) which a former owner has assured me has given 28 quarts milk per day. We have two heifers, with their first calves, which averaged 35 and 37 lbs. milk a day through the month of June.

"I have tested the quantity of cream obtained from given quantities of milk from the above cows, and find it to be $1\frac{1}{8}$ to $1\frac{1}{4}$ inch from 10 inches of milk. There are some persons who deceive themselves, and doubtless others who are guilty of deception knowing it to be such, in representing mixed blood Short Horns as 'full blood,' 'pure Durham,' 'thorough bred,' &c. Now it is not sufficient that an animal is called 'full blood,' or guessed to be; the breeder of this race of animals, who understands himself, will require evidence of the fact, and such evidence as cannot be called in question." *

4. Of the Short-horned cow ANNABELLA, presented to the Massachusetts Agricultural Society by Admiral Coffin, E. H. Derby states, "that he has a perfect recollection of weighing her milk repeatedly in June, when she had no other feed than what she obtained from the pasture; the milk, morning and night, weighed 48 pounds. At the same time, we weighed the milk of a very fine native cow with the same keep, which gave 33 pounds. The greatest objection to them in my opinion is, that they incline to go dry longer than our native stock."

I cannot agree with Mr. Derby in thinking the going dry a long time a constitutional feature in this stock. This circumstance depends not upon the stock but upon their treatment and keep; especially their treatment with their first calf.

5. A short-horn cow, imported by F. Rotch as I understood, then I believe of New Bedford, and owned by C. N. Bement of Albany, a farmer well and deservedly known to the agricultural community, was one of the most beautiful and promising animals of the kind that I have seen; her pedigree undoubted

* Appendix, G.

and carried up to the highest sources. At my request, Mr. Bement tried her capacities for butter, and in one week in September obtained six pounds.

6. A cow, owned by George Johnson of Lynn, of whose pedigree, after much inquiry, I can learn nothing, but of whose genuineness as an improved Short-Horn I have no doubt, if not of full blood yet very high bred, has produced this season, from 12th March to 12th September, (six months,) 7100 lbs. of milk, averaging 15 beer quarts of milk per day for that time. She is now (November, 1841,) giving at the rate of nine quarts per day. Her feed is now one bushel of mangel-wurtzel and half a peck of wheat-shorts per day, with what hay she will eat. The butter properties of this cow have not been ascertained, as her milk is sold daily by the quart. She is a superior animal, both in appearance and product.

7. Wm. K. Townsend, of East Haven, Connecticut, had eighteen cows of the Durham Short-Horns, full-blooded or in part, which were kept for supplying milk to the city of New Haven. These, in milk, gave a daily average of 110 quarts, besides the milk and butter used in the family. It will be at once perceived how indefinite this account is, though given by the intelligent committee of the New Haven Agricultural Society. We are at a loss to know how many cows were in milk at a time, whether all or a part only, and how much butter and milk were used in the family. The family, it is said in another place, was large.

I have had the pleasure of seeing this remarkably beautiful stock. Their appearance was in the highest degree favorable to their character and keeping. The average return of milk, as above, was 6 2–9 quarts per day, exclusive of the reserved quantity.

8. I subjoin an extract of a letter from one of the most intelligent and public-spirited farmers in New England, Henry Whitney, of New Haven, giving an account of his Improved Short-Horn stock. Perfect reliance may be placed on it, and it will be read with much interest. Mr. Whitney's personal im-

provements in agriculture and gardening, his liberal expenditures in his importations, with a view to improve our live stock, and the intelligent and efficient aid which he is rendering to the great cause of an improved husbandry, entitle him to the grateful respect of the agricultural community. Many men are like the spindles in a factory, which make a great deal of buzzing and racket, yet perform a very humble part. Mr. Whitney, without noise or ostentation, moves with the force of a power-wheel. He turns the spindles, while the little things, with their heads always erect, imagine that they fly round of their own accord. Though we would give honor to whom honor is due, it is not worth while to undeceive them. They perform their part well, and their operation is essential. The Connecticut agricultural loom is now turning out many a beautiful and substantial fabric.

"I have never kept an accurate account of the milk given, for any particular length of time. The calves generally have been allowed to suck until three or four months old, after which it was given to them from the pail until eight or nine months had expired.

"I have imported four cows, all of which were carefully selected in England and at high prices. They have all produced one or more calves since I have owned them, and with one exception they have been dropped in winter. Strawberry, the cow you saw at Northampton, calved in July 1840. I have carefully measured the milk from each soon after calving, and they have averaged from 22 to 29 quarts per day. Betsey, the first cow I imported, gave in January 1839, soon after calving, 29 quarts, and four months afterwards she was giving 20 quarts. Her milk was only of a fair quality. She continued to milk very largely until within a few weeks of slipping her calf, which occurred about the 7th or 8th month after taking the bull, when she again increased the quantity to 16 quarts.

"My second cow, Violet, gave, after calving, 24 quarts of very rich milk, and continued to milk deeply for three or four months, when the quantity was diminished to 10 or 12 quarts per day.

"My third cow, Strawberry, gave by measurement 22½ quarts of milk on the grass she could clip from my short pastures.—Her milk was very rich and yielded a large amount of butter, though I cannot say accurately how much as it (the milk) was not all brought to the house and a fair proportion was used for ordinary purposes in the family. Mr. Lathrop, on whose farm, at Hadley, she remained four or five weeks, wrote to me on her return as follows:—'I must speak in the highest terms of Strawberry for a milker, and butter cow. As for size and shape she speaks for herself.' She is without doubt a very superior cow. She was at Hadley in October, 1840.

"My fourth cow, Ringlet, calved about a year since, producing twin heifers. She was milked three or four times, giving from 10 to 12 quarts each milking, when she fell sick with the milk fever and was two or three weeks before she recovered.—During her illness she bruised one of her teats so badly that she has lost the use of it. This cow is undoubtedly the best milch cow I have; but as the calves have sucked her until within a very short period, I cannot give any particulars. She is now five months in calf: her twins are one year old, and she gives now from three teats 8 quarts per day. You will please understand that I measured the amount with care, *full* BEER *measure*, purposely for my own gratification and without giving any extra feed for the purpose of increasing the milk.

"My cows were fed in winter on cut straw with corn or oil meal mixed—say half a peck of corn meal to 4 bushels of finely cut straw and about 2 quarts oil meal added. About a bushel was given to each cow once a day, and 3 pecks of turnips or ruta-bagas twice a day to each, besides a little hay. This was my feed when they were in the greatest flow of milk. In summer they are out at pasture, and when it is short, corn-stalks and other green feed are given to them. On our dry soil, however, it is difficult for the Durhams to thrive when the summer droughts commence. They suffer, too, much from the heat and from the stings of flies, which almost set them crazy. They stand our winters fully as well as our common cattle, and put on flesh very rapidly at that season if well fed.

"My calves, at a year old, weigh from 900 to 1050 lbs.; and I feel confident that a thorough-bred Durham steer can be made to weigh as much at three or four years old as a common steer at five or six. There are certainly objections to the breed where pasturage is short and a full supply of hay is not given. They are greater consumers than the common cattle of the country, but they are of much greater size and, as said before, mature much earlier. My cows are mostly herd-book animals, thorough-bred. I enclose you the pedigrees in full of Strawberry, Ringlet, and Violet, as requested."*

9. Cow. Levi Lincoln, Worcester, 1825. A cross from Denton on a superior native cow. "This cow has often given from 24 to 27 quarts of milk per day of excellent quality, yielding a large proportion of cream. The least quantity of milk given by her in any one day during the summer drought, on grass-feed only, was 13 quarts." [Mr. Lincoln states to me that this was beer measure.]

For the dairy and the stall, he speaks with the utmost confidence of the preëminence of Denton's stock. One of his three year old heifers (a half or three fourths blood) gives from 16 to 20 quarts of the richest milk by the day since calving; the other a little less, from the circumstance of having been in milk continually for more than a year; but her milk is in no degree inferior in quality. The last season she gave eleven quarts at a milking, with grass only, and this not infrequently.

Mr. Lincoln likewise states to me, that on putting six of our best native steers, purchased from Vermont, and six others of the mixed blood of Denton into the same open yard in the fall, and keeping them through the winter at the same manger on the same feed and in the same exposure, the growth and condition of the mixed bloods in the spring were greatly superior to those of the native stock.

10. Cow. Dolly. George Hood, Lynn. "Dolly had her first Calf in April, 1833, before she was two years old. In the following June she gave 14 quarts per day, measured a number

* Appendix, H.

of days in succession, and made 10 lbs. and 2 oz. of butter per week. She calved in October, 1839, and from the 15th of that month to April 13th, 1840, 180 days, she gave 16 quarts per day, which sold for $180. In January, 1840, she gave 565 quarts measured out, averaging over 18 quarts per day in the coldest winter month, and three months after she calved. Some days in that month she gave 20 ½ quarts per day. She calved again in December, 1840, and from the 17th December, 1840, to July 14th, 1841, 212 days, she gave 3004 quarts milk, being 14 1-6 quarts per day for 7 months, which was sold for $168 67. Her milk is rich and makes delicious butter.

"She is fed on three pecks of sugar-beets and carrots per day, with good hay, and in the coldest weather a bucket of warm water with a quart of shorts in it. Dolly is remarkable for transmitting her milking qualities to her offspring. Three of her calves have been raised here, and they are all great milkers. One of them, called the Countess, gave last winter 14 quarts per day for some months after she calved, being 4 years old. I have a heifer from her, 15 months old, and a bull 11 months old from Dolly, both sired by Wyecomet from Mr Wells' stock. They are fine animals, and I expect to get a good stock from them.

"Dolly's colour is light red, with a few white spots. She has the fine mellow skin, beautiful proportions, and majestic mien peculiar to the noble race from whence she sprung."*

11. Cow. D. N. Breed, Lynn, 1841. This cow is supposed to be one fourth of the Durham blood. The subjoined is given as her product.

1839. April 15. I bought a cow 6 years old that month.

15 days in April I took from the cow more than the calf received, - - - - - - - 90 quarts milk.

May	31,	31 days,	average	14	quarts per day,	434 "
June	30,	30 "		16	" "	480 "
July	31,	31 "		13	" "	403 "

* Appendix, 1.

Aug.	31, 31 days,	average	12	quarts	per day,	372	quarts milk.
Sept.	30, 30	"	11	"	"	330	"
Oct.	31, 31	"	10	"	"	310	"
Nov.	30, 30	"	10	"	"	300	"
Dec.	31, 31	"	9	"	"	279	"
Jan.	31, 31	"	9	"	"	279	"
Feb.	28, 28	"	7	"	"	196	"
March	15, 15 days					30	"
						3,503	quarts milk,

in 12 months; cow calved April 10, 1840.

12. Cows. Enoch Silsby, West Bradford, Mass. "The Durham Short-Horns. I think highly of, for the improvement of our country stock, and should prefer half and three quarters blood, to full; they come in as well at two as ours at three years old, feed well on the same food as the *natives*, and look better in the spring; the pure blood were fair milkers and would hold out till calving, *if required;* I purchased at different times, ninety-eight selected, country heifers; would keep none if they did not give 7 quarts at night and five in the morning, on a flush of feed, at three years old. Many did it, but would fall off, and by November, become dry or nearly so. Out of the said ninety-eight, I kept but two who would give a good mess of milk up to the time of parturition (*if wanted*). From these and their progeny, I have been most successful in raising, by putting the Durham Short-Horn bull to the cows. The production has been a great improvement on the *natives* both for milk and appearance, and I have not had a single failure. I feed principally on English hay, occasionally oat and barley straw, and roots, and bring them in at two years old as well as the *natives* would come it at three. I have never kept a particular account of the quantity and quality of the milk, but I know they are superior to my neighbors'; with good feed, they will give from 16 to 21 or 22 quarts per day; for curd I cannot tell, as I do not make cheese."

B. Shurtleff, of Chelsea, who has for many years kept an extensive milk farm near Boston, and who has had several of these animals of different grades, and had likewise many calves from Bolivar, the bull before referred to, says—"they have no merit as milkers above our common stock." A farmer in one of the best towns in the county, who has been some time engaged in raising this stock, says without hesitation, "he should much prefer our native stock for a dairy." A farmer in Marlborough, who is one of the best managers in the county, and who keeps a dairy of twenty-five cows, will not have a Durham among them; and the farmers in this excellent farming town are agreed in the opinion that a calf of one of the Improved Short-Horns, at six weeks old, is very inferior to a calf from a native cow. A great amount of veal is sent from Marlborough to the Boston market; and the marketmen and the butchers agree with the farmers in this opinion, which is very probably, after all, mere prejudice.

From a letter received from a farmer in Rhode Island, second for his excellent management to none other within my knowledge, the following is an extract:—

"My experience in cows is confined to native stock and a cross of the native and Durham. Some of the latter have been good milkers, but not superior to the common stock. From one I probably obtained nine quarts per day on an average for the year; and from a native cow, twelve quarts for the same period. I do not know the exact quantity, but from the circumstance of having milked them myself from first to last, and from weighing at different periods, I am confident it is not overrated. Their keeping while at pasture, which was poor, was some hay daily, and perhaps three quarts of Indian meal. When confined to the barn there was an addition of three quarts of oil meal, or, as a substitute for this, twice the quantity of shorts."

I give an extract of a letter from another farmer, resident in Medford, in this county:—

"Of the Durham stock, I have but three, a bull and two

cows, imported by R. D. Shepherd, in 1839. One of these cows is of no value as a milker. The other is a very fine animal in appearance, but has twice slipped her calf, and until this season has given no milk. She had her first living calf on the 28th August last, and while the feed was good averaged about fifteen quarts of milk per day. She has since gradually fallen off to about ten and a half per day, which she gives now (November). Her milk has never been separated from that of the native cows; I can therefore say nothing definite of its quality. I have been less curious and exact in measuring it and trying its quality from having always understood this stock to be more distinguished as beef cattle, than for any peculiar excellence as milkers."

These are the only particular and detailed statements which I have been able to obtain. My own experience, either with the full bloods or the mixed breeds, has not been favorable to them for milk or butter. I visited some time since the yard of a farmer in the State, who has passed the highest encomiums on this stock for their dairy properties, saw his cows milked, and measured the milk. He had 5 animals,—2 as I understood, of full blood, Denton's progeny; 3 of mixed blood; and some other native cows. It was in September, and the pasturage was abundant. The best animal in the yard at the morning's milking did not give more than four quarts; the second not more than three; the third, one quart and a half. It is not necessary that I should give any farther minutes.

I feel myself bound in honor to state these facts and these prevailing impressions, leaving them to have the weight to which any may think them entitled.

I shall proceed now to give an account of some native cows, or cows raised among us, which have fallen under my observation; and I have only to add, that in my opinion, nothing is wanting to multiply such cows among us by hundreds but more care in the selection of the best, and a great deal more liberality and carefulness in feeding and nourishing them. I have referred to some of these cows in my former reports; I

shall add others, and hope to be pardoned for the repetition on account of the importance of presenting this whole subject in a connected view.

I shall refer in the first place, to the celebrated Cramp cow, owned in Lewes, England, because as yet she bears the palm of all others; and because I wish to direct particular attention to the extraordinary care with which she was kept. She was not of the Improved Durham Short-Horns. She was bred in Sussex from a Sussex-bred cow; and it would seem as though she had some aristocratic blood in her veins, as it is said her great great grandsire received a prize cup at Petersham, in 1726, though I think this must be an error for a much later period, as she was calved in 1799.

From the first day of May, 1805, the day she calved, to the second day of April, 1806, a space of forty-eight weeks and one day, her milk produced 540 lbs. of butter. The largest amount made in any one week, was 15 lbs. From May to June, she gave 20 quarts per day. From 20th June, to 10th September, 18½ quarts. In forty-seven weeks, she produced 4,921 quarts of milk.

In the next year, from 19th day of April, 1806, the day she calved, to the 27th February, 1807, forty-five weeks, she produced 450 lbs. of butter. The largest amount per week, was 12 lbs. The quantity of milk for the time was 4,137 quarts. During this year, she was sick and under a farrier's care three weeks after calving. She went dry seventeen days only.

In the third year, from the 6th of April, 1807, the day she calved, up to the 4th April, 1808, fifty-one weeks and four days, she produced 675 lbs. of butter. The largest amount made in a week, was 18 lbs. The quantity of milk given in that time, was 5,782 quarts. In the fourth year, from the 22d April, 1808, the day she calved, to the 13th February, 1809, forty-two weeks and three days, she produced 466 lbs. of butter. The quantity of milk given in the time, was 4,219 quarts. In the fifth year, from April 3d, 1809, to May 8th, fifty-seven weeks, her produce in butter was 594 lbs. The amount of milk given

in the time, was 5,369 quarts. The largest quantity of butter in any week, was 17 lbs. This is the most extraordinary cow of which we have any record. Though it has been presented to the public before, yet the account may not be accessible to all; and I deem it useful to state the mode of her treatment.

"In the summer season, she was fed on clover, lucerne, rye grass and carrots, three or four times a day; and at noon, about four gallons of grains and two of bran, mixed together, always observing to give her no more feed than she eats up clean. In the winter season, she was fed with hay, grains, and bran, mixed as before stated, feeding her often. viz. five or six times a day, as was seen proper, and giving her food when milking; keeping the manger clean, where she is fed with grains; not to let it get sour; wash her udder at milking three times with cold water, winter and summer; never tied up; lies in or out the barn as she likes; particularly careful to milk her regularly and clean. Milch cows are often spoiled for want of patience at the latter end of milking them."

I now proceed with a list of cows produced and raised among ourselves; not a distinct but a mixed race; raised under innumerable disadvantages; yet showing, in a remarkable manner, what valuable materials we have to work with.

1. The Oakes Cow in Danvers, Mass., produced in 1813, 180 lbs. of butter; in 1814, 300 lbs.; in 1815, over 400 lbs.; in 1816, 484¼ lbs. During this time, one quart of the milk was reserved daily for family use, and she suckled four calves for four weeks each, in the course of those years. She produced in one week 19¼ lbs. butter; and an average of more than 16 lbs. of butter per week, for three months in succession. The largest amount of milk given by her in one day, was 44½ lbs. She was allowed 30 to 35 bushels of Indian meal per year and all her own skimmed milk and most of the buttermilk. At one time, the owner gave her potatoes, which increased her milk, but not her butter. In the autumn, he gave her about six bushels of carrots.

This cow came into the possession of Josiah Quincy, then of

Quincy, who had at the same time a large cow of English blood, the progeny of a celebrated imported cow, and owned by John Welles, of Dorchester, whose improved stock are held in high estimation; but as to their legitimacy in the Short-Horn family, or the strict purity of their blood, I cannot speak with confidence. On a trial of this Oakes Cow with this English Cow for a fortnight under the same food and treatment, the English Cow produced 16 lbs., the Oakes Cow thirty-two lbs. and a few ounces in that time.

2. The Nourse cow, owned in North Salem, made 20 lbs. of butter in one week, and averaged 14 lbs. butter per week for four successive months.

3. The Haverhill heifer, two to three years old, produced 14 lbs. of butter in a week after her calf was killed at six weeks old, and more than 18 lbs. of butter in the ten days after her calf was killed.

4. Cow owned by John Barr, in Salem.

1822.	In 274 days the weight of milk was .	7611 lbs.
	No. of quarts, beer measure, . .	2965½
1823.	In 268 days, weight of milk was .	7517
	No. of quarts, beer measure, . .	2923

The sales from this cow, including the calf at 5 dollars and milk at 5 cents per quart, in 1822, was $153 25. In 1823, $151 15.

5. Cow. John Stone, Marblehead. From June to October this cow averaged 11 lbs. of butter per week.

6. Cow. N. Pierce, Salem. 3,528 quarts milk per year; nearly 10 quarts per day.

7. Jeremiah Stickney, Rowley. 19 quarts daily; calf at 6 weeks old weighed 196 lbs.; gain 2 3-7 lbs. per day.

8. Cow. Isaac Osgood, Andover. 17 quarts of milk per day; made 50 lbs. of butter in the month of June.

9. Cow. S. Noah, Danvers. In 148 days from 2d May, gave 587⅛ gallons milk; more than four gallons per day for that time. This cow calved on the 28th of April, and in the 148 days succeeding the 2d of May, she yielded 6054½ lbs. of milk.

10. Cow. T. Flanders, Haverhill. From 20th April to 22d September, besides 46½ gallons milk used for family, made 163 lbs. 4 oz. butter.

11. Cow. Daniel Putnam, Danvers. "This cow calved May 21st. The calf was sold June 20th for $7 62½. During the 30 days that the calf sucked, there were made from her milk 17 lbs. of butter. From June 20th to September 26th (fourteen weeks) she gave 3370 lbs. of milk, or more than 34 lbs. 6 oz. per day. The greatest quantity on any one day was 45 lbs., or 17½ quarts. The weight of a quart of her milk is 2 lbs. 9 oz. The greatest quantity in one week was 288 lbs. The quantity of butter made in the same fourteen weeks was 139 lbs. The greatest amount in one week was 12 lbs. 2 oz."

12. Cow. Owned by William Osborn, Salem. The milk of this cow from January 24th to April 10th, was 3127 lbs. varying from 33 to 48 lbs. per day, averaging 40¼ lbs. per day during that time.

13. Cow. Owned by Richard Elliot, Danvers. This cow's milk gave 16 lbs. of butter in one week; and she yielded on an average from 15 to 18 quarts per day, beer measure, for a length of time.

14. The yield of a cow owned in Andover is remarkable. Her origin is not known, but her appearance indicated a mixed blood; and I was led to believe she partook of the Yorkshire blood, a race of cattle which I have found in the neighborhood of Moultonborough and Canterbury, N. H., but whose introduction I am not able to trace.

In 1836, besides supplying the family with cream and milk, there were sold 127¾ gallons milk at 14 cents per

gallon, - - - - -	$17 88
166 lbs. butter at 25 cents, - - -	41 50
Calf sold, - - - - -	8 00
	$67 38

"The keeping was good pasture and swill of the house, in-

cluding the skim milk, with three pints of meal per day." These statements show, in a strong light, the difference between a good and a poor cow; and the utility of liberal keeping.

15. A cow of Samuel D. Colt of Pittsfield, from 1st December to 26th April, 148 days, produced 193 lbs. of butter.

16. A cow owned by R. Campbell of Pittsfield, has yielded 26 beer quarts of milk per day.

17. A cow owned by Hosea Merrill, gave 30 beer quarts of milk per day.

18. A cow owned by D. Fenn of Stockbridge, 8 years old, produced in one week 12 lbs. 9 oz. butter. During the same time, 10 quarts of the milk were sold, and in addition cream and milk were used freely in the family.

19. A cow owned by Calvin Davis, 4 years old in the spring of 1838, in 172 days produced 225 lbs. butter, and fatted a calf. An accidental injury to the cow prevented a continuance of making butter.

20. Two cows of Wm. Dewey, of Alford, in good season, averaged, for a length of time, 14 lbs. of butter each per week.

21. A cow belonging to the late Dr. Hyde, of Stockbridge, for some time produced fourteen pounds of butter per week.

22. Two cows in Vandeusenville, produced 14 lbs of butter each per week.

23. A cow belonging to —— Millard of Egremont, produced 14 lbs. of butter per week.

24. From two cows belonging to Russell Brown, in Cheshire, besides the free use of milk and cream in the family, 90 lbs. of butter were produced and sold in three weeks, and in four successive weeks 114 lbs.

25. A cow owned in Stockbridge, by Stephen Willard, produced as follows:

In	321	successive	days	331	lbs. butter.
"	284	"	"	293	"
"	306	"	"	318	"
	911	days		942	lbs.

"The above is exclusive of 25 lbs. made while fattening three calves." He adds "my method of keeping has been grass only, from spring to fall. In the fall I begin with pumpkins and potatoes, and feed moderately during the time she gives milk. An account has been kept for only three years; but it would not vary much from the above, for the twelve seasons I have had her, except the present season she has been farrow." This cow is now eighteen years old, "and will calve again about the middle of February."

26. Two cows owned in Pittsfield, produced each 50 lbs. of milk per day; and one other 32 lbs. at a milking.

27. A cow owned by Thomas Hodges, in North Adams, produced last year 425 lbs. of butter; 400 lbs. of this amount were made in nine months. Her feed consisted of one quart of rye meal, and half a peck of potatoes per day; and very good pasturing.

28. A cow is owned by Joseph F. Upton, of Ashfield, Franklin Co. From the first of April, 1837, to the middle of February, 1838, her product was 335 lbs. 15 oz. From the 9th of May, 1838, to the 28th December, 1838, she had produced 303 lbs. 3 oz. of butter, and was still making at the rate of one lb. per day.

The owner adds, "In the year 1837, I killed my calf at three days old, and gave my cow the skimmed milk through the summer. I commenced the first of October to feed on potatoes. I gave her about one peck per day boiled, as long as she gave milk. In the year 1838, I fattened my calf and killed it at four weeks old. It weighed 75 lbs. She has had nothing but grass this year, until the first of October; since then I have fed her with one peck of boiled potatoes per day. My cow is seven years old last spring." Her winter keep at present, while giving milk, is as much hay as she will eat, and one peck of boiled potatoes per day.

29. Cow. N. Sanderson, Waltham, Mass., 1828. Thirteen and one half lbs. butter per week through the season, on an average.

30. Cow. Luke Fisk, Waltham, Mass., 1824. Made 12 lbs. butter per week.

31. Cow. Geo. H. Hardy, Waltham, Mass., 1826. Averaged, for four months, $11\frac{3}{4}$ lbs. per week.

32. Cow. John White, Dedham, Mass., 1826. Gave 12 lbs. butter six weeks in succession; one week 12 lbs. 13 oz.; three months, averaged $10\frac{1}{2}$ lbs. per week; gave 18 quarts milk per day, at times.

33. Cow. James Robbins, Watertown, Mass., 1827. May and June, from 10 to 13 lbs. butter per week.

34. Cow. Ralph Haskins, Dorchester, Mass., 1827. Eighteen quarts per day—average 14 to 15 quarts. Before grass feed in April, the cream of two days made $2\frac{3}{4}$ lbs. butter, and was made from 2 1–16 quarts of cream. Two or three minutes in churning. This was the mother of Mr. Jaques's famous Cream-pot breed.

35. Two cows—Rev. Mr. Phenix, Chicopee, Mass., 1828: for several weeks averaged 20 lbs. per week, besides what milk and cream were used in the family.

36. Cow. W. Chase, Somerset, R. I. 1831. Most of the season, 20 quarts milk daily; averaged nearly 14 lbs. butter per week during the season; 120 lbs. made in ten weeks.

37. Cow. Israel Graves, Northampton, Mass., 1830. Four years old; one week, 13 lbs. 9 oz. butter.

38. Cow. L. Hosmer, Bedford, Mass., 1830. 14 lbs. butter per week.

39. Four cows. Jesse Putnam, Danvers, Mass., 1830. Averaged more than 208 lbs. butter each in the season; highly fed.

40. Six cows. J. Curtis, Marblehead, Mass., 1830. Averaged over 181 lbs. butter each in the season, without extra feed.

41. Cow. W. Dickinson, Deerfield, Mass., 1830. One week, 14 lbs.; first eight weeks after calf was taken away, made 96 lbs. Six quarts of milk made one lb. of butter.

42. Cow. H. G. Newcomb, Greenfield, Mass., 1830. From March 27th to May 25th, made 100 lbs. of butter, and reserved 160 quarts milk. In 14 days, made 29 3–16 lbs. butter.

43. Cow. D. Wait, Greenfield, Mass., 1830. In one fortnight made 25 lbs. butter. In May 1832 she produced, in one week, 15¾ butter. Average daily weight of milk, 47 lbs.—Measured one day 26 beer quarts.

44. Two cows —— Hart, Shelburne, Mass., 1834. Besides milk and butter used for a family of three persons, they sold from these two cows, in one season, upwards of 400 lbs. butter; feed, grass only. In June, they made in one week 23 lbs., one week 25 lbs., one week 28 lbs.

45. Cow. —— Barrett, Northampton, Mass., 1830. This cow milked, for one fortnight, every eight hours; at each milking has yielded a pailful, holding 10 quarts—the weight of the milk averaging daily 49½ lbs. Her milk has yielded daily 2 lbs. 5 oz. butter, making 32 lbs. 6. oz. in 14 days. From one milking alone, 1 lb. 6 oz. were made, which will give 4 lbs. 2 oz. butter in one day, from one cow; the butter was of a superior quality, and brought a high price in the Northampton market.

46. A cow owned in New London, Connecticut, yielded 10 quarts milk per day, for 14 successive months.

47. Cow. I. G. Tyler, Bradford. This cow, from April 1 to Sept. 28, produced 154¾ lbs. of butter. In the second week in June, she yielded 126 quarts of milk, beer measure, at the rate of 18 quarts per day for that time.

48. Cow. C. C. Sewall, Danvers. From the 26th of June, in 95 days she gave 3189 lbs. or 1275 quarts beer measure.—The greatest quantity in one week was 116 quarts; in one day, 17 quarts, 1 pint. The daily average quantity was 13 quarts.

49. Cow. Albert Johnson, Lynn. From 27th March, 1840, when she calved, to 28th September, 184 days, she produced 6840 lbs. of milk, or 2736 beer quarts, averaging nearly 15 quarts per day. The largest quantity any one day was 52 lbs. or 20¼ quarts. She had good pasturage until the drought in summer, and then some hay and one bag (four bushels) of shorts.

The account of this cow for part of the present year is as

follows. From March 29th to September 30th, 186 days, she has given 6783 lbs. of milk, equal to 2714 quarts, averaging 14½ quarts per day. The largest quantity given in one day was May 9th, 51½ lbs., equal to 20½ quarts. She has been sick a part of the season, by browsing the leaves and branches of the black cherry-tree, which has occasioned some diminution of her milk.

50. Cow. Charles F. Putnam, Salem. From November 15, 1839, to November 13, 1840, she produced 4214 quarts of milk, beer measure, being an average of 12 quarts per day through the year. Mr. Putnam writes to me, "that the first month this summer, (1841,) with two quarts of meal per day, she averaged eighteen quarts of milk per day. I am confident that the cow will give twenty quarts per day in good fair feed. She was milked till within three weeks, and could have been milked to the time, of calving."

51. Cow. Hobart Clark, Andover. Butter in a week 14 lbs.

52. Cow. Julius Smith, Cheshire, Conn. This heifer, two years old, averages 18 quarts milk per day.

53. Cows. Spencer, Guilford, Conn. These cows average 14 quarts daily through the season.

54. Cows. Allen, Cheshire, Conn. Eight cows. 15 quarts of milk each, daily.

55. Cow. Shelburn, Vt. Has yielded 26 quarts, beer measure, in a day; and at two milkings in 24 hours, produced 3 lbs. 14 oz. of butter. This cow was raised in Vermont. Some persons, from her great product, call her English; but the admixture of blood is very small if any; and if any, it is not known, whether Durham, or Ayrshire, or what. There is nothing but her color, which indicates any difference from our best formed native stock. She has some progeny by an Ayrshire bull, which are very promising.

56. Cow. S. Henshaw, Springfield. 17¾ lbs. of butter per week, and in one case, 21 lbs. of excellent butter. In 4½ days that is 4 days and one milking she produced 14 lbs. 3 oz. of butter at the rate of 22¼ lbs. per week. I had in a

former publication marked this cow as a cross from a Durham bull; but I was misinformed. Mr. H. tells me she was a native cow without mixture of foreign blood.

57. Cow. West Springfield. This cow in sixty days produced 2692½ lbs. of milk, averaging 44 5-6 lbs. per day. This was equal to 22½ quarts per day for that time. She repeatedly produced over 50 lbs. and sometimes 54 lbs. of milk per day. I have the exact daily returns for the time.

58. Cow. O. Morris, Springfield. "The summer after she was seven years old, the quantity of butter made from her between the first day of April and the first of September, five months, was 206 lbs. During the time, we used milk and cream in the family freely. Some weeks we have made 14 lbs., exclusive of milk and cream used for family purposes. I have often weighed her milk in the month of June, and she has frequently yielded 31 lbs. at one milking at night. We have been particular to have her milked in the summer at five o'clock in the morning and at seven o'clock in the evening, and always by the same person. I think much of regularity in the times of milking; and that one person only should be permitted to milk the same cow the same season. My cow has always had a good milker, and her milk has been rapidly drawn. Her food in the winter is good hay, and in addition thereto from 2 to 4 quarts of rye bran at noon. I feed and give her water three times each day. In the summer, besides the pasture, she has 4 quarts of rye bran at night. From the experience I have had with this cow, I feel quite sure that many cows which have been considered as quite ordinary, might, by kind and regular treatment, good and *regular* feeding and proper care in milking, have ranked among the first-rate."

59. Cow. Roxbury. This cow, besides taking care of her calf, produced 3975 beer quarts of milk in one year or before her next calving, which was within the year.

60. Cows. J. P. Cushing, Watertown. "There has been no account kept of any of our native cows. Several of them, however, on grass, and also in the winter (soon after calving) have given 20 quarts a day for a month or more. Several of

our native cows, particularly two which you recommended, give a greater quantity of milk than any of our imported cows, with a single exception."

61. Cow. Page, Danvers. 13 lbs. butter in one week; 30 lbs. in three successive weeks.

62. Cow. B. Shurtleff, Chelsea. Supposed to be of the Galloway breed, small cow, has given 21 quarts per day.

63. Cow. Daniel Breed, Lynn. "She is six years old. She gives now (Nov. 19,) on grass and 1½ peck of roots, six quarts of milk per day. She has not had any hay or meal this fall, and all the hay consumed by her last winter, was 2900 lbs. without meal. She calved last April, and comes in again March 12th. She gave in June an average of 45 lbs. of milk per day, and has given 2490 quarts the last seven months. She is milked until within a few days of her calving. What is remarkable about the cow is her small size, and its requiring so little food to produce so much milk." The above measures are all ale and beer measure.

64. Cows. "George Goodnow, of Southborough, in the county of Worcester, keeps 10 cows upon his farm. He has kept an accurate account of their produce for a number of years. The amount of butter made from these 10 cows in the season of 1839, was 2172 lbs. The amount sold 2028 lbs. The amount used in his family, 144 lbs. During the month of June, the same season, the 10 cows averaged 9 lbs. each per week on grass feed alone. He has a number of cows that have made 10½ lbs. per week, and one that he has made 11½ lbs from. After the 1st of December he makes no butter, but sells his milk during the winter, the account of which has been mislaid. His calves suck till they are 7 weeks old, then they are mostly slaughtered. The cows are dry from 2 to 3 months previously to calving. In the season of 1840, the butter made from 10 cows was 1965 lbs. Amount sold, 1831 lbs. Amount used in the family, 134 lbs. Mr. G. had not footed the account for the present season, (1841,) but he said it would not probably vary much from the two previous years. The

cows are all native. You may rely upon the above being correct."

65. From 30 cows in Cheshire, Berkshire county, all native cows, an average of 425 lbs. of new milk cheese has been produced to each cow, and 10 lbs. butter, or 300 lbs. in the whole in a season.

66. Two dairies in Cheshire: one of 21 cows, produced 626 lbs. of new milk cheese, and 1700 lbs. of pork were made on the same farm, half of which was to be credited to the cows; one of 18 cows, produced 632½ lbs. of new milk cheese in a season, and 1000 lbs. of pork were made the same season on the same farm. Two quarts of rye meal were given to each cow two months the first of the season, and one quart for one month during the last of the season. Most of the time they had their whey.

I might greatly enlarge this list by a mention of other native cows as remarkable as those to which I have referred; but here I shall submit the case. The beauty of the Improved Durham Short-Horns and their perfection of form are admirable. They come with good keeping early to maturity. They have a tendency to keep themselves in good condition; and with extraordinary feeding and care, they arrive at a large size, and some individuals, all points considered, have surpassed any thing within my knowledge. The Claremont ox, a half-blood Durham, whose pedigree is not known, which was sent from this country to England for exhibition three years since, was pronounced by competent judges the finest animal of the kind ever seen there. His live weight was reported as not far from 3700 lbs. The Greenland ox was nearly as heavy, and singularly beautiful. A native ox exhibited in Boston, in 1840, did not differ much from these in size, fulness, and weight; but compared with them in appearance, he was misshapen and deformed. The Durham cows, in general, especially the selected ones, which have been imported on account of these qualities, are large milkers; but their milk seems generally inferior as to richness or butyraceous properties. The milking properties of

Mr. Whitney's stock at New Haven, are very remarkable. The Durham cows are large animals, and should be expected to secrete largely of milk; but many of them, however, are inferior as milkers; and, upon as calm and impartial a view of the subject as I can take from my own personal observation, I cannot pronounce them, as a race, distinguished and preferable to all others for their dairy qualities. I have come to this conclusion with very strong prejudices in their favor; and as I measure my words in this case, I wish to be judged only by what I say. Whenever a Short-Horn cow proves an inferior milker, the enthusiastic advocates of the race are pleased to tell us that it is because she has no pedigree, and is not a herd-book animal; but admitting that her genealogy is somewhat mixed, it is singular that the virtues of the blood should not show themselves to a degree, and that the impurity or defect should always predominate. It is certain, however, that many mixed bloods have in every respect excelled many of the pure bloods.

In regard to what we call our native stock, in which various bloods and breeds are intermingled, many of them are indeed miserable in appearance, in shape, in condition, and every other quality. This comes in general from neglect and indifference, because we kill or sell to the butcher our best calves, and commonly leave what we do attempt to raise, "to shift for themselves." Yet at the same time, without presumption I think, New England may challenge the world to produce finer teams of oxen, by fifties and hundreds of pairs, than are to be found at our cattle-shows. Let any intelligent judge of stock go into Worcester county, Mass.; into New Haven and Hartford counties, in Connecticut; or especially to Saccarappa, in Maine, where ox teams are constantly employed in carting lumber to Portland, and if he will find any superior oxen for labor and condition than are to be found there, he would do a signal favor to the agricultural public in letting us know where we may look for them. I have seen none. I believe we should search the world over in vain to find any.

Our native cows are of every variety, but there are several parts of the State where, though it cannot be said that any scientific or systematic improvement has been undertaken, yet by a long-continued selection from the best, whole families or breeds are to be found distinguished for their excellent properties as dairy stock. The list of native cows, which I have given, shows conclusively that we have those which, for the quantity of milk they give, are scarcely inferior to any; and for the amount of butter and cheese which they produce are surpassed by none. The numbers referred to prove that they are not rare.

Whether any thing would be gained by substituting the Improved Short-Horns for our present stock, is, to say the least, questionable. The Short-Horns are great consumers. Though animals do not always consume in proportion to their size, yet this must be considered as a general rule. They require most particular attention and liberal feeding to bring them to maturity, though we admit that they arrive at maturity early. Many of the Short-Horned premium young animals which have been exhibited at our cattle-shows have had the benefit of two wet-nurses for six months. Most of our native calves are put off with two teats, and at eight or ten weeks old are turned adrift into the pasture to live or die as they please. Our own stock has never had fair play; and if treated in the same manner as the best Short-Horn stock they would not perhaps fall so far behind them as might be supposed. Our pastures are in general short and our winters long. A smaller race of cattle, therefore, and a more hardy stock would seem better adapted to our condition.

The London milk establishments are mainly supplied with the Short-Horns, because, it is said, they give more milk, and after becoming dry, take on flesh sooner than other races, and are therefore more easily disposed of to the butcher. The size of these animals would naturally indicate a larger yield of milk, and, at the same time, a greater consumption of food. But the yield of milk is put down at an average of nine quarts

daily. These are presumed to be wine quarts, and deducting one fifth, it does not much exceed the yield of some milk establishments among us. Besides, in the London dairies, cows are not suffered to become with calf.

One of the most extraordinary Short-Horn cows known in England, it is said, produced 373 pounds of butter in 32 weeks; 17 pounds being the largest quantity made in any one week. This is quoted as quite remarkable; but this, as far as it goes, does not equal the Oakes, the Nourse, the Adams, or the Springfield cow. One of the best-informed and most ardent advocates for the Short-Horns, the late Henry Berry, remarks:—"That their milk does not contain the same proportionate quantity of butter as that from the Long-Horns, the Scotch cattle, or the Devons, is probably true; but we have reason to believe that the difference has been much exaggerated, and is more than compensated by the additional quantity of milk." Whether this additional quantity of milk can be procured without an additional quantity of food, is a question which naturally arises, but which I have no means of answering with confidence.

The quantity of cheese made in a year from a cow in the celebrated cheese district of Wiltshire, Eng. is thus stated.—"The quantity of cheese that is made from each cow in this district is greater than is common in any other cheese-making country, sometimes as much as 4½ cwt., or 5 cwt. per cow, seldom lower than 3 cwt. Perhaps 3½ cwt. is a fair average in a good cheese-making year on every cow that calves in proper time." In the famous district of Cheshire in England, the average amount of cheese to a cow, is stated at 2½ cwt. The old breed of Irish cattle, much valued for the dairy, will produce from 84 to 112 lbs. of butter per year; a very good cow will yield 1½ cwt, that is 168 lbs. net. Of the Ayrshire cows, kept in the highest condition for giving milk, it is stated that the yearly average in milk may be 650 gallons or 2600 quarts, (wine measure I presume is intended) and 90 gallons will make 24 lbs. of butter, or 15 quarts (wine measure) to a pound. In another case it is said "that a well fed cow of a good

breed, will produce on an average 180 lbs. of butter in the season; though the common calculation is 150 lbs. In the Epping district, where there is an indiscriminate mixture of Devon, Suffolk, Leicester, Holderness and Scotch, the calculation in a well managed dairy amounts to 212 lbs. per year to a cow. In one case in Sussex, upon an actual trial, the cows produced only 136 lbs. per season."

As far then as we can depend on these accounts, our own native cattle for dairy stock will not suffer by comparison with the best English stock of any of those races most distinguished for their milking properties. Our own Cheshire cheese dairies certainly yield the palm to none.

The cross of the Durham Short-Horns with the Devon, has produced in many cases an excellent stock. But if of no other value to the country, their introduction will prove an immense benefit by showing our farmers what can be done in improving the size, form, and condition of their own stocks, by a most careful selection from the very best, by persevering attempts to amend defects and engraft good properties in the animal constitution, and by constant care and good keeping.

It cannot be denied that a vast proportion of our cows are wretched in their form, health, and condition. There is no reason on the other hand to doubt that by breeding only from the best on both sides, and by a liberal mode of keeping, we may produce a dairy stock, and a stock for labor, as well adapted to our pastures, climate, and husbandry as can be found. Perhaps I should be authorized to add for beef also, that is, producing as many pounds according to the expense of their keep. The average weight of bullocks slaughtered at Smithfield, the great cattle market of England, is 656 lbs. At Brighton in this county, the average weight of oxen is 875 lbs., and of steers 600 lbs. each. The last is thought by some persons to be overrated. The weight used at Brighton is net weight; one hundred weight being now reckoned at 100 lbs. avoirdupois.

X. Brighton Market. — The great Cattle Fair of the State, and indeed of New England, is held at the beautiful village of Brighton, about six miles from Boston, on the Monday of every week. Here capacious pens are erected for the reception of such live stock as may be brought in, and the drovers and butchers assemble from all directions. The business of selling and buying is principally got through with on Monday, though cattle and other stock, when prices are not satisfactory to the seller, are frequently kept over, for a week or fortnight, for a better market. With the exception of a small fair at Danvers, in Essex county, held occasionally in the fall, I know of no other cattle fair in New England. Cattle, sheep and swine are brought here from the interior of the State, from Maine, New Hampshire, Vermont—from New York, and sometimes from Pennsylvania, Ohio, Indiana and Kentucky.* Ordinarily few sheep are ever brought to market except it be wethers fatted or to be fatted. Great numbers of pigs and shoats are driven here to be sold for keeping, but except an occasional drove from some distillery establishment few fat hogs are sold here either alive or dead. Nor is it any mart for horses, though occasionally they are brought here for sale. The cattle principally consist of young stock for wintering, working oxen, milch cows with their calves, and fat cattle for barrelling and for the retail market in the city and vicinity. The cattle for barrelling are taken at once to the large slaughtering and packing establishments, where they are disposed of accordingly; and fat cattle are likewise purchased for the butchers by the

* I ascertained some time since at the Bull's Head Market, in New York, that the expense of a drove of cattle consisting of one hundred head from the vicinity of Lexington, Kentucky, to that place, including the expenses of one night and a day in New York, was 1300 dollars, or 13 dollars per head. This was at a season when the drovers could avail themselves of pasturage. The price of corn is not recollected. They came in in good condition.

Store hogs or shoats, driven moderately in the mild season and well fed on the road, will gain in flesh, it is said by some, almost sufficiently to pay the expenses of their drift.

slaughterers, who kill and dress for one dollar* per head with the customary perquisites, or else purchase and kill on their own account, and supply the marketmen in the city and vicinity

* In my report on Franklin county, I stated this fee at two dollars. I was misinformed, though including the perquisites, it is considered equal to that. At Brighton, five quarters are made, as the tallow and hide are considered a fifth quarter, and their weight returned and paid for as the meat. In New York Markets, only four quarters are made; the hide and tallow are not weighed or reckoned in the price, and this fact is to be regarded in comparing the prices of cattle in the two markets.

In Brighton Market, the offal or perquisites of the slaughterer, are the entrails, the feet, the head, a strip from the fore shin, and the blood. The tongue, cheeks, and heart of the bullock go to the butcher. The slaughterer sells the feet and head to the tallow chandler and soap boiler, who extracts the tallow and oil; the claws go to the comb-maker, the bones and pith of the horns go to the bone-mill for manure, or for the purpose of obtaining animal charcoal, and the blood to the sugar refineries. A thorough system of economy pervades all the branches of the business.

It is a fact worth recording in reference to one extensive slaughtering establishment, and it may apply to others for aught I know, that the hides sold from it command always twenty-five cents per one hundred lbs. above the market price. The solution is this. No spirituous liquor has polluted these premises for nearly twenty years, and no man has been employed here, who was known to use any. The consequence is that the hides are never cut; and are eagerly sought after for factory bands and various other purposes, where holes in the leather would render it hazardous and unfit for use. When we consider the ten thousand ramifications in respect to the security of human life and the practice of all arts and trades into which the curses of intemperance and the blessed influences of sobriety extend themselves, we cannot feel too deep an interest in establishing a system of universal abstinence, and in exorcising this worst of all evil spirits, intoxicating spirit, from every hold where he has had possession.

It is extremely desirable that the system of buying and selling by live weight or on the hoof, should be adopted at Brighton. It would be greatly to the advantage of the drovers both in respect to interest and morals, to be able to finish their business in one day, receive their money on the sale of their cattle and return immediately to their homes. It would prevent the suspicion of fraud which now sometimes exists in the returns of weight made by the slaughterers, by removing all opportunity for it. I may mention an occurrence, which shows the boldness with which these frauds are sometimes committed, and the extraordinary circumstances by which in many cases crimes, when deemed most safely covered up, are detected. A

with such beef and with such amounts of beef as they may desire. The drover generally waits for two or three days until he gets the returned weight of his cattle after being slaughtered, and receives his money. The butchers who come from a distance in order to get supplies for the small and remote villages and towns, of course drive their cattle to their respective homes to be slaughtered; and large numbers go from hence to Lowell,

farmer on receiving the returns of the weight of a yoke of oxen, which he had entrusted to a drover for sale, was very much disappointed and dissatisfied. He had no reason to distrust the honor of the drover, and the drover returned the weight of the full number of cattle sold. It seems after the drover had delivered his herd of cattle to the purchaser, the purchaser selected this yoke of cattle, and, instead of killing them, sold them at a high price, putting another inferior pair in their stead, whose weight on being killed was returned to the drover. In the mean time, the yoke in question, which were sold to a farmer, broke out of his yard and returned to their first owner, which led to the discovery of the fraud.

It would be very desirable if several competent persons of established character and responsibility, were resident at Brighton, who should not themselves be buyers, but who should receive and sell cattle upon a fair commission. This has been done to some extent; but the increasing practice of having the droves picked of the best cattle, before their arrival at market by forestallers, renders respectable dealers unwilling to engage in disposing of the remainder, as the low prices which they must necessarily get for what remains after the best are selected, fail to give satisfaction to their employers, and tend to bring their own honor or competency into doubt or suspicion.

Business hitherto at Brighton has been very loosely conducted, though in general without doubt, and quite as far as under the circumstances is to be expected, with honor. The amount is immense and continually increasing. The business is done almost exclusively in cash, as any desire of credit on the part of the purchaser brings him at once under suspicion. The facilities for intemperance and gambling, which have sometimes existed at Brighton, have been dreadfully prejudicial to the drovers and others, who visit there and are obliged to remain there or in the capital some days without occupation for the return of the weight of their cattle. Young men coming from the interior with cattle for sale, are often ruined by here being entrapped and laying the foundations of fraud and drunkenness. If there is a place in our community, Brighton is one, where the friends of sobriety should combine their forces in this great cause of order and humanity; and where the banner of Total Abstinence should throw its broad folds to the breeze.

New Bedford, Fall River, Providence, R. I. and other considerable towns. The number of head of cattle, of all descriptions, brought here frequently exceeds eight thousand on a market-day. Five thousand sheep have sometimes been driven there in a single day. The cattle are often sold on the hoof—which is, on many accounts, a preferable mode for both parties, as it leaves no room for fraud or suspicion of fraud in regard to their weight. It is very desirable that the practice of selling on the hoof should become more common. Experienced judges "lay" the weight with surprising accuracy. The live weight affords an uncertain rule, as the weight of an animal is so materially affected by a full or an empty stomach. Mathematical rules are given, and tables for determining the live weight of animals have been framed abroad, which are said to give results very nearly exact, but they have not been introduced here.*

Great impositions are often practised in the selling of swine by live weight. They are supplied abundantly with salt and filled to repletion with corn before the sale. The buyer in this case does not suffer from an over weight only, but from the injury done to the hogs, who do not recover from the effects of such excesses for a long time, and in many cases have been incurably injured; in some instances have died within a few days in the hands of the purchaser. We call ourselves a christian community! In Turkey such rascalities would speedily give the villain an opportunity of carrying his head under his arm.

In times of a quick market, droves of cattle and sheep are often waylaid a day's or more journey from the market, and sales are effected without their reaching Brighton. Large numbers of the droves reach on Saturday night the resting places within such a drive of the market as is easily accomplished on Monday morning. At these places the Lord's day is too frequently desecrated by these premature negotiations; and the gathering of the droves towards the market, proves many times a troublesome annoyance to the sober part of the community in the vicinity of the great avenues. On these accounts, it has been much desired that the market-day might be

* Appendix J.

on another day than Monday: but the present custom is so strongly established that any alteration seems hopeless.

The laws of the State prescribe the manner of cutting up and packing beef, and of making returns to the seller. They may be seen in the Appendix;* but as they allow the parties to make their own arrangements at their pleasure, they are little observed, and custom rides over the law. For the last ten years an intelligent and exact person has been employed as reporter at the Brighton market. He takes account of the number of animals of all descriptions and varieties, excepting horses, brought weekly into the market, and notes the average prices at which they are sold. His reports appear the next morning in one of the most widely published daily papers in Boston, and the ensuing day in other papers, and are circulated throughout the State. Before this arrangement, farmers and drovers in the interior depended on mere rumors, which seldom reached them in season to regulate their movements in regard to the market, and were not always to be relied on. The exact reports now given, are received with confidence, and are of great importance to the farmers and drovers. They now learn whether the markets are glutted or thin, and the prices which they may calculate upon. This saves them from many mistakes and disappointments.

The importance and responsibility of the situation occupied by this reporter are very great. The farmers and drovers in the interior understand his reports to be made up with careful inquiry and the strictest impartiality, so that they feel an entire reliance upon them, and regulate their movements accordingly. There is good reason to think that attempts have sometimes been made to bias these reports, so that by putting, for example, the prices lower than the truth, droves might be purchased before their arrival at market at a lower rate than they would otherwise command. Any reasonable distrust of the integrity and impartiality of the reporter would at once, it is obvious, render his reports, which are now so valuable,

*Appendix K.

worthless. It concerns all honest men, as well buyers as sellers, to regard such attempts with indignation, and expose the parties making them to public censure and contempt.

This gentleman has been kind enough to reply at large to several interesting inquiries which I addressed to him on the subject of Brighton Market, and I cannot do better than to insert his letter. I can only regret that other gentlemen alike competent in the case, to whom similar inquiries were addressed, have not done myself and the public the same favor.

"The following is the number of beef cattle, stores, sheep and swine, offered for sale at Brighton since 1829, one of which years, 1830, was reported by another person (since dead).

	1830.	1831.	1832.	1833.	1834.
Beef Cattle,	37,776	33,922	40,807	49,180	36,382
Stores,	13,685	15,400	9,886	3,286	18,485
Sheep,	132,697	84,453	100,583	90,722	93,766
Swine.	19,639	26,871	14,697	17,408	27,844

	1835.	1836.	1837.	1838.	1839.	1840.
Beef Cattle,	51,096	38,504	32,667	25,830	23,263	34,160
Stores,	15,872	11,858	16,216	9,573	15,252	12,736
Sheep,	91,160	82,830	110,206	104,640	95,400	124,170
Swine.	23,141	15,667	17,052	26,104	26,086	32,350

Estimated Sales.

	1835.	1836.	1838.	1840.
Beef Cattle,	$1,373,054	$980,018	$1,377,330	$1,366,400
Stores,	201,960	204,988	315,907	277,456
Sheep,	205,999	169,307	261,600	217,321
Swine.	97,019	86,370	163,165	129,400

First interrogatory—"Does the character of the stock generally improve?"

I think there is some improvement in the stock of cattle generally. In mutton, there is no improvement, but there is in wool. In swine there is a decided improvement.

Second—"What is the average weight of oxen—of steers—of cows,—and of wethers when dressed?"

Oxen, 875. Steers, 600. Cows, 450. Wethers, 42.

Third—"Are any animals sold by live weight, and if so, what is the ordinary allowance for shrinkage, or loss, or offal, by slaughtering?"

There are a few beef cattle every week sold by live weight, and occasionally a lot of sheep. The ordinary allowance for shrinkage, is from 30 to 35 per cent. on market cattle. Some cattle which have been driven a long distance, or are very fat or hollow from the want of food, will not shrink more than 25 per cent.; while others thin of flesh, or full of food, will shrink 40 per cent.; wethers usually shrink 50 per cent., and sometimes more. It depends very much upon the state of the animal at the time of weighing. Oxen fresh from the pasture at night, have frequently been weighed and reweighed on the following morning at 9 o'clock, and found to have shrunk 80 to 100 lbs. each.

Fourth—"Are animals more generally sold on the hoof by estimate than formerly?"

There are more, and it is to be regretted that the number is not larger.

Fifth—"Does the system of slaughtering the animal, and then returning its weight to the drover, expose or lead to many frauds in your opinion?"

The system undoubtedly leads to more or less frauds; the temptation is great. Very few, however, are exposed, it being exceedingly difficult to detect the fraud. The butchers, however, as a class, for punctuality and honesty, will probably compare with any other class of business men.

Sixth—"Are there any practices prevailing within your knowledge in cutting up or weighing, which are illegal and against which the farmers complain?"

No regard is now paid to the statute law in dressing and cutting up beef cattle. The common law seems to have taken its place, an agreement between the parties makes the statute void. There is now a very general and uniform practice in dressing, cutting up, and weighing cattle, against certain parts of which the farmers and drovers a few years since complained consider-

ably, but less latterly, and the practice is now silently complied with.

Seventh—"Can you suggest any valuable improvement in the management of matters at Brighton?"

I think it would be a very great improvement, if all beef cattle were sold either by live weight or on the hoof. It would save many harsh words, and very many suspicious and fearful thoughts, perhaps unjust, though they may not be so.

Eighth—"Are the animals sold at Brighton, principally from this State, or is any considerable proportion of them from other States; and if so, from what States?"

About two thirds of the stall-fed cattle are from this State, the balance principally from New Hampshire, Vermont, and Maine; now and then a lot from New York. The sheep are about half from this State, the remainder from New Hampshire, Vermont, and a few from New York. The swine are principally from the State of New York; in these animals which now take so conspicuous a place in Brighton market, there has been a decided improvement; occasionally there is a lot from Vermont and New Hampshire, but they diminish every year.

Ninth—"Excepting Mr. Sweetser's stock from Athol, are there as many cattle brought from Worcester county, as from any other county?"

Yes; the number from Worcester county is probably twice that of any other county, exclusive of Mr. Sweetser's stock?"

Tenth—"Do many come by the Railroad, within your knowledge?"

Occasionally a few yokes of very large and fat cattle; but more frequently a drove of sheep, and a still larger number of swine, particularly in the coldest and also very warmest months. Should the freight be reduced, I think the number would be greatly increased.

Eleventh—"Is any difference made in price within your knowledge, between potatoe-fed cattle, or stock fatted on Indian meal?"

Not any; very few cattle are now fed on potatoes.

Twelfth — "Are stock often sent from Brighton to New York, or from New York to Brighton market?"

None are sent from Brighton to New York; occasionally in the summer season, a few hundred come from New York to Brighton. This happens when there is a very large supply at N. York of southern and western cattle; and we sometimes see in our market, very fat cattle fed in Kentucky and Ohio. Of cattle of the pure Durham blood, we have very few; hardly enough to give a single butcher a chance to test the quality. *A mixture of blood*, will, undoubtedly, improve almost any stock; and it is to be regretted that there is not more attention paid to this important fact.

The market business at Brighton, is now conducted upon a system, which is either cash, or short credit, which never exceeds a week. This is very frequently and necessarily done to enable the butcher to kill and weigh his cattle. If the practice of buying and selling cattle by the hoof or live weight could be brought about, the cash system could be made complete; if, however, a week's credit was occasionally necessary, a note might be given, and the money received at the bank by paying the discount, which would probably be less than a single day's board, and the drover could be immediately on his way home.

XI. Swine. These form a considerable portion of the live stock of Middlesex county. Though Middlesex is not a hog-raising county, yet such is the number of swinish emigrants into it, and the respectability of the condition to which they are advanced after their arrival, that I might be liable to the charge of some Jewish prejudice if I passed them over in silence. Some years since, at a Brighton Cattle Show, an accomplished scholar, then a professor of Harvard University, and afterwards Governor of Massachusetts, whose wit was always racy, and, when let out, sparkled and bubbled like a soda fountain, in toasting the farmers of Massachusetts and the literati of her college, expressed a wish that their *pens* might equally do them honor. Without disparagement to the other

side of the house, this wish I may say, in respect to the farmers of Middlesex, seems accomplished.

Large numbers of swine, as appears from the reports of the Brighton market already given, are brought into this county for sale. These come mainly from the state of New York. Until within a few years, a breed known as the Grass-fed hogs, constituted the principal stock. This was a hog, raised with little other feed than clover pasturage for the first six months, of a white color with black patches sprinkled over him, long and well formed, of good thrift, and who, with good keeping, at eighteen months old, was easily brought to 400 and 500 lbs. weight. Within the last few years the Berkshire hog has been introduced. His symmetry, thrift, cleanliness, fineness of bone, his excellent shoulders and hams, and, above all, his good humor and his marked deficiency in the organ of tune, secured universal favor. In my visits among the farmers since the introduction of this race, I have been amused with their enthusiasm for their swine, resembling that of parson Trulliber, in Fielding's History of Joseph Andrews; and in finding them, I had almost said, more proud of their Berkshire pigs at their troughs, than of their chubby and rosy-cheeked children round their supper-tables. I am a great admirer of the Berkshire swine, but I could never sympathize in these preferences; and my respect for human nature has considerably increased since the progress of the blessed Temperance reformation, and since men are now seldom seen as formerly with all rationality extinguished, and even their animal nature outraged and degraded.

We have been compelled, however, in this as in many other cases, to witness the capriciousness of public favor; and to adopt, with the variation of only a letter, the familiar proverb, and say in this case, that "every *hog* must have his day." The popularity of the Berkshire swine is on the wane. It is objected to them by many farmers that they are not large enough, though they are easily made to reach, at fourteen months old, 300 or 350 lbs.; and further, that they do not cut up well; and that the fat on their backs and sides is not thick

enough, especially for packing down for fishermen, who would be glad to have their pork all fat, and whom I have seen spread their uncooked salted fat pork, as landsmen spread butter, on their bread.

The former objection is not made by all persons, as many would prefer for their tables the pork of a hog weighing 300 lbs. to that of hogs weighing 600 lbs., of which I have seen many in our market. With respect to the latter objection, I was half disposed at first to consider it as mere caprice, but that E. Phinney, of Lexington, a farmer in this matter "not unknown to fame,"—and another most respectable farmer of Franklin county, admit that there is some truth in it; and they, as well as many others, prefer a cross to the pure blood. The impression is becoming general, and the butchers in Quincy market are unanimous in their unfavorable opinion of the Berkshire hogs. They admit that their hams and shoulders are good for bacon; but their backs, where they most require it, have no depth of fatness, and they are therefore unsuitable for salting. They are good breeders and nurses. They may be kept, therefore, to much advantage where the object is to raise roasting pigs for the market. This is sometimes quite profitable where a sow has two litters a year. A roast pig, only weaned by the knife, has from time immemorial been deemed a most luxurious dish. So it is likely to continue to be. Charles Lamb says that the Chinese never knew the lusciousness of a roasted pig until an accidental fire occurred which destroyed a pig-stye with its inhabitants. In pulling the bodies of these poor creatures burnt to a crisp from the fire, some of the skin or flesh adhered to the fingers of the Chinese, and in putting their hands by chance to their mouths, they for the first time in their lives inhaled the odor and tasted the deliciousness of the roasted skin. After that, the *accidental* burning of pig-styes became so common that the civil authorities were compelled to interpose.

It is but just, however, to the Berkshires to say, that the unfavorable impression in regard to them, though general, is not

universal. An intelligent and very exact farmer at Braintree, B. V. French, has found them to answer his expectations. Upon recently killing a number, he was well satisfied with their appearance, and is of opinion that much of the prejudice which exists against them belongs properly to the impure but not to the genuine race.

The introduction of the Chinese hogs into this country and into England seems to have been the foundation of all the extraordinary improvements which have taken place in this race of animals—improvements which, within less than half a century, have doubtless enriched the State of Massachusetts many hundreds of thousands of dollars, and the country by millions. The effects of this cross with other swine have been to give fineness of bone, plumpness and fulness of form, extraordinary thriftiness, and quietness of demeanor. The old race of hogs, seemed to be of the wolf species in temper as well as condition, and were the personification of ugliness and rapacity. The first introduction of one of these animals into a secluded part of Scotland, within the last century, is matter of comparatively modern history. Having got loose from his stye, he appeared to the terrified imaginations of these simple people as the arch-fiend himself, and crowds hovered together through fear—the parish schoolmaster being at their head with an open bible, to endeavor to lay this evil spirit! The animal now, in his improved condition, is regarded as one of the farmer's best friends; he eats what nothing else will eat; he is a general scavenger, and an excellent composter of manure. His own manure is one of the most enriching substances which can be supplied to the soil, though not one of the most lasting in its effects; and his flesh is the most frequent dish upon the farmer's table.—This county may boast of great improvements in their swine. A Mr. Mackay, of Boston, owning a farm in Weston, obtained from abroad, some years since, a valuable hog, whose natural good qualities by good management he greatly improved. Some of this breed of swine have been most remarkable for thrift and weight. Besides this, a hog called the Mocho hog, long, round

and thrifty, whose pedigree is not known, has been introduced here. Some of the best hogs which I have seen have been from an admixture of these three bloods. Mr. Phinney emphatically approves this cross; and the weight of his swine when killed, of some of which I subjoin an account, establishes the soundness of his judgment.

In 1840, Mr. Phinney sent the following hogs to market:

Feb. 6.		Feb. 15.		Feb. 17.		Mos. old.
1 weighed	407 lbs.	1 weighed	469 lbs.	1 weighed	763 lbs.	20
2 "	414 "	2 "	367 "	2 "	591 "	15
3 "	413 "	3 "	362 "	3 "	476 "	15
4 "	305 "	4 "	331 "	4 "	430 "	12
5 "	364 "			5 "	475 "	12
6 "	366 "			6 "	465 "	12
				7 "	430 "	12
				8 "	464 "	12

In 1841, the subjoined is a list of fifteen Berkshire and Mackay hogs from the same farm:

February 22, 1841.

1 weighed	738 lbs.	1 weighed	528 lbs.	1 weighed	487 lbs.
2 "	655 "	2 "	523 "	2 "	480 "
3 "	579 "	3 "	517 "	3 "	476 "
4 "	574 "	4 "	503 "	4 "	441 "
5 "	556 "	5 "	501 "	5 "	400 "

The grass-fed hogs, which I have before mentioned, are regaining their popularity. They have been, to a degree, crossed and intermixed with various valuable breeds in the interior, and are now preferred to all others in the Brighton market. With good care and keeping, at fifteen and eighteen months old they are easily carried to 500 and 600 lbs.

Of four, fatted by Stephen Morse, of Marlborough, the current season, the weight was as follows: 539 lbs., 530, 506, 459—averaging 508½ lbs. each. These hogs were put into the stye in September, 1840, weighing between 70 and 80 lbs. each, and were killed in October, 1841. They were kept mainly upon boiled potatoes the first winter, and since that, upon the slops of the dairy, skim milk, butter milk, whey and Indian meal.

Some of the best hogs which I have ever seen have been fatted at the slaughtering establishment of Jesse Bird, in Watertown. He keeps his swine about six months. He purchases the grass breed above mentioned, preferring hogs with a small head, round and full body though not deep belly, and with full shoulders and broad backs. They are taken in, weighing from 170 to 200 lbs., kept in the slaughter-yard for a time, and, previous to killing, are fed upon potatoes and Indian meal cooked, and are brought to weigh from 450 to 600 lbs.

At the slaughtering establishments in the vicinity of the capital, large amounts of pork are supported and fatted upon the offal. Sometimes this is cooked for the swine ; in other cases, it is given in its raw state, so that without any troublesome change in the way of preparation, the hogs eat the cattle and then men eat the hogs. It is easy, but not agreeable to imagine in such cases what the pork may be. The richness of animal food becomes thus a little too much concentrated even for the epicurean palate ; and few persons knowingly would have the courage to touch such food when coming directly from the slaughter-yard, excepting some, who are cannibals by nature, and by some accident have been misplaced in a civilized country. It answers very well for shipping pork, for no questions of taste are ever held over a barrel of provision either on a slave plantation or at sea. It is ascertained, however, that in fatting swine, some portion of animal food and pot liquor is highly conducive to thrift. In the best establishments, the hogs some time before being slaughtered, are put upon vegetable food, potatoes, Indian meal, &c., so that the rankness of the pork is taken away.

E. Phinney's swine establishment at Lexington, is among the most extensive in the county. His number of fattening swine averages about 100, with fifty store hogs, and they are killed in February and March, when from 10 to 18 months old, being of the fall and winter litters of the previous year. His pens are well arranged ; seldom occupied by more than three or four in a pen. They have a manure-yard attached to

each pen, into which bog-mud and litter are thrown for their manufacture and compounding, and they have always a dry and comfortable bed. They are fed regularly three times a day. I shall subjoin an account given by himself of his mode of management, which the farmers will read with interest; and shall annex in the Appendix,* a sketch of his styes or barracks.

"An inquiry is often made as to the best time of killing, or at what age it is most profitable to slaughter them. On a large farm where much green herbage is produced and where the value of the manure is taken into the account, the pigs killed at the age of 15 and 16 months, give the greatest profit. When it is intended to kill them at this age, they may be kept on more ordinary and cheaper food for the first 10 or 12 months, or till within 4 or 5 months of the time of killing. The manure they make and the extra weight of pork more than pay the expense incurred in keeping them the longer time; but the spring pigs which are to be killed the ensuing winter and spring, must be kept upon the best of food from the time they are taken from the sow until they are slaughtered.

"The older class of pigs for the first 10 or 12 months are kept principally upon brewers' grains, with a small quantity of Indian or barley meal, or rice, ruta-baga, sugar-beet, &c., and in the season of clover, peas, oats, cornstalks, weeds, &c., they are cut green and thrown into the pens; the next 4 or 5 months before killing they have as much Indian meal, barley meal or rice, with an equal quantity of potatoes, apples or pumpkins, as they will eat, the whole being well cooked and salted, and given to them about blood warm. During the season of fattening, an ear or two of hard corn is every day given to each pig. This small quantity they will digest well, and of course there is no waste. Shelled corn, soaked in water made as salt as the water of the ocean for 48 hours, with a quart of wood ashes added to each bushel and given to them occasionally in small quantities, greatly promotes their health and growth. Their health and appetite is also greatly promoted by throwing

* Appendix, L.

a handful of charcoal once or twice a week into each of their pens. Their principal food should, however, be cooked thoroughly and nicely. From long practice and repeated experiments, I am convinced that two dollars' worth of material well cooked, will make as much pork as three dollars' worth of the same material given in a raw state.

"Pigs when first taken from the sow should be treated with great care, to prevent them from scouring and becoming stinted; when either of these happen, it will require many days and sometimes weeks to put them again into a healthy, growing condition. When first deprived of the maternal food, a little new or skim milk, boiled and slightly salted and given to them often and in small quantities, will prevent scouring and greatly promote their growth. If intended for killing at the age of 9 or 10 months, they should be full fed all the time and kept as fat as possible. If, on the other hand, they are intended for killing at the age of 15 or 18 months, they should not be full-fed, nor be made very fat for the first 10 or 12 months.

"To satisfy myself of the benefit of this course, I took 6 of my best pigs 8 weeks old, all of the same litter, and shut them in two pens, three in each. Three of these I fed very high and kept them as fat all the time as they could be made. The other three were fed sparingly, upon coarse food, but kept in a healthy, growing condition, till within 4 or 5 months of the time of killing, when they were fed as high as the others. They were all slaughtered at the same time, being then 16 months old. At the age of 9 months the full-fed pigs were much the heaviest, but at the time of killing, the pigs fed sparingly for the first 10 or 12 months weighed, upon an average, fifty pounds each more than the others. Besides this additional weight of pork, the three "lean kine" added much more than the others to my manure heap. These results would seem very obvious to any one who has noticed the habits of the animal. In consequence of short feeding, they were much more active and industrious in the manufacture of compost, and this activity at the same time caused the muscles to enlarge and the

frame to spread, while the very fat pigs became inactive, and like indolent bipeds, they neither worked for their own benefit nor for that of others.

"For the purpose of increasing my manure heap, my pens are kept constantly supplied with peat or swamp mud, about three hundred loads of which are annually thrown into my styes. This, with the manure from my horse stable, which is daily thrown in, and the weeds and coarse herbage which are gathered from the farm, give me about 500 cart loads of manure in a year.

"On regular and systematic feeding and clean and dry bedding, the success of raising and fattening swine very much depends. A faithful feeder, also, who has some skill and taste, and withal a little pride of vocation, is indispensable."

Of all articles ever given to fatting swine Indian meal is, without doubt, the most nutritious. Mr. Phinney, it seems, has by actual trial settled a much vexed question, whether hogs should be forced by full feeding when young, or at first be only kept well in a growing state. He found it better, when designed to be kept more than a year, to let the young animal, by sufficient but not excessive feeding, have time to develop himself and acquire a natural size, rather than, by filling him to repletion, to bring on a premature state of fatness, which seemed to check the growth. To young pigs, milk, whey and butter-milk are the best of all feed; but where cows are kept for the purpose of supplying the market with milk, the pigs will be of course regarded as very poor customers. "The milkman will not call." There is however, as I have shown in page 254, under some circumstances, a mistake in this matter.

The establishment of J. P. Cushing, Watertown, for keeping and fatting swine, is upon a large scale, and is exceedingly well contrived for his situation. It consists of a long one-story building, with separate pens on one side extending the whole length, each designed for four swine, with an open yard and a lodging and eating room to each, besides some lying-in apart-

ments.* A commodious passage-way runs the whole length of it, with the troughs projecting into the passage-way, and a shutter for the troughs so contrived that the trough is easily cleaned at any time, and the food of the hogs is placed before them without admitting that which, in the usual slovenly mode of feeding, is but too common, an uncivil interference on their part before all is ready. Some contrivance as effectual as this for another class of animals would be quite useful at some of our public hotels and steamboats, and save us from the severe remarks of those foreign travellers who have little sympathy with our customary dispatch of business, and seem to look upon us as a nation of fire-eaters.

The cooking apparatus is at one end. Had economy of room and ease of feeding been studied, the building might have been double the width, with pens on each side. In England, they are sometimes made circular with the cooking apparatus in the centre and the feeding troughs all within the circle; but in such cases there must be much waste of room. Mr. Cushing's barracks are lengthwise of his cattle-yard, so that the manure from the pens of his swine is thrown immediately into the yard, and any litter or muck easily supplied in the same way. His store hogs, too, at pleasure may be turned into the cattle-yard with the advice given in Æsop's fable by the dying father to his sons, "that there is a treasure buried in the field which they would find by digging for it." The swine however do not much need the advice. They are natural philosophers and go by instinct into deep investigations. Some of them should always be kept in barn-yards and cellars. They are of great use in turning up and mixing the manure; and in yards where cattle are fed upon grain, and the sweepings of the barn floors are

*The length of this building, including the cooking-place, is 252 feet, width 12 feet, and height the same. There are twenty pens, each 12 feet by 8, and a yard of 12 feet attached to each pen. The number of hogs that can be accommodated depends upon their sizes—from three to six, say an average of four of 300 weight each. There were fatted fifty-two hogs last season, weighing, dressed, 15,573 lbs.

thrown out, they take care that nothing is lost. I have known a considerable number of store hogs kept in a thrifty condition upon that only which they obtained in a yard where a proportional number of beef cattle were stall-fed. The philosophy of reciprocal uses, which is apparent in every department of nature, though it frequently presents itself in a form offensive to a fastidious taste, is to a reflecting mind always instructive on the wonderful economy of the divine providence.

A very large hog establishment in this county is to be found in West Cambridge on the farm of Abner Pierce. He keeps in his enclosure about 500 hogs. They are supported upon the city swill or refuse. No hogs are allowed to be kept in Boston but by special and extraordinary permission; and among the excellent municipal regulations, the refuse vegetables, meat, garbage, and offal of the houses are required to be kept by each householder in a box or barrel which is emptied once a week or oftener by the city scavengers. This, being taken into the covered city carts, is delivered at Mr. Pierce's establishment, about five miles from the city, daily—he paying therefor to the city 4000 dollars per year on a contract for five years.

His hogs, when I visited him, were in an enclosure of about fourteen acres, partly covered with trees and bordering on one of the beautiful ponds in that vicinity, a picturesque situation most certainly, for animals making such humble pretensions to taste and sentiment. If nothing else, however, in the summer months they enjoy, as much as their betters, the luxury of a refreshing bath and quiet repose under the shade, both essentially conducive to their health and thrift. He has had no general disease among them, though occasionally a case of the "blind staggers." He considers this troublesome disease as proceeding wholly from indigestion; and he finds no difficulty in its cure, by procuring an immediate evacuation. For this purpose he gives a dose consisting of half a pint of lamp oil, and half a pint of molasses, strongly charged with pounded brimstone. This remedy is important to be known, as the disease is not uncommon among swine, and often proves fatal.

This disease can hardly be considered local, though the "blind staggers" in years gone by, has been known to prevail in some localities near at least one of these ponds among a class of animals, who assume to be of a higher rank, but who occasionally pollute these beautiful regions by a resort to them for purposes of dissipation; but a simple and perfect preventive is at last found for *this* disease, (so much more humiliating and dreadful in its effects on *them*,) if they can be induced to take it, in "total abstinence."

Mr Pierce's hogs are purchased; he raises none. He buys them at a weight of 100 to 150 lbs. Their average weight when killed, is from 250 to 300 lbs. He has a killing twice a year, though many of his hogs are kept a year. The supply of refuse from the city, is sufficient, excepting at certain seasons of the year, when some meal and corn are given. They fatten in the yard without extra feed, excepting as above. At killing, the skins (that is the small entrails) are sold at 10 cents a set; the harslet at 8 cents; which pay fully the expenses of dressing. The remainder is cooked for the swine, after saving and selling what can be used by the soap maker. The manure made in their beds where they are littered, is sold readily at four dollars per cord and in quick demand. The average sales of manure are not less than one thousand dollars.

In the enclosure there are extensive plank platforms on which the garbage is spread when brought from the city. The right of cleaning the tables, after the hogs have filled themselves, is purchased by several neighboring farmers at $2 50 per day. Much of the refuse thus obtained is spread upon their grass lands, or ploughed in on their cultivated grounds, or placed round their apple trees, and in every case with the greatest advantage. If not used immediately it is put into a compost heap and covered with mould. Some farmers who obtain it use much of it for feeding their own swine. One farmer stated to me that he had purchased the right of obtaining it two days in a week. He kept the last year fourteen hogs entirely upon these gleanings. The gain upon these hogs

in live weight from 1st October to 1st April, when he sold them on foot, was 2800 lbs. Other farmers have been equally successful in this economical process.

The average gain of the hogs at this establishment is rated at a pound per day, live weight. A large amount of bones are brought out in the carts, and these find a ready sale at the bone-mill for manure.

The question of profit in keeping and fattening swine has been much discussed, and so much depends on circumstances of age, breed, food, length of time kept, and price in the market, that the question must remain open. Mr Phinney gives it as his opinion that with Indian corn at one dollar per bushel and potatoes at 33 cents, and the price of pork 12 cents, they may be fatted to a profit. In his experience, he says, four quarts of Indian or barley meal with an equal quantity of apples, pumpkins, potatoes or roots cooked, will give two pounds of pork.

A small example of fatting swine in Medway, Norfolk county, which came under my notice, seems worth recording, because an exact account of their cost was kept. The owner was a mechanic and bought every article of their feed, not even keeping a cow. His two hogs when killed weighed, one 420 lbs — one 382 lbs., and pork was then worth 12 cents per lb. Value when dressed $96 24 cts. They were killed at 14 months old. They were bought in November and killed in the December of the next year. They were kept in the stye the whole time; were fed three times a day with weeds, corn, and potatoes. The potatoes were boiled and the Indian meal mixed with them into a mash. They were fed exclusively on corn one week before being killed. They did as well in winter as in summer. Salt was frequently given to them in their swill. The price of corn bought for them was 117 cents to 136 cents, or an average of 130 cents per bushel. Potatoes were 30 cts per bushel. The whole cost of the hogs when fatted was $62 including the price of purchase, or 7.8 cts per lb.

I shall here subjoin some careful experiments made by my-

self a few years since in relation to this subject. They were given to some portion of the public at the time, in another form; but they may here reach many by whom they have not been seen, and to whom they may be interesting.

Experiment 1. Two hogs about one year old: one of them a barrow in very good condition; the other a barrow recently gelded and in ordinary condition, were put up to be fed exclusively upon Indian hasty pudding or Indian meal boiled with water. We began feeding them the first of March, 1831, and weighed them again on the nineteenth of the same month. In the eighteen days they consumed six bushels of Indian meal. They were offered cold water to drink but did not incline to take any.

The result—

No. 1 weighed on 1st March, . .	233 lbs.	
" " 19th " . .	269	
gain	36	
No. 2 (recently gelded) weighed on 1st March	190	
" " 19th "	247	
gain	57	

The gain of the two was 93 lbs. in 18 days. The quantity of meal consumed by them was 10 quarts per day to the two. We allow 30 quarts to a bushel deducting two for grinding. The price of corn at the time was 70 cents per bushel. The expense of the increased weight is 4.5 cents per lb.

March 21, 1831. Killed the hog mentioned first in the foregoing experiment. Live weight 273 lbs. Weight when dressed 215 lbs. Loss in offal, loose fat included, 58 lbs. or a little more than one fifth.

Experiment 2. No. 2, mentioned above, weighed on 23d March, . .	253 lbs.	
do. on 30th April, . .	312	
In 38 days, gain,	59lbs.	

No. 3, a shoat purchased from a drove, weighed

on 28th March, . .	100 lbs.
do. on 30th April, . .	151
Gain in 33 days, ...	51 lbs.

This is a fraction over 1 lb. 8 oz. per day each, nearly 1 lb. 9 oz.

In this case their food was exclusively boiled potatoes mashed with Indian meal. The exact amount consumed not ascertained, but fed as freely as they would bear.

Experiment 3. The two last-named hogs were for the next 20 days put upon Indian hasty pudding exclusively, with the following result :

No. 2 weighed on 30th April, . . .	312 lbs.
" " 20th May, . . .	382
Gain in 20 days, . . .	70 lbs.
No. 3 weighed on 30th April, . . .	151
" " 20th May, . . .	185
Gain in 20 days, . . .	34 lbs.

The two in the above named 20 days, consumed four and one half bushels of meal, cooked as above. Meal 78 cents per bushel. Gain of the two, 104 lbs. in 20 days.

Experiment 4. Sundry swine purchased from a drove, and fed with meal and potatoes, washed and mashed—

28th March, 1831,	19th May, 1831,
No. 1, weighed 97 lbs.	165 lbs., gain in 52 days, 68 lbs.
2, " 134	182 " " 48
3, " 100	186 " " 86

The two following, raised on the farm, and fed as above—

25th April, 1831,	19th May, 1831,
No. 4, weighed 151 lbs.	206 lbs., gain in 24 days, 55 lbs.
5, " 140	165 " " 25

Experiment 5. In this case it was not intended to force their thrift, but to keep the swine in an improving condition. They were shoats of the last autumn, and were of a good breed.

Tuesday, 3d April, 1833. Put up four shoats, and began feeding them with Indian hasty pudding.

	3d April,	22d April,		25th June,	
No. 1,	176 lbs.	202 lbs.	gain 25	264 lbs.	gain 62
2,	119	153 "	34	226 "	73
3,	150	170 "	20	218 "	48
				[Total, 183 pounds.	
4,	121	145 "	24	Killed 30th May.	

From 3d April, to 22d April, the above swine consumed seven bushels and one peck of Indian meal. From 22d April, to 25th June, seven bushels of Indian meal, cooked as above.

One of the above, No. 4, was killed on 30th May; being absent, the live weight was not ascertained.

On the 25th June, the three remaining hogs were weighed, and in the 63 days from 22d April to 25th June, they had gained in that time 183 lbs. as above.

After 30th May, when one of them was killed, one peck of meal made into hasty pudding with a small allowance of the waste of the kitchen for a part of that time, lasted them three days, that is 22-25 or less than a quart, say $\frac{7}{8}$ of a quart per day to each.

At first we employed half a bushel of Indian meal to make a kettle of hasty pudding; but we soon found that a peck of meal by being boiled sufficiently would make the same kettle nearly full of hasty pudding and of sufficient consistency. The kettle was a common-sized five-pail kettle, set in brick work in the house; and it was remarkable that the peck of meal produced nearly the same quantity of pudding, that we obtained from the half bushel, which showed the importance of inducing the meal to take up all the water it could be made to absorb.

The price of Indian corn was at that time 75 cents per bushel

—30 quarts of meal to a bushel deducting the toll. The amount of meal consumed in the whole time from 3d April to 25th June was 14¼ bushels—the cost $10 69—the total gain, making no allowance for the gain of No. 4, from 22d April to 30th May, which was not ascertained, was 287 lbs.

The gain of No. 1, 2 and 3, from 22d April to 25th June was 183 lbs. in 63 days; and allowing one peck to serve the three hogs for three days, required 5¼ bushels, the cost of which was $3 94. The live weight could not be estimated at less than 4 cents per lb. when pork was at market 6 cents.

The value of the 183 lbs. therefore was equal to $7 32, or at 5 cents to $9 15 cents.

The gain of the swine for the first 19 days, from 3d to 22d April, was

No. 1, 26 lbs. or 1,368 per day.
" 2, 34 " or 1,789 "
" 3, 20 " or 1,052 "
" 4, 24 " or 1,263 "

The gain from 22d April to 25th June, 63 days, was

No. 1, 62 lbs. or 0,984 per day.
" 2, 73 " or 1,158 "
" 3, 48 " or 0,761 "

The difference of daily gain in the two periods was attributable to the diminished quantity of meal. The question then arises, whether the first mode of feeding was as economical as the second.

In the first 19 days, 7 bs. 1 peck consumed, gave 104 lbs. gain.
" next 63 " 5 " 1 " " " 183 "

Had the first gain been in proportion to the second gain in reference to the meal consumed, the 7¼ bushels which gave 104 lbs. should have given 252 5-7 lbs. This great disparity can be explained only in the more economical preparation of the meal, by which a peck, taking up as much water as it would contain, gave a kettle nearly full of pudding, when half a bushel of meal, imperfectly prepared, gave little more. This seems to demonstrate the great advantage of cooked food, both as it

respects its increase of bulk and the improvement of its nutritive properties. Whether it would apply to those substances, whose bulk is not increased by cooking, equally as to Indian meal and the like, is a matter which experiments only can determine.

Such are some few trials in reference to the feeding and fattening of swine, which I have made, or information of which I have obtained from other sources, which may at least lead the inquisitive farmer to further experiments and inquiries, on a subject of great importance to his interest. The inferences to be made from them I shall leave to others. The results, as will be observed, are not uniform. The thrift of animals must depend on various other circumstances besides the kinds or the quantity of food given them. Much depends on the breed, as every farmer knows; much on the health of the animal; something on the season of the year. I failed in attempting to fatten several swine in one case, though they were carefully attended and various kinds of feed were tried, and the failure was totally inexplicable until they were slaughtered, when the intestines were found corroded with worms, resembling those found in the human stomach, and this, I have no doubt, prevented their thrift. The same fact has occurred in another instance, and with the same result. I failed in attempting to fatten some other swine, who had been driven a considerable distance and exposed, probably not even half fed on the road, to severe cold and storms. Some of them were frost-bitten in their limbs; and though attended and fed in the most careful manner they made no progress for months. In an experiment recently made, of giving swine raw meal mixed with water, I have found a falling off in their gain of nearly one half, compared with giving their food cooked, such as boiled potatoes and carrots, mixed with meal while hot; the result being, in a stye containing a number of swine, as 279 to 500. In respect to confinement or freedom, various opinions are entertained. The Shakers at Canterbury, N. H., deem it indispensable to the thriving of their swine that they should have access to water

to wallow or wash themselves in ; and that they by no means do so well without it. On this point I have had no trial further than to satisfy myself that fatting hogs are sometimes injured by being suffered to root in the earth.

With respect to the age at which it is advantageous to put up swine to fatten, I have only to remark, that it is with swine as with other animals, there are some breeds which come much sooner to maturity than others. A successful farmer in Saratoga county, N. Y., says that March pigs, killed about Christmas, are the most profitable for pork. Four pigs of what is called the Grass breed, were slaughtered at Greenfield, N. Y., which weighed 348 lbs. 318 lbs. 310 lbs. and 306 lbs. at nine months and seventeen days old.

On this point, I present a letter with which I was honored by the late John Lowell, whose authority in the agricultural community is justly estimated.

"Dear Sir,—

"I have been prevented answering your inquiries as to my experience in raising old or young pigs. I may say that I have fully and clearly ascertained, from a trial of 20 years, that young pigs of from 25 to 30 lbs. will give nearly double, in some remarkable cases three times, as many lbs. as shoats of 6 months weighing from 100 to 150. I have taken two pigs of 100 lbs. each, age six months, and never was able between May and November, to get them above 180, rarely above 170. I have taken three pigs of about 30 lbs. each, and on the same food which I gave to the two, they would weigh from 170 to 180 each in the same period ;—nay I have taken pigs of 200, and never could get them to weigh more than 300 in 7 months on my food. The way I ascertain the quantity of food is, that I never give any thing but the produce of my dairy, and the refuse of the garden, peaches, apples, and cabbage, which are uniform generally.

"3 pigs of 90 wt. or 30 wt. each, will give ordinarily 510 lbs.
less original wt. 90 often
not more than 60.

gain 420 lbs.

2 pigs of 100 wt. each, will give ordinarily 340 lbs.
less original wt. 200

gain 140 lbs.

"But the 3 pigs of 90 will not consume for the first 3 months half so much as the 2 of 100 each, and I have kept a 4th and sold it in August for quarter pork.

"There is nothing new or remarkable in these facts. It is the law of the whole animal creation. It is true of the calf and of man. The child of 7 lbs. quadruples its weight in 12 months; and the calf of 60 wt. if fine and well fed will weigh 600 wt. at the end of the year, and (if a female) will not double the last weight at any age.

"P. S. It should be remarked that the weight at purchase is live weight, and at sale dead or net weight, because in truth, to the owner this is the true mode of considering the subject. No doubt my sort of food is peculiarly favorable to young animals, it consisting in very liberal allowance of milk. If the older pigs were at once put on Indian meal they would attain to 250 lbs. at a year old, but the cost of the meal at 70 cts. per bushel would amount to 9 dollars, and if the first cost, 5 dollars 50 cents, be added, and the pig sold at 6 cents, there would be but 2 dollars gain on 2 pigs of 100 lbs. each; while 3 small pigs without meal fed on milk would give 24 dollars in the same time. I do not mean to give minute details but general views. As an important qualification of the foregoing statement it should be added, that shoats of 6 months bought out of droves have usually been stinted in their growth, and animals, like trees, recover slowly after a check. I presume if shoats were taken from a careful and liberal owner the difference would be less. But as a general law it may be safely affirmed, that weight for weight at the purchase, the younger the animal the greater the positive, and the far greater the net gain. At least such is my own experience and belief."

The preceding facts and experiments encourage the belief that hogs may be raised and fattened by the farmer to advant-

age, where corn is worth about 70 cents per bushel, and his pork will bring him 6 cents per lb. Success must greatly depend on skill, care, selection, and good management. The best swine that I have ever found have been in dairy countries, for there cannot be a doubt that milk and whey for every animal are among the most nutritious of aliments. Indian meal probably ranks next, though many farmers prefer a mixture of provender, such as corn, oats, rye, or barley; but I believe in all cases cooked food will have a decided advantage over that which is given in a raw state: an advantage more than equivalent to the labor and expense of its preparation. Potatoes are a valuable article of food, but the pork is not so good as that fattened upon corn. Carrots are more nutritious than potatoes. Corn given in a raw state or on the ear is a most wasteful management.

Swine ought to be kept on every farm in sufficient numbers to consume all the offal and waste of the dairy and kitchen. If beyond this, a breed can be obtained, which will arrive at early maturity, and which can be advantageously grass-fed or kept at a small expense and in an improving condition through the summer; and being put up to fatten early in autumn and forced as much as possible so as to be sent to market early in the winter, the farmer will ordinarily find a fair profit in this branch of husbandry. A great advantage is found in the keeping of swine from the valuable returns of manure both in quantity and quality, which are obtained from them, where care is taken to supply them with raw materials for the manufacture. Too much care cannot be bestowed in the selection of the breed and the general health of the animal when put up to feed; and it is strongly recommended to every careful farmer occasionally to weigh the animal and measure the feed, that he may ascertain seasonably on which side the balance of debt or credit is likely to fall. Nothing is more prejudicial to good husbandry than mere guesses and random conjectures; and though the result of our operations may not meet either our wishes or expectations, an intelligent mind will be always anx-

ious as far as practicable to know precisely how far they correspond with or disappoint them.

The profit of fatting pork with us has become much more questionable since such vast amounts of salted pork and hams are brought into our markets from Ohio and the far Western States, through the great and constantly increasing facilities of transportation. It is judged that much more than a year's supply is now on hand in the city of New York, and the new has not begun to come in.

This must essentially affect our markets. But it is to be considered that to a certain extent our own pork here will always be preferred; and that fresh pork, the lean pieces, will always be wanted in our market, with which the Western pork cannot at present come into competition, though after the experience of the last five years, it might be almost rashness to say that our markets may not yet be supplied with roasting pigs and fresh spare-ribs from Cincinnati. Then again there is on every farm a certain amount of refuse and offal, which may be profitably given to hogs, and would otherwise be lost. There is another circumstance, which must go to the credit of our swine. Manure in Middlesex county is every where valued at least at 4 dollars per cord on the farm. A hog duly supplied with the raw material, for a hog cannot, more than an Israelite, make bricks without straw, will make three cords of valuable manure in a year. A sow well kept likewise, may raise a litter of pigs, and may be fitted for the market in the same year. These circumstances may encourage us to think that, in spite of Western competition, a certain amount of pork may be profitably fatted among us every year. It is comparatively a recent discovery that apples are as good for fatting swine as potatoes. This opinion has been expressed to me by many farmers in this county. Apples may be cultivated to an indefinite extent and at a small expense. We may easily avail ourselves of this advantage. The opinion of many of these farmers is, that they are better given raw than cooked. This point will, I hope, be made matter of experiment. The fat-

ting of hogs, however, is subject to so many contingencies, that under present circumstances, excepting where extraordinary supplies of food are easily obtained, upon a large scale it can be safely undertaken only with extreme caution and care. Many, who have undertaken it, have been unsuccessful.

XII. Manures.—The price of manures in this county is very high. The farmers in the vicinity of Boston depend upon the city stables for a large portion of what they use. The price in Boston varies from three to four dollars a cord. I have known a market farmer to purchase one thousand dollars' worth in a year. Since the value of liquid manure is established, and its intrinsic efficacy is so much superior to the solid parts of manure, it is strange that no provision is made by the farmers for saving the vast quantities that are now lost in the city. Hardly an instance can be found, there is not one within my knowledge, of any provision for saving it at their own barns. This is an improvement yet to be effected. I have urged this matter so strongly, though not beyond its importance, in my former reports, that I shall add little more.*

* "In respect to the quantity of nitrogen contained in excrements, 100 parts of the urine of a healthy man are equal to 1300 parts of the fresh dung of a horse, according to the analyses of Macaire and Marcet, and to 600 parts of those of a cow. Hence, it is evident that it would be of much importance to agriculture if none of the human urine were lost. The powerful effects of urine as a manure are well known in Flanders; but they are considered invaluable by the Chinese, who are the oldest agricultural people we know. Indeed so much value is attached to the influence of human excrements by these people, that laws of the State forbid that any of them should be thrown away; and reservoirs are placed in every house, where they are collected with the greatest care. No other kind of manure is used for their corn fields.

"How infinitely inferior is the agriculture of Europe to that of China! The Chinese are the most admirable gardeners and trainers of plants, for each of which they understand how to prepare and apply the best manure. The agriculture of their country is the most perfect in the world, and there where the climate in the most fertile districts differs little from the European. very little value is attached to the excrements of animals. With us thick books are written, but no experiments instituted; the quantity of man-

I have known $6 50 paid per cord for stable manure taken at the stable; and a farmer, whose soundness of judgment in

ure consumed by this or that plant is expressed in hundredth parts, and yet we know not what manure is.

"If we admit that the liquid and solid excrements of man, amount on an average to 1½ lbs. daily (5-4 urine and ¼ lb. feces) and that both taken together contain 3 per cent of nitrogen—then in one year they will amount to 547 lbs. which contain 16.41 lbs. of nitrogen, a quantity sufficient to yield the nitrogen of 800 lbs. of wheat, rye, oats, or of 900 lbs. of barley." —*Boussingault.*

"This is much more than it is necessary to add to an acre of land, in order to obtain, with the assistance of the nitrogen absorbed from the atmosphere, the richest possible crop every year. Every town and farm might thus supply itself with the manure, which, besides containing the most nitrogen, contains also the most phosphates; and if an alternation of crops were adopted they would be most abundant. By using at the same time bones, and the lixiviated ashes of wood, the excrements of animals might be completely dispensed with.

"The urine of horses contains less nitrogen and phosphates than that of man. According to Fourcroy and Vauquelin, it contains only five per cent. of solid matter, and in that quantity only 0.7 of urea, whilst 100 parts of the urine of man contain more than four times as much.

"The urine of a cow is particularly rich in salts of potash; but according to Rouelle and Brande, it is almost destitute of salts of soda. The urine of swine contains a large quantity of the phosphate of magnesia and ammonia.

"When it is considered that with every pound of ammonia which evaporates, a loss of 60 lbs. of corn is sustained; and that with every pound of urine a pound of wheat might be produced, the indifference with which these liquid excrements are regarded, is quite incomprehensible. In most places only the solid excrements impregnated with the liquid are used, and the dunghills containing them are protected neither from evaporation nor from rain. The solid excrements contain the insoluble, the liquid all the soluble phosphates; and the latter contain likewise all the potash which existed as organic salts in the plants consumed by the animals."—*Liebig's Agricultural Chemistry.*

I have quoted the above from this valuable work, of which a full account will be given in the Appendix. I commend this work to the perusal of every intelligent farmer. It is full of instruction, and of stimulants and food for inquiry. It is in the highest degree creditable to our agricultural community, that two large editions of this work, published in this country by Prof Webster of Harvard University, with valuable notes, have been disposed of, and a third is forthcoming.

other matters I have always respected, expressed his willingness to purchase all the manure from the cow-stable in Lowell at five dollars per cord, though he must then cart it four or five miles in order to reach his farm. These prices are enormous, and the more surprising, since almost every farmer in Middlesex has at hand the means of preparing a compost-dressing for his land of equal value, at not half the cost.

Upon the farms in the vicinity very great quantities are carried from the livery-stables in the city. The hog establishment at West Cambridge supplies a large amount of manure to the farmers in its neighborhood. I do not refer in this case exclusively to the excrementitious matter of the swine, but also to the refuse garbage from the tables, of which I have spoken. This is spread upon their grass lands, or ploughed in on their cultivated grounds, or spread round their apple trees ; and in every case with great advantage. If not used immediately, it is placed in a compost heap, and covered with mould, to be used when needed. It has been found particularly useful when applied to fruit-trees at the roots. It is of course full of animal matter, and must furnish in abundance the principles of vegetable life. The intelligent farmer who gives me this account speaks of the effects of this manure as immediate and powerful. To night-soil he objects that its influence is transient. He gives the preference over all others to stable and horse manure. He raises largely of early vegetables and small fruits for the market. The stable manure is more convenient for his forcing beds in the spring, and, after it has performed its part there, is easily applied to other crops.

Large amounts of night-soil are obtained in Boston and Charlestown, and applied by the market-gardeners. It is brought out in a crude state in covered and tight wagons, and too often, without regard either to decency or comfort, is carelessly deposited by the road-side near the dwelling-house in a kind of basin, where a quantity of mould is at hand to mix with it, to absorb the liquid parts, and to put the whole into a condition to apply to the soil. The slovenliness with

which these matters are sometimes managed deserves no light censure. I knew a case in which, in the opinion of his physicians, the life of a respectable individual was a sacrifice to one of these negligently managed deposits made by a neighbor in his immediate vicinity. I do not know why, in a civilized community, the public have not an equal right to claim that the air shall not be needlessly corrupted, any more than the wells in a neighborhood poisoned, whether it be by the effluvia of some odious manure-heap or the scarcely less disgusting odors of tobacco. These places of deposit, as matter of public decency, ought never, under any pretence, to be permitted by the highway. By careful management of them in some suitable place on the farm, remote from the road and the dwelling, this great nuisance might be abated.

I am aware upon what a homely subject I have fallen; but I know how essentially it concerns the farmer's interest and the public health. "Evil be to him who evil thinks." I would advise a fastidious reader to pass over this whole chapter, but that I fear if I did, as it happens with forbidden passages in the classics in college, he would think that he owed it to himself to determine on the propriety of such advice, by first reading with increased attention what the chapter contained.

Every advance in cleanliness is an advance in civilization, a contribution to health and an equal help to good morals. The unfortunate beings who live in cities, are doomed to inhale and exhale the innumerable odors, which are there commingled from cellars occasionally filled with bilge-water, mud-docks which the receding tide has left bare, common sewers, and broken gas-pipes. In the country there is no apology for allowing any thing offensive on the premises. The farmers who obtain the night-soil from cities, would find an advantage in digging a long and deep vault, at least four feet in depth, walled up with stone and plastered and floored so as to be made thoroughly tight, and having a close and moveable covering. Into this the contents of the carts should be carefully turned, with such a constant supply of soil or muck orashes

or effete lime or gypsum as would completely absorb the liquid parts, and might be so intimately incorporated with the solid parts as to bring all into a feasible state of application to the land. This vault or stercorary should likewise serve as a place of deposit for all dead animals in the place, and all other offensive matters, which might be converted into manure. The contents of the family vault, being freely mixed with mould or spent tan, should likewise be conveyed there at least once a week. This would be a great gain to comfort and health. I saw such an arrangement on one farm, and its advantages were most obvious. It formed an excellent bank of general deposit, whose discounts in the spring were always most liberal and useful.

The preparation of night-soil for easy use and transportation, has been the subject of various chemical experiments. The prepared article goes under the name of poudrette; and though there have been occasional disappointments, I have seen it used with great success. The admixture of effete or slacked lime with it has the same effect as any other absorbent; but the application of quick lime, while it destroys its offensive odors, expels its ammonia and proportionately reduces its value. Liebig recommends its mixture with gypsum or chloride of calcium or some mineral acid. I have not known this tried. This would fix the ammonia and give it out to the plants as the vital process is prepared to take it up. The mode of preparing it in Paris, is by drying it in large vats in the sun until it can be reduced to a fine powder and loses all smell. Its best properties are then gone. Fine peat, muck, fine mould, powdered charcoal, tanners' bark burnt and charred, are substances which may be mixed with it to great advantage. It is beyond all question one of the most powerful of manures, but can only be applied advantageously in a prepared state. An establishment for this purpose is about being made in the county which may prove eminently beneficial.

Bone manure has been tried to some extent; in some cases within my knowledge, with great and decided success; in oth-

ers, without perceptible benefit. These diverse results convince us of our ignorance, and show how much we have to hope from the investigations of chemistry and philosophical experiments in relation both to manures and soils, and the hitherto scarcely approached mysteries of vegetable life. Much of the bone manure which has been used has been from bones which have passed first through the hands of the soap-boiler, and after all the gelatinous parts have been extracted. A considerable portion of their fertilizing properties has thus been taken away. The most successful application of bone manure which I have known was where they were mixed at the rate of about one part to eight with leached ashes or mould, and a fermentation brought on before they were applied. They were then spread lightly in the furrow, where carrots were sown. The effects were most favorable, and surpassed a free dressing of barn manure in the neighboring part of the field to the same kind of crop. I have known this manure applied likewise with great advantage to corn in the hill, a small amount in each hill without other manure, and to turnips in the drill. Peat mud is used with much success by many persons. Its application, when spread directly from the bog upon the soil, has not been approved; but when it has been thoroughly decomposed and reduced by a mixture with stable manure, with ashes, or with quick lime, it has furnished a valuable manure for spreading upon grass ground or putting in the hill with corn.

Various other manures have been used with great success. Ashes are every where commended as excellent for corn and wheat, and likewise for grass. Ashes being the direct result of vegetable combustion, contain of course that which is essential to vegetable growth and life, and being constantly carried from the earth by the removal of its vegetable products, must in some form be returned to it.

In some cases the waste from the cotton mills has been used with much advantage. This consists of that which is thrown out when the cotton passes through the picker, and is made up

not only of the wool itself but a considerable amount of the seeds, which are known to abound in oil, and at the South are much valued as a manure. This manure is sometimes spread thinly on grass land, and at other times put into the compost heap. It has been too little employed for us to determine the best mode of its application.

The waste from the woolen mills has likewise been used as a top-dressing for grass both in Tewksbury in this county, and at Northampton in Hampshire. I have seen its effects in these places and in some other parts of the country. They have been most remarkable, and surpassed by no manure which I have ever seen applied. This refuse used formerly to be accumulated in the neighborhood of the woolen factories at Lowell; and being surcharged with oil used in cleansing it, there was great risk always of spontaneous combustion. When thrown into the river it was complained of as interfering with the shad fishery. The amount of wool used at the Middlesex mills in Lowell is more than 600,000 lbs. per year. Being full of animal matter it is a most excellent manure. Its value has long been appreciated in England, but we seem to have come late to the knowledge of it. I have seen it spread directly upon grass land, both in mowing and pasture grounds, with surprising effect. It is much to be desired that the water in which their wools are washed, full as it is of animal oils and alkalies, could likewise be saved and applied to the land. It would prove beyond doubt a most valuable manure either applied on the grass lands or mixed in the compost heap. In the economy of nature nothing is without its use; and the first duty of the farmer is to remember that nothing should be lost.

A very exact and intelligent farmer in Groton made some comparative experiments with different manures on pieces of land contiguous to each other, of which he has favored me with an account. The land to which these different substances were applied was what is there termed reclaimed meadow, and rich in vegetable mould.

One bushel of ashes applied to three square rods of land at

the rate of 53 bushels per acre; this produced a heavy burthen of grass, and was considered the best of the several manures applied.

Salt, applied at the rate of one peck to three rods, or fourteen bushels per acre, produced a fair crop, and was considered the next best to the ashes.

Gypsum, sown at the rate of three bushels to the acre, manifestly much improved the crop, and was much the least expensive application. Lime was dry slacked and applied at the rate of one bushel to six rods, or 26 bushels per acre, without any perceivable effect.

I do not present these examples as furnishing any decisive results, but rather with the hope of inducing farmers to make and record exact experiments though on a very limited scale, that by the accumulation of such facts we may arrive at something more definite. Little can be deduced from the above experiments, unless equal quantities of each kind of manure had been used; and then we want likewise to understand the nature of the soil, as in respect to some soils, it is obvious certain kinds of manure are much more suitable than others.

Saltpetre has been used to some extent in Middlesex county. The use of this manure and the nitrate of soda abroad, has, according to the reports which we have had, been productive of so much benefit, that every fact connected with their application here is important. I shall subjoin some few of the results which have come within my knowledge.

E. Phinney of Lexington thus writes to me:

"My experiments with saltpetre as a manure have satisfied me of the inexpediency of using it for that purpose. In the spring of 1839, I purchased 400 lbs. for which I paid $8 per cwt. I tried it upon wheat, rye, and grass. Fifty pounds to the acre on wheat and rye had no perceptible effect, and on grass but very little. One hundred pounds to the acre occasioned a very considerable increase of straw and grain, both in wheat and rye as well as grass. But had I bestowed an equal outlay in compost made from peat-mud and stable manure, or

peat-mud and ashes, I have no doubt the immediate crop would have been more benefited and the land have received more permanent improvement. I have in one instance seen very striking effects produced by the use of saltpetre upon a light, sandy soil. But the quantity used I could not learn, any further than that it was much greater than the quantity to the acre used by me. I believe a portion of saltpetre and common salt, say ten pounds of the former and twenty pounds of the latter to a cord of compost manure well mixed, would greatly improve it. The beneficial effects of saltpetre in the destruction of insects that annoy our crops, cannot be doubted. I noticed on the farm of Mr Whipple of Lowell, two orchards separated only by a stone wall. The trees upon one side of the wall were badly eaten and almost destroyed by canker-worms, while those upon the other side were untouched. On enquiring the cause, I learnt that saltpetre had been used upon the land of the latter orchard and none upon the former. The remedy may be an expensive one ; but were my trees attacked by this terrible scourge, I should immediately apply it. The saltpetre, instead of injuring the trees, as most applications do which are made for this object, would greatly promote their growth."

I think proper to subjoin here, though from another county, the experiment of John E. Howard, of West Bridgewater, Plymouth county, an account of which he was kind enough at my request to furnish me. Mr Howard's exactness and intelligence are well known.

" You expressed a wish to hear further concerning the experiment which I made the past season, to test the efficacy of saltpetre, when applied as a top-dressing to grass land.

" Of the patch selected the soil is a light sandy loam. On this, some time in the latter part of May last, I sowed saltpetre at the rate of one pound to the square rod. The effects were soon visible ; the grass exhibiting a deeper shade and a more luxuriant growth than in any other part of the lot. It continued to grow thriftily until the period of its maturity, when on

cutting it, the produce was judged to be double that grown on any equal number of feet in the same field. The beneficial action of this substance, however, seems not to have extended beyond the first crop; as, since that was removed, no appearance of superior fertility has marked the spot where it was spread."

O. M. Whipple, of Lowell, the proprietor of a large establishment for the manufacture of gunpowder, in which much of this material is used, has favored me with successive communications on this subject, which I can do no better than present in his own language.

"It is now about sixteen years since I commenced using saltpetre. The grounds upon which I have used it, have yielded large crops, and have held out much longer than grounds in general, of the same quality of soil, and of the same kind and quality of dressing commonly used.

The kind of saltpetre which I have used, has been that part extracted from the common saltpetre while undergoing the process of purification, and is not fit for gunpowder. I have, therefore, not been particular as to quantity, using what I have had to spare; but I am satisfied that it requires but a very small quantity to produce favorable results; I have thought that one hundred and fifty pounds per acre, would be a sufficient quantity to be used generally. The best mode of using it, is to mix it with barn manure, meadow mud or any kind of compost which may be at hand; although I have used it in various other ways, as I shall now describe.

I have one piece of ground of $2\frac{3}{4}$ acres. It had been used for a long time as mowing ground, and had, as it is termed, run out, and grew but a very small crop of grass, say 1500 lbs. to the acre. I ploughed it in the fall of 1830; in the spring of 1831, I covered it with barn manure, mixed with saltpetre, as described above, and harrowed it in, and planted corn without disturbing the furrows. I had a very handsome crop of corn. In the spring of 1832 I again dressed it as before, that is, with barn manure and saltpetre, sowed oats and stocked it down

The oats were good. In 1833, I took from it a crop of grass, which was estimated to be six tons. It has grown grass every year since, and I believe not a less quantity than the estimate above has been taken from it since the first crop. I should be safe in saying that there were six tons grown upon the lot the last year, and this year the crop is good. I have another lot, containing $1\frac{3}{4}$ acres, which like the other yielded little grass; 20 cwt. being all the lot produced in 1822. In the spring of 1824, I dressed it upon the surface with manure, meadow mud, and saltpetre mixed; and it yielded a moderate crop that year. In the spring of 1825, I sowed upon the surface, as you would sow rye, a quantity of saltpetre. The result was, that I took from the lot at least four tons of hay, as it was adjudged. This too was in a lot containing apple-trees, and the grass much lodged all over the field. I continued sowing upon this lot a small quantity of saltpetre once in two years, for five or six years, and at the same time raising a very large crop of grass yearly. Nothing has been done to this lot for the last six years, and there is at this time upon it more than a middling crop of grass.

I have another lot of light-soiled ground, of about four acres; it had been used for growing rye. It occurred to me that I would try the experiment of saltpetre upon a small piece of this ground. The result was so favorable, that the next year, in the spring, I covered the piece with meadow mud mixed with saltpetre. The result was, that I obtained from the ground as large a crop of grass as it was considered profitable to raise. Last year, which was the fifth, it yielded two tons per acre. There has been, however, a small quantity of saltpetre sowed upon the lot since. I could describe other lots upon which saltpetre has been used, but with the same results as those already mentioned.

I shall now designate the above lots and describe the kind of soil.

The first, is No. 1, of a middling quality, neither very wet nor dry.

The second, No. 2, is an orchard adjoining Concord river, of a damp soil and of a very good quality.

The third, No. 3, is a dry, sandy soil, considered by me of no value, until I practised using saltpetre upon it as a dressing. With regard to the mode or manner of using saltpetre upon ground, I do not think it makes much difference, if it is but put upon the ground. I have practised sowing it upon the surface, and mixing and ploughing it in with, for aught I know, equal results; but I should be rather in favor of mixing and ploughing it in. In this case it would require a larger quantity, say 300 lbs. per acre; the effects would be more slow and lasting. In sowing upon the surface, it would require a less quantity, say 150 lbs.; but it would be necessary to repeat the dressing yearly, until the crop should be satisfactorily large. I am more in favor of bringing up the ground gradually, by the yearly application of a small quantity of saltpetre, than I should be by a larger quantity, and getting a large crop the first year."

Since the foregoing, the same farmer has furnished me with some additional information, which follows; and again, the present year, assures me of his continued success in this application. I could have wished that the experiments had been made with more exactness.

"Since my communication to you in June last, respecting the use of saltpetre as a manure, I have had a more particular practical demonstration of its utility.

Having an island in Boston harbor, called Spectacle island, and its distance from land rendering it very expensive to furnish manure for it, in the spring of 1838 I concluded to try the experiment of using saltpetre as a substitute, and in order to test its ability with some exactness, out of two acres which had been cultivated the year before, half an acre was set apart for the purpose of receiving 150 lbs. saltpetre, which were sowed on the surface and the whole two acres were then ploughed and planted with potatoes. At harvesting, I found that there was an increased crop upon the ground where the saltpetre had been applied. I directed the man in charge to dry 5 hills upon the

ground where the saltpetre had been applied, and also 5 hills where there had been no saltpetre, and weigh each parcel. The potatoes on the ground where the saltpetre was applied, weighed 9 lbs., the other 4 lbs.; this, it will be perceived, was the result of one year's application only. I am inclined to think that its influence will be felt more or less the second, or even the third and fourth years.

A field containing two acres from which grass had been taken for 8 years, I had ploughed in the spring of 1838, once only; it was ploughed deep, and 90 rods were appropriated to the growth of ruta-baga. The seed was sown upon the tops of the furrows, without any manure in the drill, and the result was, that I obtained 500 bushels of the article specified above; the remainder of the field was sown to oats, but the crop was mostly destroyed by the unexampled growth of hog weed. This field had been wholly sustained by the application of saltpetre upon its surface, previously to its being ploughed, excepting at the time of ploughing, when there was turned in a small coat of manure."

D. S. Haggerston, the intelligent and experienced manager of J. P. Cushing's garden and farm at Watertown, has been kind enough to favor me, at my request, with some practical observations and experiments on the subject of manures, which deserve attention, and are therefore subjoined.

"I send you an account of experiments made on the farm of J. P. Cushing, Esq., of the different composts used as manures, and the apparent effects of each.

Meadow muck or peat has been used in various ways, and found so very beneficial, that two thirds of the manure used on the farm is dug from the swamp.

A compost for top-dressing mowing land is made from leached barilla ashes from the soap-boilers' and meadow muck, in the following manner. The muck is dug from the swamp, the last part of August, or early in September, and lies one year on the surface, after it is thrown out of the pit. It is then carted to a convenient place to make the compost heaps, which are formed

by spreading a layer of muck ten feet wide, eight inches thick, and of any length desired; on the muck four inches of ashes are spread, then another layer of muck, and so on for five layers of each, which makes a pile five feet high, in the form of a ridge. This is to lie through the following winter. As soon as the frost is gone in the spring, the pile is turned over, well broken, and mixed together. It then lies till the October or November following, when it is spread on the land at the rate of fifteen cart-loads to the acre.

Two accurate trials of the above compost, in comparison with decomposed stable manure, resulted as follows; 4 squares of equal size which are kept as lawns and mown seven or eight times in a season were manured, two with the leached barilla and muck compost, and two with a compost of well-rotted stable manure. It was spread at the rate of twenty cart-loads to the acre. The grass on the different squares was much the same in quantity, but on the squares manured with the muck compost, it was decidedly of a darker and richer color, and the manure introduced a greater quantity of white Dutch clover or honeysuckle. The second trial was in a field mown for hay, $2\frac{1}{4}$ acres. The field was divided into two equal parts, as near alike as possible, one half manured with muck compost, the other half with rotted manure, at the rate of fifteen cart-loads to the acre. Eight tons and eighty lbs. of hay were cut from the field. No difference could be discovered in the parts manured by the different composts. This proved that for a top-dressing, the compost of leached barilla and muck is equal to stable manure. After using it to a large extent for several years, I am still in favor of it as a top-dressing. The compost manure, which we use for ploughed land, is made up of two thirds muck, and one third manure. The muck in all cases is mixed with the manure before it ferments, and care is taken not to put in so much muck as to prevent the compost's heating. The fermentation of the manure decomposes the muck rapidly, and I am convinced the greatest art in the use of muck, as a manure, is to have it in a proper state before it is put upon the land. To

dig it from the swamp and apply it before it undergoes a chemical change is undoubtedly injurious. This change is brought on rapidly by hot horse manure or unslacked lime, but with colder substances it requires longer. For mixing with cow manure, or putting in hog styes, it ought to be dug from the swamp, at least six months, and it is better that it should be exposed to a winter's frost, before it is used. The air then, in some measure, effects the change. The action of the manure soon decomposes the fibre in the muck. It falls to pieces like lime, and then has an earthy appearance. In this state, a mixture of one third manure and two thirds muck has never failed with me to produce better crops of all kinds of vegetables than clear manure. For the last five years we have thought it wasteful to use manure without being mixed. Before coming to this strong conclusion of the benefit of muck, when used as a manure, many experiments were made, and universally resulted in favor of muck.

We have tried bone manure to some extent, but have found no benefit from it. The following are two experiments on potatoes and corn. Rows were planted in three different places in a field of potatoes recently broken up from the sod. A pint of bone dust was put in each hill of the three rows, and well mixed with the soil. A row was planted alongside of the bone dust without any manure. The remainder of the field was manured with compost, a shovel full to a hill. The rows with compost yielded 9½ bushels to a row; the rows without manure 4 bushels, and the rows with bone dust 2¼ bushels, each. When the potatoes were dug, cedar posts were put down firmly, so as not to be moved by the plough, in different parts of the rows where the bone dust was used.

The following year the crop was potatoes again; the manure was spread on the field and ploughed in. The rows, that came in a line with the cedar stakes, were all small potatoes and wormy, the only wormy potatoes in the field. A field of two acres was planted with corn; the compost manure ploughed in; the corn was planted in rows; on half of the field bone dust was sown in the row, at the rate of 55 bushels to the acre.

An extra price was paid for this in order to have it ground finer, that the effects might appear sooner. At no part of the season could any difference be seen. The yield of corn was not at all improved by the bone dust; the part where none was used being quite as good as the others. The field yielded 160 bushels of ears to the acre. Several hundred bushels of bone dust have been used on grass land, and round fruit trees, but no perceptible good has been derived from it.

A small experiment with poudrette was tried on turnips. It was a failure. They did quite as well side by side without manure, and yielded four times the quantity where compost was used.

We have used salt from 15 to 25 bushels to the acre; have found it useful in destroying the cut worm, but never thought it increased the crop, except sea-kale or asparagus, which are both maritime plants.

Liquid manure has been tried on grass, but the result was not so favorable as anticipated. It appears to make the grass grow very unevenly in bunches.

The experiments we have made with lime are not yet matured sufficiently to determine the result, and my experience with it is rather limited.

From experience I know that the effect of manures is so variable on different soils, that what is beneficial on one farm is of no use on another; as in the case of bone manure with us. I have known land where no manure could be used with a quarter of the benefit that bone dust was, and its not having the desired effect on this farm ought not to militate against it in the least. By chemical analyses of soils you can come generally to the result at once, and I believe it to be the only true way of determining the propriety or expediency of one application or another."

To this I deem it useful to add some remarks of E. Phinney, in a recent letter to me:

"I am satisfied there is great economy in having a year's stock of manure beforehand. Stable manure, when put upon the

land in its green state and ploughed in, must be liable to more or less waste—whereas if made into compost, especially if lime be mixed in, it is subject to little or no loss. From two hundred sheep and a dozen young cattle, well bedded with loam and vegetable mould during the last winter, I have now a compost heap of 300 cart-loads, and an equal quantity made from the manure of my horse and cow stables, mixed with peat-mud drawn out last winter. The first, being made principally of loam and vegetable mould, is intended for top-dressing the grass upon my reclaimed meadows; the other pile, being a mixture of peat and stable manure, is intended for uplands. These piles will be in fine condition for my crops the next spring, and will contribute more to the improvement of my grounds than if my last winter's stock of manure had been taken green from the stables unmixed and unfermented, and spread upon the land last spring. The bulk is quadrupled; and no farmer, I believe, will pretend that four loads of this compost will not enrich the ground more than one load of green manure, especially that composed of peat-mud—which has been ascertained, on chemical analysis by a very distinguished agricultural chemist, to contain as much vegetable nutriment as an equal quantity of cow-dung.* The peat-mud, however, should be combined

* The following is the analysis of C. T. Jackson, M. D. the accomplished geologist of Maine, Rhode Island and New Hampshire, of some of the peat from Mr Phinney's farm.

"It was sent to me in as dry a state as is required when it is used for fuel, but it still contained water in considerable proportions. One hundred grains of the peat dried at 300° Fah. weighed 74 grains, loss 26 grains water. The dry peat was burned in a platina crucible and left 5.0 ashes of gray color. The vegetable matter by difference is 69.0. The ashes analyzed yielded

Silica	1.0
Alumina, iron and manganese,	0.6
Phosphate of Lime,	3.0
Potash, traces,	00
	4.6

100 grains of dry peat would give 7 grains of ashes and 93 grains of vegetable matter.

with a small portion of alkali or fermented with animal manure. In addition to the foregoing I shall take over two hundred cart-loads of manure from my hog-stye."

To these accounts I subjoin the experiments of the Superintendent of the Glass Manufactory, at Sandwich, Plymouth Co., Deming Jarves, in the use of a material not much known as a manure. I am much indebted to his kindness for this account. As there are some extensive glass manufactories in Middlesex county, this substance may be equally procurable there.

"Agreeably to your request, I herewith give you a statement of the mode of using, and of the effects as a manure, of the material obtained by the glass manufacturers in refining their pearl or pot ashes—usually called neutral salts, being that part of the ash not soluble in water. After many experiments I found a barrel of this material well mixed with 10 horse cart-loads of soil or loam, was the best proportion. Too much care cannot be taken in mixing the material well with the earth—as from its unctuous nature it is apt to lie in lumps, and do more injury than good. When well prepared, I have found it the most powerful manure I have ever seen used. I have successfully applied it—and in all cases as a top-dressing—on cold grass land, meadow, and high grass ground; also on ploughed fields for rye, corn, oats, &c. Wherever used it has been marked by powerful effects. In the various experiments I made, no other manure was applied the same year. On one field in

The analysis of peat made by the same gentleman from Mr Cushing's farm at Watertown, presents similar results.

One hundred grains of the thoroughly dried peat yielded 4.5 grains of ashes, which do not effervesce with acids, hence do not contain any carbonate. The composition of the ashes is

Silex,	1.3
Alumina, ox.iron, and manganese,	1.5
Phosphate of Lime,	1.7
	4.5

The vegetable matter in this peat amounts to 95.5 per cent., and consists of vegetable fibre and of the apocrenic and crenic acids combined with the bases obtained from its ashes."

grass of about 10 acres, I dressed a few acres at a time with this material; the other part of the field I dressed with barn manure, at a rate equal to 15 ox-loads per acre. Before mowing, the eye could readily discover the difference in the growth; and when mowed, the part manured with the mineral yielded full one quarter more crop. For five years, the field has averaged two tons per acre, and is by no means a rich soil. I am no chemist, and cannot describe by what property it acts on the land. I found in grass ground where the various kinds of foul grass or weeds grew—such as some call lamb's tongue, sorrel, &c., all these disappeared, and the clover and herdsgrass took their place. I am this fall dressing the last acre with this material, and do not intend to use any other manure; my practice has been to spread about 20 loads to the acre. In ploughed land I have found the same beneficial result when compared with that part manured with barn manure.

How long its good effects will last, I cannot say; certainly for three years its influence is felt. Wet ground will bear more of it than dry; too much on dry ground burns the land.

It has been used in this vicinity, at times, for twenty years; but the want of knowledge in tempering it, made its usefulness very limited. One farmer for many years secured all a glass manufactory made; and he told me 10 years since, he used it secretly and with great success; so much so as to occasion much surprise among his neighbors, that his farm yielded so luxuriantly, when he did not appear to make more barn manure than they did.

I once ploughed under a strong dressing, but did not discover any good effect from it; my impression at the time was, I lost my labor and material.

Its alkaline property cannot be very strong, as all that can be obtained from it by the several processes which it passes through in the hands of the glass manufacturer, is small, yet strong enough to neutralize the acid in the soil. When mixed as heretofore named, and thrown in a pile, no weeds will grow in it for two or more years, but it will remain dry and barren."

It will not be out of place here to refer to an experiment made by C. N. Bement, of Albany, N. Y., distinguished for his enterprise and success as a farmer, on the use of hog's bristles as a manure. He has obligingly communicated the results to me in a private letter.

"I have made some experiments the past season with, to me, a new kind of manure, hog's bristles. I have used horn shavings from the card manufactories, and crushed bones for corn, potatoes, and ruta-baga, with good success; and from analogy it occurred to me that bristles might contain as great fertilizing qualities as horn shavings or bones. I applied to a brush manufacturer in the city for his refuse bristles or sweepings of the shop, which he had been in the habit of paying a cartman to remove. I obtained only about thirty bushels, the greater part of which I applied to potatoes, putting a handful in each hill. The result was most satisfactory, the yield being more than double to those where a shovelful of yard manure was put in each hill, and, other circumstances being the same, many of the hills furnishing a peck of potatoes too large for the table. This kind of manure, as well as horn shavings, have a powerful recommendation in that they carry no foul seeds to the soil. I also tried bristles on Indian corn, putting the same quantity in each hill, and the effect surpassed my most sanguine expectations. The corn came up very soon, grew rapidly, maintained a dark and healthy color during the whole season, the ears filled well, and it ripened early.

A farmer in Worcester county has been long in the habit of applying salt. On his wheat ground he sows as much salt as seed wheat, and for corn he puts it with his compost manure; not, however, in large quantities. He deems it a remedy against the Hessian fly, of which I have great doubts; and mixed with compost, he puts it into the hill with corn, and considers it a remedy against the wire-worm. In the latter case, from his long experience and facts stated to me, I am inclined to think it efficacious.

A composition which I have myself applied with advantage

on a light mould, is as follows ; raise a platform of earth on the headland of a field, eight feet wide, one foot high, and of any length according to the quantity wanted. On the first stratum of earth lay a thin stratum of lime fresh from the kiln ; dissolve or slack this with salt brine from the nose of a watering pot ; add immediately another layer of earth ; then lime and brine as before, carrying it to any convenient height. In a week it should be turned over, carefully broken and mixed, so that the mass may be thoroughly incorporated. This was applied in the hill to corn. The crop was equal to that obtained by barn manure on parts of the field immediately contiguous.

O. M. Whipple, of Lowell, to whose experiments with saltpetre I have referred at large, gives it as his opinion "that equal quantities of common salt and saltpetre mixed together and these mixed with compost manure would form one of the best and most economical manures for enriching land. The proportion of common salt to be taken for the purpose can be determined only by experiment, and this must somewhat depend on the nature of the soil." A large amount of valuable manure is obtained from the print works in Lowell. The principal ingredient in it is sulphate of lime. It has been used by the farmers in Dracut with great success, producing, as I have seen, large crops of grass. In Nantucket, the refuse of the oil manufacture, or where the whale oil is purified, is greatly valued as an ingredient in compost. It consists principally of animal or fatty matter and potash.

I have gone thus largely into the subject of manures, for the purpose of showing the practice of some of the best farmers in the State; and likewise the great number and variety of resources which we have for enriching the land. Wherever there is waste or decay, there is manure, so that in the great system of nature, death itself seems to be the element of life. Few arts or manufactures are carried on without supplying in their refuse a valuable manure ; and a sagacious farmer can hardly look round his premises without finding in abundance the means of increasing his compost heap. His sink, his vault, his fire-

place, his chimney, his wood-yard, his stable, his hog-stye, his poultry-yard, his dove-cote, his road-side, his meadows, his peat-bogs, his woods, every mud-hole on his farm, every loitering place for his cattle, every clay pit, every marl-bed should be laid under contribution. As the main element in agricultural improvement and success, the farmer should direct his attention to the increase and protection of his compost heap.

Mr. Phinney's notions in respect to the application of manure in a green or fermented state, seem to deserve a remark. That the efficacy of green barn manure is much greater than that of an equal quantity of decomposed or rotted barn manure cannot be questioned, because the experiments of many distinguished cultivators have fully determined this. Manure of course is not so easily applied in a crude as in a fermented state; and on this account it is perhaps always desirable that it should, by being turned over and made short, be made to undergo a degree of fermentation and applied to the soil in as warm a state as possible. But Mr. Phinney, by the plan which he adopts, has another object in view, which is the increase of the quantity of his manure. For this purpose he compounds it; using a third part of stable manure with two thirds peat-muck, and in the mode in which he mixes them, the fermentation of the stable manure dissolves the peat—and the peat, acting as an absorbent, takes up and fixes all the enriching volatile gases of the fermenting manure, and thus becomes itself enriched. This is undoubtedly a good method; but the keeping of barn manure by itself until it becomes thoroughly decomposed and effete, instead of applying it in a green state, would be a wasteful and objectionable process.

The application of quick lime to barn manure or animal manure of any description, is, I believe, always bad. It consumes or drives off all the enriching parts of the manure, and renders other parts insoluble. The application of quick lime to night-soil, which is often recommended, will, it is true, remove all offensive odors, but at the same time, it drives off and removes all the most valuable parts of the manure. The lime which

remains, may be valuable as an element in the soil, or as a mechanical divider of the soil, but no farther. It is not an enricher of the soil. Though in the form of a carbonate, it gives out its carbon with an extreme reluctance. As constituting an element in the plant itself, the amount required for any plant is so small as to deserve very little consideration, and, from its being found every where in sufficient quantities to form the eggs of birds, and the bones of animals, it may be regarded as every where diffused in equal sufficiency for the purposes of vegetation. In its application to peat composts, it assists in their decomposition, but here likewise its tendency is to expel the ammonia, to drive off the enriching parts of the manure, and to reduce much of the remainder to an insoluble state. Here, however, its pernicious effects may be counteracted, where there is a sufficient covering of mould to absorb the gases, which would otherwise be dissipated in the air. Under such circumstances its use may sometimes be advised.

The ill-success of Mr. Haggerston, in his application of bone manure, does not, as he sensibly remarks, imply that it may not be very efficacious in other situations. If the bones, from which his manure was obtained, had passed through the soap-boiler's hands, or had been long bleaching in the rain and air and sun, there remained only the phosphate of lime, an important element in vegetation, but of which perhaps there was already a sufficiency in the soil. Had these bones been full of animal matter, it cannot be doubted that their efficiency would have been seen. Of the poudrette, too, in the use of which he seems to have been equally unsuccessful; before deciding against its efficacy, it would be desirable to know the composition. No one questions the extraordinary power of human excrements; but what other substances were in this case combined with them, and in what proportions, does not appear. They may have been such, or furnished in such proportions compared with the material which they were designed to neutralize, as to render the actual amount of night-soil applied insufficient to warrant the expectation of any marked effect. If it

were prepared by the use of caustic lime, and just so far as it was so prepared, for reasons which I have given above, no marked effect was to be expected. Lime in a caustic state applied to the soil, may operate to supply, where there is any deficiency, the very small amount of calcareous matter which some plants require; or to correct any hurtful acids in the soil; or to operate as a mechanical divider of the soil, rendering it more pervious to light and warmth and rain and air; or to destroy insects and grubs. Beyond these effects, I want more evidence than I yet have, to satisfy me that it has any valuable use separate from what the mixing of any other ingredient not found in the soil would have. In its application in a caustic state to all animal manures, I believe its effects to be always pernicious and destructive. Lime in the form of a carbonate, unless where reduced by trituration to a very fine powder, has very little effect other than as a mechanical ingredient in the soil, it being almost as insoluble as granite, and requiring not less than 900 parts of water for the solution of 1 of lime.

The philosophy of manures is yet very imperfectly understood. Every intelligent experiment with manures is valuable; but so many circumstances must go in every case to affect the result—such as the kind of manure, its condition, its quantity, the mode of its application, the time of its application, the plant to which applied, the nature of the soil, the condition of the soil, and many nameless contingencies—that an experiment, to be the ground of certain and positive conclusions, must be conducted and detailed with the greatest exactness, and be many times carefully repeated. Much advantage may be expected, as has often been suggested, from the chemical analysis of soils; but we must not be too sanguine in our expectations, even from this source. If the process of vegetation were as simple as some men would have us believe, we might then hope much more from chemical analysis than we can now expect. I do not doubt that every process in nature, however mysterious in its appearance to us is, properly speaking, simple, that is depending on certain elements and laws

always operating with a certain exactness and to certain ends. So no doubt is every process connected with animal and vegetable life; yet with our limited views and imperfect means of observation, we are at present unable to approach an explanation of it. I do not say that we may not hope to reach it. The process of analysis is a destructive process. How little are we able to determine what a building was by being shown only the bricks and stones and sand and lime and wood and glass and iron of which it was composed. Take any six or eight simple elements, and by a simple rule in arithmetic, calculate the immense number of combinations of which they are capable. Every thing which exists in nature is reducible by chemistry to a few simple elements; but under what an infinite number of forms of combination do they present themselves; and substances the most opposite in nature are separated by the minutest lines and shades of difference; that which is sweet from that which is bitter, that which is nutritious from that which is deadly.

In analyzing a soil, and reducing it, so far as chemistry will do it, to its constituent parts, the chemist may detect the presence of some poisonous substance or the absence of some useful ingredient; but beyond this, by the separation of the individual parts how little can he understand their operation when combined and exhibited under the various forms in which they are found to unite! In order to understand what the plant takes from the soil, it would be necessary to examine the soil itself before and after its growth. But this is not all; the plant itself must be analyzed. This cannot be done without its destruction or alteration by the action of some powerful acid or by fire. Burn it, and there remains a very small amount, in proportion to the whole, of incombustible matter or ashes. Now, how little can we know of the nature of a plant by the mere examination of its ashes! There is another fact, of a nature equally confounding. Every soil is capable of bearing an infinite variety of plants, and many of these of the most opposite character. Yet this variety of plants shall, in many cases, without

interference with or obstruction to each other, flourish and perfect themselves equally well in the same soil and in the same atmosphere, and each of them shall abstract from the same soil or the same manure or the same air that, and that only, which it requires; and appropriate it and so much of it, and no more than it needs, to its own specific nutriment and use, and distribute it according to its nature in exact proportions to its stem, its roots, its leaves, its flowers, to its coloring, its taste, its odor, its fruit. Now at what a distance, for any thing that we can see, do human sagacity and science remain from any solution of this inscrutable mystery. I do not say these things in disparagement of science or in discouragement of inquiry. Far otherwise; but rather to stimulate inquiry by showing what a boundless field is open to our curiosity, and how little we have accomplished, and how little ground there is for pride and dogmatism in what we have already done. Inquiry is the only road to knowledge; and as food for the body, so is knowledge the only proper aliment for the mind, alike indispensable to its health and vigor and power. No great advance has ever been made in human knowledge, but by united and concentrated efforts. We should all do what we can. Whoever contributes but a single accurately observed and well authenticated fact in nature to the general stock performs a valuable and an essential part in the erection of the glorious fabric of useful knowledge. The prosecution of inquiries into natural science, in the interest which it creates brings with it its own reward. The farther we advance, the more this interest is quickened, until at last in our converse with nature, 'God's earliest revelation of himself,' we are never less alone than when alone; dumb nature every where is eloquent, and the whole creation becomes instinct with life and beauty. Science has already conferred immense benefits upon agriculture, but what she has done is nothing compared to what she has in store for us.

I cannot quit this great subject of manures, the very sinews of husbandry, without adverting to one or two facts, which certainly are not creditable to the farmers of Massachusetts.

The first is that ships are continually loading at our wharves for the transportation of bones and other substances to Europe for manure; and the second is that we are willing to sell our ashes to the farmers of Long Island, N. Y., who can afford to visit all our seaports for that purpose, and find an advantage in even scouring the shores for the whole length and breadth of Lake Champlain in Vermont, for the same objects. They go even to Canada for ashes, leached or crude, and transmit it by canal to New York. Where is our enterprise? If they can afford to do this, cannot we find an advantage in using these materials ourselves, while we have them on hand?

XIII. Agricultural Improvements.—Though in a great degree in its general aspect unpromising, yet no county in the State is more distinguished for its agricultural improvements than Middlesex. It exhibits many beautiful examples of the triumph of labor and art over nature; in which valleys have been filled, rough places smoothed, and the desert made to bloom. All these are the achievements of an improved husbandry, and exhibit the most ample compensatory returns of labor directed by skill and capital expended with sound discretion. I do not know where I should in preference take a farmer, to show him what may be done under discouraging circumstances, and therefore what he may accomplish in improving his own husbandry.

1. In the district of West Cambridge, and to the west of several ponds which adorn this beautiful region, there is a tract of country exhibiting as much labor, skill and success in the cultivation, and as much improvement, as are to be found in New England. It is principally the residence of many market-gardeners, who supply the city with fruit and early vegetables.—In these sheltered situations, they are successful almost beyond competition in bringing forward their vegetables early in the season, and reap a rich harvest from their enterprise. Much of this country had at one time little to recommend it, being regarded as a thin and sterile soil; but the estimation in which

it is now held—land which ten years since was purchased for 37 dollars per acre being now worth 300 dollars—is proof of the improvement which it has undergone. The extensive hog-establishment of Mr. Pierce, which I have already described, by its abundant supply of manure has materially assisted its improvement. But very great improvements have been made here in ditching and draining wet meadows, by which, within a comparatively short time, lands which scarcely produced any thing, or else an aquatic herbage which was worth little but as litter, now bear as fine crops of the best of hay as the rake ever gathered. These meadows are not peat meadows, but rather a rich deposit of mud. The lands have been thoroughly drained by ditches and sometimes laid into beds; a crop of potatoes well manured taken from them, and then laid down to grass. After this process they soon become capable of producing almost any crop.

2. A very extensive improvement is now in progress in the eastern part of this district, in what is called the Fresh Pond meadows, which promises great results. An extensive tract of land lying to the northward and eastward of Fresh Pond, partly in Cambridge and partly in West Cambridge, embracing, as one of the commissioners informed me, not less than five hundred acres, formerly so saturated and flooded with water as to be in many places scarcely passable, is now likely to be brought into a state of productive cultivation; and when once reclaimed and reduced, cannot be estimated at less than two hundred dollars per acre. If well cultivated it will pay the interest of four hundred. The outlet is at the North into Medford river, where the influx of the tide forces back the water upon these meadows. The first object was to exclude the tide, and then cut ditches into which the surface water might be led, and cut off the springs on the margin of the meadow at the foot of the hills and turn the water from them into the ditches.

The petition to the courts by whose authority this improvement has been carried on, desired "that the tides from the meadows during a certain portion of the season, should be shut out; and that there should be constructed at the joint ex-

pense of the proprietors such principal ditches through the meadows as would enable the individual owners to drain their meadows so as to be able to introduce the cultivated grasses in all, and perhaps plough a large part of it." The commissioners having examined the meadows, decided under commission to put in a self-acting gate, which would allow the water accumulating in these meadows to run off during the recession of the tide, and which would prevent the reflux at the approach of high water. They also decided to straighten, widen and deepen the outlets of Fresh Pond and Spy Pond, and to open ditches into those parts of the meadows remote from these outlets, so that each proprietor would have the means of draining his own land without trespassing upon his neighbor. These principal water-courses were made under the immediate superintendence of one of the commissioners, who is a farmer and lives near the meadows. Some of the principal proprietors followed out the subject pretty thoroughly, by cutting off the springs upon the margin, and opening such cross ditches as were necessary to produce the desired result. This was done the same season that the principal ditches were excavated under the commissioners. Should this experiment succeed according to its early promise, it will be one of the finest improvements ever attempted in this part of the country; and convert, under the skilful cultivators who reside near it, the whole of this hitherto unsightly region into productive gardens and verdant and waving meadows.

3. The most remarkable improvements in the county have consisted in the redemption of peat bogs and their conversion from sunken quagmires into most productive arable and grass lands. Such improvements are to be found all over the county, and are to be seen to great advantage in Lexington, Groton, Framingham, Concord, and many other towns. Large tracts of peat bog yet remain in the county to be redeemed. The general method has been to open sufficient drains for the removal of the water entirely, or else to reduce it so that it may not at any time stand higher in the ditches than within eighteen inches of the surface.

It is indispensable that the water should be removed, and if entirely, undoubtedly the better. The next step has generally been to pare the surface and burn the sward and hassocks in small heaps, and spread the ashes over the ground. Some persons then have immediately sown their grass seed in abundance and have gathered good crops. Others, as soon as it has been thus prepared, have manured it plentifully with a compost manure mixed with a large proportion of loam; and others have given it a good dressing of mould or of sand. Others, after draining the meadows, have applied a top-dressing of three or five inches of coarse gravel directly upon the sward; and then have sowed their grass seed with a good coating of manure. Sometimes, as in Groton, the land after being pared and burnt has been broken up by a plough, and after being exposed in this state to a winter's frost has been planted with potatoes manured in the hill, and then laid down to grass. It is not easy, without a personal knowledge of the premises, to point out the best mode to be always adopted. The covering of the meadow with a thick coating of gravel without removing the sward is pretty generally condemned, as in a short time the coarse grasses make their appearance again. The application of coarse sand to a certain extent is approved, as it serves to divide the vegetable matter and to consolidate the meadow so as to make it passable with teams. The paring and burning of the turf is always an advisable process unless it be in a season of drought, when the great body of peat might take fire and burn large and deep holes in various parts. The application of mould and compost manure to almost any extent is always beneficial, and grass seed should be sowed very abundantly in order that the hay may not be too coarse and that a thick and strong sward may be formed. The taking of a cultivated crop at first is not so desirable as to get the meadow as soon as possible into English hay, and after two or three crops it will become consolidated, and may then be ploughed and cultivated to advantage. In redeeming meadow land of this description, I have myself found an advantage in making a large open ditch through the centre of the meadow,

and then cutting side ditches at right angles with it to empty into it, and sometimes cutting off the springs by covered drains round the margin of the meadow. The centre ditch may be four or five feet wide at top, and two or three at bottom, or six feet at the surface and two at the bottom, according to the quantity of water to flow in it, and of a suitable depth to take off all the water; and the side drains may be two feet at top and one at bottom, with six inches of rough stones thrown in at the bottom and these covered with straw or brush so as to prevent the dirt sifting through, and these again covered in with the material which was at first thrown out. It is necessary that the top of the stones with which the drain is filled should be below the ordinary depth of ploughing so as not to be disturbed when the land is cultivated. I do not know how I can better serve the objects of my Report than by allowing several of the farmers, who have most distinguished themselves for these improvements, to give their own account of the methods adopted. I may here add that among other applications the application to a peat meadow after it has been pared and burnt, of a good dressing of clay has been signally beneficial. Herdsgrass, to the growth of which these reclaimed bogs seem particularly congenial, peculiarly delights in a soil strongly clayey or aluminous. Three tons of hay to the acre from these lands is not uncommon, and their productiveness may be long kept up by good management. Four and five tons are sometimes produced.

4. I begin with an account of his mode of reclaiming peat meadow, with which my respected friend, Mr. Phinney, to whose high reputation as a farmer my praise would add nothing, has favored me. His meadows present examples of some of the most judicious and productive improvements to be found in the State.

"I consider my peat grounds by far the most valuable part of my farm. They are more valuable than my wood lots for fuel, more than double the value of an equal number of acres of upland for the purposes of cultivation, and in addition to these, they furnish an inexhaustible supply of the most essential ingredient

for the compost heap. Some years since, I occasionally sold to my neighbors, a few rods of my peat land, annually, to be cut out for fuel at $3 per rod square, being at the rate of $480 per acre, but finding this sum to be less than its value for cultivation, especially when laid to grass, I have declined making further sales at that price. I have raised upon my reclaimed meadows, 75 bushels corn, 500 bushels potatoes, and from 4 to 5 tons of the best hay at the first and second cutting, to the acre, at a less expense of labor and manure than would be required to produce half this crop upon my uplands.

"To render these lands productive, they should be thoroughly drained, by cutting a ditch around the margin of the meadow, so as to cut off the springs and receive the water that is continually flowing in from the surrounding uplands. If the meadow be wide, a ditch through the centre may be necessary, but this will be of no use without the border ditches. This being thoroughly done and the surplus water all drawn off, the next step is to exterminate the wild grasses and herbage of every kind that grow upon the surface. To effect this, the method heretofore, and now by some pursued, is to cover with sand or gravel from three to six inches deep, top-dress with manure, sow the grass seed, and rake or bush it over. This, for the first year or two, will give a good crop of hay. But after this, I have invariably found that the more hardy and coarse kinds of wild grass would work their way through the sand and gravel, and completely supplant the cultivated grasses, when the whole must have another covering and another top-dressing, or be abandoned as worthless. If to be planted with corn or any of the root crops, my course has been to turn over the turf or sward, with a plough having a wrought-iron share and coulter, both ground to a sharp edge, in the driest season, say in the month of September, roll down as hard as possible, carry on the following winter a sufficient top-dressing of compost, about 20 cart-loads to the acre, and in the spring spread the same, and plant with corn or roots, without disturbing the sod. When the corn or root crop is taken off, the surface is made smooth

with the cultivator or hoe and harrow, and late in November, or just before the severe frosts set in, sow with herdsgrass and red-top seed, half a bushel of the former and a bushel of the latter, to the acre; the field is then rolled, which completes the process. If the plough does not turn the sward entirely over, it will be necessary to follow with the bog-hoe, to level the uneven places. By keeping the sod undisturbed during the cultivation, a more firm and compact surface is formed, upon which oxen or horses may walk, generally without danger of miring. If the ground be intended for grass without the intervention of a hoed crop, the turf is turned over as before stated, in August or September, or as early in the season as the surface becomes dry enough to admit the oxen or horses upon it, then follow with the hoe and roller, and make such parts smooth as may be left uneven by the plough, and late in November cart and spread on not less than twenty cart-loads of compost to the acre, made of equal parts of loam or vegetable mould and stable dung, then sow the grass seed and bush and roll down.

"If, after all requisite draining, the land still remains so wet and miry as to render the use of the plough impracticable, the bog-hoe must be resorted to, and the whole turned over by hand, the top-dressing carried on in the winter and the grass seed sowed in the spring, and if done before the frost is all out, it may be bushed and rolled down, otherwise it must be raked in by hand. The cost of turning over with the hoe will not exceed $20 per acre at the usual prices of labor.

"This mode of culture completely subdues the natural grasses and wild herbage, and gives a compact rich surface of vegetable mould, which will give an abundance of crop of the best hay for four or five years without the aid of more manure. If the sod be disturbed and attempted to be pulverised in the course of the cultivation, the surface when laid to grass will be loose and spongy, an extra top-dressing of compost will be required, and after all, the surface will never become so compact, nor the produce by any means so great.

"Should meadows be found too soft and miry to admit of being ploughed in the summer or autumn, and the expense of turning with the hoe be thought too great, I would recommend ploughing in the spring, when the frost is out to the depth of three or four inches, carting on the manure and then sowing or planting at a convenient and proper season.

"The most important parts of the business in reclaiming these meadows, consist in taking off all the surplus water by judicious draining, and in thoroughly exterminating the natural herbage and grass. This being effected, we have our rich bottoms equally as productive as the deep alluvions of the west, and obtained at a cost and sacrifice very much less.

"In answer to your inquiry whether I have turned over greensward and sowed it directly down to grass without manuring, I reply that I have not; my course has been to top-dress the inverted sward with compost. With reference to the ultimate improvement of the soil, I plough deep, which brings to the surface a considerable portion of the poor subsoil, requiring to be mixed with manure to render it productive. That land may be greatly benefited by turning over the greensward after the crop of hay is taken off, and immediately sowed to grass without manure, I have no question; but for present profit, as well as with a view to future improvement, it may be well to dress with manure. My best crops of grass are, however, from fields which have been planted, the season of turning over the greensward, with corn or roots, and sowing to grass the next spring without disturbing the inverted sward. I have found that when grass seed is sowed upon the sward without cultivating it for one season, the poorer kinds of natural grasses spring up between the furrow slices, and in the course of a year or two entirely supplant the better kinds of cultivated grasses. This is a great object with farmers who raise hay for the market. The quantity grown upon an acre, without putting on a hoed crop for the first season after turning over, may be quite as great, but of inferior quality."

5. The next account which I shall give is that of Abel Moore,

of Concord, in this county, whose improvements have been remarkable and in the highest degree productive. The land, which has thus been renovated, before his improvements, though almost in the centre of the beautiful village of Concord, would scarcely have brought a rent of 25 cents to the acre. Those, who would see what magic power there is in skilful cultivation, would find a high gratification in comparing a part of this meadow which now remains in its original state, with that which, I had almost said, Mr. Moore has raised from the dead and adorned with life and beauty. The mode in which Mr. Moore forms his ditches, by making them so wide at top that the slope to the bottom is so gradual that they may be crossed in the summer season with a team without a bridge, deserves particular attention. Here is no heaving of frosts and caving in of banks, or undermining of the edges of the ditch; and the slope of the bank is so easy that grass may be grown and mowed to the very bottom.

"In the winter of 1826 I began to cut off the brush from about 20 acres of my farm, lying between the old county road and the turnpike leading from Concord to Boston. In the summer of 1827 I commenced ditching this meadow land by cutting ditches through the same about 4 feet wide and from 3 to 4 feet deep. In the fall of the same year I commenced gravelling about two acres of the same land by carting on about 500 loads of sandy loam to the acre. In the spring of 1828 I sowed these two acres down with oats and grass seed, and had a large crop of oats. I have ever since had a large crop of grass twice every year without any depreciation. On about one half of this land I have never put any manure since it was first sowed down, but it has the wash of the road which does it considerable good. I have continued reclaiming more or less of this land every year since, and have already finished about 23 acres. I am doing more at this time, and shall continue to reclaim this land until I get the greater part of it done.

You ask me if I have ever pared and burnt the land. Answer. I have not; but I have a paring machine which I have

run through both ways so as to cut it in junks about five inches deep. I have then turned it over, rolled it down, added sandy loam and compost, and sowed it down with oats and grass seed. This I did two years ago last spring, and had the best crop of oats I ever raised, and I have had since as large crops of grass on this as on any other land. I have ploughed four or five acres of the land since I fixed it, and have raised the first year large crops of potatoes, and then laid it down the next spring with oats, wheat, and grass seed. In every instance I have not failed of having a large crop.

You ask me how often it requires top-dressing. Answer. About once in two or three years. I always put on the dressing in the fall if convenient. I spread it, then harrow it well, and roll it down.

You ask me if I have measured any of my meadow and weighed the hay. Answer. I caused a small square piece between two ditches to be measured. It contained 84 rods. The grass was well dried in two days of as good hay weather as we had last year, and weighed 38 hundred and 5 lbs. I cut a good second crop on the same which I did not weigh.

I have never kept any particular account of what it costs me to redeem my meadow. But I am sure the two first crops have amply repaid all expense for the whole labor.

In ditching my meadow of late, I have left no raised banks, but have levelled it back, so as to have grass to the very edge of the bank, and to prevent the banks from caving in."

6. My next account is from Amos Bancroft, M. D., at Groton, whose method will be found to be in some respects different from that pursued by others. The appearance of his mowing fields and the amount of his potatoe crops certainly speak well for his husbandry.

" I will give you a concise account of my method of reclaiming the peat meadows. I have tried ploughing, paring, and planting with potatoes. I think ploughing in the beginning does not answer. I first drain the ground by ditching, if it requires it. Then I bog and cut off the hassocks, stack them

and burn them on the ground or remove them to the upland. Part of our peat meadow has no hassocks or bogs. My practice has been to plant before breaking the surface. I place a shovelful of manure and earth, or any good compost, in hills on the ground about 3 feet apart for my potatoes, and in dressing them with bog hoes, cover them from the surface sods and make potato hills of a suitable size; they require but little more attention until they are dug. After this, if the surface is sufficiently rotten or pulverized, I give it a dressing and sow with timothy and redtop; if not, I plough and plant another year. The more gravel or loam I carry on the better. The first crop of potatoes I think pays for the labor. After it is sown down it will require to be ploughed or dressed every three or four years. My meadow gives me two tons of hay to the acre. Where the ground is too wet to be ploughed I cart on gravel and manure, and repeat every three or four years. Potatoes and hay are the only crops I have succeeded in bringing to profit. Oats will grow rank, but are liable to be blasted and fall down. Wheat and rye, I think, will do no better; but I have experimented on a very small scale on the two latter. Lime, plaster, and ashes I have never tried. The reason I plough my ground on the meadow, instead of letting it lie and dressing it every few years, is because I raise my potatoes on it easier than on the upland. I think likewise the process of ploughing and harrowing improves the soil by pulverizing and warming the surface. The annual quantity of potatoes raised on the meadow is from three to five hundred bushels."

Dr. Bancroft's crops are excellent. Two winters since his grass was entirely killed out by severe freezing, the meadows being covered with ice. The gravel which he speaks of applying is from a clay bank in the neighborhood, and contains a large portion of alumina.

The meadows in Groton are quite extensive to the east and west of the town: in the former case a tract of 100 acres; in the latter, of 150 acres. The soil is peat; but of fine grain, not abounding so much in fibrous matter as some peat, and but

little of it is suitable for fuel. Much of this land is now under very high improvement, though some of the proprietors with an incredulity and obstinacy peculiar to some men, and evidently in a degree constitutional, will not see the improvements, though their own land in its original swampy and tangled condition, presents a strong contrast with the improved meadows of their neighbors. There are none so blind as those who will not see. Much land remains to have its face washed and its hair combed. These meadows are easily drained; the level of the meadow being 115 feet above the Nashua river, and there being an outlet at each end.

When these lands become perfectly subdued and enriched, lying as they do open to full view with the beautiful village of Groton upon their margin, with the wide horizon and the distant mountains bounding the prospect, it will not be easy to find a more charming landscape.

7. Another farmer in Groton, Rufus Morrs, whose farming is excellent, has effected great improvements in the reclamation of peat meadows. His premises indicate indefatigable industry directed by great skill and judgment.

He disapproves, he says, from long experience, the application of gravel to these lands. He "bogs" the meadow with a hoe, that is, turns over all the sods; carries on a compost of loam and manure mixed, plants potatoes, or lays it down with oats to be cut green, or sows it in the fall without any grain. He has sometimes taken up a piece in the autumn; repeatedly harrowed it until it was reduced to a fine state; manured it; then sowed grass seed at the rate of half a bushel of herdsgrass and a quantity of red-top, but no clover, and the next season has taken a large burden of grass from this land.

8. I have found nowhere on a small scale, more skilful improvements executed than on the farm of Mark Fay, in Marlboro'. He made various attempts of which he gives the subjoined account. From 1829 until 1836, he states that he tried various ways, until he adopted the plan of turfing, and burning the turf in heaps and spreading the ashes. He then in June seeded

the ground with grass seed, and at the same time sowed oats, which he cut in August for fodder, and as nearly as he could judge, he had about two tons to the acre. The next season he had a crop of herdsgrass and clover. He mowed the ground twice, and obtained by estimation, four tons to the acre. In September, 1837, he turfed and burnt about one fourth of an acre and sowed winter rye. In June the ensuing season, he cut about two rods of the straw for braiding-straw, which proved very good. He reaped the remainder, which yielded five bushels of good rye. In August, 1838, he turfed about one acre, and let the turf lay about a week turned bottom up and then set fire to it as it lay. It burnt very well. He thinks this better than to burn it in heaps, as it leaves the ground more even, and saves the labor of collecting the turf. The expense of turfing, burning, and seeding this acre, was about 12 dollars, whereas his first experiment cost him more than 50 dollars per acre. In the second year, he gives the ground a top-dressing with compost manure, and continues this yearly. His first movement is to ditch the ground thoroughly, and so to drain that the water in the ditches certainly may not stand within eighteen inches of the surface, and he finds it necessary to cut a ditch near the hard land, the margin of the meadow, so as to intercept the cold springs. He usually plants the banks of the ditches two or three years with potatoes; and after this part of the ground gets well warmed and rotted, he spreads it on the grass for a top-dressing.

I inquired the result with some carrots, which by way of experiment, he had sowed upon the banks of his ditches. He answers that he obtained thirty bushels on ten rods, and thinks he should have had fifty, had he not been too sparing of his seed. They would have done better in the other parts of the ground, as the banks of the ditches proved too dry for them. He has now obtained a turf-cutter, which is calculated to be used with ox or horse-power. The share is like that of a common plough, excepting that it wings each way eight inches from the centre. It has no mould board. It has a coulter, and this with the

shares are ground to a sharp edge. It cuts the turf in strips without turning them over; and they are then cut crosswise with a knife and inverted.

Mr. Fay's plan of cultivating the banks of his ditches is, on some accounts, not to be approved. Leaving the mud thrown out of the ditch upon the edge, increases the danger of their caving in. Mr. Moore's (of Concord) plan of excavating his ditches will, I hope, attract the particular attention of farmers. Mr Fay—and many other of the excellent farmers of Marlboro' agree with him—is of the opinion that the first crop in these cases usually pays for the cost of the improvement. They agree, likewise, in pronouncing loam and manure in compost the best dressing; and that gravel is to be avoided.

9. This subject of reclaiming meadow is of so much importance, that I shall offer no apology for giving in detail the practices of many of our best farmers. I now add the views of Wm. Buckminster, of Framingham, Editor of the Massachusetts Ploughman, published in Boston, to whose agricultural intelligence and enterprise, and likewise mechanical ingenuity, the farmers of the county and State are much indebted.

"We were not long in discovering that we could raise good English grass on all peat bottoms which could be drained. We now consider all such land the most valuable we possess for obtaining hay. We adopt various modes to subdue these bogs, according to their condition and to the materials in the vicinity suitable to be applied to the surface. Some of the bogs will bear up a team, and we are able to subvert the surface-sod, by means of a large plough with a sharp share and coulter. In some cases, we use a paring plough which cuts the sod, and leaves it in its place to bear up the team. After an acre has been thus cut, the bog-hoes are made use of to cross-cut the furrow and to subvert it. Loam, gravel, or sand is then carted or wheeled on, covering the sods one inch or more in depth, according as we judge necessary to make the surface even, and to give it warmth. When a bank of loam, gravel, &c. is near and the surface of the bog is even, we cover completely all the

vegetable growth, that it may rot and become manure for the future growth; and this mode is found preferable to any other where the material for covering is found near the bog; two men with wheel-barrows being able to cover an acre in one week, at an expense of 12 dollars. In all cases we apply compost manures to the surface, and mingle them with the loam, &c., before sowing our grass-seed. When the surface is rough and the vegetable growth consists of bushes, coarse grasses and hassocks, we pare and burn the whole surface soil, and obtain ashes enough for manure for two or three years. After that we apply composts, consisting mostly of gravelly loam to warm the surface and to keep out the wild grasses. This mode of subduing is often as cheap as any, when the meadow is broad and materials for covering the surface are not near. Gravel is the material which we prefer when the meadow is quite cold and wet, as it gives more warmth to the surface and brings the peat mud more readily to action. But when the bog is dry, and consequently does not want so much warming, loam is preferred to gravel; and the richer the loam, the less compost manure will be required to start the first growth. Sand is sometimes carried on, but we consider sand the least suitable material to be applied in large quantities to cover these bogs. It lies heavy and does not bring the peat to action so readily as fine gravel; though sand in small quantities is found quite useful when mixed with heavy soils not consisting of peat.

"The best calculators endeavor to get these bogs ready for the seed by the first of September, if possible, since they are then enabled to cut a good swarth in the following summer. They usually sow herdsgrass and red-top seed at that season, and a little clover in the winter, as this is more liable to be winter-killed than other seeds.

"Our first step is to drain the bog sufficiently to enable us to operate on the surface and to root out the water grasses. In cutting the drains, we have regard to subsequent operations which may be needed to renovate the soil again when the sour grasses have encroached too much on those which we intend

shall be a substitute. When the springs will permit, we cut our ditches parallel with each other, and thus form *lands* which may be readily ploughed after the ground has been filled with grass roots. These meadows grow harder continually as we continue to grow the better grasses in them, and we often find it practicable to use the plough as in case of higher lands when the sod requires to be subverted. Wild grasses will invariably creep in ere many years elapse, and we subdue them by ploughing about the first of September and seeding again on the furrow."

10. A successful instance of this same kind of improvement in Essex county has been reported to me by Wm. Osborn, of Lynn, and is so creditable to him for its exactness that I think proper to annex it.

Four acres of peat meadow in Saugus. Mr. Osborn commenced in 1837 by paring and burning; but finding it likely to be too wet, and thinking this method was at the expense of the soil, he turned it over and left it to the action of the frost in the winter. In the spring had the whole surface chopped fine with sharp grub-hoes for after-crops; cut four ditches across it, with a sufficient outlet to keep the water down at least fifteen inches from the surface. The ditches were four feet wide and three deep. The land was formerly covered with a heavy growth of pine and maple, the stumps of which remained; and it was now covered with a young growth of maples, alders, dog-wood, &c. The process of paring and getting out the stumps was going on at the same time; and all the work was done by hand, as the bottom was too miry for cattle to assist in removing the stumps. I am best satisfied, Mr. Osborn remarks, with that part where the sods were burned. I find, by throwing it into beds or ridges that I have no trouble from the water; and unless the seasons prove very wet, the land may be cultivated with any root crop whatever.

I annex a sketch of the different plots divided into seven parts by ditches.

1. Quarter acre pared and burned and ashes spread. The sods

which were not fully burned, were put into a compost heap and mixed with stable manure, lime, and salt. The land was thrown into drills, manured with compost and unbleached ashes, and sown with cabbage.

2. Cultivated and manured in the same way excepting the ashes, and sowed with ruta-baga.

3. 4. The sods were turned over; the mud spread from the ditches and raked in with a handrake. Land sown with rye and grass.

5. 6. Planted with potatoes, squashes, pumpkins and cucumbers; manured with very coarse yard manure.

7. Planted with corn, potatoes and squashes, and manured much the same as 5 and 6.

The part on which the sod was burnt, produced most abundantly; on a small space of thirty paces, three drills in width, we dug nine bushels of potatoes uncommonly large. We could fill a bushel basket without removing it, and we had no occasion for hoes in digging them as we had only to pull the vines to bring them all out.

I will add the account of expenses and products.

Cost of land,	$25 00
Labor by contract,	86 50
94 days help from the farm,	70 50
Potatoes for seed,	15 00
Rye and grass seed,	1 17
Six cords of manure,	30 00
2 casks of lime,	2 00
22 days in gathering crops,	16 50
	$246 67

Products.

327 bushels potatoes at 60 cents	$196 20
5 do rye at $1 25.	6 25
8½ do corn at $1 00,	8 50

100 bushels ruta baga at 30 cts.	30 00
1800 to 2000 lbs. hay, ...	12 00
50 dozens of cabbages at 50 cts. . . .	25 00
2000 lbs. squashes, ...	20 00
Value of fuel taken off, at least	25 00
	$322 95

Balance in favor of the improvement the first year, $76 28

The prices of the produce are estimated at a high rate; but they were the current prices at the time. The improved value of the land is not rated; but it would be fair to place it at 100 dollars per acre.

11. An improvement of a similar kind by William Gifford of West Falmouth, Plymouth county, is equally remarkable. This was a low piece of sunken peat bog, which he began to drain by ditching it, making his ditches 4 feet wide at top, three feet at bottom and two deep, thus laying the ground into beds or plats 20 feet in width. The contents of the ditches were carefully spread upon the land. In the ensuing winter, while the ground was frozen, the whole surface was covered to the thickness of half an inch with fine mould. This ground was sewed with wheat and grass seed early in the spring when the frost was out not more than three inches, and a dressing of about six tons of horse manure applied to the acre, and the whole carefully harrowed. The wheat and grass grew finely. He obtained about six bushels of excellent wheat to the acre, and his stubble crop of clover and herds-grass afterwards amounted to two tons to the acre. The land now for two years has continued to maintain its condition. He applies annually a dressing of horse manure about the same as when he sowed it the first time. It has become so hard he can now drive a ton weight upon any part of it, though when he began he could thrust a pole into the ground ten feet without difficulty, and it was difficult to walk over it without sinking. By actual measurement it has yielded three tons of

excellent hay to the acre, and the first crop paid the whole expense. This improvement strongly arrested my attention when in that part of the country; and Mr Gifford writes to me that it would not be for his interest to sell it for 500 dollars per acre, although when he began it did not pay the interest of five dollars per acre.

12. Another case of improvement, although not of peat-bog yet of low wet land (producing scarcely any thing), and by ditching, draining, and manuring, making it in the highest degree productive, is so remarkable that, although in another county, I will not withold it, especially as I shall not have another opportunity of presenting it in this form. The land has been thoroughly relieved from standing water; and without doubt much of its productiveness is attributable to the application of the wool waste. It belongs to the woolen factory near Northampton, in Hampshire county, and is under the management of the intelligent superintendent, S. Brewer. Recent accounts of the same land speak of its undiminished productiveness.

"I find, on reference to the deed, that there are eight acres and one hundred rods, about two thirds of which is a cold, uneven, swaley, piece of land—and the residue, the last two years, has been under high cultivation.

When we purchased this lot four years since, nothing of any consequence had been done to it for some time, and the first year we did but little to it ourselves. The second we manured it pretty high, and the third (which was last year) we put all on it that it would bear.

The result of the year 1837 (that part of the lot to which I now particularly allude) has been as follows :—

The land from actual measurement containing five hundred and sixteen rods (3 acres, 36 rods), the product from the same at two cuttings—the first July 8th and the second Sept. 6th—has been 15 tons, 642 lbs. of the best quality of English hay.

About one half of the manure put upon this piece of land was from the barn yard, and the other half our waste wool

spread in the fall and raked off as early in the spring as the frost would admit. That part of the lot which received the latter manure was more productive than the other. From having had so good a covering, the roots of the grass were kept warm through the winter, and as soon as the snow disappeared in the spring I noticed a more healthy appearance, and the grass came forward much earlier than it did upon that part of the lot which received the barn-yard manure.

I am now breaking up and draining the other part of this lot, and as soon as practicable I intend getting it into grass. When that is once done, I have no doubt but we shall be able to cut annually from this entire lot containing eight acres and one hundred rods, *thirty-five tons* of the first quality of hay.

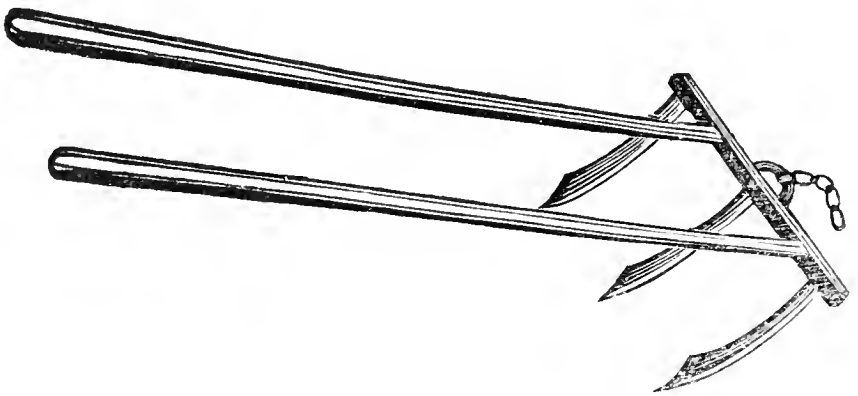
I have no means of knowing the exact quantity of manure used the last year upon this land ; but when I say 100 common cart-loads, I believe that it will prove more than there were."

13. Another experiment in Tewksbury, in Middlesex county, which in its progress has been entirely successful, and illustrating particularly the value of the wool waste, is deserving of being recorded.

" I have commenced reclaiming my meadow. On ⅛ of an acre, which I completed two years ago, by way of experiment, good English hay was cut this last season at the rate of five tons per acre. I ditch, pare, and burn, sow on grass seeds, spread the ashes and give a coat of wool waste, never touching it with either plough or harrow. I use an instrument in paring, for the purpose of cutting the surface into strips or slices of about 12 inches wide, so that the long iron plough with a broad and sharp sock or share, fixed to it to cut the bottom of said slices, shall easily turn them over. This instrument consists of an iron shaft of about three feet long and two inches diameter ; on this, at the distance of one foot apart, three sharp steel, sword-shaped cutters 2½ feet long, are fixed ; in the intervals between the swords, on the said shaft, two strong handles are fixed, which extend back and over the cutters, say 7 or 8 feet — the cattle are attached by a chain and hook to the centre of the

shaft; the man bearing merely his weight on the handles. With this tool it is very easy to cut through the grass roots of common meadows; on my meadow which is, or was *all* hassocks, I think from what I have tried, that two men with a yoke of oxen will pare one acre per day."

The following is a rough-sketched view of this instrument.



I shall add but one example more of this description of improvements, which as it comes from one of the best and most successful farmers within my knowledge, and shows a different process from any before given, will be read with interest.

14. "I have reclaimed 12 acres of meadow. Of thse 4 were pared and burnt at an expense of $25 an acre; the ashes being the only dressing. Three were turned with the spade at the same expense, and manured with 6 cords of manure to the acre. The remainnng 5 were covered with the turf and mud from the numerous ditches, but not being subdued by this method were finally turned over with the spade. Thirty-five dollars an acre would have covered the expense including ditching, but for the useless labor to which I have alluded. The last 5 acres being partially decomposed, were burnt over at a time when the moisture below prevented the fire from penetrating much under the surface. These and one of the first four have had no other dressing. The last crop being the third year was about $1\frac{1}{2}$ ton to the acre. The manured part has done best. The whole was planted previously to being stocked to grass which was done either late in summer or early in autumn."

The improvements in different parts of the county are quite remarkable, and to be seen to some extent in almost every town. There are still large tracts to be recovered. It is hoped that what has been done will excite a universal ambition to convert every such worthless bog into a fruitful field. While farmers are constantly seeking to enlarge their number of acres, how much is it to be desired that those, which they already have, should be brought into a condition of productiveness. The usual objection to all improvements, that they cannot afford them, will not apply here, where by an outlay of twenty-five dollars the value of one or two hundred may be realized.

15. But much more expensive improvements than those to which I have referred have been made in the county, and with a success, which has afforded a full remuneration for the labor and money expended. On the farm of Nathan Smith, Jr., in Waltham, and so likewise on Mr Phinney's farm, in Lexington, considerable tracts, which it was not easy to drain by a ditch, have been redeemed in this mode. The whole ridge of broken land, which is included in Lexington and the upper part of Charlestown, and indeed the whole of this region, abounds in large rocks and stones of granite. It is as important for the improvement of the uplands that these rocks should be removed, as for the bogs that they should be drained. In order to effect this they have been frequently piled up in walls of four and six feet thickness, or made up into single heaps on different parts of the farm. In the improvements to which I now refer, two purposes have been answered — the first to drain the bog, the second to get rid of the stones. Besides this, large amounts of raw material are obtained for the compost heap. Accordingly, in these cases the farmers have gone into the centre of the meadow and dug a deep ditch, throwing all the mud upon one side; they have then, at a season either of frost in winter or extreme drought in summer, filled in these places with stones until they were raised to such a height as they judged best, and then they have returned upon these stones the mud taken out of the ditches.

They have then made another ditch within the first, which they have filled in with stones and then covered with the mud thrown out as before; and so have kept on until they have reached the margin of the meadow. The bog then is completely underlaid with this bed of stones, which serves to drain the land; and the surface above the stones may be cultivated or kept in grass as may be desired. This appears to be an expensive improvement, but the excellent crops soon repay the cost, and furnish land of the most productive nature.

16. Improvements of this kind of land have been made in some other parts of the State by another process. In Hingham and Abington, Plymouth county, in the case of individuals owning large tan yards, they have, after draining these meadows as well as the situation admitted of, covered them with spent tan of hemlock bark from their tan pits, to the depth of six inches or a foot; upon this they have spread a covering of mould or loam and compost manure and then sowed grass seed freely. These meadows have produced most abundant crops of hay; and as the tan, where so much wet remains, is fast rotting, the whole surface must presently become a deep and lasting bed of rich vegetable matter. There has been in many places a difficulty among tanners in disposing of their refuse tan. There has been a prejudice against using it for manure. When applied in a crude state it is undoubtedly unfriendly to vegetation; but in a decayed and rotted state it is as beneficial in the soil as any other thoroughly decomposed vegetable matter. This use of it demonstrates its value.

There is a large amount of this bog land in Middlesex county, yet to be redeemed. The extensive and unsightly meadows in Sudbury, which might, if the draining of them were practicable, be brought into fertile fields, must remain as they are, as the damming up of the water-courses on account of the mills below will prevent the reduction of the water.

17. The reclaiming of these peat bogs and quagmires is undoubtedly the greatest improvement in the agriculture of Middlesex county; but there are other improvements going on of much

importance. In my First Report on the Agriculture of Massachusetts, the attention of the farmers was strongly called to the use of the subsoil plough, which after a trial of more than twelve years, in connection with the system of thorough draining, was then effecting a most beneficial revolution in English agriculture. Confirmations of its extraordinary utility were abundantly furnished in my Second and Third Reports. Since that, a subsoil plough after the most approved model has been introduced into the country and subjected to a most successful experiment. Improvements in Great Britain are undertaken upon a scale far beyond any thing likely to be attempted among us. There they think the subsoil ploughing must be preceded by a thorough draining of the land or the good effects of it will not be fully realized. Some few attempts among us at subsoil ploughing without draining, have been so beneficial as to warrant the most sanguine expectations of advantage, when the joint system shall be completely carried out on lands adapted to it. The success is dependent on three particulars; first, the freeing of the land from all superfluous wet. The deepening and loosening of the soil to a depth of sixteen or twenty inches with drains, completely underlaying the field, will cause the water, which falls and which would otherwise remain in the ground, at once to pass off. The second is, by deepening and loosening the soil to render it permeable to the roots of the plants, which then easily extend themselves in search of their proper nourishment, and accessible likewise to light and air, which are both essential or conducive to vegetation. The third is, by bringing the subsoil gradually to the surface to cause it to become enriched by the air, by manuring and cultivation, and ultimately rendering the whole depth of soil moved by the plough of equal fertility. The effect of light and air in enriching soils exposed to them is observed easily where the dirt from digging a well is thrown out, which, though at first absolutely sterile, will after awhile become covered with a healthy vegetation. There can be no longer a question of the great improvements which are to come from

the proper use of this instrument; and I am happy to record the success which has followed the partial use of it on Mr. Phinney's farm.

"My potatoe crop this season fully demonstrated to me the great utility of the subsoil plough. Early in June I planted a field of four acres of my hard stony upland with potatoes—half the field with rohan, and half with long red potatoes. The soil a thin vegetable mould upon a gravelly subsoil. The same field I planted a few years ago with potatoes, and owing to the hard crust beneath this thin mould which the roots could not penetrate, the dry weather in August killed the tops and my crop hardly paid the expense of digging. The last spring I spread upon the field ten loads of manure from my hog-styes, being mostly composed of peat mud, to the acre. The drills were made by the common plough, drawn by one horse and followed by the subsoil plough, drawn by two yoke of oxen, which effectually broke the hard crust, and loosened the earth from 12 to 15 inches below the surface, and though the drought was very severe the tops remained perfectly green and thrifty through the season. At harvesting I dug 270 bushels of rohan from the acre, and 280 of the long red potatoes from each acre. Taking into view the hard dry condition of the land, the light dressing of manure, the almost unprecedented drought and the entire failure of the crop in a former year, I fully believe the crop this year (1841) though but a moderate one, is owing mainly to the use of the subsoil plough. This was made more apparent from the fact that a few short rows at one corner of the field, where the subsoil plough was not used, yielded but about half the quantity produced on an equal space on other parts of the field.

"The astonishing results of numerous experiments made by farmers in Europe, in subsoil ploughing and under-ground draining, would seem incredible did they not come too well attested to admit of a doubt. Most of our farmers have a portion of cold wet land lying at the foot of high lands; having no vegetable deposit, they cannot be called or treated like swamps

or peat meadows. The top consists of a thin black mould resembling in some degree the poorer kind of alluvial soils, resting upon a hard pan of gravelly or sandy clay, and notwithstanding they are too wet in the spring to be susceptible of cultivation, they become by midsummer baked and very hard, producing nothing but a small crop of sour, worthless grass. Upon grounds of this character I have made some attempts at under-draining, and after relieving them entirely of the surplus water, have introduced the subsoil plough, breaking and loosening the stiff, hard subsoil to the depth of fifteen inches. I drain by digging ditches three feet deep and two feet wide in all directions, where it was apparent that the springs from the surrounding high lands might be intercepted; and in lieu of tiles, which are used for this purpose in England, I used the common stones from my fields, leaving an open space of about eight inches square at the bottom, to conduct the water off. The drain is then half filled with small stones, which are covered with the tough hassocks taken from my bog meadows, to prevent the dirt from getting into the drain. They are then filled with earth and the field made smooth. Then follows the common plough, and after it the subsoil plough. Of all the agricultural experiments which I have made, this is decidedly the most satisfactory, and yields a greater profit on the amount expended."

B. V. French, of Braintree, Norfolk county, has likewise commenced some improvements of land with the subsoil plough. "He ploughed nearly eight acres in April and May last. The land was strong with a tenacious subsoil. The work was done by first turning a furrow with a common plough, and then following with the subsoil plough to the depth of from 16 to 20 inches, excepting when ploughing near small fruit trees, when it was run out in order to avoid cutting the roots." The experiment is yet but imperfect, and I regret that Mr F. has not given me an account of the crops cultivated, but he speaks of the results as being "most satisfactory."

18. It would be difficult to enumerate the various individuals,

who have spoken to me of the increase of the products of their farms, and especially of their hay-crops within a few years.

Jacob Pierce, of Woburn says, ten years ago he cut not more than five tons of hay upon his farm. Now his crop is from 35 to 40 tons. Asa Locke, of the same town, says that thirty years ago his farm did not yield four tons of hay; now it produces forty tons. Francis Richardson, of Billerica, bought his farm in 1816. The yield was at that time two tons of hay. He now cuts forty tons. Pursuing the business of a butcher and soap boiler, he has peculiar advantages, which are not available to all, and shows that he understands the proper use of them.

19. Benjamin P. Hutchings in Carlisle, has made very great improvements with very limited means. Twenty-two years ago he did not obtain a single ton of English hay from his farm. Now his crops are large, having sold the last year, besides retaining enough for his stock, standing grass to the amount of sixty dollars, and hay in the market to the amount of two hundred dollars.

This farmer has used largely of the cotton waste and seed obtained at Lowell, of which I have before spoken. He spread it upon dry and gravelly grass land with great advantage; the grass was one third larger than that part of the field which was manured with barn manure. The same substance, when well rotted, produced on low lands excellent rye and potatoes. Its application to corn on low land was beneficial, on high or dry land it was not so useful. This cotton waste costs at Lowell 50 to 75 cents per load; it is as heavy as barn manure; and should be well rotted and mixed with mould or compost before being used.

20. Zaccheus Read, of Westford, whose farming is highly creditable to him, has an example of irrigation on a small scale. He conducts a small stream into a field on a side hill and by carrying it in a zig-zag direction by channels or furrows on the side hill is able to flash the water over the whole field. This has been attended with great advantage. The experiment is on

so limited a scale that it would scarcely have deserved notice, but that I wish earnestly to attract the attention of the farmers to this subject. As yet it has hardly received any consideration ; yet where circumstances are favorable to it, its results are among the most beneficial. It must be the case in respect to many drained meadows that by a dam and gate at the outlet, they might in a dry time be flooded at pleasure and to great advantage. The keeping of the water upon meadows through the winter by flooding them has proved injurious, destroying the artificial grasses, and either leaving the ground naked or bringing in the coarse aquatic grasses, which are worthless.

21. A great improvement has taken place throughout the county in the construction of barns. Few farmers now think of building a barn or stable without having under it a commodious cellar for the manure, where it is protected from the sun and air and rain. Some have added to their yards a well, in which the liquid manure from the yard is collected, and by a pump is occasionally thrown again upon the compost heap. All this is commendable ; and such provisions for the saving of the manure soon pay for themselves many times over. The strongest indication of an improved, and the surest indication of a successful husbandry, is in the sedulous care which is taken to protect and increase the manure heap.

22. I ought not to quit the subject of agricultural improvements in Middlesex county, without adverting to the subject of ploughing land ; and to an improvement in this matter, the advantages of which, if it had not its origin here, have been exemplified in this county. The first ploughing match in the United States, took place under the direction of the Massachusetts Society for promoting agriculture in Brighton in this county, in 1817 ; and these ploughing matches, which now annually take place in every county where there is an Agricultural Show, have been of the most essential service in improving the form and making of ploughs and the art of ploughing. Perfection is as yet very far from being reached, but in comparing, as many of us are able to do, a field after being plough-

ed thirty years ago with one at the present day, the improvement seems most extraordinary.

The great aim of the ploughman now is not only completely to invert the sward, but so completely to cover in the vegetable matter upon the surface that it shall be kept under for the enriching of the soil instead of being exhaled by the sun and air. The importance of this vegetable matter in its decay to the succeeding crop is not a recent discovery. It is mentioned by early cultivators; and Lorain, of Pennsylvania, one of the most sensible and practical writers upon improved husbandry we have ever had, particularly insists upon it. But E. Phinney, of Lexington, in this county, is the first person, within my knowledge, who undertook to demonstrate its advantages by showing the actual amount of vegetable matter ordinarily contained in the surface of an acre of land in grass. By taking a cubic foot of greensward in a mowing field, and carefully separating by hand and weighing all the vegetable matter which it contained, he ascertained that it would equal at least thirteen tons to the acre. This was a remarkable result, and evinced the importance of a mode of ploughing by which this herbage should be completely covered. This is done by turning the furrow slices perfectly flat so as to drop one within the other. Where the field is to be laid immediately down to grass this method is good; but where it is to be cultivated in corn or potatoes, it seems to me preferable to turn the furrows at such an angle that they shall lap one upon the other. When this is done by a skilful and careful ploughman, the vegetable matter on the sward will be as completely covered in as if the sward were laid perfectly flat; and this advantage will follow, that where the furrow is thus laid obliquely a larger portion of the surface is exposed to the enriching influences of the sun and air, and when the harrow passes over it, it is reduced to a finer tilth.

It is considered desirable in these cases not to disturb the vegetable matter turned under during the rotation; and some farmers are in the practice of ploughing once only for these

crops. Thus, for example, the land being turned over to the depth of six or eight inches, corn is planted ; the next year this same ground is not ploughed again, but merely harrowed and sown with wheat or rye, or some small grain, and laid down to grass. The saving of the labor of one ploughing is something; but the chief advantage in this case is in not disturbing the vegetable matter buried by the complete inversion of the sward, until it is thoroughly decomposed, and in a condition to go to the nourishment of the growing plants. On the farm of R. Morss, in Groton, I saw the advantages of this mode of cultivation strongly exemplified, where, in one case, in the same field, grass had been sown after only one ploughing—the second crop, wheat, having been cultivated by only splitting the hills of the Indian corn, and giving the ground a thorough harrowing ; and in the other part of the field, two hoed crops had been taken before the land was laid down to grass, and the land ploughed deep without regard to breaking and bringing up the sward before it was thoroughly rotted. On the former ground the crop of grass was a third heavier than on the latter.

XIV. Fruits and Orchards.—Middlesex county is distinguished for the abundance and excellence of its fruit, embracing many varieties. I had intended to have gone at large into the cultivation of the fruits and garden vegetables with which the market is supplied from this county, but it would too much extend my report.

One of the largest products of small fruits is that of strawberries. These are cultivated in great perfection and with corresponding profit. In one case, I have known an individual to sell six hundred dollars' worth from an acre in a single season ; and in another case, from a little more than an acre, another farmer to sell 3000 quart-boxes, averaging, after commissions of sale were deducted, 25½ cents per box, or, in the whole, 765 dollars. These are cultivated in wide drills, on narrow beds. In the autumn, they are covered with straw, sea-weed, or fresh-meadow hay ; in the spring this is raked off, and good manure is

abundantly dug in between the drills, and then the litter is replaced between the rows. This serves the double purpose of keeping the ground moist, and likewise of keeping the fruit from the dirt. The vines require to be replanted once in three years.

Peaches are cultivated to some extent, though under many discouragements. They were raised nearly half a century ago with much more success than of late years. A farmer in Waltham has sold 700 dollars' worth in a season from his peach orchards. I mention such facts as these, which are unquestionable, with a view to stimulate the farmers to the cultivation of fruit of every description. With the present rapid increase of the population in the cities, and the multiplication of manufacturing villages, there is no danger of over-production. With the extraordinary increase of wealth likewise, to which our community is evidently destined, we may expect an increase of luxury; and I have known within the two last years, peaches, which were brought forward very early in a greenhouse, and were of the best kind, to be sold for six dollars per dozen in the market. The cultivator, whose establishment is small, sold to the amount of seventy dollars in a season, and could have doubled his sales, if he had had the fruit. It need not trouble the conscience of the farmer to administer to so innocent a luxury as that of indulging in fine fruit, however liberally his customers may be willing to pay for it. In general, peaches are a short-lived tree, but as they are easily cultivated, and come soon into bearing, a supply should be constantly coming forward. A rare-ripe peach-tree, on the farm of John Welles, in Natick, in this county, producing fruit of an excellent quality, continued in bearing more than a third of a century, and being a natural peach, that is, not engrafted, the trees from the stones of this fruit preserve entirely the character of the original. The best cultivators advise to keep a peach orchard constantly cultivated, and cover the roots of the trees with salt hay or litter, in the autumn. Some prefer to plant these trees on land with a northern rather than a south-

ern aspect, as in the former case their vegetation is retarded in the spring, and they are not so liable to the alternations of freezing and thawing.

A very successful and most skilful farmer, George Pierce, of West Cambridge, who, by his skill and industry, deserves all the success which he obtains, succeeded last year in spite of the drought, in obtaining an abundant crop of peaches, when many others failed. The quality of his fruit may be determined by the fact, that many of them brought at once in the market, one dollar per dozen. They were grown in the open air. He surrounded his peach-trees, which he cultivated with the same care as his corn and cabbages, with a bedding more than a foot thick of litter, being his refuse bean vines, embracing a space of two yards or more in diameter. Several times during the drought, he poured one or two barrels of water from the neighboring pond upon his litter, so that it was kept constantly moist. He did this once a week until rain came. The effects upon the trees were excellent and almost immediately apparent. His trees yielded an abundant and perfect crop. When such results are seen as the fruits of great care and well directed labor in cases most unpromising, it is time for many of us to cease talking about our "bad luck." A large part of mankind never succeed because they are not willing or are too indolent to take the obvious means of success. They want the reward without complying with the conditions; and to have the pleasure of the dance without paying the fiddler. It is not strange that such persons find "no luck about the house."

The cultivation of apples in Middlesex county is carried on to a large extent, and might be increased with great advantage. Great pains are taken to produce the very best engrafted fruit, especially for winter, and among these, the Baldwin Apple and the Golden Russet, are in most esteem. The Porter Apple, which is an early autumnal fruit, is greatly valued. It would be out of my province to go largely into this subject. The amount of sales however, from some of the farms in the county are quite large. A farmer in Waltham is accustomed to put

up for market, from 500 to 700 barrels. On a farm in Woburn, which has been almost created by the labor of its present proprietor, now in a green old age, enjoying the fruits of his indomitable industry, the sales of apples the year before the last amounted to 1200 dollars. There are other farms, where the product in fruit is greater than here, but as I have not the precise accounts, I do not state them. These results may surprise many of the farmers in the interior. I hope they will surprise them into the imitation of such industry and enterprise. To many of the farmers in the interior, the extension of the railroads will afford, in this matter and in many others, an opportunity of coming into equal competition with the farmers in the immediate vicinity of the capital. There are new reasons for the cultivation of apples since their value for the feeding of swine and cattle has been discovered. If they are only half as valuable as potatoes, and many farmers deem them of equal value for this purpose, the ease with which they are raised strongly recommends their cultivation.

There are many orchards in Middlesex of large extent and in excellent condition. Two were some time since the subjects of premium from the Massachusetts Agricultural Society. The one belonging to Nahum Hardy, of Waltham, who reclaimed eight acres of land from a wild and rude state, and planted it with 500 apple-trees, all engrafted fruit; the other of E. Phinney, of Lexington, who brought a rough piece of land into a suitable condition and planted it with 400 trees. Both these farmers have extended their cultivation since that time, and the admirable condition of their trees evinces the skill and care of their management. The product of the orchard of the latter, makes a large item in the returns of his farm. He has more than a thousand trees in bearing.

Mr Phinney saved some of his trees a few years since by a process which is worth recording. They had been completely girdled near the ground in the winter by the mice, who had eaten the bark round to a width of two or three inches or more. By cutting scions, and inserting the ends of several of them

in the spring round the tree, under the bark, above and below the injury, so as to form a communication for the sap, the injured parts have begun to grow together, the whole wound may ultimately be covered, and the tree live and flourish. To most persons, after the injury their situation would have seemed desperate. Mr Phinney avoids planting his trees deep; but cultivates them as near the surface as he can, and at the same time sufficiently to cover the roots.

John Welles, whose farm is in Natick, in this county, and than whom few men among us have given more attention to the subject of fruit and forest trees, considers the ordinary life of apple trees about sixty years; but it would be desirable to replace them soon after their decline commences. The situation most favorable to an orchard is a sheltered situation with a moist soil. He succeeded in producing a valuable growth of trees on a light and unfriendly soil, by making a hole for planting four feet square; after removing about a foot of the top soil, which was to be returned round the tree, taking out the hard pan at bottom to a sufficient depth to deposit in it a load of stones, and then sprinkling some mould on the stones and planting his tree. The stones served to preserve moisture for the roots and gave likewise in their interstices room for the roots to extend themselves. No farmer need complain that his land is not suitable for an orchard; because he may make it suitable, at an expense which the fruit of the tree after it comes in bearing will soon compensate.

James Cutter, of Weston, has been remarkably successful in transplanting trees of more than ordinary size. He has removed pear trees of 8 and 10 inches in diameter. His practice is to clean the dirt entirely from the roots of the tree; to cut off all the roots, at a distance of four or five feet from the tree; and to put no manure in the hole.

I. M. Gourgas, of Weston, a farmer of much experience and intelligence, disapproves of applying white-wash or any caustic wash to the trees; but he has found great advantage in the application of ashes to them at the roots. To my inquiries of

one of the best farmers in the county, whose trees were in the most healthy and perfect condition possible, what wash he applied to the bark, he answered the only wash he applied was to the roots; that is, he kept the trees themselves enriched and cultivated in as careful a manner, as he would if they had been the most delicate and valued exotics. An apple-tree growing in Kingston, Plymouth county, and planted in the year 1669, the year of Philip's war, bore, in 1838, thirty bushels of good fruit. It is a high-top sweeting, a favorite apple among the settlers of the Old Colony. Many of these trees, planted many long years ago, still remain, productive, and of a large size. They resemble the pilgrim fathers and their early descendants in the vigor of their growth and the energy of their endurance; and the virtues of the good men whom they have survived, in the sweet and precious fruit, which they continue to yield.

The largest apple-tree, which I recollect, I found in Duxbury, in the same county; and it was evidently an early settler. On measuring it, I found its girth at the smallest part six feet seven inches, at the dividing of the limbs, twelve feet five inches, and the girth of one of the limbs, two feet five inches. It produced in one year, 121½ bushels.

The fine orchards in the highly cultivated districts of West Cambridge, to which I have referred, have been, in a great degree, exempt from the scourges of the canker-worm, from which others, in places not very far distant from them, have suffered. Some of the farmers have given as a reason for this exemption, that they make friends with the birds, never suffering one of them to be disturbed, or scared, or killed. The birds, grateful for this hospitality, destroy the canker-worms, who are much like pirates, who plunder the cargo and burn up the vessel. I am not convinced that the birds are entitled to all the credit in the case, though, undoubtedly, they should have a due share of it; but the protection which these good farmers show to the innocent and defenceless, is as creditable to their humanity as to their discretion. The birds are, in general, good friends to the

farmer; and the man who can wantonly destroy the life of one of these beautiful creatures can hardly with safety be trusted with a child.

The crows who come into the field when the corn is just coming out of the ground, destroy the only means of supply, and strangle all the hopes of the husbandman in their birth, are not entitled to the same indulgence. If any offence should be made capital, this would seem to be one. O. M. Whipple, however, of Lowell, suggests a protection, which is effectual and harmless.

"A quart of corn soaked in strong saltpetre liquor, and sown upon the surface of an acre of ground at the time the corn is coming out of the ground, or at the time the crows commence pulling it up, will serve as a sure protection against their interfering at all with the corn. I have practised it for fifteen years without ever knowing a hill of corn being touched after the corn was sowed upon the field."

XV. Forest Trees.—The principal growth of the county is white and yellow oak, pine both white and yellow, hickory, soft-maple and white birch. Very little if any wood is standing, which is not comparatively recent. The original forests have long since disappeared. The value of wood in the county as fuel makes its increase and preservation of great importance; and I shall merely recur to such facts having a bearing upon this subject as have come within my knowledge.

Edmund Parker, of Reading, in whose statements entire confidence may be placed, says that he had occasion to sell 40 acres of woodland in Wilmington, on which the wood was of only 20 years' growth. The wood on one half acre of this land was cut and measured, and produced 36 cords, 5 feet of white and yellow (or pitch) pine. This was at the rate of 73 cords 2 feet to the acre. The whole lot averaged more than 40 cords to the acre. The pitch-pine had ceased its growth; the white was still growing when cut. The soil was sandy; and, it is evident, peculiarly favorable to the growth of this kind of wood.

Addison Flint, of Reading, states upon his own knowledge that a lot of wood in Andover of 33 years' growth, consisting of fifty acres, yielded 900 cords of wood. Two thirds of the wood were walnut and maple; one third was pitch-pine.

The value of standing wood in Reading, is from 2 to 3 dollars per cord. The price of cutting and cording it, where it grows, is from 58 to 62 cents. Mr. Flint speaks of four farms within his vicinity devoted entirely to wood. On one of them the greater part of the wood then standing was blown down in the tremendous gale or whirlwind of 1816. It now yields wood to the value of 100 dollars per acre. A white pine within his knowledge, 39 years old, produced $15\frac{3}{4}$ cubic feet of wood.

A lot of 40 acres was, seventy years ago, completely stripped excepting 110 trees. Since that time 200 cords have been blown down upon it and sold. In this time the owner has, besides, obtained the fuel necessary for the family, and sold 20 cords per year. It is judged that there are now 1500 cords standing upon the lot. He is of opinion that no property furnishes a more productive investment of capital than wood land thus situated. The facts in the case would seem fully to confirm this opinion. The land after the wood is cut off is usually sold for ten dollars an acre. I have found it a prevalent conviction, both in this and Norfolk and Plymouth counties, in all which much land has been thrown out of cultivation and devoted to the raising of wood, that in general it may be cut over once in twenty years, and yield in that time at least 20 cords. The return therefore upon the purchase at ten dollars per acre, may be considered as equal to one cord of wood per year standing, which can seldom in any situation be rated at less than $2,50 per cord. This would be at the rate of 25 per cent per year, without any risk of being indicted for taking usurious interest; and without any of those compunctious visitings which some men must feel, if such men had any conscience, whose accumulations are wrung from the sweat and toil of the oppressed and defenceless, the over-worked and the half-fed victims of avarice.

Wm. Blanchard, one of the oldest farmers in the county, and since my visit to him called by Providence, I trust, to a higher field of labor, gave it as the observation of a very long life, that a thin and exhausted soil will give 25 cords of wood to an acre in 25 years, and that good land in 30 years will give 50 cords to an acre. Three years previously, from a lot of seventy acres he cut 3000 cords of wood.

Elpalet Loring, of Hingham, Plymouth county, states that oak wood may be cut once in 15 or 20 years, and that he obtains 30 cords to the acre. Nathaniel Brooks, of Scituate, in the same county, cuts his oak wood once in 15 to 20 years. This subject is, in my opinion, of so much importance that I shall subjoin the opinions and experience of some farmers, whose authority is entitled to respect and confidence.

Elijah Atherton, of Stoughton, Norfolk county, writes me thus:

"Wood land is considered to be the most profitable in our vicinity. Land that is favorable to the growth of wood, with proper care will produce twenty cords of wood per acre in twenty years; (to wit,) one cord per year per acre, for twenty years, at which time it is generally fit to cut off. The price of good oak wood in the centre and westerly part of the town, is $5,50 per cord, and in the easterly part, $6,00 per cord. Pine wood is about two thirds that sum. There are nearly a thousand acres of land in Stoughton, which twenty years ago, were either mowed or pastured, but are now turned out and growing up to wood. The raising of wood has now become a subject of great importance with us. We consider it almost as injurious to allow cattle to go into our young sprouts and browse, as into our cornfields. Pine wood may easily be raised in our old, worn-out fields and pastures of light land. Some of our farmers have already begun to sow the pine seed, and transplant small pine trees. Where this has been done, the prospect of a fine growth of wood is very flattering. It often happens that when the seeds fall from the large pine trees, the young trees come up five or ten times as thick as they can grow to advan-

tage. In this case a large portion of them may be pulled up without injury to the others; and if the ground is properly prepared, a man may transplant as many of them in a day as he could of cabbage plants, and with as sure success. In doing this, with a very little pains, he may have his trees completely in rows, which will add much beauty to his forest, and to his convenience when the wood is cut off."

Morrill Allen, of Pembroke, Plymouth county, among the farmers in Massachusetts most distinguished for intelligence, practical skill and success, in reply to inquiries as to the best mode of cultivating wood, writes to me :—

"From limited observation and experience I should recommend leaving the land without any culture, where the wood removed was of a kind and age that shoots would be likely to grow from the stumps. It may be true that shoots will grow more vigorously after stirring the soil in preparation for a crop of rye; but the burning, an operation necessarily preceding, will often be so deep as to prevent the springing of many shoots.

"Where there is no prospect of a second growth from the stumps, either from the age of the cut timber or the kind of wood, then it will be prudent to burn, plough or harrow, sow rye, and with it such forest seeds as we would choose to have the next growth proceed from. Two advantages may be anticipated in this management; first, wood will grow sooner from seed sown on a pulverized soil than it would from that naturally scattered among the rubbish of woodland bottom; a second advantage is, where we sow seed, the kinds of wood comprising the future growth are placed very much within our choice."

John Welles, to whom I have before referred, whose intelligent and strong interest in the agricultural improvement of the Commonwealth for many years claims for him the grateful respect of the farming community, has favored me with the following note:

"As a general principle it is considered by many that after

cutting off a wood lot, a period not far from 30 years may be advantageously allowed before the re-growth should be again recurred to. A period of little over 20 years is allowed by some, prompted often by a desire to avail of the capital.

"But when the annual growth in circumference in each thrifty tree is considered as about one inch, the latter period appears too short. If, however, the wood is of birch, &c., or the smaller growth is wanted for hoops and other uses, a different calculation must be made. These differences of time may be corrected and brought to a better result by the observation and experience of our farmers.

"The growth of an apple tree in one year, is from $1\frac{1}{4}$ to $2\frac{1}{2}$ inches in circumference. An elm in 20 years gave $1\frac{3}{4}$ inch. An ash in 20 years gave $1\frac{5}{8}$ inch. These trees stood alone. In some instances where trees have stood from half to three fourths of a century, their growth has been found to be $1\frac{1}{2}$ inch per year."

I have entered somewhat upon this subject in my First Report, and shall not, therefore, extend my remarks. The subject cannot be too earnestly pressed on the consideration of the farmers in every part of the State. The growth of the common white birch is a source of considerable profit in many parts of the state, as it will generally answer to cut it in 7 or 8 years. If suffered to stand until twelve years, it is often in a state of decay. Our forests should have as much attention as any portion of our husbandry. The cattle, at least in the early growth of the trees, must be effectually excluded from them. On the island of Nantucket, where no wood scarcely is grown, and where the impression prevails generally, that none can be grown, the sheep which run at large over the island, mutton-heads as they are, if they could speak, would at once solve the mystery. On the island of Tuckernuck near by, and equally exposed, I saw a flourishing growth of young oaks of seven years old, which as well as I could learn, fortunately for the owner of the lot, the Nantucket sheep had not seen, unless it were across the water. The exposed situation of such

places undoubtedly affects the growth, and especially of detached trees or clump of trees; but where large plantations are made, if proper pains be taken, all reasonable success may be expected. It may require in the outset much care and expense to get the trees under favorable way; but there is hardly a situation where they may not be successfully cultivated; and success will abundantly compensate the expense.*

XVI. Ornamental Trees. The cultivation of ornamental trees ought to be strongly pressed upon the farmers. "Put a tree down; it will be growing while you are sleeping." Many of them enrich the country; all adorn it, and thus essentially increase the value of an estate, and render the country more healthful as well as beautiful. Every place on a farm, where they can grow without injury to the crops, ought to be planted with trees. Timothy Walker, of Charlestown, Middlesex county, lately deceased, left a legacy of some hundred dollars to be expended in planting ornamental trees on some of the great roads in that town. This was a noble bequest; and places him among the benefactors of the community. It is an example worthy of imitation. A taste for the beauties of natural scenery cannot be too much cultivated among us. A taste for natural beauty is closely allied to a taste for moral beauty. The more attractive our homes are rendered, the more shall we love our homes; and the love of home is the parent of many kind and noble affections.

A taste for natural beauty is an original element of the mind. It may be strengthened, elevated, and enlarged by education; but it appears even in the rudest minds, and thus speaks its divine origin. I believe the perception of beauty exists in all animals; or why should they have been made so beautiful?

Natick in this county was the seat of the first christian mission to the Indians, where the benevolent Eliot, designated as the Apostle, sought to pour into the minds of these children of

* Appendix M.

nature, benighted with the thick darkness of superstition, the heavenly rays of inspired truth. Eliot was followed by a worthy successor, Oliver Peabody. The Indians appreciated the blessings of the religion of peace and love which he taught them; and in gratitude for his services, these sons of the forest, to whom the trees seemed as their own kindred, came in a deputation bringing two elms, and asked leave to plant in front of the humble dwelling of the missionary these "*trees of friendship.*" This was in 1722, and these trees stood for ninety years, when one was rived by lightning, and the other seemed to perish through sympathy. When the successor of Mr. Peabody, Mr. Badger was settled in 1753, the Indians offered the same token of respect and the same pledge of good will to him. These trees are still in full vigor, and remain as beautiful monuments of affections, which have gone out on earth, but are destined to be re-kindled and burn with a purer flame.

Nature is every where prodigal of beauty, as if she would stimulate the passion for it to the utmost extent. Among the varied combinations of charming objects, which mingle in a rural landscape, the trees are preeminent. Sometimes rising in single cones so exact and symmetrical in their form, that they seem the perfection of art; sometimes spreading their umbrageous limbs in curves and lines of the most graceful expansion; sometimes bending their boughs to the earth loaded with golden and crimsoned fruit, and when the sun pours its bright rays upon them, presenting not an inapt image of that sacred bush where the divine presence wrapt itself in robes of fire; sometimes seen in long single lines skirting the traveller's path; sometimes in beautiful clumps and clusters, affording a grateful shade to the panting herds; at other times in the wide spread forest, shading a valley with their deep and black green; here again burnishing the mountain's side with their thick and matted foliage; now in autumn robed in the gorgeous vestments of more than oriental magnificence; and oftenin winter bending under their piled-up fleeces of snow, or glistening with matchless splendor when cased in ice and changed into a crys-

tal forest of glass and diamonds; in all these cases how suited are the trees to charm the eye and delight the mind! Why should not the eye be charmed? Why should not the imagination be delighted? Why should we not take pleasure in the beauty of God's works? Why should we not do what we can to make our homes continually more and more beautiful; and to multiply and fill to overflowing these innocent sources of pleasure?

The country is full of poetic sentiment and religious monitions. The privileged inhabitants of the country should seek to rise above the mere drudgery of life, and make themselves familiar with nature in her ever varying and charming aspects. It will not hurt their industry, but it will cheer their toil to study the benevolence of the Creator in the perfection of all his works; and, I trust I may add without irreverence, to second his provision for the happiness of his creatures in multiplying every where around them the forms of beauty.

I hope I shall be pardoned for the enthusiasm which I may betray on this subject. Let those, who think my remarks out of place, kindly pass them over. Penetrated to the depths of my soul with a sense of the beauty of nature and the charms of rural life, I am anxious that even the lowest laborer may have his toil alleviated, his self-respect quickened, and a sentiment of the dignity of his own nature breathed into his heart by a habit of observing and studying and enjoying the wonders and glories of the visible creation around him. I cannot think it difficult under a just education to awaken this sentiment and form this habit even in the humblest minds; and what sources of gratification in such case shall we open to him, which the wealth of cities cannot purchase, and what motives to religious trust and joy shall we inspire, which written teachings can never impart. For what a prodigality of beauty is every where manifested in the natural world! Light itself is the perfection of beauty, and wherever it spreads its glittering robe, converts every thing which it touches into beauty. Take the great features of nature, the earth, the water, the sky, the sun, the moon,

the stars; and what beauty is resplendent in every one of them. Take the vegetable tribes, the trees, the flowers and the verdant fields; take the animal creation, from the fairy bird that cleaves the liquid air with his burnished wing, to the pearl of exquisite brilliancy, that lies buried in the depths of the sea; and what a divine beauty shines out in the whole. Examine the minutest atom, which you can pick from the earth with the finest needle, the smallest flower that drinks in the refreshing dew, the least insect that floats in the sun-beam, the tenderest leaf that quivers in the breeze, and the vast continent with all its mixed and varied features of land and water, of valley and mountain, of prairie and forest; take the vast ocean, with its ceaseless heavings, and its deep cerulean waves, and the golden and crimsoned heavens at the rising and setting sun; look at nature, even in her decay, in the variegated glories of autumn, or reposing under her jewelled mantle in the death of winter, look at every thing in its individual form, or in its combinations, and even in objects which seem offensive or loathsome, or terrific,—all, all, is flooded with beauty. I have stood hour after hour, gazing at the mighty Niagara; and while I beheld in its tremendous movement, an image of the Divine Power, and in its ceaseless flow, a symbol of the Divine Eternity, yet in its deep torrent of living green, its glittering tresses, of a whiteness which the drifted snow does not surpass, and in the dazzling iris, spanning its troubled and foaming abyss, and girding, as it were, the lion's neck with a cincture of brilliants, beauty, ineffable beauty, pervaded and triumphed over the whole; and there, of all other places on earth, seemed to have fixed her shrine and to demand universal homage.

XVII. Particular Farms.—1. In giving an account of the agriculture of Middlesex county, the farm of Elias Phinney, of Lexington, may be expected to occupy a prominent place. In the skilful and judicious improvements which he has effected, I think the farmers of Massachusetts would not long

hesitate to allow him the precedence. This I know is high, but not undeserved praise.

I am unable to procure a detailed report of the products of this farm, but its improvements constitute its principal interest. It consists of 160 acres, of rough and hard land, of knolls and peat swamps, which by extraordinary skill and labor, have been converted into a most productive farm, every where exhibiting the triumphs of intelligence and skill, and of labor directed by sound judgment.

When his improvements commenced, ten tons of hay were the annual product; now one hundred are obtained. The stock on the farm consists of six horses, three yokes of oxen, twenty-four milch cows, from one hundred to one hundred and fifty swine, and a large flock of wether sheep for fatting.

I have already given some account of the pork usually fatted on the farm, and the whole method of keeping and fattening his swine. The milk is daily taken at the farm by a neighboring milkman. Large amounts of fruit, apples and peaches, and grapes, and of vegetables, are sent frequently to market, and considerable amounts of hay are sold. One great principle, however, is constantly regarded, to consume on the place all the produce of the place, when it can be done without loss, for the sake of the manure.

The improvements on the farm have consisted mainly in the redemption of the peat meadows, and of these I have given a full account. He has, to some extent, likewise practised the irrigation of his lands by conducting water from a pond, which is situated on a high part of his farm, by successive channels on a side-hill through his orchard, and upon a portion of his mowing land. The benefits of this he pronounces very great. The transit of mere spring water, without any intermixture, has the most beneficial effects in quickening and perfecting vegetation; and many farmers in the State might avail themselves at small expense, of local advantages which they enjoy for doing this, which are now wholly neglected.

A second great improvement on Mr. Phinney's farm, may be said to consist in the manufacture of manure. On this point, likewise, I have spoken at large, and it is one which ought strongly to attract the attention of the farmers. Many a farmer now expends large sums in the purchase and transportation of manure, when he has on his own farm, or in his immediate vicinity, the means of making a compost of equal value at half the expense.

The third great improvement now going on, on this model farm, is the improvement of the pasture lands. This is a matter which I have often urged, but to which few farmers have given any consideration; and therefore in general nothing is more disreputable to the large majority of farmers throughout the State, than the condition of their pastures. Mr. Phinney, as far as his manure heap will allow him to do it, ploughs and manures his pasture ground, removing as many of the stones as can conveniently be taken away; but where his manure is deficient, he simply ploughs the land, completely inverting the sward, sowing rye and grass-seed and rolling it down. This effects at once a beneficial change, greatly increases the amount of feed, and is preparatory to a more liberal cultivation.

The fourth improvement is in the extensive cultivation of fruit. Mr. Phinney has stocked his place very fully with the best of engrafted fruits, of apples, pears, peaches, and grapes; and does not deem the common method sufficient though generally practised, of planting the trees, and then telling them to grow of themselves; but gives to every one of his trees his particular personal attention, and considers their cultivation, by ploughing and manuring his grounds and carefully trimming and supporting his trees, of equal necessity and use as that of any garden plant whatever.

Mr Phinney's crop of corn the current year by measurement, averaged 70 bushels to the acre; his potatoes 300 bushels, and his hay from two to upwards of four tons. He has been in the habit of raising wheat for years. His crops of wheat average from 25 to 30 bushels, and he considers it ordinarily as certain

a crop as any which grows upon his farm. I apprehend this is owing to abundant manuring, and clean cultivation for the crop that precedes it, and to the excellent condition of the land. It is spring wheat, and generally sown after corn. He chooses to get the seed in early in April.

The farm of Mr Phinney every where displays energy, judgment, and skill; courage to conflict with obstacles and perseverance in subduing them. The sole object is profit; every thing therefore is managed in the most frugal manner consistent with the proper accomplishment of the object in view. His farming, on this account, may be recommended to the poorest farmers as an example, as it shows them what may be accomplished under discouraging circumstances; and the means within reach of those, whose circumstances are restricted, of converting their now profitless lands into the most productive fields; and demonstrating under what circumstances in agriculture labor and capital may be amply compensated.

2. John P. Cushing's farm and gardens present a beautiful example of the management of land under the most liberal expenditure of capital without regard to profit. Every thing will be found in this place in the highest order, and the crops are abundant and of excellent quality. Mr Cushing's experiments with various manures, have been already detailed, and the continuance of such experiments, if conducted with exactness, must prove of the highest benefit to the agricultural community. Mr Cushing's improved stock are singularly beautiful. They have been imported at great expense; and with the most honorable liberality and public spirit, he has sought to advance the general interest of the farmers by the gratuitous distribution of their progeny in different parts of the Commonwealth. I have no interested motives, thank Heaven! to flatter any man; and I express only my own honest convictions in saying that I know no more beneficent use of wealth than in the encouragement of honest labor; in showing what art and skill can do in embellishing and rendering the earth productive; and in the introduction and liberal diffusion of valuable seeds and useful

plants and improved animals, thus seeking to advance the substantial welfare of the whole agricultural community. I cannot but hope that the examples of a few such men may not be lost upon the many hundreds of men of wealth in our cities, who, having devoted the early part of life exclusively to accumulation, give up its close to mere indolence or sensual indulgence; or like the dog in the manger, think it enough to lie down upon their heaps of gold to guard with sleepless vigilance against the abstraction of a single sixpence; and know nothing of the purest of all felicity and the highest of all honor, that of doing good and living to the benefit of others. In this beneficent use of wealth its actual value is doubled; and while Mr Cushing finds a useful occupation and an interesting pleasure in making these experiments and improvements, there is here no monopoly or exclusion, for others find an equal pleasure in observing their progress, and learning and applying their results.

3. The next farm to which I shall refer is that of Amos Hill, in West Cambridge, in that highly cultivated district of which I have before spoken.

Mr. Hill's farm consists of 194 acres. Tillage 25, English mowing 60, wet meadow 60, pasture 20, orcharding 15, wood 10, salt marsh 4 acres. The salt marsh is distant from home. The greater part of the remainder is in one body, and most of it on a level surface.

Mr. Hill commenced some years since the draining of his meadows. He completed, at his own individual expense, the draining of one hundred acres, before application was made to the Legislature to effect the great improvement in this way of which I have given an account in page 354. To this tract his land lies adjacent. This improvement is still going on, a second gate having been erected by which the water is brought entirely under command. The advance in the value of these lands by this improvement is enormous. It may well quicken the ambition of others to improve their grounds, wherever improvement is practicable. Before this operation this land was sold for 20 and sometimes 10 dollars per acre; that which is

now thoroughly redeemed and cultivated would readily command two hundred dollars per acre, and will pay the interest upon a larger sum than this, and keep up its condition. The whole tax for the common improvements has been about two dollars an acre; but even of this trifle some of the proprietors have complained. This reminds me of a case in which a kindly disposed man having given a poor neighbor his winter's fuel from his own wood-pile, was in the spring presented by this same neighbor with a bill for cutting the wood given him. Where are the limits to human cupidity? As I observed before, the greater part of this soil is a deposit of rich alluvial mud and decayed vegetable matter, though in some parts a small amount of peat is found. Mr. Hill speaks with strong emphasis of the value of clay applied to these lands as to be preferred to any manure which can be put upon them. He puts no clover upon them, but sows herdsgrass, redtop, and fowl-meadow, which last he considers a valuable grass. These meadows when subdued are capable of producing almost any crop. From some acres the last season he obtained crops which yielded him 150 dollars per acre. This improvement promises to be one of the most beautiful as well as one of the most productive in the commonwealth.

Mr. Hill's objects are the production of vegetables, fruits, milk, and hay. His ordinary number of cows is from 10 to 12. These he changes twice in a year; purchasing new milch cows in the autumn which he turns off in the spring for fatting, and selling in the fall the cows which he purchases in the spring. He owns pasturage in New Hampshire to which his cows are sent in the spring to be fatted; and his sales of beef the present year amounted to about 15,000 lbs. In this way he has the full advantage of his cows in the best of their milking condition; and his sales of milk average about 800 dollars. The average yield of milk he considers about $6\frac{1}{2}$ quarts, or a can a day to a cow, which seems not a large yield under this management. In changing his cows so frequently, he perhaps does not give the same attention to the selection, as if they were designed to be kept longer. The average cost of his new milch

cows is 25 dollars; and their value when turned off in the spring is estimated at 15 dollars. He fats annually about 1000 lbs. of pork.

The returns which he has given me of some of his crops are as follows: English hay 75 tons, of which he sells about 40 tons; salt hay 6 tons, fresh meadow hay 35 tons; pease sold green, 275 bushels; potatoes, 1000 bs.; onions, 200 bs.; beets, 250 bs.; ruta baga, 400 bs.; winter apples, 350 barrels; cider, 10 barrels; asparagus, squashes, and melons, 500 dollars' worth; horse-radish, 100 dollars; celery, 150 dollars; five acres of cabbages, savoy and drumhead. These are principally drumhead, which are sold to coasters and ships and bring from four to seven dollars per hundred; the price at the present time is ten dollars per hundred. His sales of cucumbers for pickling have this year amounted to $1000. There are many small items which it is unnecessary to particularize.

Mr. Hill has usually six or seven acres in squashes and melons, and one acre in asparagus. His melons are planted in the rows of his pease. The pease are sowed in rows five feet apart. The melons in every other row of pease, in hills ten feet apart. The hills for the melons are manured with two good shovelfuls of manure when the pease are sown, though the melons are not planted until some weeks after the pease.

The cultivation of asparagus was formerly a laborions and expensive affair. It has ceased to be so. Mr. Hill deems his lightest and most sandy soil best suited to this crop. The land after being well tilled, is laid out in furrows or trenches, three feet apart and about a foot deep; the plants are then set in the trenches; and the land kept clean and well manured. In this way it is as easily cultivated as Indian corn, and is a very profitable crop. Horse-radish is cultivated much in the same way; the land requires very high manuring, and the plants are set out by cuttings in narrow rows. As the root is taken up, this requires a frequent planting. I have known two square rods of horse-radish to produce 60 dollars in one season in the market.

Mr. Hill's cabbages are set out in rows three feet apart, and

the plants two feet apart in the rows. This would give 7260 plants; but of these a great many must be expected to fail.*

From an acre in apples Mr. Hill in one case obtained 300 barrels. As a wash for his trees, he uses a composition of one pound of potash to one gallon of water; but is of opinion that this or any application to the bark will seldom be required, where the land is well manured and cultivated.

Mr. Hill differs from many farmers, in preferring to feed his meadows in the autumn; as he thinks they will produce more hay than when the "old fog" is left upon them. Where the grass is cut early, this may be the case; but where a late haying is practised, and an opportunity is given for the thorough decay of the old vegetation, I apprehend a different result would be found. At any rate, the poaching of the meadows by cattle, where the land is soft and clayey, so as to leave many holes for the water to stand in, must be prejudicial. The observations and experience of so successful a farmer, who has been exclusively devoted to agriculture for thirty-seven years, and, in that time, has sold much more than 75,000 dollars' worth of produce from his place, exclusive of the consumption of his family, are highly valuable, and I, therefore, make no apology for going into these details.

Here is the encouraging example of a man making himself rich and independent by farming, unassisted but by his own labor and the resources of his own farm, which his improvements have continually multiplied and enlarged. He began before the mast, and now walks the quarter-deck. Many men think it extraordinary that they cannot walk the quarter-deck without knowing, far less pulling, a single rope in the ship. They are afraid of getting tar upon their hands. Agriculture is a trade or profession to be studied and learnt as much as any other trade or profession. The general opinion is, that any dunce may be made a farmer; so any dunce may be made a merchant, or a lawyer, or a minister; but what sort of merchants, or lawyers, or ministers will dunces make? Not

* Appendix, N.

long since, in one of my excursions, I visited a gentleman brought up in city habits from his childhood, who had recently removed into the country with a view to farm for profit. As a farmer, he had not got a single wrinkle upon his horns, for he was then only about six months old. He showed me his plantations, his buildings and multiform conveniences, and above all, his Berkshire pigs, which he proposed to fat upon ruta-baga and hay-tea. He then told me, with admirable self-complacency, that he *had* thought there was some mystery in farming; but he had found none, and in three months, had learnt all that there was to be known about it. Had he said all that *he* could learn of it, I should have agreed with him. It would have been hopeless in me to have attempted to undeceive him; but the barrenness of his products, and the bottom of an empty purse, soon brought home the conviction of a too common error; and, I am sorry to add, provoked some curses upon farming, which belonged entirely to his own ignorance and indiscretion. He was not the man who, because his beans came up the wrong way, caused them to be turned and planted with the top down; but he was first cousin in the same family.

Mr. Hill employs five men in the winter, and twelve through the summer. He pays high wages, because the best services are required, and no men work more hours in a day, than men employed by the farmers in the vicinity of the capital, who supply the market.

Mr. Hill purchases the right for a portion of the time, of clearing the refuse from the plat-forms in the hog-establishment in his neighborhood, which I have described. He knows no manure so efficacious as this wherever applied. It is always composted. Next to this, he ranks night-soil, which is likewise mixed with mould or peat-mud.

4. George Pierce, whom I have already named, has a home-lot of little more than seven acres which he cultivates, in the same favored district of which I have been speaking. Besides this he sometimes extends his cultivation by hiring occasionally small lots in his neighborhood.

The extent of his out-lots is not given; but it may be inferred from the fact that for one of them he pays an annual rent of 35 dollars; for the other piece 40 dollars.

The amount of sales from the whole three within the year thus far, is $3428 54. The amount of sales from his home-lot of seven acres, is $2675 54. The amount paid for labor on the whole up to this date (27th Nov., 1841) is $499 99, without including the expense of board of the men. This, I presume does not embrace any charge for his own labor and supervision and marketing. The bills paid since the last spring for manure amount to $224 75; but he thinks the whole used has amounted to twice that sum.

His particular aim is to raise fruit and vegetables for the market, such as apples, peaches, strawberries, raspberries; and lettuce, radishes, spinach and other greens, early cabbage, cucumbers, squashes, melons of various kinds, cauliflower, brocoli, beets, carrots, turnips, pease, beans, onions, &c., all of which are profitable crops, when he is successful in growing them.

He plants little of corn and potatoes, as he thinks he can use the ground to much better advantage. Some of his most productive crops the present season have been fall-sowed onions, from a piece of land 3 rods in width, and 8 rods in length, which gave him 167 dollars. Another profitable crop was saba, or as they are sometimes called seve beans. There were 1248 hills, which, on the first picking yielded 38 dollars. The yield according to the account kept, amounted to 70 dollars, when having lost his minutes, he was unable to ascertain the entire amount. Of string beans he had the last season two acres. From this lot it was not unusual to carry ten barrels in a day to market. In two weeks he carried to market from this lot 172 bushels, the average price of which was 67 cents per bushel or $115 24. At the same time this ground was occupied with other crops, such as melons, tomatoes, cauliflowers, cabbages, &c. As soon as the beans had ceased to bear, the vines were immediately removed, and the ground being well cultivated. there was ample room and time for the other crops

to grow. Many of his early vegetables are forwarded in hot beds under glass. On most of the ground which he cultivates, he gets from two to four crops. A crop of radishes, lettuce, beans, and cucumbers may be had on the same ground the same season; and to these a fifth crop, fall spinach, is sometimes added. In the past season he says he has had crops, which, by the old modes of husbandry, would have occupied ten acres, growing upon four acres.

His practice is for the first crop to give such a dressing of manure as will carry that and the succeeding crops well through without renewal. He never manures sparingly.

His onions are sowed in July or the first of August. They are lightly covered with litter in the fall, and early in the spring are uncovered and become soon fit for the market; and the crop is off the ground in season for its successor.

Mr. Pierce values very highly stable manure, and wishes to apply it to his crops in its hottest state. It then forces vegetation most rapidly and powerfully. He has seen the powerful effects of night-soil more than five years after its application; but it was in this case applied liberally; and it must never be used without composting. For ashes he has a high estimation, and when the soap-boiler calls to buy *his* ashes for the customary price of ten cents a bushel, he replies by offering the soap-boiler twenty cents a bushel for all *he* has, and buys them, if he can. I give his opinions as those of a strictly practical man, of much experience and perhaps inferior to none in the admirable skill and success of his cultivation. It is pretty evident that he does not wait in the morning for the sun to call him.

In referring to these extraordinary results it would be idle to think that they are reached without skill, judgment, energy, perseverance and toil. But it is a skill which sharpens the wits; and a toil, if not excessive, which quickens the appetite, and strengthens the muscles, and keeps off idle dreams. The earth is a good paymaster; but it does not acknowledge any obligations to those to whom it owes nothing.

5. The farm of Caleb Wetherbee, in Marlborough, consists

of 120 acres. I give the report for one year. In tillage 15 acres, English mowing 25 acres, wet meadow 20 acres. His stock consists of—horses; swine; cows 25, oxen 5. Two pairs are usually fatted.

English hay,	60 tons,	$2\frac{1}{2}$ tons per acre.
Fresh meadow hay,	———	less than one ton do.
Indian corn,	375 bushels,	50 bushels per acre.
Rye,	193 "	16 " " "
Barley,	133 "	22 " " "
Potatoes,	900 "	150 " " "
Pumpkins,	50 cart-loads.	

Apple trees from 600 to 800.
Pork fatted, 6,408 lbs.

From 25 cows, from April 1 to Dec. 1, four having been dried from 1st September, 2,951 lbs. of butter were produced.

Mr. Wetherbee was kind enough to furnish me with the proceeds of his farm for three successive years.

In 1835 there were sold from it—

Butter,	$740 92	Potatoes,	$25 70
Pork,	660 28	Oats,	48 20
Cider,	108 34	Calves,	137 60
Fruit,	89 62	Total,	$1810 66

In 1836—Butter,	810 62	Pork,	802 24
" Veal,	167 94	Apples,	92 38
" Hay,	20 88	Cider,	262 74
" Beef,	90 00	Total,	$2246 80

In 1837—Butter,	609 81	Potatoes,	43 02
" Veal,	219 83	Apples,	51 98
" Pork,	775 30	Cider,	71 66
" Beef,	170 53	Hay,	21 00
		Total,	$1963 13

Whole amount of sales in three years, $6020 59.

6. Farm of ABEL MOORE, of Concord, 130 acres exclusive of woodland. Tillage 16 acres: upland mowing 6 acres, averaging two tons to the acre: low meadow 25 to 30 acres, yielding 40 tons: reclaimed meadow 25 to 30 acres, producing from two to five tons per acre: corn 6 acres, averaging 65 bushels per acre: on half an acre produced 40 bushels of corn: potatoes 4 acres, crop 1500 bushels: other vegetables—one-half acre of carrots, 450 bushels; one-fourth acre of sugar-beets, 320 bushels; one-tenth acre mangel-wurtzel, 165 bushels; 1 acre of ruta-baga, 200 bushels. The last crop was a repetition on the same land. The previous year the crop was 1132 bushels. This crop is a great exhauster of the soil; and should not be repeated soon on the same ground.

Besides these crops, he cultivated the same year three acres of barley, half an acre of wheat, and one acre of oats. The amount of these crops was not reported. One and one-third acre of buckwheat produced 51 bushels. The butter made on the farm, 600 lbs. From first of November to first of June the milk is sold. The pork fatted is 2000 lbs.

The stock kept on the farm are—oxen 7 yokes: cows 13: young cattle 4: horse 1: swine from 50 to 75. One breeding sow on the place produced 111 pigs in 11 litters. Another, four years old, has raised eight litters, from eight to ten in a litter.

The amount of manure made on the place was 1200 cart-loads. For labor on the farm he paid 550 dollars.

Of Mr. Moore's extraordinary improvements in ditching and draining his meadow, I have already spoken at large in page 360.

7. Z. REED, Westford. 85 acres; tillage, 7 acres. Manures highly, 25 cart-loads of compost manure to the acre: his greensward inverted, the land rolled, and the manure spread and harrowed in. Mowing, 30 acres of upland, averaging two tons to the acre—twelve acres of low meadow, not suitable for the plough, affording 25 tons of hay, of good quality. His low lands are occasionally manured with 20 loads of compost to the acre.

Five acres in corn, averaging 36 bushels per acre. Two

acres in potatoes, 350 bushels per acre. Seven acres in grain, oats and barley.

Butter made, 1000 lbs. Cheese—⅓ new milk—600 lbs.

Sheep 25, native, yielding 95 lbs. of wool. His sheep lamb in February; and he sells the lambs, in May, for a price averaging three and four dollars each. He loses one in ten by cold, when he ought to lose none.

Stock kept: 8 oxen: 8 cows: 12 young cattle: 25 sheep. Apple trees 700, engrafted fruit: other fruit, peaches, pears, &c. 250.

From two acres he obtained one year 600 bushels potatoes; and from the same land the ensuing year 80 bushels of barley. Though 25 miles from Boston, he has sometimes sent there 40 bushels peaches, and sold 200 barrels of apples.

8. In Concord. Abel B. Heywood. Tillage 30 acres: English mowing 20: wet meadow 30: pasture 80: orcharding 4: wood 50: waste 50: total 264. Stock — Horse 1: oxen 6: cows 10: swine 15: young stock 10. Amount of sales $700. Value of produce used or on hand $480,89. Cost of labor $165,49. Incidental expenses $35.

Products.

English hay,	20	tons,			1½ per acre.
Fresh meadow hay,	60	"			2 "
Wheat,	7	bushels,			
Indian corn,	200	"	40	bushels	"
Rye,	100	"	20	"	"
Oats,	100	"	50	"	"
White beans,	20	"	15	"	"
Potatoes,	700	"	200	"	"
Onions,	30	"	200	"	"
Carrots,	10	"	300	"	"
Beets,	10	"	350	"	"
Parsnips,	8	"	225	"	"
Turnips,	100	"	500	"	"
Ruta baga,	15	"	400	"	"

Beef fatted,	8000 lbs.
Pork, "	1000 "
Butter,	330 "
New milk cheese,	300 "
Cider,	20 bls.
Winter apples,	10 "
Straw,	8 tons.
Corn fodder,	8 "
Wood sold,	60 crds.
Do. used,	20 "

Manure made,	200 loads.
Do. bought,	20 "

Average value of Land.

Tillage and mowing land,	15 to	40	dolls. per acre.
Peat meadow,	20 "	50 "	"
Wood land in pine.	30 "	100 "	"
" in hardwood fit to be cut,	150 "	250 "	"
Land 1st year after wood is taken off	10 "	20 "	"

9. Framingham. Increase S. Wheeler. Acres 245: mowing and tillage 70 acres: wood land 30 acres.

Products.

Hay,	100 tons.	1 to 2½	tons per acre.
Indian corn,	350 bushs.,	50 bushels	"
Potatoes,	800 "	320 "	"
Ruta-baga,	1000 "	500 "	"
Oats,	60 "	Cheese, new milk,	55.
Barley,	57 "	Skim milk,	478
Wheat,	22	Pork fatted,	5237 lbs.
Butter,	2455 lbs.	Pigs sold amou't to	$40,11.

The amount of produce sold from this farm for seven years past has averaged $2000 per year. Largest amount in any

single year has been $2444. In hay, during the seven years, $1054.

Compost manure is made of one load of barn manure and two of peat or dry mud.

Meadow land is redeemed by draining, using the meadow plough, applying compost manure freely, harrowing and seeding. Stock on the farm ; 3 yokes of oxen : cows 26, of which 20 only have been milked : one bull : five calves : 140 merino and Saxony sheep. Labor employed, the tenant and one hired man at $18 per month : 35 days labor in addition, hired in haying.

10. Westford. Ephraim Abbot. Acres 230 : tillage 19 : English mowing 26 : wet meadow 20 : pastures 91 : orcharding 2 : wood 72.

Stock. Horses 2 : oxen 4 : cows 11 : young neat stock 8 : swine 6. Amount of sales $480 90 : value of produce used or on hand $1,058 78 : cost of labor, $423 49 : incidental expenses, uncertain.

Products.

English hay,	29 tons,	1⅛ ton per acre.	
Fresh meadow hay,	20 "		
Wheat,	32 bushels,	11⅓ tons per acre.	
Indian corn,	166½ "	30¼ "	"
Rye,	14 "	8 "	"
Oats,	11½ "	20 "	"
Buckwheat,	70 "	24 "	"
Potatoes	294 "	120	
Flat turnips,	151½ "	260	
Beef,			1100 lbs.
Pork,			1673½ "
Butter, not ascertained,			
Cider,			23 barrels.
Winter Apples,			40 "
Straw,			2 tons.
Corn Fodder,			8 "
Onions, carrots, beets, parsnips, &c., in garden.			
Manure made,			75 loads.

Produce and provisions sold to laborers, not included in proceeds.

Mr. A. has successfully redeemed peat meadow, by draining, applying loam and compost manure, and sowing grass-seed. The first year he obtained one; the second year two tons per acre.

11. Tewksbury. Acres 100: in tillage and English mowing 25: meadow 5: pasture 40: wood 30.

Live stock. Horses 2: cows 6: calves 3.

The soil, a mixture of loam, clay and gravel about six inches deep, on a hard yellow pan.

Products.

12½ acres in	English hay,	22 tons.
5 "	Meadow,	4 "
3 "	Indian corn,	200 bushels.
2 "	Wheat,	25 "
2 "	Buckwheat,	30 "
1 "	Spring Rye,	27 "
¾ "	Barley,	28 "
¾ "	Oats,	22 "
3 acres.	Potatoes,	800 "
	Sugar Beet,	50 "
	Turnips,	100 "
	Squashes,	1000 lbs.
	Straw,	8 tons.
	Corn Fodder,	6 "
	Milk sold,	5600 quarts.
	Butter made,	100 lbs.
	Calves raised,	3

The course of crops:—1st year, corn. 2d, esculent roots, potatoes chiefly. 3d, wheat or rye, with grass 3 or 4 years.

When the farm was taken 5 years ago, 150 dollars' worth of hay were purchased to keep the stock through. Besides the wool waste from Lowell, 150 dollars have been expended for

manure, chiefly night-soil, which is delivered on the fields at 5 cents per cubic foot.

12. West Cambridge. Charles Wellington. Acres 88 : tillage 15 : English mowing 30 : salt marsh 3 : orcharding 30 : wood 10.

Stock. Horses 4 : oxen 6 : cows 2 : swine 20.

Products.

English hay,	60 tons.
Salt,	4 "
Potatoes,	1600 bushels.
Beets,	800 "
Turnips,	500 "
Pork,	4000 lbs.
Cider,	30 barrels.
Winter Apples, prime,	600 "

Manure made,	50 cords.
" bought,	100 "

The cost of cultivating an acre of potatoes is estimated at	$40
" " " beets "	50
The value of tillage and mowing land here is estimated at	150
of pasture land at	30
of salt marsh at	100

The amount of manure usually applied to an acre is 4 cords. The cost of labor, board included, is charged at $1000. About 25 acres of this farm was almost covered with large and small stones; this land has been cultivated with great labor, and is now in orcharding. Twenty acres were formerly low, wet peat meadow, and bog; now all in tillage and English mowing, and yielding abundantly.

Mr. Wellington raised the present year twenty tons of the marrow squash, on about six acres of his orchard ground, although most of the land was covered with apple-trees.

Mr. Wellington remarks that fruit trees of all kinds require cultivation, both by ploughing and manuring. About 2 cords

of manure annually to the acre, with a frequent passing over the land with a cultivator, is deemed necessary to insure a crop of good fruit.

Hay, beets, potatoes, and marrow squash, are all profitable articles, but fruit is the most profitable. In addition to the crop of winter apples, he has sold 100 bushels of early apples, 75 bushels of the best kind of pease, 80 bushels of quinces, and 3000 quart-boxes of strawberries.

The whole product of this farm, including that already sold, and that which is now ready for sale, will not fall short of six thousand dollars.

Mr. Wellington adds:—"My crop of fruit, the current year, has not been so great by one third as in 1840, and probably not more than two thirds of an average crop. The sales of produce, the present year, fall considerably short of those of former years. I have not enumerated, in the above statements, many of the smaller vegetables raised and sent to market—such as pease, beans, cucumbers, summer squashes, asparagus, turnips, melons, &c. which amount to no inconsiderable sum, in addition to the wholesale products."

To these statements of farms I might subjoin various others, but it cannot be necessary. These, together with the preceding statements in the Report, will give a sufficient view of the mixed husbandry of the county. In presenting among others some of the best-cultivated farms in the State, I can but hope it will stimulate the ambition of our intelligent husbandmen. In showing what has been done, they will see what they can do. In agriculture there is no monopoly of advantages, and every man is benefited by the success of his neighbor. In the present condition of our population, there is no danger of overproduction.

13. The produce of a small piece of land in Groton belonging to George Brigham, is so remarkable, that I subjoin it.—The owner, the year I visited him, besides a full supply for his cow, sold ten dollars' worth of hay. The abundance of the yield is, I believe, to be in some measure attributed to the fact that a large potash establishment, 40 years since, stood on the lot.

"The small plat of ground which you saw when at Groton, contains one and a half acre; about one half of which is meadow bottom, deeply gravelled more than thirty years since. I mowed the grass about twelve years, and once in three or four years gave it a light dressing of common manure. Finding it to yield much more hay than was necessary for a cow, and wishing to save the trouble and expense of pasturage, perhaps a mile or more from home, I appropriated one half acre for that purpose. It produced a good supply for five years; when I gave it a light dressing of compost manure, and reduced the pasture to sixty-eight rods by accurate survey. It has for the last four years supplied my cow with an abundance of feed, from early turning out to September first. The pasture is low ground bordering on meadow, and is always moist. I have never noticed a dry spot, even in the driest seasons.

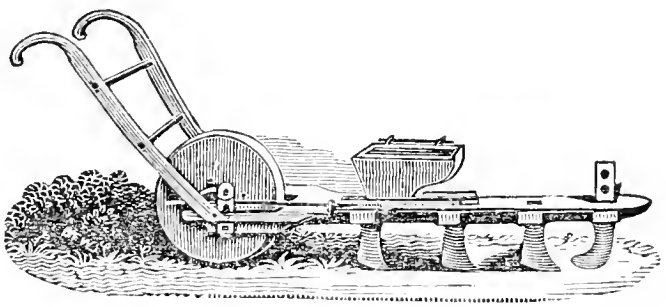
"The adjoining acre, about two-thirds of which is meadow bottom, has with common usage, produced from two to two and a half tons of hay annually. It might be made to produce a much larger quantity."

14. I will add but one among many examples of admirable management on a small scale, which came under my notice, all of which would illustrate in the strongest manner the almost certain results of industry, united with the strictest temperance and frugality.

This farm consists of 36 acres, and is devoted to raising wheat, corn, barley, potatoes, and other customary crops. The farmer began life $900 in debt; he has brought up a large family, and given one son $500. He has earned usually in the winter $125 by shoemaking. He owns his farm, and his debts do not exceed $100. The farm has been his only resource excepting the products of his winter labor as above.

XVIII. Agricultural Implements.—The farming utensils in the county have nothing peculiar in their construction. Wm. Buckminster, of Framingham, has invented a corn-planter, which I have seen used with great advantage both for ruta-baga

and Indian corn. I annex a cut of it with his own description.



"A beam four feet in length has four consecutive teeth, similar to those of a Cultivator, inserted into it. A wheel fourteen inches in diameter and four inches thick is attached to the hind end of the beam to regulate the whole, and to beat down the loam which is thrown upon the seed to bury it.

The hind tooth is hollow, and the hopper is placed above it containing the seed corn. Cogs on the wheel strike a rod which *pumps* the seed corn out of the bottom of the hopper and lets it fall through the hollow tooth into the channel which has been cut in the soil by the four consecutive teeth; the corn falling through the tooth to the bottom of it is buried sufficiently deep for vegetation.

Rows are made in one direction, and the hills are dropped at the distance of one, two, or four feet from each other, at the option of the planter. A thirty acre field may be planted by a *double machine*, with one man, one boy and one horse, laboring ten hours and travelling three miles per hour.

Nothing but the finest loam of the field ever falls on the seed corn, and it is planted more exactly than is usually done by hand."

The same farmer has invented a machine for sowing grass seed, which is drawn by a horse and drops the seed with great uniformity. It seems to me well adapted for the purposes designed.

XIX. Nurseries.—1. The nurseries of Jona. Winship & brother are in Brighton, in this county, four miles from Boston.

There are twenty-five acres in the three nurseries, all closely filled with a great variety of fruit, and ornamental trees, and shrubs of every kind that it has been in the power of the proprietors to obtain in this or foreign countries, with an extensive green-house establishment for exotic and tender plants of this continent.

The borders for herbaceous, flowering, and useful, or medicinal plants, extend round and across the two principal nurseries, are from twelve to fifteen feet wide, and would form in extent a mile or more.

In extent of land, variety of plants, neatness and judicious arrangement through the different sections of the gardens, greenhouses, and nursery, these highly cultivated grounds are full of gratification for the gardener and the lover of fruits and flowers.

2. The nursery of William Kenrick, at Nonantum Hill, is in Newton, 6½ miles from Boston. Thirty acres are comprised in the nursery grounds, including the land on which are the buildings, garden, and those vacant lands which for a season are necessarily and occasionally appropriated to other uses in some of the interval years of rotation. These nursery grounds are principally devoted to the cultivation of the most approved and superior varieties of fruit trees, and also the most hardy and beautiful ornamental species of trees, shrubs, and herbaceous plants. No pains, labor, or expense have been spared in obtaining all that is new and valuable and beautiful, and adapted to our climate, from the most celebrated resources and collections of all countries;—these selections are adapted to every section of the Union.

3. In the same neighborhood is another extensive nursery of the same kind, belonging to John A. Kenrick, a place designated as Nonantum Dale. It is well stocked with fruit trees, and a large collection of ornamental trees of the most approved varieties, flowering shrubs, and herbaceous plants.

There are several other nurseries and gardens for the sale of plants and flowers, and fruit trees, in the same town, and in

several other parts of the county, which it is not necessary that I should enumerate.

The existence of these establishments, their extent and yearly increase indicate the ample patronage which they receive, and speak emphatically in favor of the intellectual, may I not add, the moral improvement of the community.

In the two great floral kingdoms of nature, the botanical and the human, if we must yield the palm to that which is alike transcendant in the beauty of form and motion, and in the higher attributes of intelligence, innocence, and moral perfection, yet it can be no derogation to admire, with a rapture bordering upon enthusiasm, the splendid products of the garden. What is the heart made of which can find no sentiment in flowers?

The vast creation of God, the centre and source of good, is, as I have observed, every where radiant with beauty. In the floral kingdom it appears in an infinite variety; in an unstinted and even a richer profusion than in other departments of nature. While these contributions are thrown out so lavishly at our feet, and a taste for flowers seems almost an instinct of nature, and is one of the most innocent and refined sentiments which we can cultivate, let us indulge and gratify it to the utmost extent, wherever leisure, opportunity, and fortune give us the means. There is no danger of an excess, under those reasonable restrictions, which all our sentiments demand "But," says some cynical objector, "flowers are only to please the eye." And why should not the eye be pleased? What sense may be more innocently gratified? They are among the most simple, and at the same time among the cheapest luxuries in which we can indulge.

The taste for flowers, every where increasing among us, is an omen for good. Let us adorn our parlors, doorways, yards, and roadsides, with trees, and shrubs, and flowers. What a delight do they give to the passer-by! What favorable impressions do they at once excite towards those who cultivate them for their own gratification, and find, after all, their chief

pleasure in the gratification which they afford to others? What an affecting charm, associated as it is with some of the best sentiments of our nature, do they give to the sad dwelling places of the departed and beloved?

The moral influences of such embellishments deserve our consideration. I do not mean simply the substitution of such refined tastes and pursuits, in place of the gratification of the lower appetites. This is no small matter. But another influence should not be overlooked.

Every one familiar with human life must be sensible that mere personal neatness and order are themselves securities of virtue. As we cultivate these habits, and in respect to our residences and the things and objects around us, make a study of rendering them orderly and beautiful, and of adding to them the highest embellishments of art, our own self-respect is greatly increased. Next to religious principle nothing operates more than self-respect, as a safeguard of virtue and a stimulant to excellence. The direct tendency of all such embellishments in our grounds and habitations is to multiply the attractions of home, and to strengthen the domestic ties. It is the glory of New England, that these precious ties are no where stronger or more sacred.

XX. Agricultural Society.—Middlesex county has, for many years, had a respectable agricultural society, which, in addition to its own funds, receives from the State six hundred dollars per year for disbursement in premiums. The annual meeting is holden at Concord in the autumn, when a ploughing match is also appointed. The benefits of these shows and competitions have been very great, though, in my opinion, they fall far short of accomplishing all the good which they might. It is from no assumption of any superior sagacity and in no spirit of complaint; but from a sense of official duty and an anxious desire that the liberality of the State should not fail of its excellent purposes, that I shall offer some suggestions respecting the management of this and other agricultural societies in the Commonwealth.

1. In the first place, a large proportion of the premiums is paid upon live stock. The object of these premiums should be not the reward or complimenting of an individual for the mere accidental possession of a fine animal but for some improvement attempted, or effected, or intended to be effected in the breed of animals in question. Animals are sometimes purchased at a distance or in another county, and brought into the county for no other purpose than to secure the premium. Now why should the owner of such an animal, to whose improvement he has contributed nothing, and who by offering or buying this animal, has no view to the improvement of the live stock of the county, why should he be rewarded with a premium? If a man will import a valuable animal from abroad, with a view to testing his qualities, or propagating his blood, or if he will raise a superior bull, which he keeps for the use of his neighborhood as well as the improvement of his own stock, or if he will raise a cow for the good qualities of those animals from whom she has descended, or show by successive experiments, that he has actually effected some amendment in the dairy or thriving properties of an animal, or if he will show by exact experiments in feeding his animals, how their milking properties or their dairy properties may be improved, then most certainly he would merit a premium. But if it is the mere showing of some single animal, which may have accidentally fallen into his hands, his possession of which indicates no merit on his part and promises no direct benefit to the agricultural community, the premium bestowed on him, to say the least, fails entirely to accomplish the objects of the government.

But again, with the exception of some swine, Middlesex county is not, and never can be, a stock-raising district. This matter cannot be forced. The deficiency of pasturage, the high price of land, and the value of agricultural produce in the market, will prevent the raising of neat stock in the county ever being other than an expensive and unprofitable operation. It would not seem desirable that it should be encouraged by

many or large premiums. Every direct and well conducted experiment, however, in the improvement of the breed of animals, every importation into the county of valuable animals for this object, ought, to a certain extent, to be encouraged; but these cases will be easily distinguished from those in which none of these objects are sought, or are likely to be accomplished.

2. The objects in my opinion to which the Middlesex Agricultural Society should principally direct its attention, are agricultural experiments, the redemption of waste lands, the improvements of pasture grounds, the irrigation of lands, the planting and care of wood lands, the cultivation of live fences, experiments with various manures, the amendment of soils, the increase of manures, the culture and improvement of crops of every description, the fatting of pork, the management of poultry, the management of milking establishments, the making of butter, the winter keeping of cows, the fatting of calves, the management of bees, the introduction of new fruits, the culture of orchards, the care and keeping of horses, the fatting of wethers, the invention of agricultural implements, the construction of farm buildings, the art of ploughing, the training of cattle, and especially the general management of farms.* These objects are intimately connected with the agriculture proper to Middlesex, and to which their premiums might, with much more advantage be directed, than to the mere exhibition of cattle, from which no general or special advantage is to come other than in the form of a premium to the accidental owner. There is, I know, always a difficulty in inducing farmers to come forward as competitors for the premiums on farms; and this often arises from diffidence or the apprehension of failure in obtaining the premiums. To obviate this, let an active and respectable committee of the Society appropriate a week, each season, to going through the county and visiting, with or without invitation, such farms as attract their attention, and induce the farmers to show their improvements and communicate their farm accounts; and then let them appropriate where they think

* Appendix, O.

they are deserved, such premiums as the funds of the Society will authorize for these objects. Let there be a viewing committee of five; let them devote five days in succession to this service; and let them be paid two dollars a day each, for their time. Fifty dollars cannot be better bestowed, and the beneficial effects would soon be obvious. If the committee are paid for the service, they will be held responsible for its faithful performance.

3. In the next place, the shows or fairs of the different counties, certainly those which are holden in the vicinity of each other, should be arranged so as not to fall on the same day. Competitors likewise from any parts of the State, should, if citizens of the State, be at liberty to contend for premiums at any cattle-show, under the regulations of the particular society holding it, provided, however, that no person should be a competitor for the same, or a similar object, at two different cattle shows in the same year, or receive a premium twice for the same object. It is often much more convenient for persons living on the border of a county to attend a show in another county than in their own; and as the money bestowed in premiums is derived from the common treasury of the State, there is no reason why it should not be free to every citizen of the State.

This would render the competition more extensive and more spirited.

4. In the fourth place the premiums should always be given in some durable form, either of plate or books; plate especially is to be preferred with suitable inscriptions; and the names of the successful competitors should be announced and the premiums distributed in public meeting on the day of the exhibition. The premiums would then be carefully preserved and handed down in the family as an excitement to others to excel; and being delivered with solemnity and a suitable address in public would create an intense interest, and an enthusiastic competition.

5. In the last place, every society should annually publish

an account of its proceedings, the report of its awards, the names of the successful competitors, with a full statement of the grounds and occasions of such awards, in a pamphlet, to which should be appended the annual address before the society and such agricultural intelligence as it may be deemed useful to disseminate. This might be done at no great expense, and would keep up an interest in the society and induce the accession of new members beyond any other method which now occurs to me. This has been successfully tried in Essex county for years; and the Transactions of the Essex Society have now reached to three octavo volumes, are full of valuable matter, and are sought after with eagerness by members and others.

There are many other things in respect to the agriculture of Middlesex which I should be glad to refer to, of equal importance with those which have been considered, if my limits allowed it. But I must leave this to those who shall come after me.

XXI. Miscellaneous Considerations.—Middlesex county, rough and sterile in many places as the soil is, is yet possessed of extraordinary advantages and encouragements for an improved agriculture. The population is rapidly increasing. The county and vicinity abound in wealth. The best markets in the country are accessible to it; and it has ample resources for manure. I have already spoken of the extraordinary improvements which have been made in it; and of the equally extraordinary compensations which have followed such improvements. These improvements have been made under the most discouraging circumstances; and, therefore, leave no excuse for any farmer to fail to do what can be done, and what he can do. The profits of farming in Middlesex are demonstrated; demonstrated by the showing of the farmers themselves. Let any candid man read the 7th Chapter of this Report, page 240, which contains the frank and unbiassed statements of practical, plain farmers, under no extraordinary advantages, and then say what honest occupation yields a fairer recompense? Let them look,

likewise, at the admirable record given in the appendix F., of Benjamin Goddard of Brookline, in Norfolk county, of several years' experience, a man who is as incapable of deceiving others as he is of being deceived himself; whose sound judgment and accuracy are proverbial; and whose exact and exemplary husbandry is the index of his whole character and life.

Such is the increase of our population engaged in trade and manufactures, and the mechanic arts, and what may be called the intellectual, the talking, the teaching, and the ornamental professions, and the large class belonging to the do-nothing-but-spend-money profession, that Middlesex county being so immediately accessible to the markets which these create, I believe there is scarcely a rod of ground in the whole county, which may not be cultivated to a profit. But we must not expect impossibilities. We must not look to husbandry, which in Middlesex must be a kind of mixed and retail husbandry, for sudden or large accumulations. The gains must be small and gradual; but they are a full recompense for labor steadily exerted, frugality strictly maintained, and capital judiciously applied. We ought not to expect more; and if all our reasonable notions of gain and wealth had not been deranged and excited to a pitch of insanity by an inflated paper and bubble currency, continually exploding in a man's pocket like a bunch of friction matches or Chinese crackers, disordering men's intellects, and throwing prices and values into infinite confusion, we should see this thing in a different light; and find in a judicious agriculture all reasonable expectations answered.

I say all *reasonable* expectations; for men, in this respect are not reasonable, which I beg leave to illustrate by some examples, in which I will not expose those who have sat for the likeness, if they do not betray themselves by their own emotion.

A very industrious, sober, frugal man, who left a lucrative business in the city six years ago, to go upon a farm, told me not long since he had not found farming as profitable as he ex-

pected. He had conducted matters, for one so inexperienced, with admirable skill, and had made extraordinary improvements, having increased the actual value of his estate, according to its produce, a hundred per cent. I asked him if his crops did not much more than pay the cost;—yes, much more; if his improvements had not fully compensated the expense; yes! land which he had redeemed, which cost him only ten dollars an acre, was now worth more than a hundred. Where was the deficiency then or the disappointment? Why! he did not find so much cash in his pocket at the end of the year as in his former business, which was an extensive concern, employing a large capital. But what had he done? First, he had nearly doubled the value of his farm. Next, he had supported his large family in the abundance of all the substantial comforts which the farm could be made to yield. Next, he had not incurred a single debt. Better than all this, he had given to his children vigor of muscle and energy of resolution; and taught them the use of their own eyes and hands and feet, which many children in the city never learn, because they must use those of other people, or "spoil their servants." Now the fresh breezes of summer, wafted over the green meadows and forests, had supplied odors, and the clear winds of winter sweeping over fields glittering with frost and snow had painted his daughters' cheeks with a vermilion hue, which all the essence and perfume shops in the city could not supply; and he himself, then a poor nervous, consumptive dyspeptic, patronizing all sorts of quackery from Brandreth's pills down to the Indian Specific, and looking like a half-withered poplar tree, now wore the figure of a man, and could stand out in a storm like the gnarled oak waving its head with a triumph corresponding to the violence of the tempest. Was this no gain? When he expected more than this from a farm not one fourth so large as he could manage, his expectations were as unreasonable as for a retail dealer in tea and coffee and nutmegs and indigo, to look for the same large returns as the successful merchant who owns the whole ship and cargo, in which they came. His

farm was a small one. He expected more from it than even with the best management it could be made to yield; and I took leave to remind him of a bachelor friend in the ministry, who being asked by a kind spinster in his parish, whose heart was full of compassion for the forlorn, why he did not get married — replied with great simplicity, that "his salary would not carry double."

In another case, a farmer undertook to catechise me for other men's sins, if sins they were, and for which I was no way responsible. You, said he, make extravagant statements of farming products, which none of us realize. I find farming poor business. I have been a farmer these thirty years, and I am now deeply in debt. You induced the Trustees of the Massachusetts Agricultural Society to give such a man a premium for his improvements — (in which most certainly the Trustees judged for themselves) and what has he done — nothing but what any of us could do; drained his meadow, and put on loam and sand, and applied compost manure and sowed grass-seed. Any body could do this. I knew how this was to be done twenty years ago, and I have thirty acres of just such peat meadow, as easily drained and reclaimed as his. Well, I replied, why have you not done it? Why, said he, because I had no money to work with. But had this man reclaimed one acre a year in his leisure hours, he would long since have had ample means of reclaiming the whole. But "he could not find the means of doing it;" though he could borrow money to purchase Eastern lands and Texas scrip, which, and not the farm have laid him flat upon his back, and tied him down with bands if not as numerous, much stronger than those which fastened Gulliver down in the island of Lilliput.

Another farmer complains that farming has irrecoverably involved him in debt. But how is this? He has one of the best farms in the country. His fixtures are of the most expensive and improved character; and even the horns of his working oxen are carefully filed, and the brass-balls upon them kept bright with rotten-stone. Besides this, he has an excellent ag-

ricultural library, and he reads constantly the American Farmer and the New England Farmer and the Albany Cultivator; and lies in bed until eight o'clock, for he went into the country to enjoy himself; and cannot allow a hired man to come "between the wind and his nobility," because he smells so strong of the barn; and then he wants to enjoy his friends, and keep his carriage and give his dinner parties, and carry the city manners into the country with a little extra extravagance, that his family may convince their friends that they can entertain them as well in the country as in the town; and all this time he professes to wonder that his farm does not support him and his family and make him rich into the bargain. This disappointment is very apt to sour his otherwise amiable temper; and he goes on to curse the farm as though like a clock, if it were only wound up once a week, it would keep time of itself; and then he goes on to curse his industrious neighbors, who succeed when he cannot succeed, though he is at four times the expense which they are at; and then he curses the poor hard-working Irish, who he wishes were back into their own bogs; and then he charges the whole race of hired men as having conspired to defraud him; and in the midst of all his disappointments, his dreams of rural felicity and farming profits have vanished like the evening clouds and left him in darkness. Could he have expected it should be otherwise? Would he under similar conduct have succeeded better in any line of business whatever? Will the study of Babbage's Calculating Machine or Blaine's Cotton Manufacture or McCulloch's Commercial Dictionary, or Bowditch's Navigator, qualify a man at once to superintend a cotton mill or to embark in an extended commerce or to navigate a ship, or in any respect supply the place of practical experience and personal assiduity, inspection and vigilance? I need not answer these questions. Men cannot be successful, in the same sense of the term, farming cannot be made matter of pecuniary profit, even under the most favorable external circumstances, in truth, men cannot escape loss in its prosecution, but upon the same common-sense prin-

ciples of give and take, of labor and reward, of practice and skill, which apply to every other honest and practical business in life.

The expectations of men in this case are so unreasonable, that I hope I shall be excused if I detail here as well as I can remember it, an actual conversation which I had with a farmer not far from this very county. Some curious person may ask me, who it was — I shall only answer, it was not Charles Wellington, nor George Pierce, nor Amos Hill, nor any of that family.

This man, then, had a farm which was fully valued at four thousand dollars. The father, who had given the farm to the son, had begun life without a dollar, had run into debt for a large part of the purchase money, but had some time since, while he supported his family, earned from the proceeds of the farm, sufficient to pay for it. Without any incumbrance he had then put it into his son's possession, and now lived with him under the same roof.

Said the son, farming is a miserable business!

But why so? Let us look into this matter. What is the estimated value of your farm?

Four thousand dollars.

Is it increasing in value?

Yes; by its favorable location, and by every improvement that is made upon it.

Do you get all the produce from it which it can be made to yield?

No, not one third. It consists of one hundred and twenty acres. At least fifty acres of it are in wood, and a considerable portion in pasture. Besides that, I have several acres of peat bog, which might be redeemed and brought into English grasses.

What is the value of the wood land?

We supply our family with fuel, and besides this, the growth of the wood, and the hoop-poles which we obtain from it, pay a large interest upon the current value of the land, so that we consider this as one of the most profitable parts of the farm.

Have you done anything to improve your pasture lands?

No; I suppose I ought to. I tried one hundred weight of plaster spread upon a part of it, and the effects were visible as far as the land could be seen; but then after that, plaster rose *half a dollar* on a ton, and I thought I would not get any more. Then the huckleberry bushes and the sweet fern, and the brakes and alders have come in so, that I cannot keep as much stock as I could formerly.

Have you attempted any improvement upon your bog meadows?

No; sometimes I have thought I would. My neighbor J. B. has redeemed eight or ten acres, and now gets two tons and a half of hay to the acre, herds-grass and clover and red-top of the best quality, where formerly he got scarcely any thing; but then it cost him at least twenty or twenty-five dollars an acre to drain and manure it; and he will have to top-dress it at least once in five years or it will never hold out. Then, too, he has put on at least half a bushel or more of grass-seed to the acre; and grass-seed which I used to buy for twelve cents a pound, or two dollars and a half per bushel, is now twenty cents a pound, and herds-grass three dollars per bushel. Then, too, labor is so high, I cannot afford to hire.

Have you plenty of manure?

No; that is a great want. I have a bog-hole where I suppose I could get two hundred loads a year, but then I should have to go more than a mile for it, and it is wet work. I have not any of the advantages which the farmers have who live within six or seven miles of Boston, and can go in and buy a load of good dung whenever they want.

Do you know what these farmers have to pay for manure in Boston?

Why, yes! I have been told they have to give sometimes three to five dollars a cord at the stables. Sometimes our tavern-keeper sells a few loads, but he asks five dollars a cord.

Have you a barn cellar?

No; I have often thought it would be a very good thing,

and my barn is well situated for one; but then it would cost, besides what work I should do with my own team, full fifty dollars to make one.

Do you keep cows?

Yes; I keep some just to eat up our coarse fodder; but our women-folks do not like dairy work, so we buy our butter and sell some milk to the milk man for eleven cents a gallon.

Do you keep swine?

Only one or two for our own pork. We do not have any skim-milk or butter-milk for them. Besides there is no great profit in fatting hogs. They will not much more than pay for what feed they will eat. I know they will make a large quantity of manure, but then you must cart in a great deal of stuff into their pens, or else they can't make any. But come! I must show you a sow I have got; she is only fifteen months old, and I sold her pigs for more than forty dollars. I suppose I shall make her weigh four hundred in the fall.

Do you raise your own grain and potatoes?

Not all. I raise about three acres of corn and about as much rye, and about six hundred bushels of potatoes. We sell hay and buy Genesee flour. We have tried wheat, but sometimes it is blasted; and it don't make white flour; and our women-folks say they cannot make handsome pie-crust or white bread with it.

How many have you in your family?

I have a wife and eight children, and my father lives with me.

Have you any trade?

No; I have nothing but my farm.

Does your farm support your family and pay your labor?

Why, yes! I have nothing else, excepting a little interest that comes from some money which I received for the sale of wood from the farm, some time ago, which came to about five hundred dollars, and which I put out at interest. We sell enough produce from the farm to pay our hired labor, which costs about a hundred dollars per year, and our store bills and taxes.

Here is a husbandman on a farm valued at four thousand dollars, not producing more than one third of what it might be made to produce, yet supporting a family of eleven persons and paying all expenses, excepting the labor and superintendence of one man, and the farm gradually increasing in value by every expenditure, however small, for its improvement; this man, too, not working half the time, and he and his family living in the enjoyment of all the luxuries, if they choose to have them, which they can reasonably ask. Let such a man if he will, take his two hundred and forty dollars income and labor no more hours than he does in the country, and go into Boston and try to support his family there. The end of the year would show him a result which would make him ashamed to complain of his present condition.

XXII. Agricultural Education.—Middlesex county is the seat of Harvard University; the earliest public literary institution founded on this continent. It has been the long-cherished object of private and public munificence. This subject may by some be deemed inappropriate to an agricultural report; yet is no class in the community more deeply interested than the agricultural, in the subject of education.

It has always been my earnest desire to see the agricultual profession exalted, and rendered attractive to the young. How shall this be done? The highest distinctions in human character, the brightest ornaments which can be worn in life, those which "sparkle with an inherent lustre all their own," and differ from the mere artificial trappings of society, as the diamond differs from the paste, are moral integrity and religious principle. I shall not farther speak of these in this case. But the distinction which, separate from these, gives elevation to the character is the improvement of the mind. This confers a rank, which wealth cannot purchase. This commands a respect, which the proudest aristocracy may envy.

In order to render the agricultural profession more attractive and respectable, we must seek its intellectual elevation. In

general intelligence and practical wisdom, the farmers of New England as a body are not wanting. Much more than this is desirable. There is no class in our community who have more favorable opportunities for the improvement of their minds than our farmers, if they would, and knew how, to use them. Our long winters, which bring so protracted a respite from labor, furnish quiet evenings for reading and study. Many intelligent men among us, some of whom have been the boast of science and the ornaments of literature, have made themselves what they were in the devotion of the hours of leisure, which their long voyages or intervals of business afforded, to the improvement of their minds, the cultivation of taste, and the acquisition of knowledge. Our farmers have equal, in some respects more favorable opportunities. The improvement of our common schools, therefore, and the elevation and extension of the course of instruction pursued in them, particularly concerns the agricultural interest. It is not enough to meet the present condition of society that our boys and girls are able to read and spell, to write and cypher, and to have some knowledge of geography. The highest branches of natural science, the principles of moral and intellectual philosophy and of political economy, should be at least so far taught in them, which is at present perhaps all we have a right to expect, that a taste for their continued pursuit might be formed, inquiry awakened, and the track marked out by which they might unassisted advance at their own pleasure to high attainments. The establishment of social libraries and lyceums in every village and town; and associations bringing both sexes together for mutual intellectual improvement, should have every encouragement, and would be followed with the best results. Such cultivation of the mind need not interfere with the necessary and useful labors of the farm; but would render these labors, otherwise, in some cases, discouraging and severe, light and cheerful. Education is a good, measurable by no pecuniary standard. As the cultivation of the highest attributes of our nature; as furnishing resources of pleasure and gratification in the solitary and the cloudy hours

of life ; as fitting us to be more useful and to do more good to our fellow-beings than by any other means we can adopt ; as enabling us to use to the best advantage the power which God has furnished of providing for ourselves and those dependent on us ; as increasing our self-respect, and saving men from low pleasures and pursuits ; and as securing a position of respectability and influence in society,—education, in the best and most enlarged sense of the term, cannot be too much regarded by the rural and laboring classes. There is indeed no reason and no hindrance in the way, why our farmers and their children should not be among the best-informed persons in the community.

But knowledge has a specific value to farmers in respect to the improvement of their art.

It is too late in the day to decry the value of science in agriculture. Who can name an art, or trade, or business, in which knowledge is a disadvantage or a prejudice to success ; or in which indeed it is not a substantial help ? Who are the men, who best succeed in life ; the ignoramuses, the blockheads, the dunces, or the intelligent, the inquisitive, the observing, the experienced ? Why should agriculture, combining as it does so many occasions and opportunities for the application of skill and knowledge, be an exception to every other art and business ? But it is said that agriculture is altogether matter of experiment ! Who then are so well qualified to make, to observe, and to report these experiments, as men of disciplined and enlightened minds ?

All the great improvements which have been made in agriculture here or abroad have been made by men of intelligence, inquiry, education and science. The present improved structure of the plough, the great instrument of the farmer, so infinitely superior to the implement of former times, and by which the power of draft required in its operation is reduced in many cases more than fifty per cent from what was formerly demanded, is the result of of a profound application of mechanical science to the construction of the mould-board and the general manufac-

ture and make of this important implement. All that has been effected among us in the production and improvement of fine fruits, in the increase of crops, in the cultivation of crops, in the construction of farm implements generally, in the multiplication of articles of culture, in the redemption of waste lands, doomed otherwise to perpetual unproductiveness, has been first made by men of active and enlightened minds, whose attention has been absorbed by these matters; who experiment in various processes, carefully noting the results; and who are not infrequently stigmatized by the sneering application of book-farmers.

How much have we yet to learn of soils, of manures, of the particular improvements which particular soils require, of the proper application of manures, of their mode of operation, of the structure and habits of plants, of their best modes of culture, of the part which the soil performs in vegetation, of the uses of manures which have been little known among us, of the improvements which have been made and are still making in foreign countries; and how is all this or any of it to be known but by inquiry, scientific inquiry and examination? Who will pretend to set any limits to improvements which may be made; or say to what great results inquiry may still lead?

Fifty years ago, by the example and influence of some of the most enlightened men in the kingdom, the turnip husbandry was introduced into Great Britain. It has added uncounted millions to their wealth. Fifty years ago the cultivation of cotton was among the smallest of our agricultural products. Now the value of this great staple approaches one hundred millions of dollars a year. Thirty years ago it was scarcely known that sugar could be obtained from the beet root. Now the product in France alone is annually 120,000,000 of lbs. What has contributed more largely to the prosperity of the culture of cotton than any thing else? The scientific labors of Whitney in the invention of the cotton gin. Who discovered the existence of sugar in beets, and who has perfected the art of manufacturing it? The most eminent chemists in Germany and France.

The most common farmer observes a difference in soils; and his familiar observation enables him to choose with advantage for his different crops. The most common farmer is aware of the importance of manure. Practice soon teaches a man the times of sowing and reaping and the common modes of saving and using his crops. But why should we be satisfied with this; and why should we think that this is all?

The soil may be suited to some crops better than to those which we now cultivate upon it. It may be deficient in some elements; it may superabound in others. Both of these circumstances may have a material bearing upon its culture and productiveness. It may have intermixtures, which are poisonous to some products, but which art would enable us to correct, or modify. How shall we come at these secrets but by scientific and laborious chemical analysis? The subject of manures is matter of vast importance to the agricultural interest. As yet we are comparatively in the infancy of knowledge in respect to them. The power of some substances to affect the crop, when applied to the soil, are among the profound wonders of nature. Who, before experience had taught us what it has, would not have ridiculed the idea that half a bushel of ground plaster of Paris strewed over an acre of ground, would cause land otherwise unproductive, to become covered with a most luxuriant vegetation and to yield tons of hay to the cultivator? Yet who will pretend that this is any thing more than the first step in the profound science of manures and their influence upon vegetation.

Various mineral manures of extraordinary efficacy are now coming into use in Great Britain and in this country, as for example, saltpetre and the nitrate of soda? What is to solve the secrets of their operation, and consequently determine the best modes and times of applying them, but the science of chemistry, aided by practical observation?

"The fit period," says Daubeny, "for collecting the fruits of the soil, depends upon the physiological fact, that the farinaceous matter which constitutes the nutritive portion of those tubers

that serve for food to man, being designed for the nourishment of the bud, begins to be consumed as soon as the latter starts into existence."

Here now is a most important fact, which science alone could have discovered, and which has at once various practical bearings in the gathering and uses of these productions.

How far the productiveness of plants is affected by the nature and condition of the soil, how manures operate to produce their effects, what relation the fertility of a soil bears to its mineral constituents, the dependance of vegetable life upon air and water, and heat and light, are all questions, which with many others must materially affect our cultivation. These are points, which science, properly so called, alone can solve.

When many minds are concentrating their rays upon the same point, why should it not be rendered luminous? It is to the glory of Massachusetts that she has taken the lead among these States in forwarding the plans of scientific improvement; and by her geological, botanical and zoological surveys she has already contributed to practical science in the most essential manner. These contributions are not to be estimated by a pecuniary value; and the cost, compared with the good accomplished and ultimately to result from them, deserves not a second's consideration with an intelligent and patriotic mind.

It is only for these sentiments, which are founded on the highest truth, to become more deeply impressed on the minds of the agricultural community, for them to take a just interest in the great subject of practical education; and to see that, where their patronage is in any form bestowed, it should be applied with an impartial hand to the advancement of their interests in a just proportion to those of other departments and classes in the community. It is my honest opinion, which I should be most happy to correct upon farther light, that this is not done in any of our colleges or universities to the extent which is desired. The course of education in general pursued in these places, is adapted almost exclusively to the training young men for the learned professions; and very little for the more practical and productive pursuits of life.

Education may be considered as having three prominent objects; first, as a mere exercise of the intellectual powers, the strengthening and disciplining of the mind for action; and in this respect it matters little what the particular study is, provided it is of a nature to call out the faculties, to form a habit of attention and concentration, and to bring the powers of the mind entirely under the command of the will. The second is as matter of ornament and luxury and personal gratification. Education tends to give refinement and elegance to the manners and character, and puts within reach of its possessor innumerable means and sources of pleasure; yet though it is called liberal with a large portion of those who enjoy its advantages, it seems to serve only as an instrument of personal ambition and vanity, or of selfish indulgence or gratification. But the third and highest object of education, is that of forming the mind and character to every thing that is manly and useful, developing the physical powers in their highest perfection and seeking a correspondent development of the intellectual and moral man; preparing men for the practical business of practical life; to provide for their own subsistence and welfare, and the subsistence and welfare of others; to advance civilization; to increase the wealth of the community; to adorn and embellish society by all the arts which ingenuity can invent, and to contribute to the general comfort; to multiply and extend the means of enjoyment and improvement, and further the progress of mankind in all that is useful and good.

For these objects, which are the best objects of human aim, education cannot be made too practical. To these objects the great pursuits of agriculture, manufactures and commerce, when under an enlightened direction and raised to the dignity of liberal professions, must essentially contribute; I will not say, more than all the learned professions, because I wish to institute no offensive comparison; but I may say without these, the learned professions could do nothing; and as far as experience goes, the intellectual and moral progress of society corresponds to the advanced condition of these great interests.

In every institution therefore for liberal and general education, these objects should be prominent. They are at least entitled to their place in the system. In every university there should be for example a professor of commerce and trade, embracing in his instructions all the subjects of trade, all the customs and laws of trade throughout the world, the subjects of currency, banking, and exchange and the arts of ship-building, equipment, and navigation. There should be likewise a professor of manufactures, who should give instruction in the mechanic arts and inventions, in the various machinery employed in these arts, and in the history of their condition and progress. There should be likewise a professor of agriculture, whose department should embrace every department of this great art, with the kindred sciences of botany, zoology and chemistry, as far as they bear upon it. The university could not establish more useful courses of instruction. In regard to this latter subject many of our young men, who are graduated with a fair classical reputation, seem hardly to have discovered that the bread which feeds them does not come as the manna did to the ancient Israelites.

Count Rumford, in 1815, left a considerable property to Harvard University, for an institution which should teach "by regular courses of academical and public lectures, accompanied with proper experiments, the utility of the physical and mathematical sciences for the improvement of the useful arts and for the extension of the industry, prosperity, happiness, and well-being of society." Two competent professors have in succession filled the chair of this department; and I can only express my wish that the course of instruction under it were more widely extended and its advantages more diffused.

An agricultural department is still wanting. In the university of Edinburgh, such a department has been filled by an accomplished professor, who has given to the agricultural community one of the best books on practical agriculture extant;*

* Low's Practical Agriculture.

and is now publishing a full account of live stock, with embellishments of extraordinary richness. In the university of Oxford, they have a chair of Rural Economy, filled by a practical man, full of enthusiasm for the art, who has presented some valuable publications to the world, and who is now prosecuting in the botanical garden of the university, a series of most important experiments in vegetation and manures.

In Harvard University, the learned professor of chemistry has recently given to the public a valuable English work upon Agricultural Chemistry,* with highly instructive notes; but this is all to be considered as extra duty, as his instructions in chemistry are understood to be mainly limited to the connection of the science with medicine. There is wanted, therefore, a distinct department for this great object.

In 1805, a number of public-spirited individuals presented to the university a fund of more than $31,000, for the establishment of a botanical garden with a view to horticultural and agricultural improvement. It is greatly to be regretted that the patriotic views of these donors should in any respect have failed of accomplishment, as we learn from the elaborate and elegant history of the university by President Quincy, that the funds were some time since inadequate to the support of a professor, and the trustees of the Massachusetts Agricultural Society, who were the proper guardians of this important trust, deemed it expedient to resign all charge of it to the corporation. Some persons had hoped that when the present distinguished incumbent, who was one of the most accomplished, enthusiastic and best practical farmers in the State, was advanced to this high post of public service, he would have carried with him a strong feeling of the importance of this great branch of public education, and have made it a particular object of interest; but eminent as have been his merits in all other departments of official duty, he seems in this case only to have added another example to that of the Chief Butler, when advanced in the palace of the Pharaohs, "who did not

* Liebig's Organic Chemistry.

remember Joseph but forgat him." I can but express my strong wish that some of our rich men, upon whom Heaven with ample means may in its kindness have conferred the far better gift, a disposition to use them for the general welfare, will presently provide effectually for this great object of public utility.

XXIII. Mount Auburn. I cannot quit the privileged and improved county of Middlesex, without adverting to this beautiful retreat, which owes all its natural and local attractions to its rural embellishments. I confess I am drawn to it by still stronger ties, for there sleep under its green banks and its waving boughs, those who were as dear to me as any thing this side Heaven; and there, too, side by side with them, it is my consolation to think, I shall, myself, repose, when my days' humble work is done, and I fall like the leaf by the autumnal blast.

This cemetery, embracing now more than a hundred acres of land, of most varied surface and aspect, was originally intended, under the auspices of the Massachusetts Horticultural Society, for an experimental garden as well as burying place; but it is now exclusively devoted to the last object. It abounds with elegant monuments of taste and touching testimonials of affection; and with singular beauty intermingles the charms of floral culture with the untrained wildness of nature. Its silent walks, its shaded retreats, its calm waters are all sacred to tender and reverential sentiments; its monuments, from the simple rough stone to the marble, chiseled by the touches of exquisite art, are all eloquent; and it exhibits every where the affectionate offerings of the heart to that idol, which Heaven, in its mercy to our weakness, permits us to adore, the precious memory of the beloved and revered dead.

It shows, too, most emphatically, that strong passion for rural beauty which the Creator seems to have made instinctive in the heart; and that spontaneous acknowledgment of the charms of the country, which the deep absorption of business or the dissipations of city life cannot extinguish, nor even so far abate, but that the mind reverts to them as the most favored elements

in man's earthly condition, and vainly thinks that after the turmoil of life is over, the sleep of death will be more peaceful in the midst of them. They love to see the sweetest flowers blooming upon the graves of those fairer flowers, which perished without maturing their fruit; or shedding their fragrance over those whose virtues still breathe a divine perfume to the heart. They love that the birds should salute the humble sleepers here with their thrilling morning hymn; that the gentle breezes of a summer's evening as they whistle through the trees, should sing the requiem of the departed in Æolian strains; and that the unsullied snow should spread its mantle over virtues as unsullied. They combine all the beautiful embellishments of the country, as though out of nature's own unrivalled materials they would build the palaces of the dead.

What an eloquent tribute is this to the strong attractions and the matchless glories of rural scenery and life! How happy would it be for thousands in our cities if they would yield earlier to these impulses, and seek the country early for the living as they now seek it late for the dead. How happy would it be for thousands, whom success has blessed with the means, if after acquiring more than enough, they would quit the slavery and drudgery of business, so often debasing to the mind and sometimes almost the extinction of the man, and find a rich enjoyment in the embellishment of the country for the common and grateful delight of all who see it; and in improving the culture of the earth, for the sustenance and comfort of some portion of the vast multitude, who are fed at this common table.

APPENDIX.

A.—(p. 120.)

SHEEP AND WOOL.

I subjoin a communication from William Jarvis, American Consul at Lisbon, in 1809—10, and then a large purchaser of Merino Sheep to be sent to this country. He is now an extensive farmer in Wethersfield, Vermont; and has as good sheep as are to be found. I have never seen sheep in better condition. Two other communications follow from Henry D. Grove, a native of Germany, bred a farmer and a shepherd, and at one time President of the New York Agricultural Society. Such men are a great aequisition to the country and do much for our agricultural interests. No man is more competent to speak with authority in these matters; for no man's flocks are better managed or make better returns. I have had repeatedly the pleasure of visiting his premises, and of being instructed by their excellent condition.

Two of these communications were addressed to Benton & Barry, who published Statistical Accounts of the Sheep and Woolen Manufacturing Establishments in the country, in 1816; a work of great labor and value, showing in a striking manner the great importance of this interest.

I.—Extracts from a Letter of William Jarvis to Benton and Barry.

"Out of a hundred Spanish Merinos five may be selected that are a shade better than the rest, and five that are somewhat inferior; the other ninety will be so nearly alike as to the quality of the wool, as to leave but little other choice than what arises from shape and size. A question will very naturally arise here, how it happens that the Spanish Merinos should be so much better built and stronger, and yield a fleece one third heavier than does the Saxony, when the latter is derived from the same stock. This is a question of difficult solution. The best reasons that I can assign for it are, that all the feebler sheep in Spain

sink under the fatigue of travelling from the winter to the summer pastures, and *vice versâ;* that owing to this mode of management, the shepherds of Spain feel the particular necessity of paying attention to the strength of the male as well as the fineness of his wool; and as every attentive breeder must have observed that the most healthy and vigorous sheep carry the heaviest fleeces, the Spaniard in selecting for strength has also secured heavier fleeces. From the mildness of the climate of Spain, too, the Spaniard is enabled to keep his sheep in the open air the year round, which may also have contributed to give them a better constitution.

The climate of Saxony and the neighboring states of Germany where those sheep are bred, is not dissimilar to the northerly part of the State of New York, and the southerly part of New England, in which shelter is necessary to defend sheep against the pelting storms in winter. The Saxons, too, carry this system of housing far beyond us; they are not only very careful to have warm shelters in the winter, but most of their breeders build sheds in their pastures, into which their sheep are driven during the stormy weather of spring, summer, and autumn, being only let out a short time to feed in the fore and afternoon while the storm lasts. This treatment alone would enfeeble the constitution of those animals. Owing to the very low price of labor in Germany too, their flocks are constantly attended by shepherds, whose watchful care makes it of less consequence to have vigorous lambs and healthy offspring, than it is in Spain, particularly as in Saxony the sheep are not pastured at a great distance from the winter establishments. For these reasons the Saxon breeders have not found it so necessary to pay as much attention to the strength of the sheep as in Spain, and it is probable, therefore, that the principal object with them in the selection of both the male and female, has been the fineness of the fleece without any great regard to the animal's constitution. But whatever may be the cause, it is certain that the Saxony wool is somewhat finer than the Spanish. This fact partly answers your question, whether the wool of the imported sheep has deteriorated in this country. Twenty-five years' experience satisfies me that the wool of the Spanish Merino has rather improved. About six years ago, I compared my Merino wool with fifteen or twenty samples of the Paular flock that had been sent me from Spain, where I purchased; and eight or ten judges who examined the two, gave a decided preference to that taken from the backs of my sheep. Mr. James Shepard, when he carried on the factory at North-

ampton, and who purchased my Merino wool for several years, told me that the superfine broadcloths made from my wool, handled softer than did those from the best imported Spanish wool he could purchase. Where the Merino has been bred with attention and care, the wool has not deteriorated in any other country beside England, and the deterioration there has unquestionably been owing to the uncommon humidity of that climate.

You next inquire, what is my particular mode of management. I at an early day became satisfied, that if the Merino could not thrive under a similar management to that which our good farmers afforded to the native breeds, they would never become popular in this country. I therefore adopted a management similar to theirs, and happily found that they throve under it beyond my most sanguine expectations. Attached to my barns I have sheds connected with large yards; in those yards I place my racks, and carry out the hay and put into them morning and evening for their food; at noon I give them a gill or a half pint of oats a head in troughs; if a half pint of oats is given a little less hay is fed out, if a gill a little more; about two pounds of good hay with a half pint of oats per head per diem, will keep them in good case, or about two pounds and a half of hay with a gill of oats. When I have an abundance of hay, I give no oats, but feed out about three pounds of hay per day, at three times, morning, noon, and night, although I think it makes but little difference whether this quantity is fed out three times a day or twice, for it must be remarked, that when sheep are in pasture they rarely feed from ten till three or four o'clock in the afternoon. I leave the doors of my sheds open, and let the sheep go in and out when they please. My sheds are occasionally strawed to prevent their becoming very filthy, and there is no waste in so doing, as all the best of the straw the sheep will eat before laying upon it.

I am careful to have water both in my yards and pastures, as I think water essential to their health as well as thrift. If the hay was well salted when put into the mow, no salt will be necessary; if not, they will require salting weekly. My rule is, to take them up in the fall when the grass ceases to be nutritious, owing to severe frosts, which is ordinarily about the 25th of November, and never let them go out of their yards until I turn them to pasture in the spring, which is commonly about the 25th April to the 5th of May, according as the grass is more or less advanced. Some attention ought to be paid to the ewes in the lambing season, and in cold easterly storms, or in heavy rains they

ought to be housed at night, when the lambs are young. During the rest of the season no attention is given to them except what is necessary in shearing, and to salt them once a week and see that the fences are up. It is better to salt them in long narrow troughs than on the ground, as they waste less, and all get an equal share. Six by six slit work, dug out triangularly with an adze, makes the best troughs for salting. I ought to have mentioned above, that if corn is given, only half the quantity is required that it does of oats, but I think oats are better for sheep. Between the 1st and 10th of May I think the best season for lambing.

My remedy for foot-rot is, three parts of blue vitriol, and one part verdigris, pulverized as fine as Indian meal, then pour in sharp vinegar made as hot as water with which we commonly scald hogs, not boiling, and pour in as much vinegar as will make it of the consistence of thick milk, stirring it briskly all the while; clean the hoof with a knife, and put on the mixture with a small paint brush, taking care that it comes in contact with the inflamed part; it is also better to put it on the sound hoofs of the affected sheep as a preventive. Strong tobacco liquor is the best cure for the scab, immersing the sheep all over except the head, and scrubbing the part well that is affected. This remedy does best directly after shearing, but will answer any time during the summer or fall months; for lambs, the liquor must be much weaker. For bloating, the best remedy is a great spoonful of castor oil, mixed with a teaspoonful of pulverized rhubarb, and about a gill of hot water, which may be put down the sheep's throat with a great spoon."

II.—Letter from H. D. Grove to Benton and Barry.

Gentlemen,—I will endeavor to give you an outline of the history of the Saxon Merinos, their introduction from Spain into Saxony, and subsequently into the United States, with a few remarks on sheep husbandry.

In the year 1764, the Elector of Saxony obtained, by special negotiation through his ambassador, a grant from the king of Spain, for the purchase of one hundred ewes and one hundred rams, and a few surplus ones to keep that number good in case any should die during the passage. Accordingly one hundred and nineteen ewes and one hundred and ten rams were selected, principally from the Escurial

flocks, the king's private property, under the care and management of the monks belonging to the monastery of that name, and which were considered the finest sheep in the kingdom. They were shipped at Cadiz, in the month of May, 1765, accompanied by two Spaniards to take care of them. Five rams and three ewes died on the passage, the remainder arrived safely at the Elector's private domain at Stolpen. The Spanish shepherds remained with, and took care of the flock till the middle of the following year, when they took their departure for Spain. During the time however, they remained in Saxony, they instructed Saxon shepherds in the care and management of sheep.

In order the better to make this valuable acquisition benefit the country as much as possible, the Elector appointed a commission, to superintend and direct the general concerns of the sheep establishment, whose particular duty it was made, to spread all the information they could obtain on the care and management of sheep before the public, and who were especially instructed to dispose of the young rams at low prices, in order to induce the sheep owners to improve their flocks. The tenants of the government domains were particularly favored, by giving them the preference in the purchase (which is kept up till this day), while every possible care was taken to induce farmers generally to improve their breed of sheep throughout the Electorate. It was further required of the said commission to make a detailed report to the government, annually, on the condition of the sheep establishment, and at the same time to submit a list of the persons who had received sheep from the national flock.

During the first years these valuable animals found many opponents, and the improvement of the Spanish flock was very slow, mainly on account of the common prejudice of the farmers, which was heightened when the scab broke out among them, but afterwards they became convinced of their value, and the improvement was more rapid. But as most of the flocks in Spain are more or less affected by the scab, those transported to Saxony had to undergo the same ordeal. This of course heightened the prejudices of many against them, who pronounced them as entirely unfit for the country, their meat not eatable, or at best, of a miserable description; a notion, however, which soon exploded. The scab, however, caused great ravages among them before they were entirely cured of this disease.

When the commissioners had exercised their functions ten years, the call for young rams was so great,—and in order the more rapidly to

improve the breed of the country,—that they resolved to petition the government to make another importation of ewes and rams from Spain, for which purpose the Elector obtained another grant from the King of Spain for three hundred rams and ewes. At the end of the year 1777, a gentleman by the name of Vaigt, manager of Count Eiorsidel's farms, who was considered one of the best judges of sheep at that day in Saxony, was provided with the necessary credentials and sent on that mission. But, for some cause unknown, he selected only one hundred and ten two-year old rams and ewes, and returned home with them. These were, however, of a very superior quality, selected from the best flocks of Leon, Escurial, Cavagnon, Negretti, Montarco and Sorian, and exceeded greatly in beauty of form and quality of wool, the first importation. The cost of them was about forty rix dollars per head.

With this acquisition, the commissioners then planted the Merino Tree on the fruitful soil of Lohmen and Rennersdorf, from whence, in conjunction with Stolpen, many pure-blood flocks derive their origin. And I owe it to truth to remark, that I have examined private flocks equal, if not superior, to the national flocks.

It would lead me too far here, to detail the introduction of the Spanish and Saxony Merino, into other parts of Germany, Prussia, Austria, &c. Suffice it to say, that many districts rival Saxony; Prussia, especially, fosters her flocks, not only by premiums bestowed through her agricultural societies, but by that enlightened protection to domestic industry, which so truly characterizes that government.

It may perhaps be supposed, that as these kinds of sheep are greatly increasing in number, they would depreciate in value. This however is not the case; for the prices at which they have been selling for the last twenty years, far exceed those of any period previous. So highly are they esteemed in Europe, that they have been transported to almost every corner where sheep can be raised to advantage; —they have been transported to Russia, and some of her possessions in Asia, to New South Wales, and my Leipsic correspondent informs me, that in October and November last (1836), six hundred rams and ewes were exported to Buenos Ayres; and but a few years since, old Spain, the mother country, from whence the fine sheep in Germany date their origin, has imported bucks from Saxony for the improvement of her flocks. The exportation of wool is very great, the amount in 1835 to Great Britain alone, was 24,000,000 pounds, and considerable

quantities are exported to the Netherlands, France, and America, supplying at the same time her own factories, which are not inconsiderable, and which turn out a fabric that exceeds, for durability, that of England or any other country. It will be readily admitted that these sheep are a great source of wealth to Germany, and especially in those districts ,where they are raised to the greatest perfection and purity ; and probably will continue to be so, for a great many years to come. The demand for the pure race is great and constantly increasing ; and I have been informed by my friends in that country, that the supply has not been equal to the demand for the last three years.

A person not acquainted with the system of breeding sheep in Germany, may perhaps be led to doubt the vast difference that is made there in the price, between the pure race and those of the mixed, or cross-bred sheep, though possessing many excellences. Yet such is the case. My friends in Saxony write me, that two hundred and fifty rix dollars have been paid for individual rams within the last year, and I have known of much higher prices having been paid. Those of the mixed, or cross-bred race, are comparatively low, and can be obtained at from three to fifteen rix dollars (the maximum price) per head, according to quality and goodness, and among these are very often individuals possessing all the characteristic excellences of the pure race. Yet they are not so valuable for breeding. Here arises a question, why the fine sheep are so much higher in Germany, than in this country ? the answer is, that capital is so abundant and the rate of interest in that country so low, that it is more profitable for agriculturists to invest part of their surplus capital in fine sheep than to let it out at simple interest.

I have been thus particular in giving you an outline of the introduction of the Escurial Merino sheep into Germany, and the high estimation in which the now called *Escurial Saxony* sheep are held in that and other countries, as many of our farmers have not a correct idea of the origin of the Saxony Merinos ; and as a fear has often been expressed, that the growing of wool will soon be overdone and not be worthy the attention of farmers. To those, let me answer, that fifty years ago similar fears were entertained in Germany, but that experience has proved them groundless ; and that, whenever that time arrives, it may fairly be presumed, that all other agricultural pursuits will be in a similar condition.

I will now briefly notice the introduction of the Saxony Merino sheep

into this country. The first importation of which I have any positive knowledge was made in 1824,* by Messrs. George and Thomas Searle, merchants of Boston, of which I had the care and management. They stood the fatigue of the voyage remarkably well; there were only seventy-five ewes and rams, of which I owned a few myself. The whole cargo was sold by public auction in Brighton near Boston, and were scattered in various parts of the country, but mostly in the New England States and the State of New York. The following year (1825) another importation of one hundred and eighty rams and ewes, and a few lambs, was made by the same gentlemen, in which I was concerned, and came out also under my care and management, and were likewise sold by public auction, in Brighton, near Boston. They sold however much higher than the first importation; several rams brought as high as four hundred dollars a head, and one sold at four hundred and fifty dollars.

These prices were sufficient to excite the spirit of speculation, and consequently the year of 1826 witnessed the arrival of Saxony sheep, in Boston and N. York, and other ports, to the number of two thousand five hundred ewes, rams and lambs. Many of these sheep were well descended and of pure race, but a great share, I am sorry to say, *were not so.* It is certain that many,—I might say some entire cargoes,—were imported and sold for the "*pure Electoral Saxon sheep*," that were only of cross breed, and some of them as low as three quarter blood, or as a German shepherd would say, "*of the second generation.*" It is to be regretted, that the importation of the Saxony sheep became a speculation, for it not only retarded the improvement of sheep in this country, but it is a positive injury to those who may possess the pure race. The importations being large, prices declined greatly, and many importers suffered great losses. There were several cargoes which sold for about fifteen dollars per head, which was insufficient to cover the expense of transportation.

The different voyages to this country, and travelling in the interior, satisfied me, that the Northern and Middle States, as far as I examined the soil and climate, were exceedingly well calculated for the production of fine wool, and would, in time, become decidedly wool-growing States. Upon which I made up my mind to settle in this country, and being fully satisfied that the raising of fine wool would be a profitable

* I have been informed, that at the instance of Col. James Shepard of Northampton, a few were imported in 1823, as an experiment.

business for farmers to pursue, I determined to make an importation for the purpose of breeding from them, and establish myself as a wool-grower. For this purpose, I embarked at New York in the fall of 1826 for my native country, and spent the winter following to select my flock. I landed with them in New York in the month of June, 1827. It consisted of sixty yearling ewes, twenty-five rams and twenty lambs, and I drove them into the section of country where I now reside. In 1828, I imported an addition of forty yearling ewes, twenty rams, and ten lambs, to my flock, which, added to the importation of 1827, made one hundred ewes, forty-five rams, and thirty lambs.

With this number I laid the foundation of my Electoral Saxon flock, which I have maintained in all their purity, and visibly improved them. Their descendants not only are as fine as the original stock, but they yield more wool, and are larger and better-shaped sheep. The whole number of Saxony sheep imported amount to about three thousand.

It has frequently been asked, "Whether as fine wool can be grown in this country as in Saxony?" Of this I do not entertain a doubt. Ten years' experience has fully satisfied me on this point. In some respects this country possesses natural advantages over Germany, and with the same care and management, we can grow as fine wool here as there. There, pasture lands in many sections are superior. Maine, New Hampshire, Massachusetts, Connecticut, New York, Pennsylvania, &c., afford, by nature, a healthier herbage, though not so much, as the best sheep districts in Germany; for instance, Saxony. There, in wet seasons, many flocks are subject to the *rot*, a calamity which is almost a stranger to our flocks, and need never occur if proper precaution is taken. This is an important consideration in our sheep husbandry, and after there shall have been generally introduced the German mode of sheep husbandry, as far as applicable to the condition and situation of our country, we shall be able fully to compete with them.

It is an important consideration to keep sheep in a thriving condition the whole year round. First, it improves the quality of the wool; secondly, it increases the quantity; thirdly, less sheep are liable to die; fourthly, the increase of lambs will be greater. Wool from sheep thus kept, possesses more elasticity, strength, and better felting properties, than if kept poor, and consequently makes a stronger and more durable cloth. To keep sheep too fat depreciates the quality though it increases the quantity; but to keep sheep too poor injures the quality and diminishes the quantity; besides which, it is injurious to the consti-

tution, and if kept so for a number of years in succession, will run them down into a diminutive little animal. Extremes should be avoided. Many of our wool-growers keep their sheep part of the year in a fleshy condition, which generally is in summer, and during the other part let them grow poor. This course of treatment is very injurious to both animals and wool. When shorn, such wool appears of a better quality than it actually is, and deceives those who are not judges of the article. There are, in fact, two different qualities in the same staple (in the length of it); the growth during the first part is coarser than during the latter, and though it appears finer, yet it is not so strong, but is feeble and makes an uneven fabric. If sheep are kept too poor they produce a wool, poverty-stricken, and though it appears very fine and of superior quality, yet it is deceptive, and the quality is not so good as if the same sheep had been kept in good and thriving condition; it is deficient in elasticity, strength, and the felting properties, and is feeble; the cloth itself made from such wool, is feeble, and frequently tears before it is finished.

Wool from diseased sheep is poorer still: the quality is greatly injured, is subject to waste in the process of manufacturing, and never makes a perfect fabric, but makes a feeble cloth, which easily tears. Wool from sheep that have died is likewise injured, for it seems to become in a measure lifeless. Cloth made from such wool is said to be much more subject to the depredations of the moth, than cloth made from live wool, shorn from healthy sheep. This article is well understood in Germany; the manufacturers pay but two-third prices for such wool. The discrimination in the selection of their wool is, probably, the reason why the German cloths are so much stronger and more durable than the English or American cloths.

I repeat, therefore, that it is very important to keep sheep in good and thriving condition the whole year round. And in order to do this, they should have sufficient food to fill themselves twice a day. In this country this is done on pasture and hay. In Germany the keeping of sheep is based upon the same grounds, but it varies in many respects. I will mention a few of the leading features.

The Germans keep their sheep under comfortable shelter during the winter. By this means they do not require, in the first place, so much provender; secondly, the tip ends of the wool do not get weather-beaten, which is an injury; thirdly, a great quantity of manure is saved. They hurdle their sheep during summer for the purpose of manuring the

land, which makes it more productive. They raise large quantities of roots, such as ruta-baga, potatoes, mangel-wurtzel, carrots, round turnips, &c., to feed out during the winter. Combined with straw, it is considered an economical mode of wintering sheep. They enrich their land, moreover, by this course of management, which enables them to keep still more sheep and cattle, and raise more grain. Many farmers in that country keep their sheep from nine to ten months of the year in the yard; some only part of their flock, and others their whole flock. For this purpose, they sow red and white clover, lucern, and Esparsette, which is mowed and fed to them in racks, three times a day, and in wet weather a foddering of straw. It follows, as a matter of course, that the stables and yards are well littered with straw every day. It is considered that an acre, thus managed, will maintain double the number of sheep, or cattle, than it would to turn them out to pick for themselves. By this course of management they are enabled to keep large numbers of sheep, without infringing much upon their grain-growing, and are enabled to come in competition with the wool-growers of other countries. As there are no fences in that country, the sheep are attended by shepherds. One shepherd with his dog will manage from five hundred to eight hundred in the summer, all in one flock.

This mode of keeping sheep during the summer season is, however, not altogether practicable in this country, for the reason that pasture lands are cheap and labor too high. Yet there are some particular locations, where, on a small scale, it might be introduced to great profit. But the German mode of keeping them during the winter, is a subject worthy the imitation of our farmers, and is altogether practicable.

I calculate upon two pounds of good hay per head per day, for my Electoral Saxon sheep, or an equivalent in grain, roots, or straw. This will keep them well. I oftener undergo than overrun that quantity. If I give them grain or roots, I deduct from the hay in proportion to the quantity of grain. My breeding ewes I feed part of the time on roots, and straw, and hay, at the rate of three bushels of potatoes per hundred per day; about a month before lambing time I increase this quantity, and during lambing, from four to four and a half bushels per day are given. When through that period, I gradually decrease until I turn them to grass. Sheep thus kept, hardly ever scour in the spring of the year. I raise from eighty-five to ninety lambs from an hundred ewes, on an average. Sometimes a lamb from every ewe that yeans one.

I have comfortable shelter provided for all my sheep, with a cellar attached to it, for the purpose of storing roots. I feed altogether out of

racks, with troughs attached to them, for the purpose of feeding short provender, and to catch the leaves that may crumble off, and the hay the sheep may pull through. Eight tons of hay fed to sheep in this manner is of as much benefit to them as ten tons fed in the open field from a stack.

My lambs are yeaned the latter part of April and the fore part of May. At four months of age I wean them, and put them in the best pasture I have, and put the ewes in the shortest feed for a short time, in order to dry up their milk. I have never had any sheep's udder injured in this manner; but if they are turned into fresh feed, a large quantity of milk is produced, which is very painful to the ewe, and frequently injures the udder.

I think it of importance that sheep should have free access to water every day, but especially during the foddering season.

Sheep are subject to various diseases, the most formidable of which, are the rot, scab, and foot-rot. Time and space will not permit me to treat upon them to-day, but I may perhaps give my views on this subject at some future time.

Very respectfully,

H. D. GROVE.

Hoosick, (Buskirk's Bridge Post Office,)
Rensselaer Co., N. Y., 24th June, 1837.

III.—Letter from H. D. Grove to H. Colman.

Buskirk's Bridge Post Office, Wash. co. N. Y. 13th *Jan.* 1839.

Mr. Colman,—

Dear Sir,—It is now more than eleven years ago when I landed with my flock of Electoral Saxon Sheep in this country, and have ever made it my unremitting attention and study to preserve them in all their purity, to improve the quality and quantity of their fleece, and to improve them in size and symmetry of form. How far I have succeeded, I leave for impartial judges to decide. But you will, nevertheless, permit me here to remark, that I have improved the quality of their wool considerably, and that I have increased the weight of fleece at least 6 oz. on an average. I mention this, merely to repeat an established fact, that even the high-bred improved sheep, is susceptible of still further improvement.

Previous to my coming to this country, I followed the profession of agriculture in Germany. The fine-wooled race of sheep, especially, attracted my particular attention; but not until I made several journeys in different sheep districts in that country and examined a great many flocks which excelled in excellence, that my predilections in favor of this interesting and very useful animal, were more particularly aroused. Being permitted to examine the flocks of some of the most eminent breeders, their courtesy and liberality to communicate their experience and observations, exact experiments and their results, gave me advantages for acquiring knowledge on this subject, for which twenty years' experience in my individual flock would have been insufficient. I could make comparisons between the different modes of breeding, and noted the favorable and unfavorable results, but I always found, that where the mode was based upon scientific principles, the improvements were much more rapid, than when bred on the hap-hazard plan.

One of the modes of the systematic breeder in Germany is an exact classification of his flock, and the keeping a correct record of it. Since the introduction of this system in Germany, the improvement of sheep took a new start and was much more rapid than it ever was before. Those flocks where it was first introduced, soon went ahead of others, and it was not long before most of the owners of fine flocks followed their example.

The first class is denominated "Super Electa;" second class "Electa;" third class "Prima;" fourth class "Secunda;" fifth class "Tertia;" not many have more than the first four classes, and any individual falling below the last, is at once rejected and disposed of. Three small samples of wool, one from the neck, one from the shoulder, and one from the thigh, are taken from each sheep (they should be cut off with a pair of scissors and not pulled out) and rolled up in a piece of white paper with the number and age of the sheep marked on it. In order to make the classification with accuracy, the animal is placed upon a table made for that purpose and held by a man, so that the examinator has a fair chance to view it critically. A clerk with paper, pen and ink, is in attendance, who notes down the texture of the staple, whether short or long, round, flat, or spiral, exterior appearance of the fleece, evenness, size and shape, &c. &c.

Every sheep is numbered and recorded in a book kept for that purpose, which is called the "Sheep Register." It is done by making notches and holes in the ears, an ingenious method, invented and brought into notice by the celebrated agriculturist, Mr. Albrecht Thaer, of Marglin,

near Berlin in Prussia, to whom the agricultural community of Germany and even adjoining States, owe a debt of gratitude for the light he has spread upon the subject of agriculture.

In my own flock, the notches denote the number, and the holes the age, of the sheep. When my lambs are one or two days old, I number and classify them. The first ewe lamb gets number one or the lowest number, and the last one the highest number. In like manner, I number my ram lambs. They are all recorded in a book, which I call my "Breeding Register," which forms part of my main book, "the Sheep Register." This book I carry to the stable with me, sometimes every day, and sometimes only every other day during lambing time, and for convenience sake, make my remarks with a peneil, which I afterwards fill out with ink. The whole is then transcribed into the "Sheep Register."

The Breeding Register presents the following columns.

Breeding Register, from 1 *July* 1838, *to* 1 *July*, 1839.

No.	Year In which born.	Tup'd by Ram No.	Date of Lambing.	No. Lambs. Rams.	No. Lambs. Ewes	Classification of the Lamb, &c.	General Remarks.
25	1833	2 7-4	6-4	1	-	1 Cl. sml. and close curled.	Thin lambs—one was very feeble and died.
1	1834	2 6-4	7-4	-	1	2 Cl. middle, small curls.	The lamb has a few hairs under the belly, &c.

This is the form in which I keep this book.

In the first column is the number of the ewe; in the second, her age, and instead of writing it out in full, I merely write 3, 4, 5, and 6, which means either 1833, 34, 35, and 36, &c. In the third column is the number and age of the ram, thus 27-4—27 means the number, and 4 his age, namely, 1834, &c. In the fourth column is the day and month when the lamb is yeaned, thus 6-4—6 means 6th day, and 4, fourth month. In the fifth and sixth columns are the number of ram and ewe lambs. In the seventh is the classification of the lambs, when one or two days old, and the last column is for general remarks.

I am very particular in classifying my lambs, with as much accuracy as possible, to enable me to decide upon the good or bad qualities of a progenitor as a breeder; if his progeny is not such as I desire, I re-

ject him at once from further service. I do not often use my rams after they are 5 or 6 years old, for when they have attained that age, their progeny begins to fail in vigor and strength. Much, however, depends upon the treatment he receives. If a ram is carefully used, not *over-worked*, he will retain his vigor and elasticity much longer, and I have known rams 7, 8, or even 9 years of age, whose progeny was as vigorous, as that from a ram of 3 years old.

I select my stock rams with the greatest care, for I consider this the most important point in breeding; and here I find my records of great value in aiding me to make the best choice. If, for instance, I have a ram before me, who has, in every respect, the requisite qualities, and turning to my records, I find his ancestors occupy a high rank, that is, stand in the first class for a number of generations back, I then have no hesitation to appoint him a sire for my ewes, and in nine cases out of ten, he acquits himself to my entire satisfaction. Or, if I have two rams before me of equal quality and hardly knowing to which one to give the preference, my records decide the question, for the one who has got the best ancestry is preferred to the other.

The experienced shepherd knows that even in full-blood flocks, not all individuals are equal in quality of wool, size, form, &c., but that some families arrive to much greater perfection than others. Here again my records are of great value, for with their aid I can designate every individual member of each family, and cross them with other families, and in such divisions as I think most beneficial. For eleven years have I thus managed my flock and selected my stock rams from those of my own raising, and yet I have no very near relationship, and I can go on eleven years more in the same manner and avoid that error; only taking a little more trouble, and some years use more rams, than to a superficial observer would seem necessary. Now if my sheep were not numbered and recorded, I could not go on without running the risk of injuring my flock by too close breeding. This is an important point in the principle of breeding domestic animals of all kinds, and if once lost sight of, the injury will soon be perceived by the experienced and discerning eye; often the injury is irreparable. That it is lost sight of and is overlooked by too many of my brother shepherds, is but too true, and this is one reason, why so many make but little progress in the improvement of their flocks. These considerations lead me to the principle of what is termed, "*breeding in and in*," a principle that embraces much, and is but little understood by the great mass of our farmers, but which, for want of time, I must pass over in silence.

I have said before, that my sheep are all numbered by making notches in the ears. For this purpose, I have a pair of instruments resembling a shoemaker's punch. With one, I make a round hole, and mark the age; and with the other, a notch, thus △, the number of the sheep. These notches and holes have a permanent meaning in the different parts of the ears. A notch in the upper part of the left ear means 1. A notch in the lower part of the same ear, means 3. A notch in the upper part of the right ear, means 10. A notch in the lower part of the same ear, means 30. With these figures you can mark from No. 1 to 99. A notch in the end of the left ear, means 100. With this additional notch, you can mark from No. 1 to 199. A notch in the end of the right ear, means 200. With this additional notch, you can mark from No 1 to 399. Two notches in the end of the left ear, means 400. With these additional notches, you can mark from No. 1 to 499; or, instead of two notches, cut off the end of the left ear, and you can express the same number. Two notches in the end of the right ear, means 500, or, cut off the end, and add one notch in the end of the left ear, and you have 600, and can mark as high as 699. You can go higher by making the end of the left ear cut off mean 600, and of the right ear, mean 700. But by the time one gets a flock of sheep large enough to raise 699 ewe lambs, and as many ram lambs yearly, it will be found that he has got over 4,000 sheep, and the sheep establishment becomes so unwieldy, that it will be necessary to organize a new one. But few flocks in Germany having attained that number are kept on one farm. I know of none in this country.

The age of my sheep I mark, by making holes in the ears, when they are one year old. A hole in the left ear, means 1. A hole in the right ear, 3. Thus, if a lamb is born in 1838, it gets 2 holes in each ear. One that is born in 1839, gets three holes in the right ear, &c. &c. Lambs that are born in 1840, 50, &c., do not receive any holes. And after a sheep reaches the age of ten years, she is generally unfit for further service, though I have had several ewes that reached the age of 13, 14, and 15, and raised lambs. If, however, you retain any ewes over 10 years old, you can easily distinguish them by their general appearance, and note them in the general remarks.

I intended to give you a more accurate description and more in detail than I have done, and answered the other questions which you propounded, but want of time forbids me.

Yours, &c.

H. D. GROVE.

B.—(p. 120.)

RELATIVE VALUE OF DIFFERENT KINDS OF FOOD FOR SHEEP.

By M. De Dombasle.

Some experiments performed by this celebrated agriculturist, are well worthy of being recorded, as approaching nearer to an exact determination of the question of the relative nutritive properties of a few of the more common aliments of sheep and cattle than any which we remember to have seen.

He divided forty-nine sheep into seven lots, of seven sheep each, in such a manner that the total weight of each lot should be as nearly as possible equal to each of the rest. Each lot was kept in a separate division of the stable; the food was given to each lot in rations of equal weight; and by means of scales, the total weight of each lot was taken once a week, and the experiment was continued five weeks. The weight of each lot was four hundred and thirty-six pounds.

The substances subjected to examination were: 1. Dry Lucern: 2. Oil cake from flax seed: 3. Oats and barley: 4. Crude potatoes: 5. Cooked potatoes: 6. Beets: 7. Carrots.

The dry lucern formed the unit of the estimate. One of the seven lots was fed exclusively on dry lucern; and each of the six others received just half the quantity of lucern, and the remainder of the ration consisted of such a portion of one of the alimentary substances as was found sufficient by a careful weighing during the five weeks, to keep each lot in the same healthy condition. The following table shows the current progress of the experiment; the quantity of water drunk by each lot of sheep during the five weeks being also measured by a guaged trough. The author concludes that fifteen pounds of dry lucern may be considered as a proper ration for one sheep per week, or rather more than two pounds per day. The primitive weight of each lot, as before observed, was four hundred and thirty-six pounds.

Lots.	Food.	1st week.	2d week	3d week.	4th week.	5th week.
1st,	Dry Lucern, . . .	437 lbs	433	437½	437½	443
2d,	Lucern and Oil Cakes, .	428 "	428	432½	439	444¼
3d,	Lucern, Oats and Barley, .	422½ "	433½	429¼	436¾	437¼
4th,	Lucern and crude Potatoes,	441 "	440½	434	432¾	439¾
5th,	Lucern and cooked Potatoes,	437 "	435½	447½	444½	451¼
6th,	Lucern and Beets, . .	435 "	424	436	437	444¼
7th,	Lucern and Carrots, . .	417 "	407	419½	426½	427½

The quantity of water drunk by the seven lots during the five weeks was as follows, showing the relative degree of thirst occasioned by the different aliments.

1st lot 223 quarts,	4th lot 123 quarts,	7th lot 35 quarts,
2d lot 189 "	5th lot 108 "	" "
3d lot 164 "	6th lot 95 "	" "

Fifteen pounds of dry lucern being considered as a proper ration for one sheep per week, or seven and a half pounds a half ration, he finds that the following quantities of each of the other aliments are equivalent in nutritive value to the half ration of lucern.

Oil cake, 4½ lbs.; barley, 3½ lbs.; oats, 5 lbs.; crude potatoes, 14 lbs.; cooked potatoes, 13 lbs.; beets, 16½ lbs.; carrots, 23 lbs.

Thus taking the quantity of lucern as a standard, the nutritive powers of the different substances will be—

Dry lucern, ...	100 lbs.
Flax seed oil cake, ...	57 "
Barley, ...	47 "
Crude potatoes, ...	187 "
Cooked potatoes, ...	173 "
Beets (white variety), ...	220 "
Carrots, ...	307 "

Bib. Univ. Mai, 1832.

C.—(p. 133.)

AGRICULTURAL CHEMISTRY.

The application of Chemistry to Agriculture is now attracting so much attention both in Europe and in this country, that I feel I shall be only in the way of my duty in giving an account of a recent work of Liebig, one of the most eminent men in his profession as a chemist now living. The work has created a great sensation abroad; and an edition with valuable notes has been published in this country by Professor Webster of Harvard University. This notice may draw attention to the subject, which cannot fail to issue in good. It has already been mainly given in the North American Review; but as that work is likely to reach but few farmers, and as I designed originally that it should appear here, I make no apology for presenting it.

Organic Chemistry in its applications to Agriculture and Physiology: By JUSTUS LIEBIG, M. D., Ph. D., F. R. S., M. R. I. A., &c. Professor of Chemistry in the University of Giessen. *First American Edition, with an Introduction, Notes and Appendix, by* JOHN W. WEBSTER, M. D., Professor of Chemistry in Harvard University.

This Treatise makes a contribution to the cause of an improved agriculture, of extraordinary value. It has been received with great interest in England, and will be read with equal eagerness by a large portion of our own people. Intelligent minds among us are everywhere awake to the immense and universal importance of the subject to which it relates.

The perfection of agriculture, as an art, implies the obtaining the greatest amount of product from the earth, with the least injury to the land, and at the least cost of labor. It has been often remarked, that the actual productive powers of an acre of land have never yet been fully tested; the maximum of product has not been reached. Magnificent and surprising results have been attained; but in no case can it be said with confidence that more might not have been effected. In general, the agricultural art falls far below the condition of productiveness and improvement which it might obviously attain; and the aversion among farmers to change their established habits, and the slowness with which

agricultural improvements of great and decided advantage extend themselves, even into neighboring districts, are well known and sufficiently remarkable. Something of this has been owing to the stationary habits of farmers, to a want of education, and neglect of reading and inquiry necessarily growing out of this; and much to prejudice, the natural child of ignorance, against scientific suggestions and the application of science to an art which, so far as they are concerned, is wholly of a practical character. This prejudice against the applications of science to agriculture, or to what in vulgar parlance is called *book-farming*, has, we confess, found some natural encouragement in the fact, that many persons, wholly destitute of practical knowledge and skill, have undertaken to apply purely theoretical rules, without regard to differences of soil, climate, nature of the crop, and nameless circumstances by which the application of these rules should be varied, or might become unseasonable or futile; and that in truth, many persons have undertaken to make books, and to give directions in husbandry, who were grossly ignorant of its great principles, and possessed little knowledge of its various practical details and rules. It must at the same time be admitted, that science has accomplished comparatively little; and that, beyond that knowledge which any intelligent, practical and experienced man easily and almost necessarily acquires of soils, manures, vegetation and crops, little has been ascertained of a practical value; and the profound secrets of vegetable life, or what is properly termed *vital action* in vegetable organism and growth, remain in all their original abstruseness and mystery. The little success therefore which scientific men have had in their attempts to resolve and explain them, and especially the little practical utility which has come from their theoretical explanations, have created, with the purely practical, a prejudice against such inquiries as invincible as it is unworthy of sensible men.

But it will not be denied, in this case, that we know as much of vegetable as we know of animal life. Anatomy may be termed an exact science; it is to a great extent matter of sensible observation and measurement; but the operations in the human organism, which are strictly vital, are altogether undisclosed. We know in truth as much how the stems and leaves and fruit are formed and perfected, as we know how the food, which we receive, is converted into blood, and serum, and bile, and muscle, and fibre, and tendon, and bone; and we know no more. Shall we despair of going further? By no means. There seems, indeed, in this case, to be a limit to inquiry; an impassa-

ble barrier, where human sagacity and inquisitiveness are at once repelled; the darkness is intense before, above, and around us, and the mere rush-light, which we hold out to guide us, serves no purpose but to render this darkness visible. Shall we then be discouraged in all attempts at further advancement? Not at all. It may be indeed that we have reached the end of our line; and that, until new endowments are bestowed, the mind can soar no higher in its flight. But with equal, nay, with much more reason may we suppose, that the cause of failure is not so much attributable to the limitation or impotence of our faculties to proceed further, as to the imperfection or error of our modes of approach and inquiry. The philosophical mind, valuing truth and knowledge as the highest of all attainments, will never rest satisfied with present acquisitions; will regard that which is conceivable as knowable; like a vigilant and skilful officer before a besieged fortress, whose direct approach is precluded, will be continually seeking some private or concealed mode of access; or, like the man in the Scriptures knocking at his neighbor's door at midnight, and hoping presently to be heard for his importunity.

The immense importance and value of knowledge in this case no sensible man can doubt. If knowledge and science are useful in any art or department of business, why should they not be in agriculture, an art which involves many others, and which in its success combines the influence and operation of more elements than any other? It is well ascertained that certain plants will grow only in certain situations, and under certain circumstances; that different soils have different properties, prejudicial to the growth of some plants, favorable to the perfection of others; in some cases distinguished by an exuberant fertility, in others by an almost incurable barrenness, but yet in most cases capable of modification, remedy, or improvement; that the operation of various manures is various; and that their efficiency or injury depends upon their condition, preparation, or modes of application. It is equally well ascertained, that by some modes of cultivation, double the produce is obtained on the same land that is obtained under a different cultivation, and the land, at the same time, placed under a progressive improvement. It is ascertained that by the application of gypsum, or potash, or soda, or salt, or various animal substances, an extraordinary productiveness follows, and the crops are often trebled and quadrupled. How shall we pretend, then, that there is not here the most ample room for the application of science in the resolution of these remarkable facts,

and in profiting by these remarkable means for the improvement of the soil and the increase of its productiveness? Separate, however, from the obvious utility of such inquiries, it is difficult to conceive of subjects more interesting to a philosophical curiosity than all those connected with animal or vegetable life and growth; for what in nature is more wonderful than the birth and progress of a human being, or the germination of a dried seed, and its advancement to the perfection of its uses and fruits?

There are besides grounds of encouragement in this case, which the philosophical mind will duly appreciate. In the ordinary course of nature there is no such thing as accident or miracle. As far as man's sagacity has penetrated into the material world,—and of the spiritual world, we know nothing but by divine revelation,—all the phenomena of nature are found to proceed upon fixed principles and laws, and to be the results of nicely established and well balanced, compounded, and adjusted influences and forces. Many of these operations man is capable of imitating, and the most extraordinary results are obviously at his command. We cannot have a doubt, therefore, that the most recondite as well as the most familiar operations of nature are all the result of established principles and laws. Many of these laws we have already ascertained, and they are of daily application and use in the common business of life. How much further we may proceed in the discovery of them, time only can tell. As yet we have only placed our foot on the first step of the threshold.

Professor Liebig illustrates the spirit of which we speak. He is a bold inquirer of nature for the laws which govern her operations. He is for explaining the phenomena of vegetable life and growth upon the established principles of chemistry, as far as their application can be traced; and he is not willing to take a general answer where a particular answer can be obtained. He does not feel satisfied to be checked in his inquiries under the presumption of inexplicable mystery, when further inquiry would untie the Gordian knot, and show that some of the problems, hitherto considered most difficult, are explicable upon the established principles of chemical science.

"A rational system of agriculture," says he, "cannot be formed without the application of scientific principles; for such a system must be based on an exact acquaintance with the means of nutrition of vegetables; and with the influence of soils and the action of manure upon them. This knowledge we must seek from chemistry, which teaches

the mode of investigating the composition, and of studying the characters, of the different substances from which plants derive their nourishment."—p. 7.

"Innumerable are the aids afforded to the means of life, to manufactures and to commerce, by the truths which assiduous and active inquirers have discovered and rendered capable of practical application. But it is not the mere practical utility of these truths, which is of importance. Their influence upon mental culture is most beneficial; and the new views acquired by the knowledge of them enable the mind to recognise in the phenomena of nature proofs of an infinite wisdom, for the unfathomable profundity of which human language has no expression."—p. 6.

The work is devoted to an explanation of the proper food of plants, and the modes in which, and sources from which, they receive this nourishment. Connected with these matters, come, of course, the value and uses of manures, and the true art of culture. These subjects are all obviously of the highest importance; and it is exceedingly interesting to see how a mind so powerful and learned discusses them. The author speaks with just respect of that distinguished man, the late Sir Humphrey Davy, who first taught systematically the application of chemical science to agriculture; and he shows himself not an unworthy pupil of so eminent a master. We can do but imperfect justice by an abstract of his views; yet it is all for which we have room.

The elements or constituents of all plants are carbon, water, (or its elements, hydrogen and oxygen,) nitrogen, and some earthy or alkaline salts. The food of plants can be received only in a gaseous or soluble form, and it must come from the atmosphere, from the earth, or from both. No earthy substance can ever be received into a plant unless in a dissolved or combined state; and though crude substances, incapable of assimilation, may in some cases be taken up by the roots of the plant, which seem to have no power of selection in regard to their food, yet they will be exuded from the roots in the state in which they were received. The alkaline substances received and assimilated by plants can only be ascertained by their ashes after incineration, and constitute a very minute portion; but, however minute, they are evidently essential to the perfection or fructification of the plant. Besides these there are certain organic acids, which are found in the juices of plants and usually combined with some inorganic bases. The alkaline bases or earths must exist in the soil, or they cannot be found in the

plant. In some cases, however, one kind may be substituted for another.

The author discusses at large the doctrine of humus, humin, ulmin, humic acid, apotheme, geine, all referring to one substance, as the food of plants. This matter is generally understood to be a certain brown or carbonaceous substance resulting from vegetable decomposition. Some portions of it are soluble in water or alkalies; other portions are insoluble but by extraordinary means. The common opinion has been that it constitutes directly the food of plants, and requires only to be dissolved to be taken up by the roots of the plants and assimilated by them. Others have maintained that it requires to be dissolved by the application of alkalies, and combining with them in the form of an acid, it becomes then prepared for the food of plants. Our author wholly denies these positions by showing that so far from humus being extracted from the soil, it is in fact increased by cultivation, as in the case of a forest, the more abundant the growth of wood upon it, the greater the amount of humus in the soil, where the *débris* of the wood is suffered to remain upon the land.

"A certain quantity of carbon is taken every year from the forest or meadow in the form of wood or hay; and, in spite of this, the quantity of carbon in the soil augments; it becomes richer in humus."—p. 68.

"The opinion that the substance called *humus* is extracted from the soil by the roots of plants, and that the carbon entering into its composition serves in some form or other to nourish their tissues, is so general and so firmly established, that hitherto any new argument in its favor has been considered unnecessary; the obvious difference in the growth of plants according to the known abundance or scarcity of humus in the soil, seemed to afford incontestable proof of its correctness. Yet this position, when admitted to a strict examination, is found to be untenable; and it becomes evident that humus in the form in which it exists in the soil does not yield the smallest nourishment to plants."—p. 61.

He attempts to prove his position, that the carbon of the plant cannot be derived from the soil, by a calculation in weights and measures. Humic acid, or the humus of the soil, can only be absorbed by the plant in combination with some inorganic bases or metallic oxide. We do not think it important here to give any thing more than the results of some of his calculations. He supposes that upon an average 40,000

square feet of land, Hessian measure, yield annually 2650 lbs. of dry fir wood, which contain 5.6 lbs. Hessian of metallic oxides. Now it is ascertained in what proportion humic acid combines with the metallic oxides, with lime for example. Having determined the metallic oxides exising in such a product, he easily determines the amount of humic acid thus introduced into the trees; and, allowing humic acid to contain 58 per cent. of carbon, this would correspond only to the production of 91 lbs. Hessian of dry wood. But 2650 lbs. of fir wood are actually produced. These calculations are well worth examining, and, if accurate, it is difficult to deny the inference which follows from them, that the humic acid existing in a soil, supposing all its carbon to be taken up and assimilated, will supply but a very small portion of that, which exists in the crop grown upon the soil.

The same remarks are applied to a crop of wheat. From the known properties of metallic oxides existing in wheat straw (the sulphates and chlorides also contained in the ashes of wheat straw not included), it would be found, that the wheat growing on 40,000 square feet Hessian of land would average 1780 lbs. Hessian of straw, independently of the roots and grain, and the composition of this straw is the same as that of woody fibre. Now, according to well-ascertained properties, it could receive but 57½ lbs. of humic acid, which would supply with carbon only 85 lbs. Hessian of straw.

Another calculation respects the amount of humic acid which plants can receive through the agency of rain water. The amount of rain falling in one of the most fertile districts of Germany, during the months of April, May, June, and July, is estimated to be 17½ lbs. Hessian upon every square foot of surface, or upon 40,000 square feet Hessian, 700,000 lbs. Hessian of rain water. Now this extent of land averages a product of 2850 lbs. Hessian of corn (wheat); 390 lbs. of humic acid calculated to be absorbed in this case, cannot account for the quantity of carbon contained in the roots and leaves alone, even if we suppose the whole of the rain water to be absorbed by the plants, whereas a large portion of it must necessarily be lost or pass off in some other form than through the organs of the plants. If these calculations be correct, it is evident that a small portion only of the carbon existing in plants can be derived from the humus of the soil. Another idea is suggested, viz. that as humus results from the decay of plants, none existed at the time of the creation to form the pabulum of the primitive vegetation. This must have had other sources of supply.

Dr. Dana is of opinion that geine or humus is an original creation, coeval with the creation of hydrogen and oxygen and carbon. The conjecture is sufficiently plausible, but it would be idle to advance any opinion on the subject. The only fact which can be said to favor one opinion above the other is, that the plants found in the earliest coal formation are plants with small roots and expanded foliage, implying that they drew their chief nourishment from the air.

The inquiry which next arises is, if plants do not derive their carbon, or but a very small portion of it from the soil, whence is it obtained? This interesting question Liebig discusses at large, and certainly with much ability. The seed itself contains the first supply of nourishment for the roots of the infant germ of the plant. Before it appears above the surface, the humus in the soil quickens and invigorates its growth by the supply of carbonic acid. This supply of carbonic acid is furnished by the accession of atmospheric air from the loosening of the soil, the carbon of the humus combining with the oxygen of the air to produce nourishment for the young plant. When it rises above the surface, and its external organs of nutrition, its stem and its leaves, are fully developed, it ceases to draw nourishment from the earth, and obtains all its carbon from the air. It is not a new doctrine that plants absorb carbonic acid from the atmosphere. This fact has been long established; but it is new that this is the principal source; and the inquiry naturally arises whether the atmosphere, containing, as it does, only a thousandth part of carbonic acid, can furnish in this way a supply of all the carbon which is required by the plant. To this inquiry Liebig replies as before, by making it matter of exact calculation.

"It can be shown, that the atmosphere contains 3,000 billion Hessian lbs. of carbon; a quantity which amounts to more than the weight of all the plants, and of all the strata of mineral and brown coal, which exist upon the earth. This carbon is therefore more than adequate to all the purposes for which it is required."—p. 74.

The absorption of carbonic acid from the air, in his opinion, is a purely chemical process. Many others have chosen to regard it as a vital operation; and have considered the leaves as respiratory organs, resembling the lungs of animals. He does not admit the analogy, and thinks that the cause of science is injured by the supposition of a resemblance, where no similitude exists. The absorption of carbonic acid from the air, the assimilation of its carbon, and the return of its oxygen to the air, are chemical processes, effected under the operation of light and

heat. Without the aid of chemistry, they are inexplicable; with it, they become perfectly intelligible. The vital action creates nothing. It does not produce carbon, oxygen, or hydrogen; but it puts them into activity; and they then arrange themselves according to chemical principles; each organ of the plant having its own specific influence in the production of the results.

The author discusses, at large, the nature and action of humus. Humus is merely decayed vegetable substance, whose decay or destruction is effected by the absorption of oxygen from the air. Exclude it from the external air, and the decay would cease; but would be renewed again as it should be brought in contact with the oxygen of the air. Woody fibre, in a state of decay, consists of carbon and the elements of water. Alkaline substances assist its decay. Humus, however, is not composed exclusively of woody fibre; other substances are associated with it. We have not the room to follow Liebig in his curious and profound remarks on this subject, and can give only a summary of his views. The constant tendency of humus is to form carbonic acid by the abstraction of oxygen from the air. The stirring of the soil, and opening it to the effects of light and heat and moisture, assist this process, by bringing it in contact with the decaying humus. It forms around itself an atmosphere of carbonic acid, and supplies carbonic acid to the plant in the first period of its growth. The roots of the plants, in the beginning and before the formation perform the functions of the leaves. They extract from the soil the carbonic acid generated by the humus. When a plant is matured, and when the organs by which it receives its food from the air, are perfected, the carbonic acid of the soil is no further required. Humus does not afford nourishment to plants, by being taken up into their vessels in an unaltered state; but only by the supply of carbonic acid, which it generates from the presence of atmospheric air.

Hydrogen is another constituent of plants; for woody fibre is composed of carbon and the elements of water. Water is decomposed under the power possessed by plants of separating its elements, and of assimilating its hydrogen, and dispensing with that portion of its oxygen not required by the plant in other processes of its growth. Nitrogen is another constituent, found in all plants; abounding in some, and supposed to form the principal portion of the nutritive properties of some of the cereal grains. The nitrogen of the air cannot enter into combination with any element excepting oxygen. The combination of

nitrogen with hydrogen, in the proportion of one volume of nitrogen and three of hydrogen, produces ammonia. It is in the form of ammonia, that plants receive their nitrogen. This ammonia is furnished to the roots of the plants by the decomposition of animal matter in the soil, and to their leaves by the effluvia arising from decayed and decaying animal and vegetable substances. This decay is continually going on, and, together with the excrements of animals, supplies the ammonia contained in the atmosphere. There are, indeed, some natural subterranean sources of ammonia, connected with volcanic action; and ammonia is found in many springs, which, Liebig supposes, derive it wholly from the atmosphere. The principal part of the nitrogen, which is found in plants, is, in his opinion, obtained in the form of ammonia in rain water. Though it appears that it has been discovered by others, that rain water contains ammonia, yet it is believed that Liebig has been the first to announce the fact. He goes on to show, by the elements made use of in a former calculation, that by means of the rain falling annually upon 40,000 square feet of soil, the field must receive 80 lbs. of ammonia, or 65 lbs. of nitrogen, which is more nitrogen than is contained in the amount of crops usually produced upon such a surface. The experiments made to ascertain the presence of ammonia in rain water, are decisive, and this interesting fact may be considered as now established. He likewise detected ammonia in the juices of the maple and the birch tree; this, being obtained remote from any house, was evidently derived from the atmosphere.

There are facts here connected with cultivation, and showing the effect of different manures upon the quality of the products, which are extremely curious. Different wheats are found to contain very different proportions of gluten, of which nitrogen forms an important constituent. Some French wheat was found to contain 12.5 per cent. of gluten, while Bavarian contained 24 per cent. Davy obtained 19 per cent. from winter, and 24 from summer, wheat. Sicilian wheat afforded 21 per cent.; Barbary wheat, 29; Alsace, 17.3; wheat grown in the *Jardin des Plantes* 26.7, and winter wheat 3.33 per cent. In regard to these differences, Liebig remarks:

"An increase of animal manure gives rise not only to an increase in the number of seeds, but also to a most remarkable difference in the proportion of gluten which they contain. Animal manure acts only by the formation of ammonia. One hundred parts of wheat, grown on a soil manured with cow-dung (a manure containing the smallest quan-

tity of nitrogen), affording only 11.95 parts of gluten, and 64.34 parts of amylin or starch; whilst the same quantity, grown on a soil manured with human urine, yielded the maximum of gluten, namely, 35.1 per cent. Putrified urine contains nitrogen in the forms of carbonate, phosphate, and lactate of ammonia; and in no other form than that of ammoniacal salts."—p. 136.

As illustrative of the value of ammonia in vegetation, Liebig refers to *guano*. This is the excrement of sea-birds, and found in large quantities on several islands in the South Sea. The effect of this manure is understood to be most powerful. It renders the soils, which consist of clay and sand, and contain, as is represented, no organic matter, highly fertile. This manure is composed principally of salts of ammonia, and a few earthy salts.

Liebig, if his theory be well founded, has solved the secrets of the operation of gypsum. It has been supposed, that gypsum acted upon plants as a stimulus, or like ardent spirits upon animals. But plants are not animals. They have no nerves, which may be tightly drawn or relaxed; and such suppositions, which serve only to betray our ignorance, are without foundation. No substance can cause the leaves of plants to appropriate an excess of carbon from the atmosphere, when the other constituents of the plants are wanting. The influence of gypsum is to fix the ammonia which is brought into the soil, and preventing its evaporation, give it out as the plants may receive it. This effect is produced by the double decomposition of the carbonate of ammonia, and of the gypsum or sulphate of lime, by which sulphate of ammonia and carbonate of lime are formed. His notions on this subject, being the first satisfactory attempt at a solution of the mystery always connected with the application of this extraordinary substance, are curious and interesting.

"In order," he says, "to form a conception of the effect of gypsum, it may be sufficient to remark, that 100 lbs. Hessian of burned gypsum fixes as much ammonia in the soil as 6,250 lbs. of horses' urine would yield to it, even on the supposition that all the nitrogen of the urea and hippuric acid were absorbed by the plants without the smallest loss, in the form of carbonate of ammonia."—p. 143.

He is equally original in his explanation of several other facts.

"The advantage of manuring fields with burned clay and the fertility of ferruginous soils, which have been considered as facts so incomprehensible, may be explained in an equally simple manner. The oxides of

iron and alumina are distinguished from all other metallic oxides by their power of forming solid compounds with ammonia. Minerals containing alumina or oxide of iron also possess in an eminent degree the remarkable property of attracting ammonia from the atmosphere and of retaining it."—p. 144.

Powdered charcoal is another element which powerfully absorbs ammonia; and will take up ninety times its volume of ammoniacal gas, which it gives out upon being wet with water. Decayed wood resembles charcoal in this property, absorbing seventy-two times its own volume. This explains further the operation of humus, which supplies not only carbonic acid, but likewise nitrogen, to the growing plants.

Liebig concludes this chapter with a beautiful reflection:

"Carbonic acid, water and ammonia contain the elements necessary for the support of animals and vegetables. The same substances are the ultimate products of the chemical process of decay and putrifaction. All the innumerable products of vitality resume, after death, the original form from which they sprang. And thus death,—the complete dissolution of an existing generation,—becomes the source of life for a new one."—p. 147.

The next subject of discussion with Liebig relates to the inorganic constituents of plants. These are potash, soda, lime, magnesia, oxide of iron, manganese, silica, and other substances. The plants cannot be perfected without them. Alkalies of one kind may often be substituted for those of another; but they are always found in equivalent proportions. These inorganic substances are admitted to the plants in combination with some acid. They exist independently of the plant, and are not the product of vital action. They are found in different soils, and are the result of the decomposition of various rocks. Potash is an important constituent of most felspars. Some of the salts are evaporated in sea-water, and in that way carried far into the interior, and after being spread upon the earth, are carried down by the rains. They are returned to the soil in decayed vegetable and animal matter, and in the excrements of animals. They are found in the ashes of plants, in the form of carbonates; and by careful analysis their amounts in different cases have been accurately ascertained. The amount of alkaline substances required by plants is very minute. But that amount is requisite to the perfection of the vegetation. It is easy to conceive how small an amount is required in the soil, when it is understood that sea-water contains only 1-12400 of its weight of carbonate of lime, and yet that is

sufficient for the formation of all the banks of coral in the ocean, and the various shells of the marine animals.

Having given this account of the constituents of plants, and the sources whence they are derived, Liebig proceeds to discuss the art of culture and the action of manures. I should be glad to quote the whole of this chapter, but must limit myself to a brief sketch. Humus is not soluble in water; if it were, a great part of it would be carried off the ground by rains. Its office is, by the presence of water to convert the surrounding oxygen into carbonic acid, which plants absorb, and then return to the soil a large portion of carbonaceous matter, that they abstract from the air, so that the humus of the soil is not diminished. The frequent ploughing of the soil, so as to promote, by admitting the oxygen of the air to the humus, the formation of carbonic acid, the application of alkaline substances, and whatever tends, as Liebig expresses it, to put the organic matters of the soil in a state of oxidation, increase the fertility of the soil. The oxygen then assists in the formation of carbonic acid to go to the nourishment of plants.

Knowing the substances which go to form the plants, the object of a wise agriculture will be to supply them, and to render them accessible to the plants. Potash, the most common and important of the inorganic constituents of plants, is more universally and abundantly diffused over the earth than any other alkaline substance. But the alkalies, by continual cultivation, may be exhausted, and the soil cease to be productive. This indicates the necessity of a fallow or rest to the soil, by which, under the operation of air and moisture, a further disintegration of the rocks may take place so as to furnish the necessary alakalies to the soil, or, without resting, they may be artificially supplied. Plants themselves in their decay return alkaline substances to the earth; and it is well ascertained that plants themselves act powerfully in the disintegration of rocks.

Some crops may be repeated on the same soil more frequently than others, because some consume more of the alkalies than others. One hundred parts of the stalks of wheat yield 15.5 parts of ashes. The same quantity of barley, 8.54 parts; and of oats, only 4.42. The ashes of these different plants are of the same description, but it is obvious that the demands which they make upon the soil must be different.

The interchange of rotation crops and the application of manures are materially connected with this fact, and with another in the habits of plants, to which we shall refer. Plants of different kinds absorb or take up different substances, from the soil; and one kind therefore may

flourish, where another would fail. The same kinds of plants cannot be cultivated in succession on the same soil for any length of time without declining in productiveness. Some plants, as flax for example, will not bear a repetition on the same soil oftener than once in five years. It has been supposed that plants themselves assimilate, and consume in their growth, certain ingredients in the soil necessary to the perfection of the plant, which should not be repeated on the same ground until this material is again supplied. But this is not all. No artificial supply of any ascertainable ingredient can control this general law of the necessity of a change in the rotation, growing out of other circumstances. Decandolle suggested, and may be said to have established, another theory, namely, that plants excrete from the roots certain substances, which are innutritious or hurtful to the same kind of plant in succession, but which may serve as the food of other plants. But there are difficulties, in respect to this subject, upon which we cannot dwell, which Liebig's theory solves with remarkable ability and equal reasonableness. The exudations or excretions of plants may be considered of two kinds. Plants, as we have before said, have no selection in their food but take up with little discrimination what is accessible to their organs of nutrition, and in a condition to be absorbed. They consequently may take up many things, which they can assimilate but in part, or not at all. These are exuded, and may serve as the food of other plants of a different character. But there is another class of excretions, or properly speaking excrements, which are purely the result of the vital action of the plants, and which, in the form of gum or otherwise, after having served the purpose designed in the nutrition of the plants, pass off by the appropriate organs into the soil. These, of course, cannot serve as the food of the same kind of plants, or of any other in their present condition; and these go to assist in forming the humus of the soil. In their unchanged condition, these excrements are pernicious to the kind of plants from which they were discharged, and, it may be, to others; and after becoming converted into humus, under the operation of air and moisture, the effects are the same as those of humus.

After all, where the crops are removed from the soil in the forms of seeds, roots, and leaves, the soil is of course deprived of many of the constituents requisite to a healthful and productive vegetation. The substances removed are then to be supplied by manure. The seed of the plant contains within itself the food, which it first requires in order to the protrusion of its radicles. The humus in the soil will give out its

carbonic acid, until the plant rises above the ground, and the leaves and other portions of its organism are formed, to enable it to gather, in the form of carbonic acid, its food from the air. Its organic constituents must be found in the soil or in the manure in the form of silicates, carbonates, or phosphates, and may be supplied in a crude form as in potash, ashes, lime, bones, &c. Its nitrogen is to be supplied, in the form of ammonia, from decayed animal or vegetable substances in one way or another. The excrements of some animals are in this respect much richer than those of others. The excrements of man are much richer in nitrogen, than those of any other animals, and those of men living upon animal more so than those of men living upon vegetable diet. In the urine of animals nitrogen is found in much greater abundance than in the solid excrements. In respect to nitrogen, 100 parts of the urine of a healthy man are equal to 1300 parts of the fresh dung of a horse. This ammonia is supplied in the soil; or floating in the air, it is taken up by rain water or by snow, and supplied to the vegetation in that form. The manures of different animals likewise return to the soil the inorganic constituents of plants, the various salts which have formed a part of the vegetable products, which have been taken from the fields and been consumed by the cattle; and thus every thing goes on in an eternal round of reciprocity.

I have thus given a general and imperfect sketch of the main principles of the work of Liebig. I have confined myself to the part, which is principally agricultural. The second part, on chemical transformations, fermentation, putrifaction, decay, and various kindred subjects, is equally interesting. The work of Liebig displays extraordinary philosophical acumen, and confers upon him the highest honor. The more it is examined, the deeper will be the interest which it will create, and the stronger the admiration of the ability with which it is written. It is not a work to be merely read, but studied; and if further inquiries and experiments should demonstrate, as seems to us from many facts within our own knowledge in the highest degree probable, the soundness of his views, his work, not merely as a matter of interesting philosophical inquiry, but of the highest practical utility, will be invaluable.

There are various notes, appended to the volume, of great interest. A long and highly interesting note is appended, containing some letters from Dr. S. L. Dana, of Lowell, to Dr. Hitchcock, of Amherst College, and taken from the forthcoming third edition of Dr. Hitchcock's

"Geology of Massachusetts," on geine or humus, and some views of Dr. C. T. Jackson, of Boston, on the same subject.

The views of these gentlemen in some measure conflict with each other, and with those of Liebig. I shall not presume to arbitrate between them, but only to remark on them, in a very few words, with a perfect respect for all the parties concerned. The eminent Swedish chemist, Berzelius, had discovered in several vegetable substances, a residuum, which he regarded as the proper food or pabulum of vegetables, and which he denominated *humus* or *geine*. Dr. Dana, by his independent researches, had arrived at the same result. This geine or apotheme was found to be the universal result of decayed vegetation; and soils are in general found productive or otherwise, as this vegetable substance or residuum is more or less abundant in them. The opinion of Dr. Dana has been that geine in a dissolved state is taken up as the food of plants. If obliged to relinquish this ground, and with Liebig, regard geine as only a source of carbonic acid to plants, he would regard its value to vegetation in the same light. But he obviates in a most ingenious manner one of the difficulties of Liebig, in respect to the solubility, or, we may more properly say, the solution of geine, by showing that it contains within itself the instrument, to a considerable degree, of its own resolution, in the water formed by the union of the hydrogen of the geine with the oxygen of the atmosphere. "The amount of water produced in this case," he remarks, "is truly astonishing. It has been found equal per hour, from an acre of fresh ploughed sward, to 950 lbs. This is equal to the evaporation per hour from an acre, after most copious rains. To show that this depends upon the decomposition of the geine, the quantity of water evaporated per hour in the day-time, from a well-manured acre, was found equal to 5000 lbs."

That humus or geine does not constitute the actual food of plants, would seem to be established by various considerations. Liebig has shown by several calculations, as exact as the nature of the case would seem to admit of, that the amount of humic acid contained in any soil is insufficient to supply the carbon in the average product of that soil, in the proportion of 91 to 2,650. Secondly, volcanic soils containing not the slightest trace of vegetable matter, as is evident from their origin, with a due mixture of earths, are among the most fertile in the world. The ashes being exposed to air and moisture, a soil is gradually formed, and the decomposed lavas furnish alkalies in abundance, which, by being exposed to air and moisture, become the source of rich

nourishment to plants. A third reason, and certainly a strong fact in the case, is, that the humus in a forest, so far from being diminished by the growth of wood, is continually increasing. It is so likewise in a cultivated field, where the produce of the field is returned in the form of manure.

Berzelius is reported to have altered his opinions of the nature of geine by a more exact analysis of its composition, and now denies its existence as a proximate principle; and Dr. C. T. Jackson, who has distinguished himself as a chemist by his analytical researches, appears to have made, without knowing what had been done by Berzelius, the same discoveries, in ascertaining that the substance called geine is only a combination of crenic and apocrenic acids, with some other substances, all of which are not yet determined. How many of these may have been, as suggested by Dr. Dana, the mere product of chemical manipulation, or whether any of them, are questions which, in the present state of the inquiry, cannot be determined. Upon the supposition that these are original and fixed elements in the composition of geine, we consider Dr. Jackson entitled to much honor for his investigations. All truth is valuable; but in the present condition of our knowledge, in a practical view, these points are not of great importance, or rather not of immediate utility. According to the principles of Liebig, Raspail, Dana, Jackson, Hitchcock, and others, the presence of humus in a soil is, *quoad hoc*, an indication of fertility. Now, whether it be a proximate element, or a mere combination of crenic and apocrenic acids with other substances, though exceedingly interesting to the philosophical inquirer, is, without some further light on the subject, of little moment to the farmer. Dr. Jackson has not, as we understand, discovered either of these acids in the plants themselves; he has not as yet shown us how they are to be used, or what part they perform in vegetation.—He is not able, by any artificial process which he can adopt, separate from the vegetable organism, to produce an atom of geine; and however nearly he may have approached it, and we commend him for every step in his progress, he has by no means reached the *ultima thule;* for crenic, and apocrenic, and ulmic acids, are themselves resolvable into certain proportions of carbon, hydrogen, nitrogen and oxygen. The question, however, whether geine constitutes in itself the food of plants in its solution by water or by some alkaline substance, or whether it merely acts as an instrument of the supply of carbonic acid to the plant in the first stages of its progress, is another question which is certainly not without its difficulties.

I am not able to understand by what process it is ascertained, that, after the leaves of the plant are formed, it ceases to draw any nourishment from the earth. This is a fact in vegetable physiology, of which at present we are without the proof. Dr. Dana has never denied that plants receive much of their nourishment from the air. His inquiries were limited wholly to what they gather from the earth. Nor is there any difficulty in the supposition that geine may serve, in its decomposition, as the food of plants. For, if geine, according to Dr Jackson, is a mixture of crenic or apocrenic acids, and if crenic and apocrenic acids are resolvable into carbon, hydrogen, nitrogen, and oxygen, these are the very elements of vegetable substance ; and we may leave it to the subtile operations of the vital action, wonderful and mysterious as it is in its operations, to accomplish what human skill and sagacity have as yet in vain essayed, the separation and appropriation to itself, by the living plant or animal, of the proper materials of its own growth.

It is exceedingly gratifying to see men of science engaging in these, I will not say humble, for scarcely any are more important, but useful subjects of investigation. Every department of nature abounds in matters of interesting inquiry ; and none more than that of organic life. Nature in her various changes, transformations, and productions, is everywhere full of the miracles of wisdom, power and goodness. The perfections of the Creator are written all over her in letters of living light. The highest duty of rational beings is "to read, mark, learn, and inwardly digest them."

In looking at the infinitely multiplied productions of the vegetable world, in observing a small seed rising into a towering plant, an acorn changed into an oak, and what seems a pellicle, driven about by the wind, growing up into a wide-spreading elm, we must be lower than the beasts, which repose under its grateful shade, if we do not ask, How do these things come ? When we see the earth in a measure obedient to our commands, and in return for our labor pouring into our lap the means of subsistence and luxury with an unstinted liberality ; when we see the dependence everywhere existing between what we do and what we receive, what we sow and the harvest we gather ; when we observe the changes of the seasons, and the obvious effects of light and heat, and moisture and manure, we can hardly claim the character of rational beings, if we do not seek to understand these things. It is idle to pretend that the mysteries of nature are too sacred for inquiry. The gift of understanding and the power of its use imply the duty of inquiry. It is as idle to pretend, that they are mysteries which never

can be understood. The human understanding has its limits, doubtless, beyond which it cannot pass; but how far is it at present from having reached them? Every day is disclosing to us some new truth. Many things, once enveloped in all the terrors of mystery, are now familiar to the understanding of a child. The works of God and the courses of his providence, are not so many isolated facts, but they are facts compacted together, and under the control of general laws; so that, beyond all question, many of the most extraordinary phenomena, which present themselves in nature, are explicable upon the simplest principles. In many cases a single key will open the most complicated lock, and is at the same time applicable to a thousand others. The discussions of Liebig furnish some beautiful illustrations of these principles.

In order to solve the secrets of vegetable life and growth, we must watch the plant from its germination to its maturity, and remark, with all possible exactness, the various influences which bear upon it. We must study its nature, its relations, its changes; its relations to the soil, to the climate, to the light, to the moisture, and to its whole culture. Botany, considered as a mere form of classes and a mere catalogue of arbitrary names, is a meagre and comparatively worthless science; but when it involves the whole physiology of plants in all their aspects and conditions, in their growth, culture, maturity, and uses, it becomes a profound philosophy. Chemistry, likewise, must here come to our aid. In order to know what the plant needs, we must know what it is composed of; in order to learn what it obtains from the soil, we must ascertain what the soil has to yield to it; and we must consider the condition of the plant, in reference to the condition of the soil in which it is planted. Manures, likewise, everywhere the acknowledged means of fertility, require the most exact examination. Ascertaining, by the aid of chemical inquiry, the elements of the plant, we shall at least learn something of what it requires; ascertaining the nature of the soil, we shall see how it is suited to the plant cultivated; and knowing the composition of the manures, we may come to understand their operations. Chemical analysis seems to offer the only means of solving these mysteries.

It has already made distinguished advances; but yet they can be regarded only as first steps. There are difficulties in the case, which it would be in vain to deny. All chemical analyses are necessarily destructive of the subjects to which they are applied. We cannot take the separate elements from the analysis of a plant, a manure, or a soil, and put them together again like the pieces of a dissected map. We can

easily infer from a thousand facts, which chemistry has already disclosed, how much depends upon the form of combination of the most simple elements; and when we consider of what an almost infinite number of permutations and combinations a few simple substances admit, we perceive difficulties in the nature of the case which must certainly very much qualify our confidence of success. They should at least check all haste in our conclusions, and disarm all severity of judgment in respect to the conclusions of others, how much soever these may differ from our own. Truth should be our great and only object. Philosophy stimulates to the pursuit of it as the most precious of all gems. Nothing should abate our zeal; nothing should discourage our efforts in the search. Fifty years ago chemistry was hardly known as a science. Now, what triumphs has it accomplished, and what a world of wonders has it opened to our view! In its application to agriculture it presents itself as the natural solvent of its now difficult mysteries. Its whole tendency and aim, in this matter, unlike many other of its applications, are to confer unmixed good upon mankind. It discloses to our adoration more and more of those mighty operations of a beneficent Providence, by which, in an unbroken circle of dependence and subserviency, the most offensive substances are converted into all that is nutritive, delicious, and beautiful. It shows us how, by the exact and wonderful combination of a thousand subtile influences in the earth, the air, the rain, the light, the dew, daily and hourly the table of the Divine bounty is spread for all that live; and not one of his great family is, by the master of the feast, ever sent empty away.

D.—(p. 162.)

EXPERIMENTS IN THE CULTURE OF SILK.

I have the greatest pleasure in laying before my readers the annexed communications on the culture of silk, from my respected friend JAMES DEANE, M. D., of Greenfield, Mass.

They are exact, perspicuous, direct, and conclusive. It would be difficult to ask more in order to determine the question of the profit and success of this branch of domestic economy or household hus-

bandry, if so it may be called. I cannot persuade myself that, now the paroxysm of the multicaulis insanity is over, they will not attract that attention from the farmers, which their intrinsic importance claims; and from the admirable manner in which they are drawn up, they cannot fail to be read with interest. I commend them especially to the farmers' wives and daughters, if I am not presuming too much in thinking they will honor any portion of my pages with a perusal. Will not they take an interest in the history of the wonderful and disinterested labors of those humble operatives, to whom they owe so much that is useful and beautiful, ornamental to their persons and gratifying to their taste,—those delicate and exquisite fabrics which were once the exclusive property of the palace, but are now within the reach of the humblest cottager?

Letter 1.—From James Deane, M. D.

Greenfield, Jan. 5, 1841.

Mr. Colman,—

Dear Sir,—The past summer, remarkable for the duration and uniformity of its high temperature, has been favorable to the cultivation of the mulberry tree, but from causes not sufficiently investigated, the rearing of silk worms has been attended, all over the country, with a succession of mishaps and disasters. The larvæ composing my own stock were perfectly healthy, and commenced winding their cocoons on the twenty-eighth day, and as in the experiment I deem myself to have been successful, it is with true pleasure that I am enabled to present you a detailed statement of operations, together with some reflections naturally suggested by an acquaintance with this great subject.

There are several absolute changes in the life of the precious silk worm, which require for their complete development just one year, and as each change is regulated by peculiar principles, a thorough understanding of them all is essential to the success of those who undertake its artificial management. These changes embrace four distinct periods, the last terminating where the first began, to wit: the quiescent state, or that of the egg; the state of the larva, or of nutrition and the formation of the cocoon; the chrysalis state, or that intervening between the worm and moth; and finally the state of the moth, or that of reproduction. These divisions are natural boundaries, and they cannot be too well understood.

The period occupied by the egg is about ten months, and when left

to the action of natural causes, terminates in the spontaneous production of the young insect, reciprocally with the first growth of its appropriate leaf, when spring has far advanced. But to render exotic mulberrys, which have been retarded by annual transplantation, available, it has been necessary to retard in a corresponding degree the hatching of the egg. This can only be accomplished by subjecting it to the continued action of low temperature, somewhere between the freezing point and the 45° of the thermometer. This state should commence before the egg has felt the slightest influence of the vernal heat, and the method I adopt is to deposit early in March a tin box, containing the eggs, *in contact with ice*, and so keep them until wanted. In this way they have been known to keep two years and hatch well.

The eggs employed in my experiment were removed from the ice-house on the 20th day of July, and as an intermediate state between a low and high degree of temperature, they were placed in a cool cellar for a few days, and then subjected to the

TEMPERATURE OF THE HATCHING-ROOM.

1st day,	2d day,	3d day,	4th day,	5th day,	6th day,
72°	73°	73°	74°	73° to 80°	76° to 88°

7th day,	8th day,	9th day,	10th day,	11th day.
76° to 80°	76° to 80°	75° to 81°	75° to 82°	76° to 82°

Nearly the entire amount hatched vigorously on the tenth and eleventh days, and all others were rejected. It will be noticed that the temperature was gradually elevated about one degree each day during the hatching process, and was maintained as nearly as possible to 77° during the subsequent feeding state, the essential features of which are presented in the following table.

Days of rearing.	Ages of the worms.	Temperature.	Weight of leaves.	No. of feeds.	Space.	Amount of labor.	REMARKS.
1. Aug. 3,	1st day of 1st age,	76° to 80°	1 lb.	12	5 feet,	2 hours,	
2. " 4,	2d " "	76 to 81	2 lbs.	12	6 "	do.	
3. " 5,	3d " "	78 to 82	3 "	12	8 "	do.	Leaves chopped fine.
4. " 6,	4th " "	76 to 81	5 "	12	12 "	do.	
5. " 7,	5th " "	74 to 80	Moulting		" "	do.	Weather hot, with frequent thunder showers and one rain storm. Temperature occasionally regulated by stove.
6. " 8,	1st day of 2d age,	77 to 79	5 lbs.	12	15 "	4 hours,	
7. " 9,	2d " "	72 to 80	9 "	12	" "	do.	
8. " 10,	3d " "	73 to 78	12 "	12	20 "	do.	
9. " 11,	4th " "	74 to 80	8 "	12	30 "	do.	Fed once during each night.
10. " 12,	5th " "	76 to 81	5 "	12	" "	do.	
11. " 13,	6th " "	74 to 80	Moulting		35 "	do.	No. of worms, 20,000, (peanuts.)
12. " 14,	1st day of 3d age,	77 to 80	10 lbs.	8	" "	5 hours,	Weight of leaves, 1335 lbs.
13. " 15,	2d " "	74 to 77	15 "	8	" "	do.	
14. " 16,	3d " "	72 to 80	17 "	8	" "	do.	Weight of cocoons, 100 lbs. (chrysalis not stifled.)
15. " 17,	4th " "	44 to 78	25 "	8	" "	do.	
16. " 18,	5th " "	76 to 79	12 "	8	79 "	do.	
17. " 19,	6th " "	76 to 80	Moulting		" "	do.	Aggregate of time employed, 16 days,—12 hours to the day.*
18. " 20,	1st day of 4th age,	76 to 82	18 lbs.	8	" "	6 hours,	
19. " 21,	2d " "	76 to 84	30 "	8	90 "	do.	
20. " 22,	3d " "	77 to 83	50 "	8	" "	do.	Amount of silk, 7 lbs.
21. " 23,	4th " "	76 to 80	64 "	8	105 "	do.	Each lb. of silk requires 165 lbs. of leaves.
22. " 24,	5th " "	75 to 77	70 "	8	" "	do.	" " " 14 2-7 lbs. cocoons.
23. " 25,	6th " "	75 to 78	Moulting		" "	do.	" " cocoons, 13⅓ lbs. of leaves.
24. " 26,	1st day of 5th age,	73 to 78	72 lbs.	6	230 "	one day,	
25. " 27,	2d " "	75 to 78	109 "	6	" "	do.	
26. " 28,	3d " "	76 to 78	117 "	6	" "	do.	
27. " 29,	4th " "	75 to 76	137 "	6	355 "	do.	
28. " 30,	5th " "	75 to 80	150 "	6	375 "	do.	* Beauvais, in his table, gives the amount
29. " 31,	6th " "	76 to 78	158 "	6	490 "	do.	of labor for 185 lbs. of cocoons, 31 days;
30. Sept. 1,	7th " "	75 to 80	136 "	6	" "	do.	and the amount of foliage consumed,
31. " 2,	8th " "	76 to 79	96 "	6	" "	do.	2000 lbs.

The silk-worm being a cold-blooded insect, receiving its temperature from the atmosphere, the necessity of keeping up a suitable degree of warmth will at once be perceived. The degree of temperature has been found by experience to be not far from the numbers indicated in the table, and it must be maintained not only through the feeding and spinning state, but also through those of the chrysalis and moth. It is indispensable, for in all the mysterious changes of the silk-worm heat is the existing agent; it is nearly in a state of torpor between 50° and 60°, yet it will spin, but the time required will be twice as long, and the amount of silk not half so much, as when stimulated by a congenial degree of heat. Near the temperature of 77°, under active management, it completes its feeding state in 24 to 30 days, its spinning state in 5 or 6 more; it is a chrysalis about two weeks, and a moth one, during which time the sexes unite, and the female laying two or three hundred eggs, the circle of transformations is for the first time broken by death.

French writers compute an ounce of eggs to contain 40,000, but from numerous calculations I have never found the number to exceed 25,000. In this experiment I hatched an ounce, and the number of worms was not greater than set down in the table. The novice is always over-estimating numbers. I stifled the chrysales with camphor, and approve of the method as being cheap, expeditious, and perfectly efficacious, and at the same time not hardening the gum of the cocoon, which consequently reels with uninterrupted freedom. Miss Barton, who reeled my silk excellently, preferred cocoons treated with camphor to those not stifled, because the dead chrysalides gave her much less annoyance in the heated water of the basin. Reeling silk is a beautiful process that never fails to excite admiration, yet it is accomplished with ease, and with a little practice and steady perseverance, a young woman will reel a bushel of cocoons, yielding a pound or more of silk, in a day. The art is not however yet carried to such perfection as to enable us to make the most of our materials, for all but expert reelers waste a considerable proportion.

The actual amount of labor required in the first ages of the silk worm is very small, it is an agreeable pastime. But when immense numbers pass into the fifth age, the labor, difficulties and cares become great and incessantly greater, and for the first time we are sensible of the enormous service which the establishment demands. Then we discover the obstacle, and it is like a mountain; we suddenly find ourselves surrounded by myriads of voracious insects that double their

dimensions daily. Dirt and filth rapidly accumulate, signs of putrescent decomposition begin to appear, the weather is perhaps moist and sultry, and finally we perceive indications of disease and confusion. These considerations teach us the necessity of preparation, and of perfecting our systems with prudent forecast.

The sudden and enormous demand of labor in the fifth age, is the great barrier to an unlimited production of silk. It in a great degree prohibits the application of capital, and the culture of silk naturally becomes an incidental branch of agriculture. Whoever discovers the method of dispensing with the tedious labors of this age, will confer everlasting obligations upon his country. That it will be systematized, and even in a great degree abolished, I think no one who is acquainted with the subject can reasonably doubt. It has already attracted the attention of American culturists, and plausible theories have been announced. We may confidently predict that when the subject has once taken hold upon the public mind, as it surely must, peculiar systems will be unfolded, based upon a study of natural laws and upon the application of scientific principles.

I fed upon hurdles consisting of a light frame of wood three feet square, intersected every three inches with broom wire. They were strong and light, and ran upon grooves nailed to upright frames, so that they could be drawn in and out at pleasure, thus affording great facilities to the operations of feeding and cleaning. These hurdles are cheap, and, materials included, cost less than two cents per square foot, and are very durable. I placed them in tiers eight inches asunder, and each tier was separated by a shelf a foot in width placed on the same level with the hurdles to hold the brushwood for spinning. The hurdles were covered with paper, and when the worms left them for the spinning shelves, they were removed with the last remains of dirt.

We should anticipate our preparations for spinning, and may derive from our knowledge of the habits of these insects many practical applications. When it has ceased to eat, the silk worm for the first time in its life manifests a disposition to ramble. Its desire is to ascend as far as possible, and if no impediments exist, it will wander away many yards. If it can possibly get to the ceiling it is perfectly satisfied with the corners and angles it discovers there. The entire surface of the ceiling can be rendered available by nailing to it strips of board edgeways, and making suitable communication with it and the feeding shelf,

which is perfectly practicable. It is a great object with the culturist to get them out of the way, and their instincts certainly harmonize with our wishes. I succeeded in the following manner. My hurdle frames terminated within two feet of the ceiling, and this space I filled with green ferns, supported upright, not however quite touching the ceiling. Underneath this mass of brush, which occupied a superficial area of less than forty square feet, we had an aggregate of nearly three hundred feet of hurdles. The communication between the hurdles and brushwood, was by means of rods and strips of boards nailed to the hurdle frames so as nearly to touch the hurdles. In this way, with a little care the entire family ascended to the brushwood, which, in a few days was converted into a web of cocoons full forty pounds in weight. Every hurdle, of which there were thirty, was removed. An ingenious observation of these little artists will suggest a hundred ways of promoting their instructing labors, and the culturist must make his own selections.

From data acquired by practical experience I proceed to draw up a list of expenditures in cultivating silk, which under judicious management I believe will be found to approximate actual results. But I must say that there can be *no standard* of cost, where every thing depends upon skill, knowledge and judgment ; and since the audacious falsehoods of mulberry dealers have been circulated to accomplish their objects, I have looked upon published statements with some distrust, and accordingly invite to my own the sharpest scrutiny. Good land, with a warm rich mellow soil, will contain from 10,000 to 15,000 plants of the multicaulis variety, and they may be computed to yield 5,000 lbs. and upwards of foliage. For this amount of fodder five ounces of eggs will be required to be hatched, producing full 100,000 cocoons, a quantity at least sufficient to reel 35 lbs. of pure silk. It sells readily for $5 50 per lb., and would therefore bring the gross sum of $192 50

EXPENDITURES.—*For Foliage.*

Rent of land, ...	$6 00
Preparations for planting, ...	4 00
Planting and dressing two or three times, ...	8 37
Interest on trees worth $100, ...	6 00
Taking up trees, trimming, protecting, &c., . . .	5 72

For Feeding.

One lad, 16 or 17, first two ages, ...	$6 00
Two lads " third age, ...	6 00
Three " " fourth "	10 00
Five " " fifth "	25 00
Gathering and curing cocoons, ...	5 00
Interest on 2,000 feet hurdles, worth $40, ...	2 40
" " apartment and fixtures, ...	4 00
Reeling 35 lbs. of silk, 75c, ...	26 25
	$114 74
Net income for one year,	$77 76

The farmer must bear in mind that this sum is over and above a handsome compensation for labor, in fact, that if his daughters perform the reeling, every dollar will remain with his family. Can persuasion be wanting to induce him to see if these things be so? Here is no competition to frighten him; the consumption of the article is truly enormous, and no product of the soil finds a quicker market. I will not, however, weary you with further comments, but will close this long letter by expressing my belief, that the enterprize of cultivating silk in the United States will speedily make its way against the tide of prejudice and derision which now sets so strongly against it, and that silk will become one of the staple products of our fruitful land.

I am, dear sir, respectfully,

Your ob't servant,

JAMES DEANE.

Letter II.

Greenfield, 20*th Oct.* 1841.

Mr. Colman,—

Dear Sir,—I take pleasure in acquainting you with a very successful experiment in raising silk, made by Mr. Benjamin Barton, of Gill, which I deem to be so conclusive, that its publication is well calculated to dispel the prejudice which exists against this important branch of agriculture. The silk worms were reared by an invalid member of the

family, and the silk beautifully reeled by his daughter, whose smallest daily product was one and one quarter pounds of superb silk of the peanut variety. This fact may forever settle the question of reeling, concerning the difficulties of which so much has been said by those who know nothing of the art. Miss Barton is a young lady of intelligence, energy, and ingenuity, and will reel without difficulty in a perfect manner, two pounds of silk of twenty fibres in a day.

Partly at my suggestion, the details of this experiment were accurately noticed. The weight of eggs hatched was, 2½ oz. The worms spun in 28 and 29 days. The amount of leaves consumed was 2500 lbs. The weight of cocoons was 248 lbs. The weight of reeled silk was 20 lbs., and the amount of labor was one month, that is, the first half was greatly less than that, and the last days something more. The building used, was the vacant corn-house, which, of course, should not enter into the list of expenditures, and the fixtures were merely temporary shelves of rough boards, and a few hurdles to contain the larvæ, during their three first ages. Neither should there be any charge for eggs, as a great quantity was produced for future use. The expenses therefore stand as follows :

Labor, one month, $12 00 ; board do. $6, . . .	$18 00
2500 lbs. mulberry leaves, 50 cents per 100 lbs. . .	12 50
Gathering cocoons, camphor for curing do. . . .	2 50
Reeling 20 lbs. silk at 75 cts.	15 00
Interest on reel and fixtures, ...	1 00
	$49 00

And the income,

20 lbs. silk for which Mr. B. has refused $ 5 per lb. . .	$100 00
The state bounty of 15 cents on 248 lbs. cocoons, . .	37 20
" " 50 " 25 " reeled silk, .	10 00
	$147 20
Deduct,	49 00
Profit, including bounty,	$98 20
" excluding "	47 00
	$51 20

The reader will observe that the cost of cultivation, including every thing, was less than $2 50 per lb. and that it is very nearly covered by the bounty of the Commonwealth. There is, moreover, another fact that deserves peculiar attention. *The worms passed each entire age without the removal of their litter*, which service was only performed immediately after moulting. The worms were remarkably large and perfectly healthy; they were fed during their first three ages with chopped leaves, and during their two last ages on branches. This is unquestionably the best method ever adopted, to promote the perfection of the worm and its economical management. It is in harmony with the natural habits and the peculiar structure of the silk worm, that when large, it shall extend and repose itself upon the stems of those branches that furnish its nutriment. The insect is thereby elevated above its litter, it has a natural support for its body, its respiration is uninterrupted, it is high and dry above the fermenting mass of litter, and consequently an immense deal of fatiguing manual labor may be dispensed with. If we can dispense with the distressing labor of cleaning silk worms, except at the period of moulting, we have nothing more to desire; that such is the fact, I cannot doubt, for the instance I have just related, is but one of the many, that the experience of this year has disclosed.

I hope this letter will be acceptable; there is such a degree of prejudice, hostility and ignorance displayed by some leading organs of communication, that facts are either studiously suppressed, or converted into contemptuous ridicule and sarcasm, but truth will triumph still.

With great respect,

I am always yours,

JAMES DEANE.

E.—(p. 229.)

The subjoined Table will show the great exactness with which the Inspector of Hops, Samuel Jaques, of Charlestown, has discharged his duty,—an exactness highly creditable to him.

Amount of Hops *inspected in Massachusetts, under the law passed June*, 1806.

YEARS	FIRST-SORT.		SECOND-SORT.		REFUSE.		TOTAL.		AVERAGE PRICES.	VALUE.
	Bags	Weights.	Bags.	Weights	Bags.	Weights.	Bags.	Weights		
1806	699	215,916	176	52.329	35	9976	910	278,221	15 cts.	$41,733 15
1807	697	228.741	360	109.750	110	31,005	1167	369,496	11 "	40,644 56
1808	727	232,190	275	80,949	69	19.837	1071	322,976	10 "	32.297 60
1809	719	202.778	231	66,176	43	11,109	993	280,063	10 "	28,006 30
1810	683	184.294	334	87,160	107	28,046	1124	299,500	27 "	80.865 00
1811	989	270,558	418	115,325	112	30,167	1519	416,050	7½ "	31,203 75
1812	956	246,274	268	66,483	43	10,156	1267	322,913	12½ "	40.364 12
1813	710	179,761	205	52,204	52	11,277	967	243,242	22 "	53,513 24
1814	612	143.903	132	31.015	23	4722	767	179,640	25 "	44,910 00
1815	1093	252.959	281	64,794	60	13 920	1434	331,673	30 "	99 501 90
1816	1052	230,758	210	43.571	65	13,045	1336	287,374	32 "	91.959 68
1817	2369	568,014	513	117,499	205	44,349	3087	729,862	34 "	248.153 08
1818	1656	397,510	718	149.170	335	69,686	2709	616.366	14 "	86,291 24
1819	1690	398,583	738	167.974	406	90,345	2834	656,902	5 "	32,845 10
1820	1884	418.224	1006	223,337	665	141,102	3555	782,663	6½ "	50.873 09
1821	1621	342.359	671	142,811	367	75.893	2659	561.063	7½ "	42,079 72
1822	2499	492,221	210	33.827	110	22,661	2810	548,709	10½ "	57,614 44
1823	2309	488,759	449	93.764	178	35 921	2936	618,444	20 "	123.688 80
1824	2130	452.774	412	86.335	178	35,921	2720	575.030	10½ "	60,378 15
1825	2168	452,492	644	121,784	242	46,965	3054	621,241	15 "	93,186 15
1826	1332	257,574	595	114,532	207	36,901	2134	409,007	15 "	61,351 05

Amount of Hops—*Continued.*

YEARS.	FIRST-SORT.		SECOND SORT.		REFUSE.		TOTAL.		AVERAGE PRICES.	VALUE.
	Bags.	Weights.	Bags	Weights	Bags	Weights.	Bags.	Weight.		
1827	2653	530,521	698	139,341	415	82,278	3766	752,140	7 cts.	$52,649 80
1828	2006	401,211	884	176,813	422	84,310	3312	662,334	6 "	39,740 04
1829	1151	230,210	1332	266,121	227	45,301	2710	541,632	8½ "	46,038 72
1830	1815	363,321	645	129,147	372	74,121	2832	566,489	11 "	62,313 79
1831	1251	254,749	857	174,205	405	76,297	2513	505,251	10½ "	53,051 35
1832	1398	273,218	487	93,614	178	33,711	2063	400,543	23½ "	94,127 60
1833	2187	433,315	910	182,993	438	82,416	3535	698,724	16 "	111,795 84
1834	1840	352,129	1213	232,972	729	137,495	3782	722,596	14 "	101,163 44
1835	1196	239,200	1307	261,400	971	195,200	3479	695,800	9½ "	66,101 00
1836	1370	260,300	1938	368,220	1153	219,070	4461	847,590	7½ "	63,569 25
1837	1364	255,289	1589	295,969	401	72,390	3354	623,648	6 "	37,418 88
1838	1087	208,109	623	119,049	175	32,834	1885	359,992	15 "	53,998 80
1839	585	107,967	528	99,182	150	26,312	1263	233,461	15 "	35,019 15
1840	991	188,808	381	70,586	108	20,439	1480	279,833	30 "	83,949 90
-	49,489	10,744,889	22,238	4,630,401	93,961	1,965,168	81,488	17,340,468	-	$2,342,297 68

Recapitulation.—Bags, 81,488 : Weight, 17,340,468 lbs. : Average price, 13½ cents per pound.

SAMUEL JAQUES, Inspector General of Hops—*Massachusetts.*

Charlestown, January 1st, 1840.

F.—(p. 248.)

ACCOUNT OF A FARM, FROM 1811 TO 1836.

By Benj. Goddard, Brookline, Mass.

The insertion of the two following letters requires no apology to the reader. They are full of interest; and their statements are entitled to implicit confidence.

Letter I.

———, *Feb.* 18, 1822.

MR. H. COLMAN,—

DEAR SIR,—I present you with an exposé of my farming operations for ten successive years, not because I have any thing extraordinary to show, but because you have requested it. Had I begun solely with a view to profit, I should have managed very differently in some things. My object in choosing this pursuit was, to be retired from the perplexities of a commercial life; not for money, or the ease of the body, but of the mind; in these respects I have not been disappointed. Considering the little similarity there is in conducting mercantile and agricultural affairs, it may be expected that many errors and mistakes relating to the profit of farming will at first accompany the progress of the business. Notions adverse to profit are very apt to obtrude; this I know is true in my case. Included in the following calculations is considerable labor for making roads and walks, for ornamental trees, &c., and something in expensive fencing; in fact, all I have expended for these objects: besides, to avoid the necessity of too much personal application, I have omitted the cultivation of vegetables for the market, having always done as little as possible in that department, consistent with being sure of a supply for family use. The surplus makes up the vegetable column.

My farm contains, according to a plan, 29 acres and 34 rods, about 4 acres of which may be considered as taken up in house and barn-yards, roads, and unimprovable land, leaving for culture and pasture 25 acres; and 5 acres of salt marsh; also a wood lot, situated at about three miles distance, which is used for a supply of fuel only; and which affords a sufficient quantity without lessening the quantity of wood; there

being 56 acres, the growth is considered much more than I consume. All which I value as follows ; viz.—

The 25 acres under cultivation at $200 per acre, (which is to include the land taken up for yards, &c.) .	$5000 00
Five acres of salt marsh, at $75 per acre . . .	375 00
The wood lot, cost	1122 87
	$6497 87

I have kept an accurate account of the proceeds of the farm as sold ; and have made an estimate of what it has furnished for family use each year, for ten years, from 1811 to 1820, inclusive ; each description of produce will be seen in its appropriate column in the following table, from which it will be seen that the average annual income, in cash, for ten years, has been $869 37

ACCOUNT OF SALES FOR TEN YEARS—FROM 1811 TO 1820.

Date.	Vegetables.	Fruit.	Vinegar and Cider.	Meat.	Hay.	Stock.	Milk.	Corn and Barley.	Total.
1811	$132 06	$126 76	$183 94	$14 38					$457 14
1812	181 91	145 48	12 83	81 92	$130 18	$32 00	$17 13	$32 05	642 63
1813	112 93	68 07	93 47	69 67	202 68	30 00	44 97	75	1023 80
1814	180 38	63 71	254 92	41 21	253 08	112 00	15 00	103 50	1105 59
1815	162 38	151 56	206 60	61 37	506 69	" "	16 99	" "	1160 87
1816	165 36	169 73	187 17	60 69	399 69	37 00	12 71	128 50	1071 09
1817	132 49	240 37	295 31	48 24	329 93	" "	24 75	" "	816 04
1818	84 34	116 71	246 30	77 99	162 21	30 02	98 47	" "	821 36
1819	103 85	280 68	131 95	25 84	185 00	" "	94 04	" "	974 64
1820	111 62	248 88	191 83	87 21	207 43	" "	128 27	" "	
	1367 34	1611 95	1803 72	568 52	2376 89	241 02	452 33	264 80	8693 70

To which I add sundries supplied from the farm for the use of my family, viz :

Wood, without its preparation for the fire, . . .	$120 00
Keeping of a horse, ...	100 00
Milk, 365 gallons, at 20 cents per gallon, . . .	73 00
Fruit 40, vegetables 61, meats 30, corn 15, cider and vinegar, 15 dolls.	161 00
	$454 00
Average annual income, ...	869 37
	$1323 37

The above articles I have estimated at the price I should have to pay, had I no farm ; and as I hereafter charge the whole of my man hire to the farm, I here give the farm credit for a man's labor, which I should have to pay without a farm. I will say only half the expense of a man, although I do not see how I could do without the whole, unless I should make a boy answer ; say $72 00

1323 37

$1395 37

From which I deduct the average annual expenditures for the same period, which have been as follows :

Blacksmiths' work,	$48 37
Farming utensils,	56 16
Grain bought,	55 64
Man's labor,	344 89
Manure bought,	87 83
Pigs,	15 02
Seeds,	2 64
Trees,	12 15
As there has been no loss in the value of the stock or animals employed, but rather a gain, the oxen and cows having produced as much more (being turned off fat) as the horse has lessened in value, I charge the interest only on the value, which I consider $260,	15 60
	$638 30
Annual amount of income brought forward,	1395 37
Annual expenses to be deducted,	638 30
Balance,	$757 07

This balance is considered the net annual income of the farm for ten years before-mentioned, but something may be added for the improvements made during that time, as it was in a low state of cultivation in 1811, though it did then contain a good number of fruit trees. For a criterion to fix this amount, I take the increased income (in consequence of betterments) for the last five years, which I find to be $199 28 on an average above the average income of the first five years; this, added

to the above balance, gives $956 35, which may be considered a fair calculation for the present net annual income; and this may be expected gradually to increase without any additional expense, as it has done for the past time.

The result then stands, that the average income for the ten years is $11 68 per cent., which includes nothing for improvements; or, for the last five years, $14 70 per cent., upon the value of the land, in which value I have not included buildings, because the house belonging to the farm is leased; and the income is not considered in this calculation; were it to be added to the value of the farm, and the rent to the income, the result would be nearly the same.

The variations of the income in different years have arisen from several causes, viz: increase and decrease of produce; by a difference in the seasons; the difference of value in different seasons; and sometimes in consequence of articles being sold in one year that were the produce of the former.

Letter II.

Brookline, Dec. 5th, 1840.

Mr. Henry Colman,—

Dear Sir,—In compliance with your request, I have transcribed from my books the proceeds of my farm from the year 1821 to 1836, having presented to you a memorandum of the same from 1811 to 1820 inclusive. My object in keeping such an account was, in the first instance, to learn where the greatest profit might be produced, compared with the labor and expense, in the mode in which it was most convenient for me to manage my farm, that it might not bring me in debt; and not altogether that of making the greatest profit from it. I kept no vehicle for the market, but sold the produce to others, to sell again; therefore the result as to profit would be quite an unfit example for farmers, who must live from the product of the farm alone. Yet, from this limited experience, I am satisfied that had I been destitute of other resources, I could by method and industry, with suitable economy, have produced from my twenty-five acres sufficient for all the necessaries and comforts of my family, and a reserve every year for old age, without laboring any more than is necessary for health and pleasure.

It has been a delightful employment for me, while my age permitted me to direct the concerns. I yet take an interest in the occupation,

and indulge it as far as my strength will permit, on a little reserve I have made, having leased the most of my land since 1836. Until then I continued my farm account in the same manner as when I exhibited to you the result to the year 1820. I could give the items as I then did, but having pursued so nearly the same course it may answer every purpose to give the amount produced each year, in gross, and save the time of separating the items. The expense of labor may be considered the same, the variation from year to year being very trifling; also the supply for family consumption has been about the same. You will see that the sales from year to year vary considerably. This is owing not so much to the amount produced as would seem. My account was kept of sales within the year; in the year 1828 I sold no hay of consequence, it being very low at that period, and the sales were made the following years; the average of the whole gives the fair result.

Sales.

1821, . .	$1,059 26	1829, . .	$1,107 74
1822, . .	1,272 45	1830, . .	1,004 80
1823, . .	986 81	1831, . .	949 33
1824, . .	867 54	1832, . .	1,086 74
1825, . .	861 58	1833, . .	998 98
1826, . .	1,034 92	1834, . .	1,050 27
1827, . .	827 45	1835, . .	1,296 14
1828, . .	569 28	1836, . .	1,389 84
	$7,479 29		$8,883 84
			7,479 29
			$16,363 13

Which is an average of	$1,022 68	per annum.
Add for products used in my family, as stated in memorandum of 1820, . .	454 00	
	$1,476 68	
Deduct for expense of labor, etc., as then, though rather less, but there is so little variation I state the same, . .	566 30	
	$910 38	
I then deduct 6 per cent. on the value of the land, $6,497 87, as then stated,	389 87	
	$520 51	balance

for my personal services, which was an ample remuneration, as profit was not my sole object. I have kept a diary from 1811 to the present time,—an expense account, and an account of the sales of my farm to the time I gave it up,—from which I have derived much pleasure, and I think some profit. It has been a chart, to say the least, to prevent the ship from running against rocks, and upon quicksands, and has enabled me, with very little experience previously acquired, to keep the ship always in good order, and when I resigned the command to leave her much better than I found her. Many farmers I have no doubt keep good reckoning. Of such I would ask, have you not realized pecuniary profits, and has it not afforded you much pleasure, from time to time, to review the past? But I am writing to Mr. Colman, and not to the public. Were I writing to the latter, I would try to induce them to spend a short space of time at evening, while they rest from their labors, in noting daily occurrences, and in keeping their expense account, as well as that of their income. Reference thereto, as they may find occasion, will assist them in varying their operations in business, their expenditures, and show them the results of any experiments they may make, and give them great satisfaction in reviewing their labors.

Very respectfully, your obedient servant,

B. GODDARD.

G.—(p. 272.)

PEDIGREE OF COW OF PAOLI LATHROP.

I annex the pedigree of one of our animals which is taken from Coates' Herd Book, and the remainder of our herd have equally undoubted pedigrees.

Cow Nonpareil.—Red and white; calved September 30, 1827; bred by Stephen Williams, Northboro', Mass.; sired by Young Denton (963): dam Arabella, (bred by Mr. Wetherbee in England,) by North Star (460): grandam Aurora, by Comet (155,) sold for 1000 guineas: great-grandam, by Hervey (301): great-great-grandam, by Danby (190).

Yours respectfully,

PAOLI LATHROP.

H.—(p. 276.)

PEDIGREE OF H. WHITNEY'S SHORT-HORN COWS, NEW HAVEN, CONN.

"*Strawberry.*"—Roan; bred in England by Charles Tempest, Esq.; imported 1840 by H. W.; got by Ambo (1636): dam Fair Helen, by Young Albion (15): grandam, Miss Foote, by Pilot (496): great-grandam, Fair Maid, by Agamemnon: great-great-grandam, Madam, by Marshal Beresford (415): great-great-great-grandam, Tube-Rose, by the Lame Bull (359): great-great-great-great-grandam, Moss-Rose, by Suwarrow (636.)

"*Ringlet.*"—Roan; bred in England by the Earl of Carlisle; imported 1840 by H. W.; got by Belshazzar (1704): dam Rose, by Navigator (1260): grandam, by Jasper (331): great-grandam, by Marshal Beresford (415): great-great-grandam, by Cecil (120): great-great-great-grandam, by a son of Favorite (252.)

"*Violet.*"—Roan; 7 years old; imported 1840; got by Regent, dam Flowery, by Blucher: grandam Primrose, by St Albans: great-grandam Cowslip, by Masons, son of Chilton.

"*Harriet and Cornelia.*"—Twin calves; got in England by Birmingham: dam Ringlet, by Belshazzar, &c. &c.

H. W.

I.—(p. 277.)

PEDIGREE OF GEORGE HOOD'S COW.

"*Dolly*, a full blood Durham Short-Horn cow, ten years old in April, 1841, was raised by Benjamin J. Phillips of Lynn.—Pedigree as follows. Dam, a two-year old heifer, as raised by Mr. Phillips from a Durham cow which he owned, sired by young Comet, (owned by E. H. Derby of Salem.) He was from Comet imported, and out of Mr. Derby's imported cow. Dolly's sire was Cicero, (owned by Mr. Williams of Chelsea.) He was from Cœlebs out of imported cow Flora." There is some little confusion of names here, which probably will not be found in the established Herd Book; but I give it as I received it.

J.—(p. 300.)

METHOD OF DETERMINING THE WEIGHT OF CATTLE.

The following rules are given in an English agricultural work of established reputation. I cannot vouch for their exactness; but should they upon trial be found of use, the table, calculated upon these principles, might be easily published in a convenient form for general use, like an Interest Table.

"The following method of ascertaining the dead weight of cattle by measurement when alive, has been adopted to a considerable extent. It is found to be an expeditious mode; and if not to be implicitly depended upon, at least furnishes a very important assistance to the judgment of the dealer.

RULE.—Take the *girth* of the beast by measuring round with a string or tape close behind the shoulder-blade, and the length by measuring from the fore part of the shoulder-blade, along the back, to that bone of the tail which is in a perpendicular line with the hind part of the buttock. Multiply the girth (in feet) by itself, and that product by the length, and then again by 42; the last product, divided by 100, will give the weight in Smithfield stones of 8 lbs each. If stones of 14 lbs. are required, the multiplier will be 24 instead of 42."

Baxter's Library of Agricultural Knowledge, p. 364.

K.—(p. 301.)

EXTRACT FROM CHAP. 28, REVISED STATUTES.

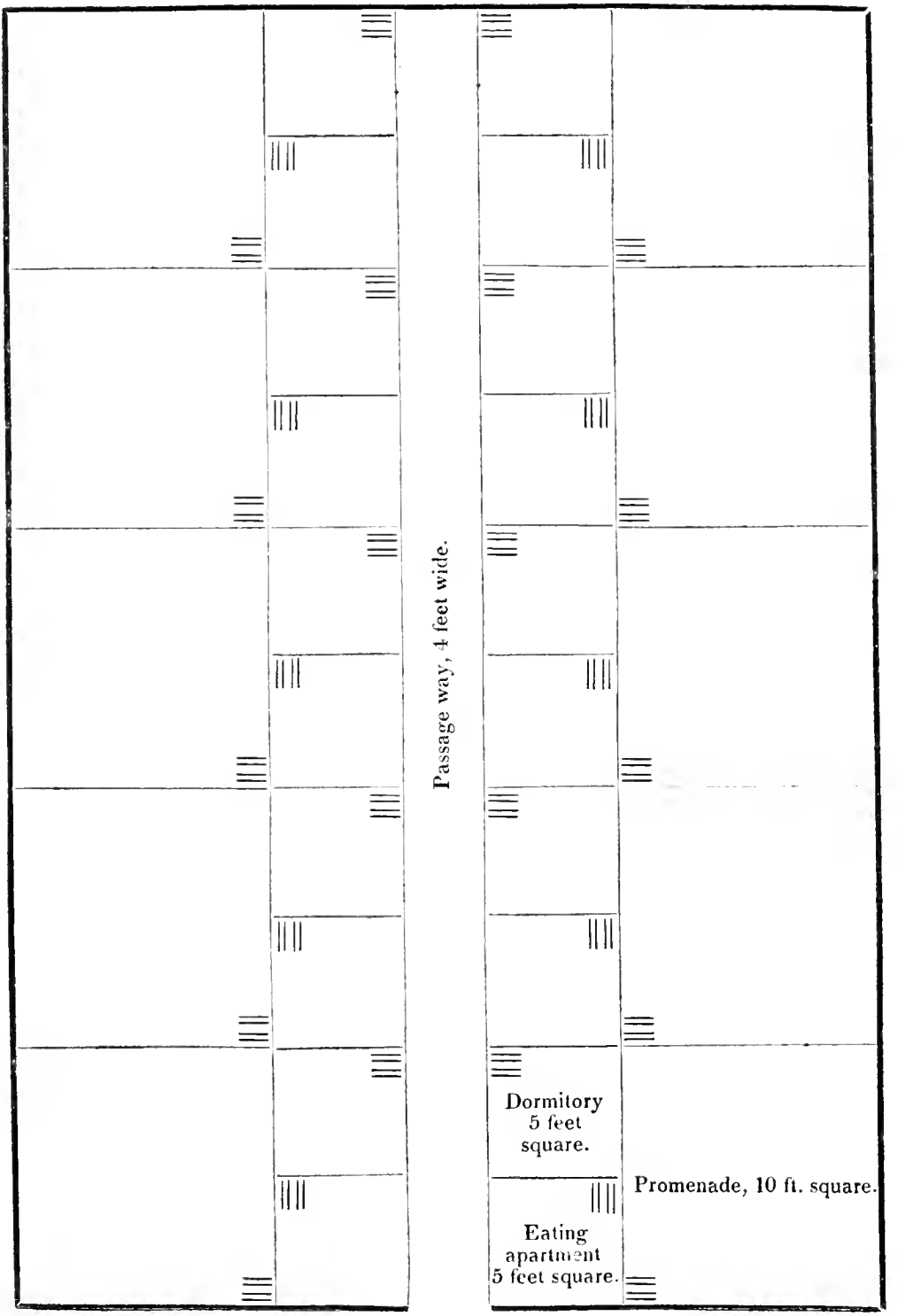
All beef cattle, except bulls, sold in market by weight, shall, when slaughtered, be prepared for weighing, in the following manner; the legs shall be taken off at the knee and gambrel joint, the skin shall be taken from all other parts of the animal, the head shall be taken off at the second joint of the neck, the entrails taken out, and all the fat of the same be taken off and weighed as rough tallow; and every other part of the animal, including the hide and rough tallow, (the udder of cows excepted,) shall be weighed.

All beef shall be weighed upon the first week-day succeeding that on which it may be slaughtered; and every person, who shall slaughter beef, so sold in market by weight, and prepare it for being weighed, in any other manner than as herein prescribed, shall forfeit a sum not exceeding thirty dollars for each offence; provided, that nothing herein contained shall prevent the buying and selling of beef cattle on the foot, or the slaughtering or weighing of cattle in any mode or at any time, which shall be agreed upon between the buyer and seller.—*Revised Statutes*, p. 260.

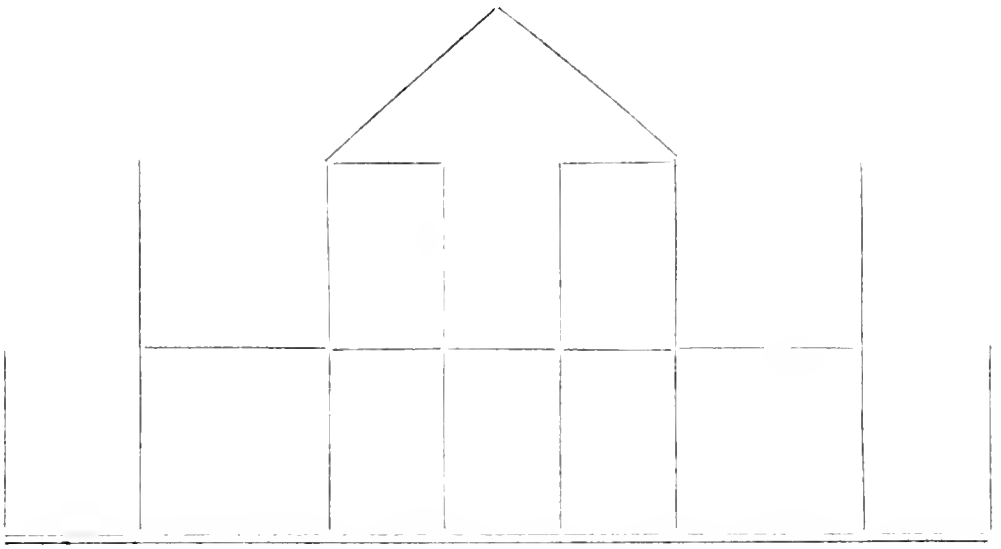
L.—(p. 311.)

PLAN OF MR. PHINNEY'S HOG-STYES.

"The annexed is a rough plan, which may serve to give you an idea of the compact manner in which my hogs are kept. It is intended for a plan of the upper story and one end. The lower story corresponds with the upper, except that the promenade is extended out about six feet from the line of the upper outside promenade line.



PLAN OF THE FLOOR OF THE UPPER STORY.



END VIEW.

"The roof covers the passage way and eating and sleeping apartments on each side, and is made sufficiently high to enable the feeder to pass between the pens. The floors of the eating and sleeping apartments are made perfectly tight; the floor of the promenade in the upper story is laid with narrow planks, placed about one inch apart, so that whatever is dropped by the pigs falls through on the compost beneath. The promenade of the lower story has no floor. The only passage for passing the pigs out and in, is by a slide-door between each dormitory and the main passage way. The pen being on ground which is a little higher at the end where the boilers are placed than at the other, the floor of the boiler room is on a level with the passage way of the upper story, where the pigs kept in this part of the building are taken in and out. At the other end of the building, the floor of the passage way in the lower story is on a level with the natural surface of the ground, and by a door at that end of the passage way, the hogs in the lower story are taken in and out. You will perceive that a pen 100 feet long and 31 wide, with 3 in a pen, will furnish ample accommodations for 120 hogs. A passage way for the feeder is made from the cooking room to the passage way in the lower story."—*New England Farmer for September*, 1840.

M.—(p. 393.)

G. B. EMERSON ON THE FOREST TREES OF MASSACHUSETTS.

At the instance of the Commissioner for the Agricultural Survey, during three successive sessions of the Legislature, a series of weekly meetings was held, of farmers in the Legislature and others interested in Agriculture, in the Hall of the House of Representatives, for conversation and discussion on this subject. These meetings were well attended, and excited much interest. It was said by one of the best-informed men in the State, seconded by several others, "that if the Agricultural Survey had accomplished nothing more than to have instituted and reported these agricultural meetings, in the interest which they created in the subject, and the information which they elicited and diffused, the Commonwealth was far more than compensated for its expenditures upon that object."

At the Tenth Agricultural Meeting of the session of 1841, Geo. B. Emerson, President of the Society of Natural History in Boston, was kind enough to address the meeting on the subject of the Forest Trees of Massachusetts. His remarks in this case were so interesting and instructive that I took pains to report them at large from my notes as well as I was able. A report of this kind can do but very imperfect justice to a public speaker; but I have taken care to do him no injustice, as I have obtained his revision of my report. The speech seems to me to deserve a more permanent preservation than in the columns of a newspaper; its appearance here will give additional value to my book, and I am persuaded be received with pleasure.

Mr. Geo. B. Emerson, agreeably to previous appointment, entered upon the subject of the Forest Trees of New England, announced before as the subject of the evening's discussion.

He began with the expression of the strong interest he had always felt in the forests of New England. He had visited among them, and had dwelt among them, with a pleasure and interest always increasing by indulgence. He had been more than twenty years familiar with them. When wearied and worn down with the labors of his profession in the city, he was accustomed to seek the retirement of the forest, and

to hold converse with the trees. He found in such intercourse an inexpressible delight, and returned to his duties refreshed and invigorated in body and mind.

He proceeded to say, that he had occasion constantly to lament the disappearance of the forests, which are suffered gradually to be wasted away. He should be most happy, if he could be in any measure instrumental in arresting this destruction. A few generations since and wide-spreading forests covered the whole land. Our ancestors on their arrival found the country a land of woods. But a large portion of them have fallen, and their beauty and glory have departed. Our forests are as interesting from the variety of trees which they present, as from their vast extent. Few of us are justly impressed either with their variety or value. It will be interesting to contrast the New England forests with the forests of our native country, of Old England, the land of our ancestors. I mean, said he, the forests of Massachusetts, with the *native* forests of England; for England has laid every temperate climate under contribution. The introduction of foreign trees into her territory for planting is more than a century old. She had added to her native trees and shrubs by importation 1300 or 1400 species. It would be exceedingly interesting to know the value of these acquisitions. She has gathered them from every island and continent; she has taxed the whole world; and of these exotics more than 500 are from North America.

In comparing the trees of America with those of England, Mr. E. went on to observe that in Massachusetts there were ten oaks large enough for ship timber; in England only two. Our white oak and our swamp white oak correspond nearly with the oaks of Great Britain. In some parts of Massachusetts we have the post oak, which is called, in Martha's Vineyard, the rough oak. We have the chestnut oak, the rock-chesnut oak; we have another oak, but he deems it a variety of this last. There are then five or six oaks of this first kind. There are five others of great, but of less value. There is the black, or yellow bark oak; the scarlet oak, improperly called red oak; the pine oak, found in the southern part of the State; the red oak, which attains a large size, but is of little value for timber or fuel; another called red oak, but often distinguished from it by the name; the grey oak, a variety well known in Maine, and much more valuable as timber than the true red oak. The scarlet oak does not grow in Maine. Besides these there are two small oaks of little importance.

Of maples there are three timber trees; the rock-maple, the white maple or river maple, and the red-flowering maple, commonly called, in this neighborhood, the white maple. In England they have only two large maple trees, and but one of them is considered indigenous.

Of ash trees we have three, and it is believed four, white,black, red and yellow ash. In England there is only one ash, of which there are several varieties.

We have one hornbeam; there is one in England, so called, from the resemblance in the longitudinal projections upon the trunk to the ridges on the horn of a deer. We have one beech; the English have one.

We have also the hop-hornbeam, or iron-wood, (*ostrya*) to which, in England, there is nothing analogous.

We have the tupelo tree, and in this instance, as in some others, there is no name universally known for this tree, as there is no tree at all resembling it, in the native country of our ancestors.

We have one chestnut tree; the English have one. We have four birch trees of considerable value; the small white or grey birch tree, the white or canoe birch, the black and yellow. The white is a tree of easy growth, and of great value.

We have two or three willows of some size, besides many small ones; the English have five or six willows. We have many fine English willows growing in this neighborhood. We have the celebrated Duke of Bedford's willow growing here. We have the white willow, the blue willow, the crack willow, and others growing in this neighborhood.

We have at least four large poplar trees; the English have four. We have one sycamore; the English have none. We have three elms; the English have seven, of which two or three are doubtful natives. We have the hoop ash. We have two walnut trees; the black walnut and the butter-nut. The black walnut, though not always recognized, may be found growing in about every county in the State. If a man wants a gun-stock, he will be sure to find this tree. The butter-nut grows every where. The English walnut is not a native of England. We have four hickories belonging to Massachusetts, and to these England has nothing to correspond. The sassafras tree is peculiar to this country. It was the first tree which attracted strongly the attention of our ancestors; and it composed a part of the first cargo remitted to their native country. We have one bass-wood tree. We

have three pines; the white pine, the pitch pine and the red pine. The English have a pine, which they call the Scotch fir, which resembles our pitch pine. We have two spruce trees, one hemlock, one larch, one fir, two cedars, and the arbor vitæ. We have not the yew tree, but in its place a low plant called the ground pine, growing abundantly in Berkshire county. It is not like the juniper, but resembles the yew tree. We have the tulip tree; but there is nothing of this kind growing in England. We have one cherry tree of timber size.

We have thus fifty-six timber trees, while the English have but twenty-seven. Our fathers in England have set us an example in the preservation of their forests, and the introduction and cultivation of foreign trees, which demands our imitation.

We have also many smaller trees, as, for example, the holly tree, which is an evergreen, but not of the pine family. We have one native mulberry—two alders, and at least four thorn trees. There are more than 720,000 acres in Massachusetts, occupied as woodland. Then there are 950,000 acres, which are unimproved, and 360,000 acres which are considered unimprovable. Mr Emerson questions the propriety of saying that any land is unimprovable. There are instances of the most hopeless sandy wastes being converted into forests. France has set us an example in this particular, worthy of all praise. In the southwest of France there was an extensive desert. It was a soil of loose sand, and began to excite considerable alarm because its ravages were continually extending themselves, and the blowing sand threatened to lay waste a large territory. They have in France a Board having charge of the forests. Under their direction, an engineer by the name of Bremontier, undertook, in 1780, the improvement of this waste territory. He began by making a fence with hurdles and branches of trees to windward, along the sea-coast. He then sowed upon the sand the seeds of broom, mixed with those of the maritime pine. There was danger of this sand being blown away; he therefore covered the whole with brush and branches of trees. The seeds of the broom and pines came up. The pines, when young, are an exceedingly delicate plant, and it is almost impossible to make them grow. The broom formed a protection for them, under which for seven or eight years the pines continued to grow—afterwards the pines became large enough to protect each other, and the broom died, having fertilized the ground with their leaves. The pine will grow upon barren sand, wherever the rain and the snow fall. No land is too barren for it.

Nutrition will be obtained from these sources to give support to the pines.

The rocky hills among us, which have been left bare, might be improved by being planted with the rock chestnut oak or with the larch. The barren hills of Scotland have been planted by the Duke of Athol, who has many thousands of acres under forest cultivation. The character of soils is dependent upon the rocks out of which they are formed. The geology of Scotland in many parts resembles that of Massachusetts. The experiment of the Duke of Athol has been perfectly successful; and the land on which these plantations have been formed, has vastly increased in value. We have many thousands of acres of what are now barren rocky hills, of a character extremely similar to what have been thus converted into forest.

Mr Emerson expressed confidently his belief that there is not an acre of land in the State which cannot be redeemed and made more or less valuable; even the wet marshes, where grass does not grow, or which yield no valuable product. There is probably no marsh, however waste and unproductive, which might not be redeemed by planting the white cedar or some other tree. The seeds of the white cedar might be scattered upon the marsh, and in most instances would presently take root. He has seen many acres which have been sown with this tree, by the processes of nature, within the memory of man. The cedar is a prolific tree; and often grows so closely in a swamp that you cannot get through it—in such unlimited abundance have the seeds been sown.

The forest land, the unimproved and that which is called unimprovable, constitute nearly one half of the territory of the State, or above 2,000,000 of acres—the whole of the territory being, according to the recent valuation, somewhat less than 4,500,000 acres. The whole of this might be devoted to trees.

Mr. Emerson then proceeded to speak of the uses of the forest. He noticed first its influence upon climate. Since the forests have been cut off, the climate of the country has been essentially changed. The forest collects moisture. Since the wood has been cut away, in many places where there were formerly streams with water sufficient to drive mills throughout the year, no perennial streams are now to be found. A forest is a great reservoir of moisture. The roots form a spongy mass, which retains the moisture; the leaves check its evaporation.—Under these circumstances it must have a material influence upon climate in rendering it mois

Forests are conductors of electricity. It is supposed by some writers that the reason why great portions of Spain, formerly rich and productive, are now barren, is because the forests have been cleared.—Nothing now arrests the electric fluid; nothing arrests the clouds and makes them pour their treasures on the earth. The electric fluid may be considered as having an important influence upon vegetation. Forests serve as natural conductors of electricity, to convey it to the earth. We should carefully leave our hills covered with trees.

Another advantage of forests lies in their affecting the winds of a country. On a country stripped of trees there is nothing to break the force of the winds. A bare hill does not protect a plain. If you cover a hill with trees, they will furnish a protection to the adjacent lands. Over a bare hill the wind pours like water in a cascade. The motions of great currents in the air resemble currents in the water. A gentleman of intelligence in Worcester, had stated to him that he believed that the reason why many delicate plants and fruits, which were formerly cultivated with success, now fail, is because the hills are stripped of their trees, which formerly furnished a protection. Trees are of great value as protectors on a small scale. Massachusetts is a country of winds, as the sailors well know.

Almost all the valuable trees which are planted in England, have nurses planted to protect them. Mr. Emerson had heard many complaints made that forest trees, when transplanted, would not grow; but no pains are taken for their protection. We often set out delicate plants on a bare plain, or on a windy side of a hill, and complain that they will not grow; but under such circumstances we can never look for success, unless we give them some protection.

Another advantage of the forests is in the preservation and improvement of the soil. When the land is stripped of trees, the soil is liable to be carried off on lands which are inclined. When the rain pours down on unprotected hills, it forms torrents which carry with them large portions of the soil. Most of this the matted roots of the trees would retain. Besides, every tree returns more to the soil than it takes from it. Every tree has thus a tendency to retain and to improve the soil. Trees growing in the forest improve the soil. The processes by which soil has been formed upon rocks have been watched. At first the lichens appear; they want nothing but foot-hold; and their almost invisible seeds, or sporules, are perhaps always floating in the air; there is no rock so hard and bare but they cling to it. They get their nourish-

ment from the atmosphere. In dying, they leave behind them a thin layer of soil, in which other lichens of a more succulent nature, and mosses, take root. Herbaceous plants will succeed these; and in process of time trees will follow, and clothe these barren wastes with wood; and as their successive deposits continue to form and enrich the soil, the wood will be continually growing better.

The next great value of forests is for fuel. This is a matter of vast importance. Here the value of trees cannot be over-estimated. The population of Massachusetts is 718,000. A family in England has been estimated to average 4 persons and 7-10ths. In Massachusetts, families are larger; we marry younger and rear more children; and here a family may be considered as averaging six, perhaps seven persons. The prices of wood vary much in different parts of the State. In some parts of the State it is worth two dollars, and in Boston seven or eight dollars. The average price may be set down, as nearly as can be calculated, three dollars and eighty-three cents. Suppose it to be three dollars and a half. Mr. E. had received estimates from all parts of the State, which varied from four or five to thirty or forty cords for a family. A fair estimate would give thirteen or fourteen cords on an average to a family. But call it only twelve. These at $3 50 per cord, will give $42 as an average for the expense of the fuel for each family. Calling seven individuals one family, and we have more than 100,000 families in the State, and the annual cost of their fuel over $4,200,000. If we count six persons a family, the expense will exceed $5,000,000. All this is or might be furnished by the forests of Massachusetts. How valuable, then, are our forests, and how important it is to know the best means of managing them, and the proper time of cutting them—the most important trees to cultivate, and what should be eradicated. There is a great choice of valuable materials for fuel. The hickories are among the best, and perhaps, on the whole, preferable to any other trees for this purpose. The maples rank next. These woods are as valuable for charcoal as for wood. That which is best for wood is best for charcoal. The woods which contain the largest amount of carbon will produce the largest amount of heat. The hickories produce the most carbon, and are therefore the most valuable as fuel.

The next value of forests is in the timber which they furnish for ship-building, for joiners' work, for house-building, and various other purposes. Vast sums might have been saved to the country by cultivating oaks. The English oaks grow here as readily as any where, as

readily as our native oaks. The English oaks and our white oaks very much resemble each other. These oaks are furnished for the English navy. For this purpose they are probably superior to ours. The objection made by many to planting them is, that they would not be productive in their time, requiring as many as seventy or eighty years to perfect their growth. Shall men act only with reference to themselves? Will they be governed by such mean and narrow principles? Let them plant them for the benefit of their grandchildren, or those who shall come after them. If they do not grow to be of use in our times, others will have the benefit of them. The success of the Duke of Athol in his plantations is most remarkable.

[The late Duke, John the Second, planted in the last years of his life 6500 Scotch acres of mountain ground solely with the larch—which, in the course of seventy-two years from the time of planting will be a forest of timber fit for building ships of the largest class in the navy. It will have been thinned out to about 400 trees per acre. Each tree will contain at least 50 cubic feet or one load of timber, which, at the low price of 1s. per cubic foot, only half its present value, will give £1000 per acre, or in all a sum of £6,500,000 sterling. Besides this, there will have been a return of £7 per acre, from the thinnings, after deducting all the expense of thinning and the original outlay of planting.—Further still, the land on which the larch is planted is not worth above 9d. to 1s. per acre rent. After the thinnings of the first 30 years, the larch will make it worth at least 10s. per acre, by the improvement of the pasturage on which cattle can be kept winter and summer.—*Rep'r.*]

It is surprising with what indifference our valuable trees are cut off. Mr. E. remarked that within his own recollection, in Maine, vast numbers of acres had been laid smooth. It would require two or three centuries to restore them. The same is true in New York. The forests are gone and going, and it particularly behoves Massachusetts to be taking care; and by a wise foresight to supply the actual deficiency or prevent its further wasteful progress; to be providing against future want. The next value of forests is as furnishing materials for furniture. Our own timbers are in this respect of the best description. Perhaps few have seen a table made of the roots of the white oak. In England, five pounds sterling have been given for the roots of a white oak. The pieces have been taken out, and when sawed and planed present a wood of extraordinary beauty. The roots of the black birch likewise have been used for the frames of pictures, and nothing of the kind within

his knowledge has been more beautiful. The roots of trees have been generally neglected even for ship-building, where they might often be employed to advantage. A great deal of very elegant furniture is now made from our own trees; from the rock maple, which displays its rich curled knots and eyes and cloudings, and from the soft maples, whose wavings are so beautiful; and these woods of super-eminent beauty are much cheaper than mahogany.

We require in the next place much wood and timber for implements of husbandry, for carriages, and for a variety of other indispensable uses. Ash, oak, and hickory are and always will be in constant demand.

The lofty ash of England is valued for its toughness. The ash of New England is tougher still, and makes better oars and materials for carriages. Our carriage-builders are now obliged to go to Maine or to the South or West for their timber. We require such timber for fencing, and for this purpose the chestnut tree and the white cedar furnish the best materials. In the growth of cedar two thirds, often nine tenths, should be thinned out; and with these thinnings a fence may oftentimes be made by driving the pieces into the ground, inclined at a considerable angle to the ground, and in two rows, touching each other, and leaning in opposite directions, the pieces to be wattled together where they cross. He has seen a very cheap and durable fence made in this way. Larch may be used in the place of cedar.

Our forests furnish many materials for tanning. Our shrub white and our shrub red oak, which correspond with the trees which are used abroad as producing the greatest amount of tanning, are here burnt. We are wasteful of these materials. We require likewise materials for dyeing. The alders are much used in the North of Europe for dyeing. A strong dye is to be found in the birches; and birches are likewise used in foreign countries for tanning. But of these uses we know little; and while no attention is paid among us to the cultivation of trees, the preservation of those which exist among us is treated with indifference. One advantage which comes from the study of forests is the discovery that plants of the same families have the same properties.

The manufacture of chairs, which is a large and productive business in Massachusetts, requires a great amount of materials, and those, which are at present of necessity employed, are in general much inferior to those formerly obtained. Basket-making is a considerable busi-

ness, and for this object young white oaks are worth twenty dollars a cord. The amount of timber required among us for barrels, hogsheads, pails, and hoop-poles, is immense; and this demand must not only continue, but increase.

Walking-sticks are always in demand. This is a great article in Great Britain; and it is a curious fact that within the last year 25,000 walking-sticks were cut and sold in the vicinity of Niagara Falls.

The cultivation of the rock maple for sugar is a matter of great importance. From trees planted by persons now living sugar is made in great quantities, and several towns in this Commonwealth, from these resources within themselves, are now able to supply their own sugar and molasses.

Mr. Emerson expressed an unwillingness, on account of the lateness of the hour, to trespass upon the indulgence of his audience, though the subject was large, and he had intended to say much more.

Trees deserve our cultivation as matter of taste, for their ornament and their shade, and for the rich beauty which they impart to the landscape. In travelling in a sultry dry day of summer, he has many times found occasion for the most grateful acknowledgments under the wide-spreading and refreshing shade of a tree planted by some kind hand on the road-side.

He has often been filled with delight in the survey of some of the beautiful prospects and scenery presented in our own State. Many travellers are familiar with a hill in Bolton, on the road to Lancaster, which opens a prospect of surpassing beauty, in the wide area of many miles circuit, spread out to the view, comprehending the charming valley of Lancaster, through which the quiet Nashua marks out its winding channel, and presenting in the distant prospect some of the highest hills of Massachusetts, and some lofty mountains of New Hampshire. The magnificent elms, which proudly spread their wide branching tops upon the meadows—the groves here and there, which the axe has spared—the frequent orchards, which indicate the wise care of the cultivator—and the extensive forests in the distance, with their mingled shades of green, from the most sombre to the brightest tint—conspire to present a landscape which fixes the attention of the most careless, and in its varied forms of light and shade, of forest and cultivation, of valley and mountain, of crops and trees, with here and there a beautiful village with its spires pointing to Heaven from among the trees, can never fail to charm the eye and to touch the heart. The prospect from

Mount Holyoke, at Northampton, presents a scene of still higher beauty and grandeur and interest. Here too the elms in the village and on the meadows are seen in their unrivalled majesty and pride. Both these views owed much of their beauty to the preservation of a single species of trees, the American elm.

Mr. E. said that there were a thousand beautiful views in all parts of Massachusetts—a thousand spots where it would seem delightful to spend a life—a thousand spots where he almost envied those who had the luxury of living—of seeing the sun rise and set—and the heavens always above and the green earth always around them.

We have a beautiful State; it was much better, it was a glorious State. He honored old Massachusetts; he gloried in being a citizen of this State. He honored her for the stand she had, from the beginning, taken in regard to the education of her sons; for being the first to declare that they should all be educated. He blessed her for her example in this matter; an example which others had not been slow to follow—an example whose value it would be impossible to over-estimate. He honored her for what she had done for those causes which were the highest distinction, the truest glory of man; for what she had done in the great cause of civil and religious liberty—in the holy cause of charity. He honored a people whose energy and industry and skill are such that they have more to show for a year's exertions than the same number of men any where else; and who, while they were so laboring, and so successfully, were still so far from being absorbed in the love of money, that they freely did more and paid more for the education of their children, for institutions of charity and for the cause of science, than the same number of people elsewhere under heaven. These were things to be proud of;—and when he travelled among such people—he desired to see them dwelling, as they deserved to dwell, in the pleasantest habitations.

Now there was many a spot which might easily be made much more beautiful. For houses and farms, there was no element of beauty so important and none so controlable as that produced by trees.

A single tree! what a charm it gives to a farmer's house! It was something for the imagination to dwell upon: it was something that the owner might look upon and point out to his children, as something better than could be estimated by money. What effect might not a single oak or birch with its golden tassels or an elm have, in awakening the sense of the beautiful, upon a child who was just learning to look upon the beautiful creation!

N.—(p. 403.)

NUMBER OF PLANTS ON AN ACRE.

The following table shows the number of plants contained in an acre, planted at the several distances specified in the columns marked "feet apart." For example, an acre will contain 10,890 corn-hills two feet apart; 2,151 four and a half apart, &c. These numbers are obtained by dividing 43,560, the number of square feet in an acre, by the square of the number of feet the plants are distant from each other; thus—the square of 2 is 4, and 43,560 divided by 4 gives 10,890, as above. If the plants be set in an oblong form, as five feet by six apart, multiply the two distances together, and divide 43,560 by their product, for the answer. When setting out trees, farmers generally name the distance in yards. In this case, divide 4840, the square yards in an acre, by the square of distances apart, if they be equal, or by their product if they be unequal, and the quotient will be the number of trees in an acre. For example: at 7 yards apart, an acre contains 98 trees; for the square of 7 is 49, and 4840 divided by 49 gives 98, the nearest whole number. If the distances be 7 and 10, their product is 70, and 4840 divided by 70 gives 69 trees.—*Newbern Spectator.*

Ft. apart.	No. plants.	Ft. apart.	No. plants.	Ft. apart.	No. plants.	Ft. apart.	No. plants.
1	43,560	1½	19,360	2	10,890	2½	6969
3	4840	3½	3556	4	2722	4½	2151
5	1742	5½	1440	6	1210	6½	1031
7	889	7½	774	8	680	8½	602
9	537	9½	482	10	435	10½	395
11	360	12	302	13	257	14	222
15	193	16	170	17	150	18	134
19	120	20	108	25	69	30	48
35	35	40	27	-	-	-	-

O.—(p. 421.)

FORMS OF ACCOUNTS.

Forms of accounts are sometimes highly useful. Many persons would be glad to keep exact accounts of all their proceedings, but from want of experience or an imperfect education, are incapable of doing it. Books of forms for the use of farmers would be very serviceable. From the Table of the returns of Hops inspected in Massachusetts, it will be perceived with what remarkable and creditable exactness this record has been kept. S. Jaques, the Inspector of Hops and the proprietor of the Ten Hills Stock Farm in Charlestown, Mass., has been equally exact in some of his arrangements there ; and as he has been kind enough to furnish me with the forms in which some of his accounts have been kept, I subjoin them for the benefit of the farmers.

1.—*Labor Roll at Ten Hill Stock Farm, September*, 1838.

Names.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Days.	Rate of Wages.	Amt of Labor.	Board.	Total Amount.
1—Stephen Brown.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30	a $1 pr day & board himself	30 00	-	30 00
2—M. E. Griffin, -	-	1	½	1	1	1	1	1	1	1	1	1	1	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21½	a $25 pr month & board —gave lost time, - -	25 00	10 71 3-7	35 71 -7
3—J. E. Smith. -	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30	a $13 pr month & board him	13 00	10 71 3-7	23 71 3-7

2.—*Table for keeping a Milk Score, to be put on pasteboard, and kept by the customer and marked by the milkman, and may be extended in the same form for the year, and settled monthly.*

Name :—G——— F———. Boston, 1838.

January.		February.		March.		April.		May.		June.		July.		August.		September.		October.		November.		December.	
Dys.	Qts.	Dys	Qts.	Dys	Qts.	Dys.	Qts.	Dys.	Qts.	Dys.	Qts.	Dys.	Qts.	Dys.	Qts.	Dys.	Qts.	Dys	Qts	Dys.	Qts.	Dys	Qts.
1	6	1		1		1		1		1		1		1		1		1		1		1	
2	6	2		2		2		2		2		2		2		2		2		2		2	
3	5	3		3		3		3		3		3		3		3		3		3		3	
4	6	4		4		4		4		4		4		4		4		4		4		4	
5	7	5		5		5		5		5		5		5		5		5		5		5	
6	6	6		6		6		6		6		6		6		6		6		6		6	
7	5	7		7		7		7		7		7		7		7		7		7		7	

3.—*Monthly Account of Milk delivered, to be kept at home, and charges duly entered.*

Ten Hill Stock Farm, March, 1838. Sundry persons Dr. to Milk.

Names.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Quarts.	Price	Total.
1—S. F. T.	-	2	-	2	-	1	2	-	2	-	2	-	1½	2	-	2	-	2	-	1½	2	-	2	1	3	1	3	3	1	3	1	40	6 cts.	$2 40
2—H. D.	-	2	-	2	-	1	2	-	2	-	3	-	1	2	-	3	-	3	-	2	4	-	2	-	2	-	1	3	-	2	-	37	6 "	2 22
3—D. F.	-	1	1	1	1	1	1	-	1	1	1	1	1	1	-	1	1	1	1	1	1	-	1	1	1	1	1	1	-	1	1	26	6 "	1 56
4—J. H.	-	1	2	1	1	1	3	-	1	1	1	1½	2	2½	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	37	6 "	2 22
5—E. H.	-	1	1	1	1	1	2	-	1	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	32	6 "	1 92

4.—*Cows and Bull Record.*

Dates.	Owner's Name.	Name of the Cow, number or marks.	Bull's Name.	Cows when Dry.	Cows when Calved.	Bull or Heifer Calf.	Remarks.
1838—Jan. 19,	John Fenno, -	Black Cow, - -	Don Cream Pot,	- - -	- - -	- - -	Paid.
April 15,	S. Jaques, - -	Civilia, - - - -	Don Cream Pot,	Dec. 12, 1838, -	Jan. 21, 1839, -	Heifer, - -	Raised—Red.

In addition to this, Mr. Jaques has kept an exact account of the age, descent and pedigree of all the neat animals bred on his farm, and has begun probably the first "Herd Book" in the country.

P.—(p. 120.)

ON THE FEED OF SHEEP.

Extract of a Communication from H. D. Grove to the New York State Agricultural Society in 1833.

[This should have followed Appendix B., but was accidentally omitted in that place.]

"In respect to the effect of grain, roots and hay upon the increase of flesh, wool and tallow of fine sheep, we are indebted to M. de Raumer, for his experiments, which throw much light upon the subject, and whose results are the more creditable since they are in accordance with the experience of others. I communicate his results because they may be considered as a sure basis in this matter.

	Increase of weight in the living animal.	Produced Wool.	Produced Tallow.
	lbs.	lbs. oz.	lbs. oz.
1000 lbs. Potatoes, raw, with salt,	46½	6 8¾	12 5½
1000 " do. without salt,	44	6 8	10 14½
1000 " Mangel-wurtzel, raw,	38½	5 3½	6 5½
1000 " Pease,	134½	14 11	41 6
1000 " Wheat,	155	13 13½	59 9
1000 " Rye, with salt,	90	13 14½	35 11
1000 " do. without salt,	133	12 10½	43 8½
1000 " do. meal, wet,	129	13 6½	17 7½
1000 " Barley,	136	11 6½	60 1
1000 " Oats,	146	9 12	42 8
1000 " Buckwheat,	120	10 4½	33 8
1000 " good Hay,	58	7 10½	12 14
1000 " Hay with straw, without other fodder,	31	15 8	6 11
1000 " Whisky-still grains, or wash,	35	6 1	4 0

Potatoes, raw and cut into slices, sheep ate with good appetite and greediness in duration—one sheep ate daily 7 lbs., with straw interchangeably after the potatoes: they remained lively and healthy, and drank 1½ quarts of water per head in 24 hours.

Mangel-wurtzel, sheep ate with greediness, 8 lbs. per head daily in duration, interchangeably with straw as with potatoes: they drank 1 quart of water per head in 24 hours, and remained likewise healthy.

Pease, 2 lbs. per head daily readily eaten in duration: drank from 2 to 3 quarts of water per head in 24 hours, and remained perfectly healthy. In an unsoaked condition pease are hard for sheep to eat, and wear their teeth.

Wheat, sheep ate greedily 2 lbs. per head in duration, and drank from 2 to 3 quarts of water in 24 hours; made them very lively, and remained perfectly healthy.

Rye, sheep do not eat readily, and it does them little good, as is exhibited in the above results of the increase of weight: they drank from 2 to 3 quarts of water daily.

Barley, 2½ lbs. per head daily in duration with greediness, and sheep do extremely well on it: they drank 3 quarts of water per head in 24 hours.

Oats, had the same effect as barley upon the appetite and health.

Buckwheat, sheep eat with great avidity, and with the best results upon the health and liveliness of the animals.

Good hay, 4½ lbs. per head daily in duration, and drank 2½ to 3 quarts of water in 24 hours.

Flag-hay, rush, &c., the lighter and the less sheep eat of it the better, as it makes them weak and inactive; and two of the sheep on which the experiments were made, became sick—one was killed, the liver and gall of which were found infected, and the other died.

M. de Raumer also considers, in accordance with M. Von Thaer,

1 lb. oil-cake meal to be as nutritious as 2 lbs. of hay.
80 " clover hay like 100 lbs. ordinary hay.
84 " vetches, esparsette and lucerne, the same.
200 " good sound straw of pease and vetches like 100 lbs. hay.
300 " barley and oat straw like 100 lbs. hay.
400 " wheat straw like 100 lbs. hay.
100 " turnips nourish as much as 40 lbs. potatoes or 50 lbs. mangel-wurtzel.

The above I have for a number of years, say 12 or 13, taken as my guide in foddering sheep, and have found that my flock did extremely well whenever I proportioned their food according to nutritiousness, and in such manner as that which 2 lbs. of good hay would give to each animal. If, therefore, I fed potatoes or other roots or grain, I gave straw with it in order to fill the belly. The best way I have found to be, a foddering of straw in the morning before roots. It seems to be congenial to

the nature and economy of the sheep, and digests better than roots on an empty stomach. This practice is pursued by the most intelligent breeders of sheep in Germany."

Q.—(p. xx.)

QUERIES BY THE ROYAL DANISH RURAL ECONOMY SOCIETY.

1. What is the soil, both superficial and subsoil? Is it high or low ground? Flat or hilly? Does the soil suffer from water? Could irrigated meadows be introduced?

2. Are there springs or small lakes? Has the quantity of water in these latterly diminished? To what cause is such diminution ascribed? Have lakes or marshes been drained?

3. What is the climate? Dry, moist, cold, mild, &c.?

4. Have the common lands been divided? And if so, into small parcels? What have been the results of such division in respect to population, agriculture, stock, &c.?

5. What is the prevailing system of culture? What variations from the system occur? Are naked fallows used, or alternate white and fallow crops? What is thought of these respective practices? Is much ground kept constantly in grass?

6. Is the practice of soiling gaining ground? What objections are urged against it?

7. Are lime, muck, marl, or other artificial manures applied? Have experiments been made in paring and burning both plough-land and meadow? If so, with what success? On what soils has this been tried, clayey, sandy, marly, or turfy?

8. Are oxen used for farm work?

9. What are the agricultural implements? Is the superiority of the swing plough (English plough,) admitted? Are the modern labor-saving implements known and used?

10. Are there wild and uncultivated lands? Are these reduced to cultivation? And how? With what succession of crops? And with what success? In the new clearings, unconnected with the established system of husbandry, do they use the labor of horses or oxen? What stock have they introduced, horn cattle or sheep?

11. Are the farmers careful in procuring good seed?

12. Are any uncommon grains, or other crops, cultivated?

13. Is grain affected by rust, blasting, or other diseases? Is there any satisfactory knowledge of the causes?

14. Is there any settled rule as to the degree of ripeness, which grain should have when harvested for market?

15. What is the character of the grain? Is there apparatus for thoroughly cleansing it? For drying it? And are measures taken for its improvement?

16. Is there difficulty in the sale of agricultural products, from want of market towns, or facilities for shipping?

17. Is the fall feeding of cultivated lands practised? Are new hedges planted, or the old kept up?

18. What is the condition of stock husbandry, both with regard to the character of the stock, and the number to a farm of given extent? Do milch cows or fat cattle yield the best profit?

19. Are more or fewer horses raised than formerly, and why?

20. Are the finer-wooled sorts of sheep increasing? Is sheep-folding practised? Are the sheep ever stall-fed? Is the native breed diminishing or increasing?

21. Is Horticulture advancing? How large gardens do the farmers commonly cultivate?

22. Are there forests which supply fuel and timber? New plantations? Is there turf for use or sale? Are plantations for hedges, or trees for fuel and timber of the extent of three, five, or seven acres, meditated?

23. Is domestic industry thriving? And employed upon articles for domestic use only, or for market? How could domestic industry be encouraged, so as to bring its products more into commerce?

24. Are there any distinguished agriculturists, either large or small proprietors, and are they among the *peasantry*, or not? What have they accomplished?

25. Is there any Economical society, and what does it accomplish?

26. Is the price of lands rising or falling? Is any portion of the population unemployed? What are wages? Might the people introduce collateral sources of income, besides agriculture, such as lime-burning, or the manufacture of clay wares?

27. What special branches of rural industry deserve special encouragement? Does animal or vegetable production merit the preference?

And of the former, whether the raising of cattle, sheep, or horses? What plants, for grain, fodder, or market, can be most advantageously cultivated?

28. Is there any thing special in the husbandry of your district, worthy to be followed or shunned elsewhere?

29. What local improvements, is it supposed, would be particularly advantageous?

R.

WEEDS.

"*Weed.—A weed is a Plant out of Place.*"

The subjoined Table was prepared at my request, by John L. Russell, minister of Chelmsford, Middlesex county, Mass. Mr Russell has distinguished himself by his botanical researches and his ardor and success in the study of Natural History. Why should not he preach about the flowers of the field, after the example of the highest of all teachers, who charged his disciples to "*consider the lilies how they grow*," that they might learn a lesson of the ceaseless and benignant Providence of God?

Native and Introduced Plants growing about Fields and Gardens: considered as Weeds by the Agriculturist.

Daucus Carrota, L.—Wild Carrot, (introduced:) in mowing; abundant in Chelsea.

Ligusticum Scoticum, L.—Sea Lovage; edges of meadows near the sea.

Pastinaca Sativa, L.—Wild Parsnip, (introduced:) fields and way-sides; liable to spread if neglected.

Clematis Virginiana, L.—Traveller's Joy; climbing over bushes and stone walls.

Ranunculus Acris, L.—Acrid Buttercup; in very wet meadows.

Chelidonium Majus, Willd.—Celandine; probably introduced—in gardens, way-sides, &c.

Cochlearia Armoracea, L.—Horse Radish; troublesome as a weed in mowing.

Lepidium Virginicum, L.—Wild Pepper Grass; on poor land and by the way-side.

Raphanus Raphanistrum, L.—Cadlock; Wild Radish.

Sisymbrium Officinale, Dec.—Hedge Mustard.

Thlaspi Bursa Pastoris, L.—Shepherd's Purse; in gardens and fields.

Berberis Vulgaris, L.—Barberry; more abundant near the sea-shore.

Malva Rotundifolia, L.—Low Mallows; a weed near houses.

Hypericum Perforatum, L.—St John's Wort; in old gravelly and sandy fields and pastures.

Parnassia Caroliniana, Mx.—Grass of Parnassus; occasionally seen in wet meadows.

Saxifraga Pennsylvanica, L.—Water Saxifrage; wet meadows.

Epilobium Angustifolium, L.—Willow Herb; fire weed,—on new burnt land and occasionally in fresh meadows,—increases rapidly by seed.

Œnothera Biennis, L.—Scabish; Tree Primrose; old stony fields, rye fields and gravel pits.

Lythrum Salicaria, L.—Purple Loosestrife; growing in bunches with pendent stems over ditches and ponds.

Sanguisorba Camadensis.—Wild Burnet; in fresh meadows, Ipswich, Topsfield, &c.

Potentilla Argentea, L.—Silver Fivefinger; old sandy fields, just after cultivation.

Potentilla Norvegica, L.—Do. do.

Rosa Corymbosa, Ehrhart.—Swamp Rose; among stone walls.

do. Rubiginosa, L.—Sweet Briar; do. do.

Rubus Villosus, Aiton.—High Blackberry.

do. Trivialis, Mx.—Low Blackberry.

Cratægus (species variæ).—Thorn Bush; Hawthorn.

Apios Tuberosa, Ph.—Ground Nut; climbing on bushes near the boundaries of fields and pastures.

Baptisia Tinctoria, R. Brown.—Wild Indigo; pastures.

Crotalaria Sagittalis, L.—Rattle Box; fields, Weston, Mass.

Genista Tinctoria, L.—Wood Waxen; dyer's weed, peculiar to the vicinity of Salem—introduced.

Lespedeza Capitata, Mx.—Tall Trefoil; dry pastures.

Lupinus Perennis, L.—Wild Lupine ; sandy and gravelly soils.

Medicago Lupulina, L.—Nonesuch ; resembles yellow clover, and perhaps nearly as good.

Pisum Maritmum, L.—Beach Pea ; sea-coast, eaten by horses.

Urtica Dioica, L.—Nettle ; walls and road-sides.

Comptonia Asplenifolia, Aiton.—Sweet Fern ; old pastures.

Myrica Cerifera, L.—Bay Berry ; useful for its vegetable wax.

do. Gale, L.—A low bush in swamps and edges of fresh meadows.

Celastrus Scandens, L.—False Bitter Sweet ; wax work, a tall strong climber on trees and over stone walls.

Ampelopsis Quinquefolia.—Woodbine ; false grape, on stone walls and running up trees.

Rhus Radicans, L.—Poison Ivy ; found as above.

do. Vernix.—Poison Dogwood ; Bigelow's Med. Bot. pl. x.

Geranium Dissectum, L.—Wild Cut-leaved Geranium ; sandy fields.

Agrostemma Githago, L.—Corn Cockle ; introduced, seen among wheat—annual and increases by seed.

Dianthus Armeria, L.—Slender Pink ; with the above.

Saponaria Officinalis, L.—Bouncing Bet ; soap wort—introduced, and spreads by the root ; edges of fields and near heaps of compost.

Spergula Arvensis, L.—Corn Spurry ; among corn and wheat, especially in light warm land.

Phytolaca Decandra, L.—Poke ; barn yards.

Polygonum Aviculare, L.—Knot Grass ; troublesome about house yards.

Polygonum Scandens.—Climbing in cultivated fields, with Polygonum Fagopyrum, L. Buckwheat, &c.

Rumex Crispus, L.—Curled Dock ; exceedingly troublesome in mowing and meadows.

do. Acetosella, L.—Field Sorrel,—indicates a poor, thin soil.

do. Obtusifolius, L.—Broad Leaved Dock ; do. do.

Campanula Perfoliata, L.—Clasping Bell Flower ; in light cultivated soils.

Lobelia Inflata, L.—Indian Tobacco ; every where causing horses to slaver.

Plantago Major, L.—Plantain ; common near door steps.

do. Lanceolata, L.—Ribbed-Leaved Plantain, or Rib-wort, fields.

Ambrosia Elatior, L.—Hog Weed ; Anakim, Roman Wormwood.

Anthemis Cotula, L.—May Weed ; stinking camomile, on sides of roads, and on heaps of compost.

Bidens Frondosa, L.—Burr Marigold; troublesome in moist cornfields, and in cleared-up and cultivated swamps.

Bidens Tripartita, L.—Trifid Burr Marigold or Beggar's Lice; tick seed, sheep ticks, ditches, swamps.

Cnicus Arvensis, Willd.—Canada Thistle; destroyed by mowing it when it flowers.

Cnicus Lanceolatus.—Common Thistle.

Onopordon Acanthium, L.—Cotton Thistle; waste grounds; very large in rich soils.

Centaurea Nigra, L.—Knap weed; black thistle, troublesome in stony, rich soil: introduced.

Chrysanthemum Leucanthemum, L.—Oxeye Daisy; White Weed, &c. Introduced.

Cichorium Intybus, L.—Succory; Middlesex county: introduced.

Erigeron Integrifolium.—Rye Fields.

do. Canadense. do.

Gnaphalium Polycephalum, Mx.—Sweet-scented Everlasting.

do. Margaritaceum, L.—Pearly Everlasting.

Helianthus Tuberosus, L.—Artichoke; gardens. Introduced.

Inula Helenium, L.—Elecampane; in clayey soils; Essex Co.

Senecio Vulgaris, L.—Groundsel; in gardens.

do. Hieracifolius, Mx.—Fire Weed; on new-burnt land, spreading with great rapidity by its downy seeds.

Tanacetum Vulgare, L.—Tansey; if neglected, grows in very dense and troublesome patches. Introduced.

Asclepias Syriaca, L.—Milk Weed; road-sides; young shoots used for asparagus; fibres of the stems spun for thread, and silky down of seeds, in the ornamental work of capes. Several other species growing in swamps.

Convolvulus Arvensis, L.—do. Sepium, L.—do. Stans, Mx.—Morning Glory; in fields and on stone walls; the second species a great creeper, with beautiful flowers.

Antirrhinum Linaria, L.—Toad Flax; a great pest in cultivated fields, especially among wheat on rich stony land, and difficult to extirpate.

Datura Stramonium, L.—Apple of Peru; Thorn Apple; sea-shore and way-side, near rich compost heaps, and contiguous to barns. Introduced. Seeds a violent emetic, and whole plant dangerous.

Hyoscyamus Niger ; Henbane ; in waste places; valuable in medicine.

Nicandra Physaloides ; Persoon ; strayed out of gardens, and likely to prove a weed.

Verbascum Thapsus, L.—Mullein ; pastures, old fields, &c.

do. Blattaria, L.—Moth Mullein ; Essex Co.

Lamium Amplexicaule, L.—Hen Bit ; Dead Nettle, old gardens and nurseries.

Leonurus Cardiaca, L.—Mother Wort ; everywhere.

Marrubium Vulgare, L.—Hoarhound ; road-sides. Introduced.

Nepeta Cataria, L.—Cat Mint ; under stone walls.

Trichostema Dichotoma, L.—Blue Curls ; in sandy soils, as rye fields and poor pastures. (Annual.)

Alisma Plantago, L.—Water plantain ; in wet places and muddy ponds.

Iris Versicolor, L.—Blue Flag or Wild-Iris ; wet meadows.

Iris Gracilis, Bigelow.—Boston Iris ; do.

Allium Canadense, L.—Wild Onion ; Meadow Garlic ; apt to increase in grain fields, and giving the alliaceous flavor to flour ; a bad weed.

Smilax Rotundifolia, L.—Green Briar ; in swamps, and covering under-growth with green, prickly branches ; difficult to kill.

Typha Latifolia, L.—Cat Tail ; in ditches and mud-holes, well known as Flags.

Acorus Calamus, L.—Sweet Flag ; in wet meadows.

Pothos Fœtida, Mx.—Skunk Cabbage ; cattle are said to be fond of the dried leaves, which are sweet.

Conium Maculatum.—Hemlock ; (a dangerous plant,) by way-sides and waste places.

Arctium Lappa.—Burdock ; troublesome, and next to useless.

Agrostis Clandestina.—Hidden bent Grass ; a coarse weedy species, about barns and in cultivated grounds.

Leersia Oryzoides, Swtz.—Cut Grass ; tall, coarse, with sharp ciliated leaves.

Bromus Secalinus, L.—Chess, or Cheat ; in wheat and rye fields. Introduced.

Andropogon Nutans, L.—Beard Grass ; common on poor stony dry soils, growing in tufts, a wiry indifferent species.

Digitaria Sanguinalis, Mx.—Purple Panic Grass ; a common weed in cultivated grounds.

Panicum Crus Galli, L.—Cocksfoot; a coarse annual grass in gardens and in rich fields.

Panicum Glaucum, L.—Panic Grass; in similar situations.

Triticum Repens, L.—Couch Grass; Twitch Grass; troublesome and very difficult to eradicate; the roots eaten in Italy.*

Carex, Sp.—The Carices are grasses with three-sided stems, and compose the principal herbage of the coarser products of fresh meadows; some species always growing in hummocks.

With the Carices are some of the Cyperi, distinguished by the inflorescence being in branching heads and of greater beauty, but coarse and wiry in structure.

The Scirpi enter largely into fresh meadow hay.

Equisetum Arvense, L.—Horse-tail; Mare's-tail.

do. Hyemale, L.—Scouring Rush.

do. Sylvaticum, L.—Wood Horse-tail.

More or less common in moist meadows, and sometimes increasing rapidly when the soil has been ploughed and again laid down. Although silicious in their structure, and very brittle when dried, yet cattle are said to devour them greedily. A fourth species, viz: Equisetum Uliginosum, Muhl.—Pipes; is considered valuable as hay.

Aspidium, several species.—Polypodium, do. do.—Osmunda Cinnamomea, L.—do. Regalis, L.—do. Interupta, Mx.—Are usually known as Polypod, Brake, Fern, Buckhorn, &c., and of little if any value.

Pteris Aquilina.—Eagle Brake; a tall, trifidly leaved fern in damp woods.

The Mosses (Musci) are generally small plants, scarcely distinguishable as species by any but the botanist. They in some species cover the ground with a speedy growth, even when under cultivation. Several are parasitic on trees, and injurious to the orchard, as the refuge and hiding places for insects, and should be removed by scraping the bark. Several species of Sphagnum are the especial agents in the production of peat. Some of these are used in packing boxes of butter and the like, being retentive of water and very cool.

The Lichens and Fungi are also parasites, on timber and orchard trees, and oftentimes indicate decay.

* I have reason to think this grass one of the most valuable that are found. G. B. E.

The Algæ are especially useful in manuring land contiguous to the sea, and the most valuable for this purpose is Laminaria Saccharina, Agardh.—Kelp, or Devil's Apron. Next to this, perhaps, Fucus Nodosus, L., and F. Vesiculosus, L., Ulva Lactuca, &c. &c.

The subjoined Advertisements are annexed to the Report as being matter of general interest to the Farmers. They are printed at private expense, and not at the expense of the State.

PROSPECTUS OF THE

NEW GENESEE FARMER,

AND GARDENER'S JOURNAL.

VOLUME 3, FOR 1842.

16 large Pages monthly, (with Engravings.) Only 50 Cents per year.

HENRY COLMAN, EDITOR.

Late Agricultural Commissioner of the State of Massachusetts.

D. THOMAS, J. J. THOMAS, M. B BATEHAM, and many others, Contributors.

GRATEFUL for the extensive patronage which the New Genesee Farmer has received during the past year, the proprietor has now the satisfaction of announcing that he has made such arrangements for the coming year as cannot fail to be highly gratifying to the readers of the paper, and secure for it a still more extensive circulation. Being determined to make it the most useful and widely circulated agricultural paper in the Union, the proprietor has engaged the services of HENRY COLMAN, the late Agricultural Commissioner of the State of Massachusetts. Depending on the co-operation and support of the friends of agriculture in the State of New York and the Great West, Mr. Colman has consented to leave the field where he has heretofore labored and locate at Rochester, where, through the medium of the new Genesee Farmer, he expects to find a more extensive field of usefulness.

The former editors and contributors will continue their assistance; and care will be taken to make the paper interesting and useful, not only to farmers but to all persons engaged in rural or domestic affairs. Under these auspices, it is hoped that the New Genesee Farmer cannot fail to obtain a wide circulation, give a new impetus to the cause of agriculture—promote the best interests of the community, and tend to increase the wealth and prosperity of the nation. It is hoped that every friend of agriculture—every well-wisher of his neighborhood and his country—will lend his aid, and not only subscribe himself but induce his neighbors to subscribe also. The paper will be continued at its present low price, in order that its influence may be most widely extended. Its appearance will be considerably improved, and having now a power-press exclusively for the work, greater promptness and regularity will be secured. Careful clerks are engaged to mail the papers, so that it is believed there will be little cause for complaint hereafter.

Post-masters and their assistants are authorised and respectfully soli-

cited to act as agents and remit subscriptions for the Farmer. The low price at which it is published will not allow of much pecuniary compensation to agents, but it is believed they will find a reward in the benefits which result from the circulation of such periodicals in their neighborhoods.

Persons ordering papers are requested to *strictly observe* the TERMS, and be careful to write *plainly* the names of subscribers, their *Post Office, County and State;* and in all cases to send the money with the order, so that the perplexity of keeping accounts may be avoided.

M. B. BATEHAM, Proprietor.

TERMS.—If current money is sent (such as New York or New Engand bills,) commission will be allowed as follows:—

Seven Copies, for	$3 00
Twelve " for	5 00
Twenty-five " for	10 00

Payments always to be made in advance.

If uncurrent money is sent, (such as Ohio, Illinois, Indiana, Pennsylvania, Canada, &c.) no commission will be allowed; but bills of all solvent Banks will be received when no commission is asked.

All subscriptions must commence with the volume. A limited number of volumes 1 and 2, can still be furnished, at the subscription price.

All letters must be free of postage.

Address, M. B. BATEHAM, *Rochester, N. Y.*

In Boston, Messrs. RUGGLES, NOURSE & MASON, *Quincy Hall*, Messrs. HOVEY, at their Agricultural store in *Merchants Row*; and Messrs. LITTLE & BROWN, *Washington street;* and in Salem, JOHN M. IVES, at his Seed store, will receive subscriptions for the New Genesee Farmer.

December 1, 1841.

THE MASSACHUSETTS PLOUGHMAN.

THIS is the title of a new *Agricultural and Family Paper*, to be conducted by WM. BUCKMINSTER, Esq. the former Editor of the Boston Cultivator. The Ploughman will be a large Folio Sheet, containing much more reading matter than any weekly Agricultural paper in the United States. One quarter part of the paper will be constantly devoted to Farming, Gardening, and the Mechanic Arts. The remainder of the paper will be filled with the most important domestic and foreign news; proceedings of Congress, and of our State Legislature; and a well arranged Price Current, corrected weekly.

Party Politics will be totally excluded; but a correct history of political events will be constantly given.

Farmers and Mechanics, generally, are invited to join us in the promotion of a cause which we trust will be ever held dear by Freemen, and the Tillers of the Soil.

The paper will be published at Boston, every Saturday morning. The first number was issued on the first Saturday of October last.

Terms, $2 00, in advance ; and if payment is delayed for more than three months, $2 50 will be charged.

Each Postmaster to whom the Prospectus is sent, is requested to act as Agent for the Ploughman ; and fifty cents will be allowed for every responsible subscriber obtained by him.

Lists may be returned to the said WM. BUCKMINSTER, the Conductor, at No 5, *Quincy Hall*, BOSTON.

The *Yankee Farmer*, recently published in Boston, is to be united with the *Massachusetts Ploughman*, from 1st January, 1842. Subscribers to the Yankee Farmer are respectfully solicited to continue their subscriptions to the Ploughman.

BOSTON, *December* 20, 1841.

THE FARMERS' JOURNAL,

AND

MAGAZINE OF USEFUL ARTS.

EDITED & PUBLISHED BY S. W. COLE,

(*Former Proprietor, and, until July, Editor of the Yankee Farmer.*)

(The Office of the late Yankee Farmer,)

OFFICE NO. 45, NORTH MARKET STREET, BOSTON.

THE Journal is designed to improve the soil and its productions; encourage the useful arts and sciences, and promote the interest of the farmer and mechanic by giving the best information in their pursuits.

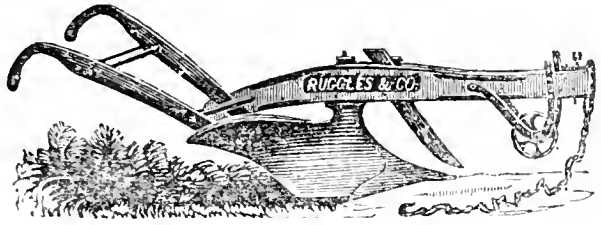
It will contain original articles from some of the best practical cultivators in the country, and choice selections from the most able works on Agriculture, Horticulture, Mechanics and Economy; giving the best management, and new discoveries and improvements in these departments.

This is one of the cheapest papers in the country; and no pains will be spared to render it strictly practical and useful. The form is neat and convenient for preservation and reference, and it will be a valuable addition to a library, as the matter is of lasting utility.

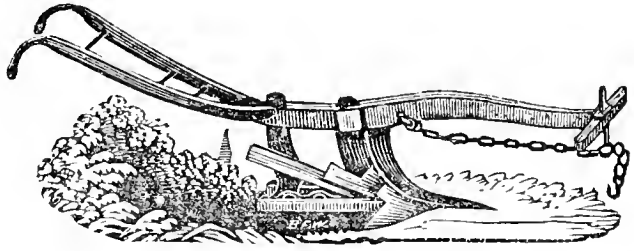
Terms : The Journal is published monthly, on a royal sheet, in quarto form, at 50 cents a year, *always in advance.* Five copies for $2. Any person procuring four subscribers and sending $2, can have the fifth copy gratis.

Post Masters are agents, and will forward names and money. The Volume commenced Oct. 1. Back numbers will be sent to new subscribers, that the Volume may be complete.

Boston, January 1, 1842.



Sward Plough.



Sub-Soil Plough.

BOSTON AGRICULTURAL WAREHOUSE,

QUINCY HALL,

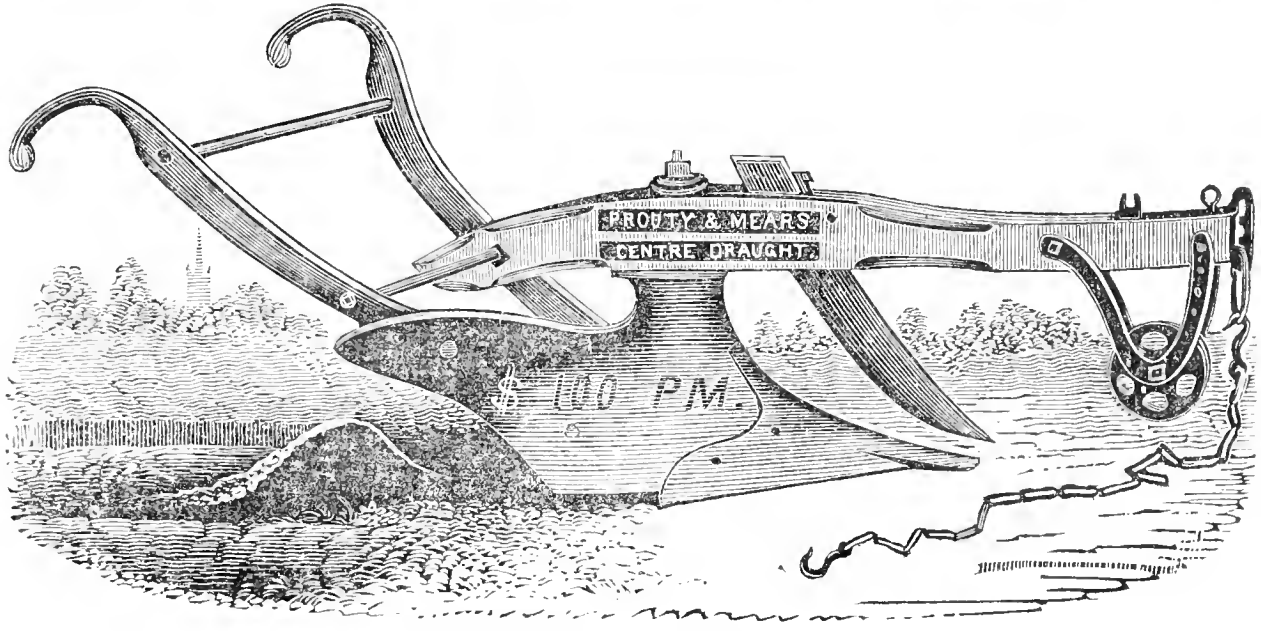
ENTRANCE FROM SOUTH MARKET STREET, BOSTON.

RUGGLES, NOURSE & MASON, are extensively engaged in the manufacturing of PLOUGHS and other AGRICULTURAL IMPLEMENTS, at their manufactory in Worcester, Mass., and have opened the above Warehouse in Boston, where they now offer at *wholesale* and *retail*, an extensive variety of Ploughs and other Agricultural Implements and Machines. R. N. & M., have recently added to their large assortment of patterns, 5 sizes of the long SWARD PLOUGHS, and were the first to lengthen the ground work, and otherwise so improve the *form* of the *Cast Iron Plough*, that it takes up the furrow slice with the greatest ease, bearing it equally and lightly over the whole surface of the mould-board, turning it over flat, with the least possible bending and twisting, and preserving it smooth and unbroken, creating very slight friction, and, of course, requiring the least power of draft. All Ploughs, and many other articles offered by them, are made under their own immediate *care* and *inspection*, by the best of workmen, which, with the machinery patented, and as yet used only by themselves, affords great facilities for despatch, and enables them to offer to Farmers and Dealers, articles of a superior quality, and on terms unusually liberal.

Cultivators, three sizes,
Harrows, of various kinds,
Churns, most approved,
Grain Cradles, New York Patterns,
Seed Sowers, or Drill Barrows,
Corn planters,
Corn Shellers, several kinds,
Hoes, a large variety,
Shovels, from the best Manufacturers,
Spades, Large and Toy,
Transplanting Trowels,
Saws, of various kinds,
Straw Cutters,
Field Rollers,
Ladies Weeding Trowels,
Grass Shears, French Pattern,
Border " "
Garden Reels, and Lines,
Picks, and Mattocks,
Tree, and Floor Scrapers,
Riddles, and Sieves,
Bark Mills,
Sugar Mills,
Winnowing Mills,
Hay, and Manure Forks,
Saw Horses,
Garden Rakes,
Hay Knives,

Axes, and Hatchets,
Patent Axe Handles,
Curry Combs, and Cattle Cards,
Sickles,
Vegetable Cutters,
Scythe Snaiths,
Scythes, of various kinds,
Scythe Rifles, Darby's Patent,
" Stones,
Ox Yokes, and Bows, with and without Irons,
Ox Balls,
Bush, and Bill Hooks,
Dirt Scrapers,
Bull Rings,
Revolving Horse Rakes,
Hand Rakes,
Anti-Friction Rollers,
Ship Scrapers,
Grindstones, on rollers,
" Cranks,
Peat Knives, and Spades,
Chains, of all kinds,
Iron Bars,
Churn Drills,
Wheel Barrows,
Transplanters,
Budding, and Pruning Knives.

PROUTY & MEARS' PATENT CENTRE DRAUGHT PLOUGHS.



THIS article is manufactured by Messrs. D. Prouty & Co., Boston, Mass. and has, from the peculiarity of its structure, and its intrinsic merits, obtained an extensive circulation among the farmers of New England; by whom, as well as those of many other of the agricultural States, it is most highly prized. For ease of draught, steadiness of motion, tendency to hold its width and depth of furrow, and excellence of work performed, whether the furrows are to be laid in side by side, on a level, or placed on an angle of 45° or thereabout, as in the ridged or Scotch system, it stands preëminent.

Besides the decisions of numerous County Ploughing Matches in their favor, to them have been awarded Diplomas and Medals, by the Mechanics' Institutes of Massachusetts and Maine, and the American Institute of the City of New York; also at the Grand Trial of Ploughs, at Worcester, Mass. Oct. 13th, 1840, under the auspices of the Mass. Society for the promotion of Agriculture, the first Premium of $100, was awarded to Prouty and Mears, for the "Best Plough that will turn the sod over and lay it in flat, regard to be had to the strength of the Plough, easiness of draught, excellence of the work it performs, and its cheapness."

NEW ENGLAND
AGRICULTURAL WAREHOUSE,
SEED STORE,
AND OFFICE OF THE NEW ENGLAND FARMER,

Nos. 51 & 52 North Market Street, Boston.

JOSEPH BRECK & CO.

THE proprietors of this establishment would inform their friends and the public, that they keep constantly on hand and for sale, the greatest variety of *Agricultural Implements*, *Grass Seeds*, *Garden and Flower Seeds*, *Bulbous Roots*, *Double Dahlias*, *&c. &c.* to be found in the country,—among which are the following :—

AGRICULTURAL IMPLEMENTS.

C, Howard Improved Ploughs,
do. do. Subsoil do.
Side Hill do.
Double Mould Board do.
Wrought Iron and Wooden Ploughs,
Scott Keith, and other Plough Castings,
Willis's Improved Cultivator,
Green's Patent Straw Cutter,
Willis's do. do.
Common hand do.
Manure and Hay Forks,
Scythes of all kinds,
Patent and other Snaiths,
Hall's and other Hay Rakes,
Grindstones on Rollers,
Corn Shellers,
Grain Cradles,
Chains of all kinds,
Willis's Improved Seed Sower,
Gault's Patent Churns,
Self-Operating Cheese Press,
Horse Power and Threshing Machine,
Davis's Road Scrapers,
Hale's Rotary Pump,
Lead Pipe,
Force Pumps,
Copper do.
Iron do.
Cast Steel Axes,
Bark Mills,
Corn and Cobb Mills,
Harris's Paint do.
Winnowing do.
Grater Cider, do.
Cast Iron Cider Screws,
Yokes of all kinds.

With a great variety of Agricultural and Horticultural tools, too numerous to mention.

FIELD SEEDS.

Northern Clover,
Southern do.
White Honeysuckle Clover,
Lucerne,
Herds grass, or Timothy,
Red Top Southern Seed,
do. Northern do.
Fowl Meadow,
Orchard Grass,
Ruta Baga,
Mangel Wurtzel,
Sugar Beet, &c.
Winter and Summer Wheat,
do. do. Rye,
Barley,
Oats, English,
Corn of various sorts,
Millet,
Hemp,
Flax Seed,
Potatoes.

GARDEN SEEDS,

Of every desirable variety, will be furnished wholesale and retail ; by the pound, box, or package.

Seeds in Boxes, for retailing, done up in the neatest manner in packages, with the name and directions printed on each parcel. Retailers supplied on the most favorable terms, with boxes from $1 to $100.

FOR THE FLOWER GARDEN.

We have a very extensive collection of choice Flower Seeds, embracing all the Annuals, Biennials, and Perennials worthy of cultivation. Packages of twenty fine sorts for one dollar.

Dutch Bulbous Roots.—We import of these annually from Holland, a splendid collection, consisting of double and single Hyacinths, double and single Tulips, Crown Imperials, Narcissus, Iris, Crocus Gladiolus, Amaryllis, Ixias, &c. &c.

Double Dahlia Roots.—Of this beautiful and popular flower, we have more than two hundred fine varieties, embracing all that were shown at the exhibition of the Massachusetts Horticultural Society. Roots can be furnished from the first of October to the first of July, safely packed in moss, and sent to any part of the country.

Fruit and Ornamental Trees and Shrubs furnished to order at Nursery prices.

We would call the attention of the public to the New England Farmer, one of the oldest and best agricultural newspapers in the country, containing a great amount of interesting and useful matter for the practical farmer and gardener. It is issued at our office weekly, on Wednesdays, at the moderate price of $2 per year in advance, or $2 50 at the close of the year.

Among our Agricultural Books we keep for sale, The Complete Farmer ; Kenrick's Orchardist ; American Gardener ; Bridgman's Gardener's Assistant ; Moubray on Poultry ; Silk Grower's Guide ; Cobb's Silk Manual ; Loudon's Works, together with a great variety of useful and interesting works in this line.

We hope by unremitting attention, to sustain the credit of this establishment. in making it one of the most complete depositories for every thing in the Agricultural and Horticultural line in the country.

JOSEPH BRECK & CO.

BOSTON CULTIVATOR,

A FAMILY PAPER,

DEVOTED to Farming, Mechanic Arts, Literature, and news of the week.

Terms: $2 00 in advance, or $2 50 if delayed beyond 6 months.

OFFICE over **29**, State Street.

OTIS BREWER, Proprietor.

HOVEY & CO'S
AGRICULTURAL WAREHOUSE
AND
SEED STORE,

NO. 7, MERCHANTS ROW, NEAR STATE STREET, BOSTON.

HOVEY & CO. offer at Wholesale and Retail, one of the most extensive assortments of Agricultural Implements, Garden and Grass Seeds, Plants, &c., as follows:

AGRICULTURAL IMPLEMENTS.

Cultivators, 2 sizes,
Prouty & Mears' Ploughs,
Seed Sowers, 2 patterns,
Hay and Straw Cutters,
Harrows,
Shovels, Spades & Forks,
Tree and Bush Pullers,
Sugar Mills,
Corn Shellers,
Paint Mills,
Sausage Machines,
Cheese Presses,
Hoes, Rakes and Scuffles,
Hedge Shears, Billhooks,
Garden Trowels, Syringes,
Scythes, Sickles, &c.,
Pruning Knives and Saws,
Garden Implements, of all kinds and patterns,
Partridge's Patent Forks,
Axes and Hatchets,
Trace Chains,
Ox yokes and Bows,
Pick Axes,
Iron Bars and Post Spoons,
Chains, of all kinds,
Gault's Patent Churns,
Scythes, of all kinds,
Patent Scythe Snaiths,
Edging Knives.

GRASS SEEDS.

An extensive supply always on hand, among which are

Northern Clover,
Southern Clover,
White Clover,
Lucerne, or French do.
Herds Grass, or Timothy,
Red Top, Southern,
Do. Northern,
Fowl Meadow Grass,
Orchard Grass,
Perennial Rye Grass,
Winter and Summer Wheat
Oats, Barley and Rye,
Millet and Buckwheat,
Bird Seeds, of all sorts.

GARDEN SEEDS.

WE are now receiving our stock of SEEDS for 1842, comprising the largest and finest assortment to be found in New England. The seeds are all raised expressly for us by experienced growers, and are warranted of the growth of 1841, and of the BEST QUALITY. Particular pains have been taken in the selection of Sugar Beet, Long Blood Beet, Carrots, Ruta Baga, Turnips, Cabbages, &c., and purchasers may rely upon the genuineness of the Seeds. A few of the more important kinds are annexed :—

Sugar Beet and Blood Beet,
Mangel Wurtzel,
Carrots and Parsnips,
Ruta Baga and Turnips,
Red and White Onions,
Cabbages, Cauliflowers, &c.
New White Carrot,
Early and Late Pease,
Early and Late Beans,
Summer Squashes,
Winter Squashes,
Cucumbers and Melons,
Tomato, Egg Plant, &c.
Pot and Sweet Herb Seeds.

FLOWER SEEDS.

400 varieties of FLOWER SEEDS, including in addition to the most superb Double German Asters, Balsams, Rocket Larkspurs, &c. cultivated at our own garden, every *new* annual to be had in London, worthy a place in the Bower garden. 20 kinds put up in a box, $1 00.

Seeds put up in boxes of various sizes, from $5 to $50 each, all ready for retail ; every kind neatly labelled with the name, and PRACTICAL directions for their cultivation ; and liberal discount made to purchasers.

Grape Vines of all kinds, from 50 cents to $1 00 each.

Rhubarb and Asparagus Roots, of the finest quality.

Strawberry Plants, 6 kinds, including Hovey's new Seedling, the largest variety cultivated, the fruit varying from 5 to 6 inches in circumference.

Raspberry and Currant Bushes of all kinds.

Ornamental Trees and Shrubs, Greenhouse Plants, Herbaceous Plants, &c.

Dahlias, embracing a collection of more than **200** varieties of their choicest in New England.

Fruit Trees of all sorts, Apples, Pears, Peaches, &c., from their new Nursery Establishment at Cambridge, called the Cambridge Nursery, only 2½ miles from the city.

Agricultural and Horticultural Books of all kinds.

Seeds packed so as to be safely transported to any part of the world. Catalogues of Seeds, Trees, Dahlias, &c. *gratis*, on application.

Personal attention given to all orders.

HOVEY & CO.

AGRICULTURAL WAREHOUSE

AND

SEED STORE.

CHARLES H. B. BRECK having taken the Seed Store, No. 45, North Market street, will keep constantly on hand and for sale, as large an assortment of Field, Grass and Garden Seeds, as can be found in the country. No exertions will be spared in procuring Seeds of the first quality, and superior varieties. His arrangements are such that he is well assured of a full supply at all times, and will never expose an article for sale that he cannot with confidence recommend.

Garden Seeds, of every desirable variety, will be furnished, wholesale and retail, by the pound, box or packages.

Seeds in Boxes, for retailing, done up in the neatest manner in packages, with the name and directions printed on each parcel. Retailers supplied on the most favorable terms, with boxes from $1 to $100.

Every variety of Flower Seeds, embracing all the Annuals, Biennials, and Perennials, worthy of cultivation. Packages of twenty fine sorts, for $1.

Agricultural Books of all kinds, among which are the Complete Farmer, American Orchardist, Bridgman's Gardener's Assistant, Moubray on Poultry, Loudon's Works, &c., &c.

All lorders from the country shall be promptly attended to; and Seeds packed in good condition to go to any part of the United States or British Provinces.

Fruit and Ornamental Trees, Shrubs, Grape Vines, and all Nursery productions, furnished at one day's notice; and when requested, can be packed in mats or boxes so as to be safely sent to Europe, or any part of America.

AGRICULTURAL WAREHOUSE,

45, NORTH MARKET STREET.

AGRICULTURAL AND GARDENING IMPLEMENTS.

THE subscriber begs to call the attention of Farmers and Gardeners to his stock of IMPLEMENTS and MACHINES, selected from the most improved patterns, and finished in a thorough and workmanlike manner.

The stock comprises every article that is useful in the management of a farm or garden. Among which are —

Ruggles' Premium Ploughs; Prouty & Mears' do. do. do; *Charles Howard's* do. do. do.; *Bigelow* and other Wrought Iron do. do.; *Rice's* Common Wood Ploughs.

Side Hill and Double Mould *PLOUGHS*, of various improved patterns. Extra Mould Boards, Land-Sides and Shares, constantly on hand.

Cultivators and *Harrows*, of all patterns and sizes, constantly on hand.

Green's celebrated Straw and Hay Cutters, operating on a mechanical principle not before applied to any implement for this purpose. This machine is simple in its construction, made and put together strongly. It is therefore not so liable to get out of order as the complicated machines in general use. This Machine is in extensive use and highly approved of. It is warranted to give the best satisfaction to those who use it.

Also, Boynton's Straw Cutter. This machine, when in operation by Horse or Steam power, will cut from three to six bushels per minute. Price $50.

Willis' Improved Vertical Straw Cutter.
" " Guillotine " "
" " " Hand " "
Common Dutch and Hand " " These machines are in very common use, and known to every practical farmer; are considered good machines for small farms and stables.

Hay Knives. Vegetable Cutters.

Grind Stones, hung on friction rollers—Family Hand Mills—Paint Mills—Winnowing Mills.

Cheese Presses.—Improved Self-governing Cheese Presses, and all other kinds, both patent and common.

Gault's and other *Churns.*

Corn Shellers.—Willis's Improved Double Corn Sheller.
New York do. do. do.

Seed Sowers.—Cole's Improved Seed Sowers.
Willis's do. do.

Willis's Improved Sausage Machine.

Sugar Mills.—Tree and Bush Pullers.

Partridge's Hay and Manure Forks, and Dung Pullers.

Axe Handles, Post Augers, Pick Axes, Post Spoons, Iron Bars, Churn Drills, Hand Drills and Hammers, Bull Rings, Trace Chains, Halter Chains, Truck Chains, Hay Pullers, Wheel Barrows, Hand Engines, Barn Lanterns, Lamps, &c., Brass Syringes for Gardens, Pruning Chisels and Saws, Budding and Pruning Knives, Fruit Shears, Fruit Gatherers, Switching Bills, Cheese Hoops and Cheese Cloths.

The above, with many other Implements and Machines, are for sale at the Agricultural Warehouse, No. 45 North Market Street, Boston, by N. P. H. WILLIS.