

# MAINE STATE LEGISLATURE

The following document is provided by the  
**LAW AND LEGISLATIVE DIGITAL LIBRARY**  
at the Maine State Law and Legislative Reference Library  
<http://legislature.maine.gov/lawlib>



Reproduced from scanned originals with text recognition applied  
(searchable text may contain some errors and/or omissions)

DOCUMENTS

PRINTED BY ORDER OF

THE LEGISLATURE

OF THE

STATE OF MAINE,

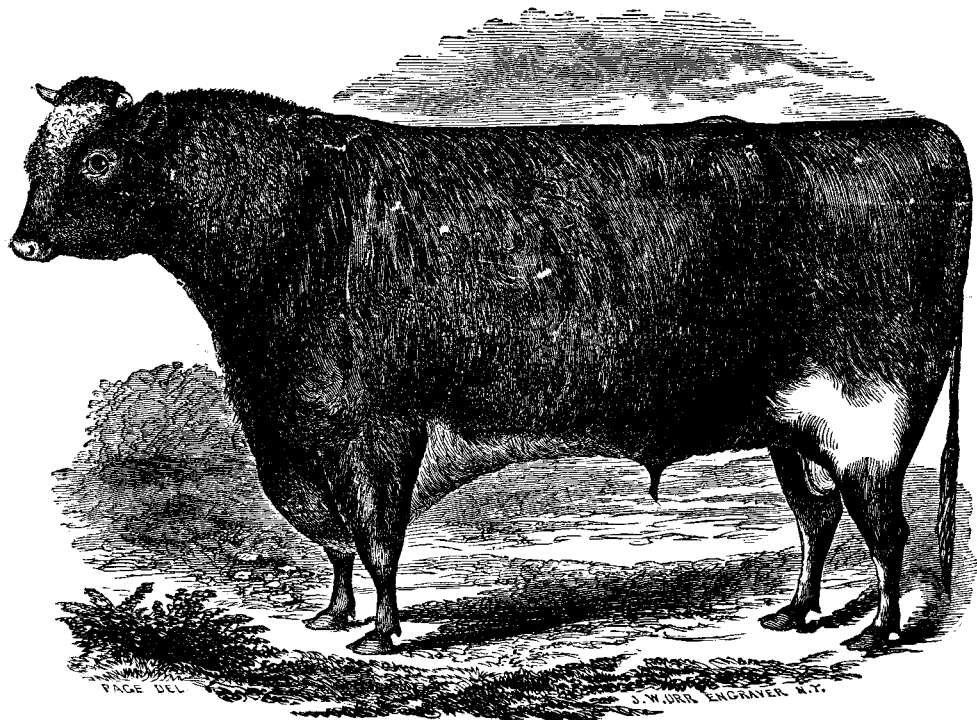
A. D. 1858.



AUGUSTA:

STEVENS & SAYWARD, PRINTERS TO THE STATE.

1858.



**SHORT HORN BULL "DUKE OF GLO'STER," (11,382.)**

For pedigree, see English Herd Book, volume 10th, page 58.—Imported by L. G. Morris and N. J. Bear in 1854; now the property of Samuel Thorne, of Thornedale, Washington Hollow, Dutchess Co., N. Y.

SECOND ANNUAL REPORT

OF THE

SECRETARY

OF THE

MAINE BOARD OF AGRICULTURE,

1857.



**AUGUSTA:**

STEVENS & SAYWARD, PRINTERS TO THE STATE.

1858.





# BOARD OF AGRICULTURE—1857.

---

## STATUTE MEMBERS:

THE GOVERNOR AND SECRETARY OF STATE, MEMBERS EX-OFFICIO.

<i>Society.</i>	<i>Name.</i>
Androscoggin, . . . . .	ROBERT MARTIN.
Aroostook, . . . . .	JOSEPH D. PIKE.
Cumberland, . . . . .	E. G. BUXTON.
Franklin, . . . . .	JOSEPH KEITH.
Kennebec, . . . . .	HORACE PARLIN.
Lincoln, . . . . .	EBENEZER COBB.
Oxford, . . . . .	DARIUS FORBES.
Penobscot, . . . . .	E. F. CRANE.
Piscataquis, . . . . .	CALVIN CHAMBERLAIN.
Sagadahoc, . . . . .	CHARLES J. GILMAN.
Somerset, . . . . .	THOMAS FULLER.
Washington, . . . . .	NATHAN PATTANGALL.
Waldo, . . . . .	THOMAS W. CUNNINGHAM.
York, . . . . .	S. L. GOODALE.

## HONORARY MEMBERS:

Bangor Horticultural, . . . . .	HENRY LITTLE.
Maine Pomological, . . . . .	D. A. FAIRBANKS.
North Penobscot, . . . . .	WILLIAM R. HERSEY.
North Franklin, . . . . .	SEWARD DILL.
North Kennebec, . . . . .	ISAAC W. BRITTON.
South Kennebec, . . . . .	NATHAN FOSTER.
Penobscot and Aroostook Union, . . . . .	MORGAN L. GERRY.
West Somerset, . . . . .	W. B. SNOW.

S. L. GOODALE, *Secretary.*



## STATE OF MAINE.

---

### An act to amend an act entitled "An act to establish a Board of Agriculture."

*Be it enacted by the Senate and House of Representatives in Legislature assembled, as follows :*

SECTION 1. The members of the Board of Agriculture, and the secretary thereof, shall continue in office until the expiration of the term for which they were elected.

SECT. 2. The State Board of Agriculture shall, after the expiration of the term of office of the present members, consist of members who shall be elected and classified, as follows : one member may be elected by each incorporated agricultural and horticultural society in the state, which maintains an annual exhibition, and expends not less than one hundred and fifty dollars in premiums for the encouragement of agriculture, horticulture and the arts connected therewith. Said members shall hold their office for the term of three years from the day of the annual meeting of the board, next after their election, except as hereinafter provided, and shall be elected by ballot at the annual meetings or fairs of such societies, or at any regular meeting thereof called for such purpose ; and they shall receive and produce as evidence of membership, a certificate of election signed by the president and secretary of such society, and also a certificate from the treasurer of the society, signed and sworn to, before a justice of the peace, that the society which he represents has actually expended during the previous year not less than one hundred and fifty dollars, as above required : *provided, however*, that if the annual exhibition of such society shall have been, by the advice of the Board of Agriculture, merged in that of the State Agricultural Society, the last named certificate shall not be required ; and in case of any vacancy occurring in the representation of any society, the same may be filled by appointment, by the president and secretary of such society.

SECT. 3. At the next annual meeting of the Board of Agriculture, the members shall be divided as equally as may be, into three classes. The term of office of the first class shall expire at the end of one year, of the second class at the end of two years, the members of each class to be designated by lot.

SECT. 4. The Board of Agriculture shall meet at the State House in Augusta, annually, on the third Wednesday of January, and they are hereby

empowered each year to elect a suitable person to act as secretary of the board, and to prescribe and determine his duties, and in case of vacancy by death or otherwise, the governor with advice of his council, is hereby empowered to fill the same. And all reports and returns required by law to be made by said societies, shall be made and returned to the secretary of said board. The compensation of the secretary shall be eight hundred dollars per annum, and such necessary traveling and incidental expenses as shall accrue in the discharge of his duties, an account thereof being first audited and allowed by the governor and council. And the compensation of the members of the board shall be the same as that of members of the legislature, for a term not exceeding ten days, provided that if a member of the board shall also be a member or officer of the legislature, he shall receive compensation in but one capacity.

SECT. 5. It shall be the duty of said board to investigate all such subjects relating to agriculture, horticulture and the arts connected therewith, in this state, as they may think proper; and it is hereby empowered to take, hold in trust, and exercise control over any donation or bequests that may be made to it for promoting agricultural education, or the general interests of husbandry; and the said board shall annually, on or before the first Wednesday of January, by its secretary, submit to the legislature a detailed report of its doings, together with an abstract or digest of the returns of the several agricultural and horticultural societies and of such statistics as he may be able to collect, with such recommendations and suggestions as the interest of agriculture may be deemed to require, and cause to be printed under his direction and control not more than ten thousand copies of the same, one thousand copies thereof being for the use of the legislature, and the remainder for distribution under the direction of the board among the people of the state.

SECT. 6. The governor shall, from time to time, draw his warrant on the treasurer for such sums of money as may be necessary to defray the salaries and expenses provided for by this act, an account thereof having been first rendered by the secretary of the board, and audited by the executive council; and a sum not exceeding one thousand seven hundred dollars annually is hereby appropriated to meet such expenses.

SECT. 7. All acts and parts of acts inconsistent with this act are hereby repealed.

SECT. 8. This act shall take effect from and after its approval by the governor.

[Approved April 6, 1857.]

# REPORT.

---

*To the Senate and House of Representatives:*

PROMINENT among the duties of my office, is that of annually submitting a report, in part\* embodying "such recommendations and suggestions as the interests of agriculture may be deemed to require." In the one which I had the honor to submit to you last year, after remarking upon the importance of agriculture, sketching the history of early efforts and of legislation in its behalf, and noticing some of its wants, the attempt was made to treat of its present condition and prospects among us.

In viewing my field of labor for the present year, two paths seemed to invite attention; the one regarding the improvement of agriculture as it exists in the older parts of the State, the other having to do with the development of the agricultural resources and capabilities of such portions as are not yet settled. Of the urgent necessity of the former there can be no doubt, and equally certain is it, that such was the principal end aimed at in the establishment of this Board; yet in view of the fact that the State is possessed of a large extent of what is almost an unbroken wilderness, portions of which are reported to be rich and fertile in a high degree, but of which very little definite and reliable information seems to be generally diffused among our citizens, and of one of the signs of the times, to wit; that the tide of emigration westward, which for years past has operated so disastrously in draining our State of brains, money and muscles, is now partially stayed, and so a favorable

---

\* The report of the doings of the Board at its last session, January, 1857, and which is also required, was prepared in season to be printed in connection with the "Abstract of Returns" from the various agricultural societies in the State for 1856, which returns were received by me in December preceding, and it is consequently omitted here.

opportunity presented to invite anew, a candid and critical examination of the inducements offered by a judicious selection of virgin soil within our own borders, I do not feel at liberty to neglect the latter path, and accordingly propose herewith, first, to present such facts and considerations regarding a part of our newer territory, as I have been able to gather by personal observation and by inquiries instituted on the spot, and afterwards, to resume the consideration of agriculture in the State at large, viewed specially with regard to its defects and available modes of improvement.

The portion of our unsettled territory which is believed at this time to present the greatest inducements to immigration, is what is known as the Valley of the Aroostook, together with a tract fifty miles, more or less, south of this, embracing the five easternmost ranges of townships, and which is drained in part by other tributaries of the St. John, but principally by those of the Penobscot.

The greater part of this territory, embracing upwards of two thousand square miles, is what is usually denominated settling land, although lumbering has been largely, and is still, to a considerable extent, carried on in some sections of it; in other portions no more timber now exists than will be needed for building purposes. The land throughout is uniformly good; in some of these townships scarce a lot of one hundred and sixty acres can be found which is not capable of being made a good farm, and but little waste land is believed to exist in any of them.

The surface is more or less undulating, the easterly ranges of townships being less hilly, and more free from stone, than is usual in the State at large; the ranges west of these, as fourth and fifth, are more broken in surface, sometimes hilly, and with frequent boulders and out-crops of limestone, slate, &c. Some townships in the first range are so free from stones that even a sufficiency for wells, cellars, &c., is not always readily obtained.

The soil is various, but consists mainly of a deep rich hazel loam, and is usually underlaid with a substratum of limestone, sometimes, but to less extent, with slate, the depth varying from two to six or more feet. The soil seems to have originated mostly from the decomposition of limestone and slate. I noticed nothing like hard pan, clay or other appearance of retentive subsoil, the water passing readily downward so as to obviate any necessity for underdraining.

I was informed, however, that beds of clay are occasionally found by digging at a moderate depth in various localities, and that it probably exists in sufficient quantity for building purposes. At number eleven, fifth range, bricks have been made in some quantity. Lime also has been burned in the same vicinity.

There is more or less of interval bordering the streams, and a still larger extent of such as is doubtless of alluvial origin, but more elevated than what usually passes among us for interval land. That which predominates chiefly is what is ordinarily called "strong hard wood soil," and good for all crops. Other parts known as cedar swales, which at a casual glance might be deemed too wet for profitable tillage, are found to prove otherwise, and when cleared to yield good crops; for some purposes they are objectionable on account of being more liable to frosts than the higher lands, but they give fine crops of grass and grain. In several instances where turnpiked roads had recently been made through these lands, I had a favorable opportunity to examine the soil, (with a little help from the spade,) to a depth of two or three feet. The upper ten or twelve inches consisted mainly of vegetable matter, somewhat resembling muck, but of better consistence; below this, a loam if not clayey, yet more nearly resembling it than was noticed elsewhere, and beneath this a gravelly loam, the whole sufficiently porous to allow superfluous water to pass away with ease—so that seeing it directly after a heavy rain, no standing water could be found. These roads, I was told, were made at an expense of less than two dollars per rod, it costing from seventy-five cents to one dollar to fell the trees and grub out stumps, and as much more thoroughly to turnpike the track.

In the vicinity of Houlton, the soil varies in character, some being lighter and some more tenacious, and here I found the average depth of plowing to be less than in other sections, being from three to six inches only. Some of the most successful farmers there, allege that plowing deeper than four or five inches turns up an inert or injurious subsoil. Hon. S. Cary, who showed me crops rarely surpassed, as for instance, oats promising eighty bushels to the acre, and wheat twenty five to thirty, if not injured by the midge, plows usually, four inches; a lot of nine acres which had previously yielded eight hundred and sixty-seven bushels of oats, by measure, was plowed to this depth, and was, when I saw it, bearing



luxuriant grass. Others in the same town plow deeper, some to the depth of nine inches, but all agree in opinion, that it is not advisable to disturb more than an additional inch each year, unless manure of some kind be liberally applied, as otherwise the crops not only get no immediate benefit, but are rather injured. Thirty or forty miles north of Houlton, as at Fort Fairfield and vicinity, the first plowing is often eight to ten inches deep, and with the most gratifying results. The soil generally exhibits unmistakable evidences of great inherent fertility, and of the land at large, it may be said, as of another in olden story, in it "thou mayest eat bread without scarceness."

The natural fertility of the soil is also shown in a satisfactory manner by the actual thrift and prosperity of the settlers, many of whom came here a few years ago, poor and destitute, and some seriously embarrassed, but are now in easy circumstances. I did not learn of a single instance in which a man, enjoying ordinary health, and resisting the temptation to meddle with timber, had devoted himself to farming operations without highly gratifying success.

**NATURAL GROWTH.** The forest trees of this section are of mixed growth. The sugar maple and yellow birch prevail chiefly, and these attain very great size. They are intermingled with occasional lofty pines, spruce, fir, white cedar, poplar, elm, ash, &c. In the lower lands, the evergreens here named, with some hemlock and abundance of larch or hackmetac, are plenty, but they are by no means confined to wet soils. Although much choice timber has been cut and found a market via the river St. John, considerable wealth of forest yet remains.

**CLIMATE.** This is the great bugbear, in the minds of many, as an obstacle to successful farming any where in Maine; and Aroostook, being the most northerly county in the State, is often deemed more objectionable for this reason. But while it has its peculiarities, I failed to see cause to deem it the worst.

It is an exceedingly healthy climate. Upon this point, I cannot do better than to quote from the late statistical report on the sickness and mortality in the army of the United States, compiled from the records of the Surgeon General's office, as the testimony of the surgeons stationed in Aroostook in 1844-5, when their reports were made, is both disinterested and conclusive, and reveals a remarkable

freedom from pulmonary disease so common in most sections of New England. From Fort Kent we have the following :

“The region adjacent to Fort Kent is probably one of the healthiest within the limits of the United States, and though rigorous, the climate seems to be productive of the most robust health. Fevers, and other diseases of a malarious origin, are unknown; and other acute diseases are by no means of common occurrence.”

This surgeon says of another who had better opportunities than himself, that he not only never saw a case of consumption in the country, but that some inmates of the garrison who had suspicious symptoms when they came into it, recovered from them entirely.

“The children in and near the garrison have generally enjoyed the best of health, and have been afflicted with none of those complaints so common in warmer climates. It has been frequently made the subject of remark by the mothers, how vast the difference in this respect between Fort Kent and their former posts.”

Fort Kent is at the extreme northern part of the State, at the junction of Fish river with the St. John, latitude forty-seven degrees fifteen. minutes north, longitude sixty-eight degrees thirty-eight minutes west, in a direct line sixty miles from the St. Lawrence and one hundred and eighty from the sea. The soil, a light loam, which rests on a stratum of gravel and pebbles. On passing through this is found a bed of tough blue clay, reposing on an argillaceous slate rock. It is fifty miles or more north of the great bulk of choice settling land in the county.

From Fort Fairfield, which is on the south bank of the Aroostook river, a few miles from its mouth, in latitude forty-six degrees forty-six minutes north, longitude sixty-seven degrees forty-nine minutes west, the resident surgeon reported :

“This post is uncommonly salubrious. The climate, though rigorous is uniform for long periods, and does not appear favorable to the development of pulmonary consumption, or of other affections of the respiratory system. The country is very little settled, but so far as my observation extends, no case of consumption has occurred either in the permanent inhabitants or among the numerous parties of lumbermen who pass the entire winter in the open air, and are the most hardy and athletic of men.”

From Hancock Barracks, Houlton, latitude forty-six degrees seven minutes, longitude sixty-seven degrees forty-nine minutes, one hundred and eighty miles from Bay of Fundy, in a direct line one hundred and fifty-six miles from the ocean, and elevated six hundred and twenty feet above it:

“This station surpasses most others in its freedom from sickness. Cold as the winter is, and damp as the autumn and spring are rendered by the frequent rains, persons who have suffered from weak chest find their complaints much mitigated by a residence here. Consumption is rarely seen among the inhabitants of the town; and many persons who were predisposed to that disease have continued in good health, free from cough, and have had their constitutions invigorated and improved.”

In the report from Fort Kent are mentioned numerous facts going to show both the longevity of individuals, and the rapid natural increase of population. For instance, six families living within the space of a mile had one hundred and six children in all. Twelve other families had ninety-three children, in an aggregate married life of one hundred and sixty-two years, averaging a birth every twenty months in each family. One settler had nineteen children in eighteen years; another at the age of fifty-nine had twenty; another had twenty-six, the mother being fifty-three years old. Many other facts are cited, showing that whatever the cold of winter or other peculiarities of climate, there is nothing to preclude the highest conditions of health and longevity.

The growing season, it is true, is shorter than elsewhere, but the rapidity of growth when once begun, is unparalleled in other parts of New England. Of this, I cannot state from observation, making as I did, my visit at mid-summer, but the uniform testimony of settlers on this point, and the progress actually made towards maturity which I witnessed, was fully satisfactory.

The snow falls early, sometimes as soon as the end of October, and before much frost (sometimes none) is in the ground. There it remains, steadily covering the soil until spring opens, a warm blanket two to four feet deep, with no alternations of freezing and thawing. When it goes off, the transition from winter to summer is almost instantaneous, and the soil *may be worked at once*. Being thus blanketed through the winter and porous enough as before remarked to allow superfluous moisture readily to pass downwards, no time is

lost either for the ground to thaw, or to become sufficiently dry and warm to be worked to advantage. The crops are put in with no delay, and once in, they proceed with rapid strides to maturity.

On a farm of Mr. Cary's, at Houlton, I was shown thirty acres of wheat, ten of which were sown April 17th to 20th. This, in the latter part of July, was fully in milk, and past liability to injury from the wheat midge or fly.\* The rest was sown considerably later and the grain not yet fully formed. Upon this, I was sorry to see that the midge threatened to levy a serious contribution.† In the neighborhood of Presque Isle, I was informed that oats, sown as late as June 10th, usually ripened without injury from frost. With regard to the usual period at which frosts occur, it was not ascertained to differ materially, of late years, from other sections. In low grounds frost is often noticeable at an early date, but on the higher lands usually tilled, one sufficient seriously to check vegetation is not expected before "the full of the moon in September," and this period safely passed, not until some weeks, possibly a month later. From the best information I could gather, frosts have not been so early or destructive for the ten years past, as before that time, and when the clearings were generally smaller and afforded little opportunity for circulation of air. The last week in August, 1842, there occurred a frost which did considerable injury, especially to the crops of such of the settlers as had been engaged in spring, in driving timber, and so had deferred their seed time to a period too late for safety. June 4th, 1844, ice made as thick as window glass. In 1845, the last spring frost occurred on the 31st of May. The injury which ensued from the early and late frosts from 1842 to 1846, was, in many cases, of a serious character, and had a very discouraging effect upon immigration. I did not learn of serious injury since that period in any case where crops were put in at the proper season. In some years frost has first occurred in Aroostook several weeks after it appeared in Penobscot county, and I learn that the present year no frost had occurred up to September 26th.

The term, during which cattle required to be fed from winter

---

\* Very generally in this State, but erroneously called "weevil;" a name which properly belongs to another and very distinct insect, which attacks the matured grain after being stored.

† I have been gratified to learn since, that the actual injury proved to be trifling.

stores of forage, proved shorter than was anticipated, the autumnal feed being said to be abundant and good *until the snow fell*, and as soon as this disappeared in spring, cattle could find plenty of fresh and nutritious grasses. Some of the residents, who had been familiar with agricultural pursuits in other States, assured me that in this regard Aroostook possessed decided advantages over southern Maine or Massachusetts. The value of such pasturage will be readily appreciated by every practical farmer.

A very noticeable peculiarity of the climate of Aroostook, is the exemption hitherto enjoyed from injurious droughts. The settlers informed me that although there had been times when rain would have been acceptable somewhat sooner than it came, yet, that it could not be truthfully said that actual injury had ever ensued for want of it.

Whether, and to what extent, this exemption may be attributed to the existence of primeval forests, and whether it may be expected to continue after the woodman's axe has done its work, may be a matter of some uncertainty; but the probability that they are intimately connected, the one with the other, adds force to the well known and abundant arguments against indiscriminate waste and strip, and in favor of retaining, (or, if preferred in some cases, allowing an immediate second growth of,) sufficient wood for fuel, timber, and especially for *shelter* to their homes, fields, orchards, cattle and crops. The subject of shelter in a climate like ours, is one of such importance that I cannot forbear to express the hope that it may be duly considered and acted upon.

PRODUCTIONS. All the small grains thrive well. Wheat is not so extensively grown as formerly, the fly, or midge, (commonly called weevil,) rust and mildew being found serious drawbacks upon its profitable culture. I was informed by Mr. Nathaniel Blake of Portage Lake, (number thirteen, in sixth range,) that the wheat-fly had never troubled the grain there, and that he usually reaps twenty-five bushels per acre; but this was the only instance of entire exemption found, although at Patten and some other places, injury from the midge had been far less than from rust. Mr. Blake also stated of this locality, that frosts were usually two weeks or more later than at number eleven, some ten or twelve miles south of it. Mr. J. W. Haines, an old settler from Kennebec county, on Letter

D, in first range, firmly holds from his own experience, that the fly, though often abundant, rarely injures the crop unless rust, mildew, or some unfavorable atmospheric influence retards the growth of the plant, thus giving the maggot time to commit his ravages, as otherwise, the plant being perfectly healthy and thrifty, the grain fills plumply and is abundant, be the maggots never so plenty.\*

---

\* As one proof of this, Mr. Haines stated that on threshing his grain, he had found maggots in great abundance, and his crop very slightly, if at all, lessened thereby. Whether his opinion as above given, be correct or not, he probably in this instance mistook the maggot of the "wheat mow fly" for that of the ordinary wheat midge or fly, the maggot of which usually leaves the plant at an earlier period before harvesting. Of the "wheat mow fly," only recently known as a depredator upon the wheat crop, Mr. Fitch, in his treatise on insects, says: "Several years ago, a farmer in my neighborhood, soon after gathering his wheat into the barn, found countless myriads of small worms were crawling out of it, literally covering the mow of grain, and wandering away from it, to every part of the barn. These worms it is evident, had just now completed their growth, and were crawling about in search of the moist earth wherein to bury themselves, to repose during their pupa state. It would seem that some cause had made them later than usual in reaching maturity; and had the wheat remained in the field, a few days longer, they would have escaped from it there, so generally that no notice of them would have been taken, and the fact would never have been known that such an army of insects had had their subsistence upon this crop.

Alarmed with the numbers of these worms, and fearing they would perhaps wholly destroy the mow of grain, the proprietor had the whole of it threshed immediately. I happened to visit the barn as the threshed grain was being winnowed, when the above facts were communicated to me. The heap of uncleaned grain was literally alive with these worms and the cracks in the floor were filled with them. The kernels of wheat appeared to be shrunk in the same manner as when they have been infested with the wheat midge. I put a number of these worms into a small box with some of the chaff and grain. Other engagements diverted my attention from this subject, and it was wholly forgotten, until many months afterwards, when, happening to open the box, I found in it quite a number of small flies, which had completed their transformations, and perished in their confinement. It therefore appears, that it is by no means essential to these worms to bury themselves in the moist earth, though that is doubtless their natural habit. But if they can find any crevice in the dry barn where they can stow themselves and lie undisturbed, it is all they require in order to complete their transformations.

The worms, according to my recollection, were much like the little yellow maggots of the wheat midge, but were of a dull white color and rather larger. Their transformations are like those of flies generally, the outer skin of the larva or maggot contracting and becoming dry and hard and forming the case, within which the insect lies in its pupa state. It is but the tenth of an inch long and three hundredths in diameter; it is shining, and of a pale yellow color, of an oval or rather an

When successful, twenty to twenty-five bushels is considered a good crop. Instances of much larger yield were narrated. Mr. Haines stated that he had grown forty-one and a half bushels of spring wheat, of sixty pounds to the bushel, to the acre. This was on land which had been in grass for four years and manured for potatoes the year previous; and that his neighbor, Mr. Goss, in adjoining township Letter C, grew last year one hundred and thirty-five bushels of bearded wheat, on five acres, and in another instance, fifty-two and a half bushels of winter wheat on one acre of new land from which no previous crop had been taken. This was mentioned as a very unusual crop, as winter wheat had rarely succeeded so well as spring wheat. Mr. Alfred Cushman of Golden Ridge, (number three, in fifth range,) President of the Penobscot and Aroostook Union Agricultural Society, informed me, that in one instance, from two and a half bushels sowing, he had reaped one hundred and seventy-five bushels, on four acres, one acre of which proving too wet, yielded only about half as much as the rest, thus indicating fifty bushels to the acre, on three acres. Since then he had been less successful, having experienced rust often and mildew occasionally.

On the whole, it seems doubtful whether wheat may be depended on as a staple crop, or that it can be profitably grown to an extent much beyond the amount needed for home consumption. But no drawbacks were found to exist which may prevent large production of the other grains. Oats, barley and rye, with fair treatment, grow luxuriantly, and yield bountifully. It is true, some very small and meagre crops were noticed; one, for instance, of about twenty bushels of oats; but upon inquiry it was ascertained to be the *seventh successive crop* of oats on the same spot, without any application of manure, and that the fifth yielded thirty-five bushels. Who can wonder if such management, or rather gross mismanagement, prevails, that some, even here, become discontented, complain of the climate, take the western fever, and talk of emigrating? And here it may be added, that evidence was abundant that two, three, or even four white crops in immediate succession on the same ground,

---

elliptical form, more rounded at the head and pointed at the opposite end, the segments distinctly marked by transverse constrictions. The fly appears much like the common house fly reduced to an infantile size."

was by no means so unfrequent as it should be. Several instances came to my knowledge, in which three successive crops of oats on the same land had yielded an average of fifty bushels or upwards per acre. The average production of these grains, *under good treatment*, may be set down as fifty bushels of oats, thirty of barley, and thirty to thirty-five of rye; the *actual average* would however be found at least twenty-five per cent. less than this.

Buckwheat is largely grown, and is probably gaining in estimation, for the remark was frequently made by residents, that although prejudiced hitherto against it, they had at length adopted its culture. The variety grown, is called here, rough buckwheat, and elsewhere known as Indian wheat. The smooth variety proves much less successful and is nearly abandoned. Its yield varies from twenty or thirty to fifty bushels—sometimes considerably more. With good treatment, and on soil in good condition, forty to fifty bushels may be confidently expected. It is usually grown upon the poorest. Its weight is from forty-five to fifty pounds to the bushel, and it yields about one-third of fine flour, which makes excellent bread and cakes, from a third to two-fifths of a coarser description, but very nutritious and highly esteemed for swine and other animals, the remainder being principally hull, is of little or no worth. The value of buckwheat for fattening animals, as compared with Indian corn, was variously estimated at from one-third to two-thirds its value, some deeming a bushel and a half of buckwheat equal to one of corn, others rating a bushel of corn worth three of buckwheat. The more usual estimate was one-half, although some who professed to have proved its value with care, were confident that deducting thirty-three per cent. for the hull, it was equal, weight for weight, to Indian corn, for fattening stock. The market value of Indian corn is usually two and a half times that of buckwheat.

Professor J. F. W. Johnstone, in his report on the agricultural capabilities of New Brunswick, states that he found, by analysis, that the flour of buckwheat was equally nutritious with the finer varieties of wheaten flour.

The success attending this grain in Aroostook, and the comparative extent to which it is grown, may be judged of from the fact, that by the census of 1850, this county, containing a little more than a fiftieth part of the population of the State, produced the



previous year eighty-six thousand five hundred and twenty-nine bushels, while all the rest of the State produced only eighteen thousand bushels.

Indian corn is not extensively grown in Aroostook county, but its cultivation seems steadily, rather than rapidly, on the increase. By careful selection of early seed, a fair crop is generally secured. As far north as number eleven, fifth range, I saw corn silked out at the end of July. Last year Mr. Bean of letter G, in this vicinity, raised fifty-one bushels of sound corn per acre. The yield is not usually above this, and the actual average probably below forty bushels.

Mr. Cushman, at Golden Ridge, (number three, in fifth range,) some fifty miles south of number eleven, informed me that he had grown at the rate of two hundred and twenty bushels of ears per acre. He had, when I was there, a very promising field of corn, which was planted more closely than I had ever before seen, viz: three feet by eighteen or twenty inches asunder, thus giving more than double the usual number of hills to the acre. Mr. Cushman is doubtless wise in endeavoring to adapt the distance between hills to the anticipated size of the plant, and to get the full benefit of a well prepared plot for corn; but four and a half or five square feet only to the hill, seemed rather close, even for small Canada corn, in Aroostook. I had the pleasure of meeting Mr. Cushman subsequently, at the State Fair in Bangor, early in October, and learned from him that an acre of this had been harvested, and the product proved to be two hundred and ten bushels of ears of sound corn—a very good crop for any where.

Messrs. Gerry, Cushman, and other residents of this vicinity, assured me that they deemed Indian corn a surer crop than wheat. The seed used, is partly the Canadian variety, and partly what is called there, the early Dutton, a twelve rowed sort, originally brought from Massachusetts, and gradually acclimated. By the census returns of 1850, it would appear that the crop of Indian corn exceeded that of wheat, by several thousand bushels; but there is doubtless some serious error in the figures.

**ROOTS.** Large crops of these are as easily grown, perhaps more so, as in any other parts of New England. Potatoes are excellent and abundant, the usual crop being from two to three hundred bushels, per acre. In some sections, very little or no injury has

ensued from disease, and it was estimated by several persons, that for ten years past, not over a quarter of the crop had ever been lost from the rot in any locality. Turnips to the amount of five hundred bushels to the acre, are grown with no labor beyond brushing in the seed on new land, and perhaps a little thinning out, no hoeing or weeding being bestowed. Much larger crops can be grown with additional labor and care. Carrots are highly esteemed, the crop, with fair treatment, varying from six hundred to twelve hundred bushels per acre. I learned of one crop of eight hundred and sixty-eight bushels, by actual measure, to the acre, where the rust had materially checked the growth. As in other sections of our State, root crops receive far less attention than they deserve.

GRASS. No better district for hay, grazing and dairying, can be found in New England, than here. Indeed, I have never seen better in Orange county, New York, nor any where else—and should a person accustomed to much richer pastures than are usual in New England or New York, tramp over some of these, with red clover well up to the knees, and a dense mat of honeysuckle under foot, (the pastures tolerably well stocked too,) he could scarcely fail to deem it a country of rare excellence for grazing and dairying. Nor can I conceive sufficient reason, why Aroostook butter\* and cheese, may not be profitably exported to large extent, and by the application of proper skill in manufacturing, be made to rival that of Orange county, and command as good a price. Whether it can or not, one thing is sure, a good name must first be established, for the little butter which Maine has sent abroad, has by no means an enviable reputation in Boston market, let the quality of some which is eaten at home, be what it may. As for cheese, Maine now buys hundreds of thousands of pounds annually, and so our farmers might command a sufficient market for a good article at home, for a long time to come.

The propensity to take off successive crops of grain, until the yield seriously diminishes, is so great, that little land is sown to grass until its fertility is very sensibly impaired; hence the low

---

\* If my information be not at fault, a scant supply even for home consumption, has been produced hitherto. One gentleman assured me that for the public house, at number eleven, he had purchased in New Brunswick, butter by the half ton or more, at a time.

average yield of hay, which does not much exceed a ton per acre,—perhaps it may a little, while with better treatment, an average of two tons might be had just as easily. The reason alleged, or excuse offered for the practice was, that as it is, they have quite as much hay as they could cure, or store, or use, and more than this would be of no value.

Among the few exports from the Aroostook valley, may be named herds grass and clover seed. Last year, Mr. John Allen, near Presque Isle, offered for premium a crop of two thousand and twenty-four pounds clover seed, grown on seven acres, and which he sold at fifteen cents per pound. He stated the profit on the crop to be one hundred and sixty-three dollars sixty cents, or upwards of twenty-three dollars per acre. I heard of a crop upon ten acres, in another locality, of twenty-five hundred pounds. It is deemed very profitable when the heads “seed well,” but this is by no means sure always to occur. It is rarely cut for seed unless promising upwards of one hundred pounds per acre; and sometimes three hundred are realized. In 1850, six hundred and sixty-one bushels clover seed, or forty thousand pounds, and ten hundred and eighty bushels of other grass seeds, were grown in the county. Herds grass, or timothy, usually yields six or seven, and sometimes ten bushels of seed per acre. In one instance, I learned of one hundred and four bushels grown on ten acres.

**FRUIT.** Of the culture of fruit in Aroostook, it may be premature to speak with confidence; but the prospect is strongly in favor of ultimate success. There are a number of nurseries established, principally of the apple, and many trees have been planted out. In the village of Houlton I was told that little success had attended the planting of any other than the Siberian crab apple, which lived and bore well, but that a few miles out they succeeded tolerably well. Here, also, I saw plum trees of choice varieties which had borne abundant crops, quite too heavy indeed for their ultimate good. The appearance of the apple trees in this vicinity indicated a growth of wood too late to become well ripened and hard, and so, unfit to withstand the severity of winter. The circumstance of the roots being for a large part of ordinary winters in a soil above the freezing point, and the tops, at the same time, in a much lower temperature, may also have had an injurious influence. On higher

lands, rocky knolls and side hills, especially in fifth range, I found orchards which bid fair to be productive and profitable. Mr. Elisha Brown of number six, in this range, has an orchard of some three hundred trees, many of them planted eight to twelve years, and most of which are succeeding finely. In his earlier attempts, he lost largely by grafting to Baldwin, Greening, Roxbury Russet, and other varieties of good repute further west, but which prove utterly unfit for this climate. Success in orchard culture here, will depend greatly upon a proper selection of varieties, and in this much help may be obtained from the experience of cultivators in the northern parts of Penobscot and Piscataquis counties, where also, some very promising seedlings have originated. It is highly probable that the sorts which in most parts of New England ripen in autumn, will here prove winter, or at least, early winter varieties. Mr. Cushman of Golden Ridge, informed me that he had received the first premium for apples at their Agricultural Fair held in October, on the Red Astrachan, such was its fine quality and good condition. This variety proves throughout Maine to be one of the hardiest, but in the western part of the State, I have never seen it in eating after August; and as with this, so probably with other early varieties, the period of maturity may be considerably later, and in some cases the quality improved, as it is proved to be with the Duchess of Oldenburg, another extremely hardy, early sort. Mr. Cushman's success has been such, that he proposes to plant at least two thousand apple trees on his farm, (with reference to its future division,) to graft them as soon after they attain suitable age, as he can decide in his own mind upon the most profitable varieties for leading sorts in their adaptation to his soil and climate. The treatment he proposes being somewhat original, may be stated. First cut down and burn the original growth; "hand-pile" the logs remaining sufficiently to allow the planting out of the apple trees, and seed down the land to clover at once. The clover to be neither mown or pastured, but left to decay on the ground, year after year. Three or four tons per acre every year, he thinks, will keep the ground in good heart, and what is more, secure the trees from the attacks of mice which are often troublesome on tilled and mown land, as they will hardly care to eat apple tree bark, or wood, while "living in clover," and with plenty of seed to fatten upon.

The smaller fruits, as currants, gooseberries, &c., &c., thrive perfectly well, and yield freely. Mr. Brown had a plantation of barberries which were quite flourishing. English gooseberries were entirely free from mildew, and so far as I could learn, this troublesome affection is entirely unknown in the eastern part of Washington county, and also in the adjoining Province of New Brunswick. It was not ascertained that grapes or pears had been tried. That there are among the early ripening grapes lately introduced to notice, or among the countless seedlings now on trial in all parts of the country, some which are both sufficiently early and hardy to succeed well any where in Maine, no doubt is entertained. Few among us now know the luxury of *good* and *ripe* grapes, or are aware of the impulse given to their culture in the last few years—of the progress which has been made, and the probability that all who will bestow the needful attention, can soon enjoy this delicious fruit. And that there are varieties of pears which will succeed in Aroostook, seems at least probable, from the fact that some are known to have grown well, and borne well, in a still higher latitude.

MARKETS. This is a matter of prime importance, and ever to be well considered in estimating the expediency or profit of production. Of what avail is it that lands be never so fertile, if crops, when grown, can find no remunerating sale?

It may be said that agriculture can *exist* without markets, for the laborer can be fed from his own products, and clothed in home manufactured flax and wool, also of his own growth; but such labor is for life, not for profit—a struggle for existence, and such agriculture cannot be deemed a distinct and desirable branch of industry.

“As a specific branch of industry, it begins as soon as a regular market for it is opened; that is to say, as soon as the industrial and commercial populations exceed a certain proportion, whether it be immediately on the spot or at a sufficiently moderate distance, with easy means of communication, so that the expenses of transit do not absorb the profits: it becomes more and more flourishing, as the market becomes greater and more approachable—that is, the nearer its vicinity to large towns or great centers of manufacture. In that case, the market suffices to create profits which rapidly increase capital, farming becomes more and more prosperous, and progresses towards its maximum.

“Some minds, judging more from appearances than reality, have looked upon commerce and manufactures as enemies and rivals to agriculture. This error cannot be too much combatted, as nothing is more hurtful to agricultural interests. In reality, the distinction between agriculture and manufactures is false: to bring the land into cultivation is also a manufacture, and the transport, the sale, and the purchase of agricultural produce is also a trade. Only this kind of manufacture and commerce being altogether of prime necessity, can dispense a little more with skill and capital than the others; but then they remain in a state of infancy, and when these two powerful aids are supplied, they become a hundred times more fruitful. Even admitting the distinction which usage puts between the terms, there can be no profitable agriculture without profitable manufactures. This is in some measure a mathematical axiom, for commerce and manufactures can alone abundantly provide agriculture with the two most powerful agents of production which exist, namely, markets and capital.

“It is of consequence, then, that our cultivators apprehend clearly the only means of enriching themselves, lest they hinder their own prosperity. Their opposition would not arrest the course of things, but would render it slow and tedious. All jealousy between agricultural and industrial and commercial interests, will only damage both. If you wish to encourage agriculture, develop manufactures and commerce, which multiply consumers; improve especially the means of communication which bring consumers and producers nearer to each other; the rest will necessarily follow. Commerce and manufactures bear the same relation to agriculture, as the cultivation of forage crops and multiplication of animals do to cereal production. At first they seem opposed to each other, but fundamentally there is such a strong connecting link between them, that the one cannot make any considerable progress without the other.”\*

The only market now existing in Aroostook for ordinary agricultural productions, is that created by the lumbering operations. This is generally a good one to an extent sufficient to absorb the surplus which the settlers now tilling the soil have to dispose of; but it is by no means a uniform one, varying as it necessarily must, with the

---

\* Lavergne's Rural Economy, pp. 152, 160, 167.

fluctuations of that interest (proverbially uncertain) which creates it. Viewed in another aspect, this market can hardly be deemed a particularly desirable one, inasmuch as the manure yielded by the hay, oats, &c., cannot be purchased by the farmer, and returned to the soil to maintain its original fertility. Neither can I deem it a reliable one, for even admitting that the demand for forest productions will be always and uniformly good, the timber crop itself, although it may not be all harvested in one year, nor ten, nor twenty, will not last always; and while it does, the market which it affords will be gradually receding from the tilled lands.

Suppose every township, as soon as stripped of its timber, to be settled with energetic, industrious farmers, and their fields presently to smile with bounteous harvests, what would they be worth? What would be the net proceeds of a thousand acres of oats, yielding a hundred bushels to the acre, if it costs a hundred and fifty miles cartage over an earth road, however good, to market them? *Perhaps a dime per bushel.\** And this leads to the inquiry, whether with present facilities for exportation alone, farming can be extensively carried on in Aroostook at a profit; and I hesitate not to say in reply, that it can, *provided* the mode of procedure be adapted to the circumstances, and this, in my opinion, is only by adopting, in the main, low farming,† to wit, the growing of cattle and horses, and sheep

---

\* If the oats weigh thirty-four pounds to the bushel, and cartage be estimated at fifteen cents per ton per mile, it will cost thirty-eight and one-fourth cents per bushel to put them into market. If they sell at forty-five cents, the net return will be six and three-fourths cents; if at fifty, eleven and three-fourths cents per bushel.

† "Farming may be called *high* or *low*, according as the farmer strives by dint of labor and capital to keep the land in the most fertile condition, and draw the highest income from it; or, as he tries with smaller means to arrive more gradually at the same result. In the one case, the course of the rotation is short, and manuring frequent and heavy: in the other, there are at all events more than four crops in the rotation, and a certain productiveness is even maintained without manuring at all. Hop culture, market gardening, and spade husbandry, illustrate the *highest* kind of farming, while grazing or sheep farming are of the *lowest*. The former is practised where labor and capital abound; the latter will be pursued under circumstances where labor and capital have for the time a high value as compared with land, or, in countries where the markets are remote, and the population limited and deficient in agricultural knowledge. The soil has little influence in the case, for some of the highest farming in England is carried on profitably on the poorest soil.

husbandry. Pity 'tis, that on so fertile a soil, a higher grade may not be as successfully pursued; but it is the part of prudence to be governed in our action by circumstances, never forgetting to control

Either one or the other system is good, that is, profitable according to circumstances: in the one case, the gross revenue may be great; in the other the net revenue may be the largest, on the whole."

The above quotation is from Dr. Robb's admirable lecture on agricultural progress in New Brunswick. What follows, though less pertinent to the point now in hand, is equally suggestive and interesting in connection with our general subject:

"In this country, high farming is little known as yet: in the old country it is extending every day. English examples are not, therefore, always the best for us, and English criticisms on our condition are not necessarily infallible. Much of what is written for England is in fact unsuitable here, and a cautious adaptation of English practices is required; for, after all, I may venture to say that farmers here are quite as anxious to be in good credit with their banker as they can be in England. In England they demand incessantly an increase of agricultural science; what we chiefly require here at present is *the diffusion of principles already established*. High farming ought always to be our aim here, but it must be taken up with care and judgment, and perhaps may not become general, until labor is more plenty, and railroads in active operation. In New Brunswick, a mixed system, or compromise between grain husbandry and pastoral husbandry, is the rule; that is, an indifferent alternation of crops is followed for six or seven years; after which, grass is cut or pastured for an equal period. Such is the practice which prevails most generally in the country, but, in numerous instances a shorter and better rotation is steadily and profitably pursued. Our first aim ought to be to learn to make or save manure enough, so as to shorten or do away with the long fallow, and restore fertility to our arable land in a shorter space of time than at present.

While acknowledging on the one hand, the great progress in agriculture which has of late years taken place in this respect, in some parts of the Province, I see again but little advancement in others; nevertheless, I am not disposed, as many are, lightly to disparage our new settlers, on account of the magnitude of their clearings and their comparative unproductiveness. It seems to be the result of necessity rather than of design. These clearings have been enlarged, not simply because the owner meditated a greater breadth of cropping, as previously stated, but because he was compelled to do so, inasmuch as he could get no more crops from the land which had been cultivated. Nay, How could he do so? He brought with him into the dark forest many years ago, we may suppose, only a wife as young as himself, a cow and a pig, an old horse, an axe, and a grindstone. Such were the first settlers; such were their agricultural implements and their farm stock. By a strong and willing arm, the forest was speedily cleared to the extent of a few acres, and the new settler got a little cash for all that he could spare of his first, best crops, from a lumber party in the neighborhood. Indeed, I believe he often hired out to them himself, and found the old camp life as jolly as ever. Sooth to say, most of us would have done the same. But, having no chance of buying manure, and having sold his hay and oats off the farm, he could have little manure upon it; and, having



those circumstances as fast and to such extent as may be within our power. I cannot doubt that a vigorous prosecution of dairy business and of wool growing, the yield from both which, on lands both cheap and good, will bear an export charge of one or two cents per pound, without destroying profit, or the growing of horses and lean cattle, possessing locomotive powers of their own, to take themselves to market, may be carried on to advantage. Very probable is it, or at least, so it seemed to me, that fat cattle might be produced, barreled, and find an Atlantic market via the St. John, at a cost enabling the producer successfully to compete with any section.

Such, in its leading features, is the more judicious mode of procedure, wherever land is abundant and cheap, bearing but small ratio to the value of labor, connected with distant markets. But to do even this to the best advantage, so as to reap a handsome profit, requires the outlay of considerable capital, notwithstanding the cheapness of land, first, to construct the needful buildings *comfortably* to house a large number of animals in winter, in order to save

---

but poor accommodations as yet, the manure which was made had long ago yielded its tribute of nitrogen to the wind; while its phosphates and alkalies, borne away with the passing brook, bade good bye forever to our friend, who at the moment was too much interested in stream-driving to think of such trifles; nevertheless, that winter's work *paid* as well as the summer's had done. A poor chance enough for high farming and stall feeding, you will say, and I agree with you. Accordingly, our friend goes on cropping and chopping alternately, while he leaves the old fields to recover by a most tedious (but economical) process of fallow or pasturage. Thus he slowly progresses towards independence; and if he has not staid away too long from his farm, fiddling and stream-driving, and so forth, he finds himself at length the unquestioned lord of a large clearing, and with an ample inheritance for his children forever; that is, if they will only try to avail themselves of its proper productiveness. It is obvious, therefore, that in the first place, our clearings must be large, and their productiveness comparatively small; and *that from the nature of the case*. Those large clearings now await the application of skilled labor, and are ready to reward it.

Immigrants with money, who understand farming, and design to pursue it as a business, need not go through the process above described; they can almost always buy cleared land, including both meadow and upland, at a moderate price, or they can hire the country people to prepare the land for use. We therefore invite those whose health and strength is their chief capital, to go upon new land; while immigrants, possessed of a little ready money, and understanding of agriculture, are recommended to buy ready made farms; and by *manure and management*, restore to them fertility, and lay broad the foundations of comfort and independence for themselves and families, in all time to come."

food and turn them out in spring in a condition *duly to thrive* on their summer feed; next, to obtain the most desirable breeds, with which to commence the undertaking; buildings also, for storing a sufficiency of winter stores, by no means forgetting an abundant supply of roots, safely stored in well ventilated, yet warm cellars. That this might be done, and the operation yield a satisfactory profit, seems sure enough, but from whence will such come? Capitalists, or those possessing means to enable them to do this, can easily get a living where they now are, in all probability comfortably settled, and in the enjoyment of greater privileges than can be expected in a new country, so that after all, inducement seems but scanty to cause *such* to emigrate and "rough it in the bush."

In estimating the comparative advantages of emigration to the new lands of our own State, and to those of the great west, there are many considerations to be taken into account. Land may be had cheaply in either case, but cheaper here than there, in fact, almost for nothing, as the half dollar per acre, which the State asks, may be chiefly paid in making the settlers' own roads—roads which he would have to make for his own convenience, if not thus paid for by the State. But in going west, cheapness ends with the price of land. The settler may get enough at a dollar and a quarter per acre, *provided* he go far enough from roads and rivers to find such as is not already taken up, but house, barn and fences are as necessary as land, and when he proceeds to their erection, he finds timber can only be obtained at a high price, usually at considerable distance, often having to be carted several days journey. Other building materials, bricks, lime, stone, nails, in fact, all, bear very high rates. Labor, especially mechanical labor, is costly and scarce. These considerations alone, leaving out many others, neither few nor trifling, (as the scarcity of water and its bad quality, when obtained, the agues, prostrating fevers, etc.,) I found to have proved operative in deciding the question in the minds of some residents of Aroostook, who had visited the west for the purpose of personal examination and deliberate balancing of advantages. They came home, content to remain, *fully* satisfied of the superiority of a residence here, and congratulating themselves that they went first to look before selling out, and thus taking a step not so easily or cheaply recalled—satisfied, that although a man possessing abundant means, might there

obtain higher rates of interest and find more tempting opportunities for speculation—the man with little besides strong hands and a willing mind had a better prospect here.

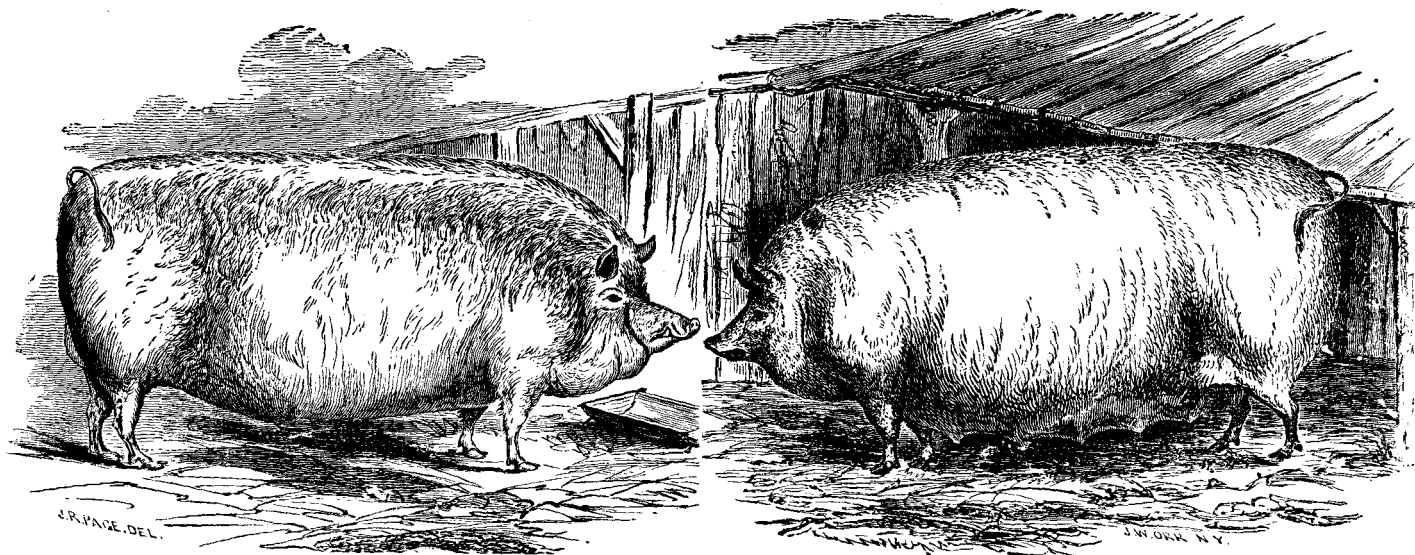
It may not be inappropriate to mention here some particulars regarding the practice of agriculture in Aroostook, as noticed while there. It is no more true of these lands, that they may be drawn upon any how and any long, without exhaustion, than of virgin soil elsewhere. Allusion has been made to repeated grain crops in immediate succession. This is a serious departure from judicious practice, and if persevered in, must result, as it has ever done in other places, in barrenness and exhaustion. It is comparatively easy to maintain fertility when once in possession, but how difficult to restore it when lost, thousands and millions of acres over the length and breadth of the land, and the struggles of their owners for a livelihood testify in most emphatic tones.

I saw nothing to prove true what rumor had said: that the settlers esteemed manure to be a nuisance, and carted it to the nearest stream to be rid of it, but with few exceptions, there was less care for its preservation than is desirable. In some instances gratifying evidence appeared that it was properly valued, and on the whole it seemed gaining in estimation, and that the settlers were gradually coming to a just appreciation of its value.

In the neighborhood of Presque Isle, there have been, through the exertions of members of the North Aroostook Agricultural Society, introductions of choice cattle, and a marked improvement has been the result. The Hereford and Durham blood prevails mostly in the crosses observed. Ayrshires were not known as such, but some cattle brought in from the neighboring Province of New Brunswick, and considered natives, bore strong evidence of an infusion of Ayrshire blood. These, including the Devon more lately introduced, are probably the best breeds yet proved for this climate, taking into consideration all their good qualities, and the absence of serious defects, all (except the Durhams, which require good feed and shelter,) being very hardy, easily kept, and valuable. The Ayrshire breed has been somewhat extensively introduced into New Brunswick. Mr. Samuel Gray, of Frederickton, brought with him from Ayrshire some years since, numbers of these to breed from for sale, and had, when I was there, a considerable herd of full blooded



## SUFFOLKS.



**"LORD WENLOCK."**

**"SCAR."**

"Lord Wenlock" was imported and "Scar" was bred by L. G. Morris. They won 1st prizes at all the Shows at which they were exhibited, viz: the New York State Show, and the Show of American Institute in the City of New York.

animals, including many choice specimens. In other parts of Aroostook, I found no more attention paid to the selection of choice stock than prevails in some other counties in the State, and much less attention paid to stock-growing as a leading branch of agriculture, than it seemed to me there should be.

Sheep husbandry receives little attention in comparison with what might be profitably bestowed upon it. The sheep which I saw there would average decidedly better for mutton than those of the State at large, the flocks having been improved by admixtures from those of Mr. Perley, a well known extensive stockgrower at Woodstock, N. B., near Houlton—and who rears principally, if not wholly, the pure Leicester breed.

The most objectionable feature noticed in connection with the growth of domestic animals, was in regard to swine—these being both too few in number and too bad in quality. Some good hogs there are, others tolerable, but more prevalent were those too nearly resembling the landpikes. These were noticed in even greater purity in some of the more sparsely settled parts of New Brunswick, from whence they may probably have been derived—big-eared, long-legged, long-snouted, slab-sided, thick-skinned, large-boned, ravenous brutes, which look as if they might have originated in a cross between a jackass and an alligator, and from which it would be the height of imprudence for one to contract to furnish mess pork for less than two or three York shillings per pound; certainly, unless he had a term of years to do it in. That such neglect of swine culture should exist, is the more to be regretted, as considerable quantities of pork are annually imported into the county at large addition to first cost from the price paid for transportation. From the best information I could obtain, between eighteen and twenty-five hundred barrels are required every year, and sometimes more than this, as supplies for the lumbering operations;\* the quantity varying from year to year with the demand for timber. No one acquainted

---

\* There was considerable hesitation among those best acquainted with this subject to make an estimate, but whenever attempted, either by judging what proportion the known quantity used by certain large operators in timber bore to the whole amount, or by the estimated amount of timber cut, and the known quantity required for each thousand tons, the result arrived at in every instance, was the same, viz: two thousand four hundred to three thousand barrels, in average years.

with the subject, of whom inquiry was made, reckoned the amount at less than fifteen hundred in any year, and most stated it to be from two to three thousand in ordinary seasons. So far as could be learned, nearly all of this was brought from abroad, while there can be no doubt whatever, that by judicious management, the whole of it could be grown on the spot, from the refuse of the dairy, with roots, and fattened on buckwheat, with perhaps a little corn, and yield a handsome profit. So good an opportunity of earning thirty to fifty thousand dollars per annum, should by no means be neglected.

ROADS, DISTANCES, &c.—*Means of Communication.* From Bangor northerly, there is now a railroad in operation to Oldtown and Milford, twelve miles;\* thence the traveled road follows the east bank of the Penobscot river as far as Mattawamkeag point, sixty-one miles from Bangor; thence in similar direction to the "Forks," at Molunkus, where it branches, the "Military road" extending in a northeasterly direction to Houlton, and northwardly thence to Presque Isle in the valley of the Aroostook.

From the "Forks" at Molunkus, the "Aroostook road" pursues a northerly course, passing through Benedicta, (a half township purchased by the Roman Catholic Bishop in Boston, some years since, and where were erected a church and a large building intended for a College,) Golden Ridge, Patten, (a border town of Penobscot county, and a very pleasant village, with many smiling farms and thrifty farmers,) townships numbers five, six, seven, eight, nine, Masardis, (number ten,) to number eleven, all in the fifth range. This last township is named on some maps Ashland, but the name has not been adopted by the inhabitants. It is the centre from which are fitted out most of the parties for operations in timber. This road continues also in similar direction to Fort Kent, (forty-eight miles further,) which is on the northern boundary of the State, at the mouth of Fish river. From number eleven, (of fifth range, or *Aroostook*, the name of the post office here,) a road tends easterly in the valley of the Aroostook river to Presque Isle and Fort Fairfield, continued also to the mouth of the Aroostook and to Tobique, in New Brunswick. By these routes it is seventy-one miles from

---

\* Another railroad has been surveyed, and some grading done upon it, from Bangor to Lincoln, about fifty miles north.

Bangor to the Forks at Molunkus; thence forty-four miles to Houlton, and forty-one more to Presque Isle. From the "Forks," by "Aroostook road," it is seventy-five miles to number eleven. From number eleven to Presque Isle, is twenty-four miles, and thirteen thence to Fort Fairfield, and six more to Tobique, N. B. Besides, these, which are the principal ones, there are minor roads diverging from various points, and often intersecting some of the choicest lands in this region. These roads vary materially in quality, parts of them, especially of the Military road, are very good, and as a whole, this is a much better one than the "Aroostook road," but none were esteemed to be any better than they should be, and are far from inviting in appearance to new comers, who have been accustomed to better. The passage of so many heavily laden teams at all seasons of the year, is a severe test for any road, and one which only a thoroughly macadamized track, or a plank road could withstand without serious injury. By those who settled early, and whose standard of comparison was the former condition of the same, or the present condition of others still worse, the above named were all spoken of as "good."

By the above mentioned routes, goods are now carried from Bangor to Presque Isle, one hundred and fifty-five miles, at about thirty dollars per ton, and from Bangor to number eleven, one hundred and forty-five miles, by the Aroostook road, at thirty-five to forty dollars per ton. Such rates add so materially to the cost of supplies brought thither, that it is no wonder if a cheaper mode of communication be sought. This, the easterly ranges of townships enjoy for so much of the year as the river St. John is navigable, which may average about five months. Freight is brought from the city of St. John to Tobique, within six miles of Fort Fairfield, at a rate varying from eight to eighteen dollars per ton; by steam to Frederickton, ninety miles, at all times when the river is not closed by ice, and when the depth of water serves, also by steam to Tobique, otherwise by tow boats, from Frederickton or Woodstock, up. From Tobique to Presque Isle, is eighteen miles, and twenty-four miles thence to number eleven, and here I was assured by the traders and lumbermen, that at the present time, not one-twentieth part of the goods sold at, or of the supplies distributed from, this point, were brought thither from Bangor, whereas, formerly, nearly the whole were.



They now procure them via the St. John, and including some forty miles or more of land carriage over a hard road, at a cost for freight usually of about one-half the charge from Bangor.

An inspection of the map of this region will show that its natural channel for communication is toward, and through New Brunswick; and it would appear that the artificial channels which we have made to connect it with other sections of our own State, have not proved good enough to compete successfully with the St. John. As traffic ever seeks the most profitable channel as naturally as water seeks its level, we cannot wonder, however much we may regret, that it has nearly all passed into the Province; nor can we wonder more to find that the social intercourse and sympathies of the people have followed in the same direction, and that, except in the matter of jurisdiction, this vast and fertile region is (almost, if not quite,) as really annexed to New Brunswick, as if so stipulated in the treaty of 1842.

The boundary line never here a practically serious obstacle to interchange of commodities, has, since the reciprocity treaty went into operation, been little more than a nominal one; and the ease and intimacy of communication will probably soon be greatly increased by means of the St. Andrews and Quebec Railroad, now partially constructed and vigorously prosecuted, and which it is anticipated may be open for use as far as Woodstock or Richmond, near Houlton, in the course of another year. The southern terminus of this road, St. Andrews, lies just opposite Robbinston, midway between Eastport and Calais, and the track, when completed, will for some distance run close to our border.

Under date of November 1, 1857, a correspondent writing from Fort Fairfield, says:

“The St. Andrews and Quebec Railroad is now opened *forty miles*; it will be opened by next September to Richmond and Woodstock, and be at Richmond, six miles from Houlton. When completed, it will run along near the boundary line the whole length of the east side of Aroostook county, and will be very convenient of access from the present settled portions of the county.”

Is there any other way in which Aroostook can be saved to Maine, except either to “annex” New Brunswick, or underbid her in the matter of facilities for communication?

The idea of a satisfactory connection with the Atlantic seaboard

connected with a just appreciation of the great results which would flow therefrom, is by no means a novel one, but has been strongly urged in years past by far-seeing men; for example, in the report of Hon. F. L. Hamlin as Land Agent in 1839, we have the following:

“ Upon a glance at the public lands, it will be seen that the fertile valley of the St. John river extends through the whole breadth of the northern part of the State, and with the Aroostook valley, includes about one-third part of our whole territory. The natural outlet of this country for trade and intercourse is through the Province of New Brunswick.

To connect this region with the Atlantic seaboard, within the limits of our own State, it will be seen that the topography of the country distinctly marks out two great avenues of communication through the valleys of the Kennebec and Penobscot.

That our seaboard will be connected with the St. John waters, sooner or later, by these two routes, either by canal or railroad, or both in part, there can be no doubt in the mind of any one who has watched the progress of internal improvements in other states, who considers the feasibility of opening these communications, and of their great practical importance in diverting the trade of this region from a foreign market, and increasing the wealth and population not only of the St. John valley, but of the whole State. The development of the agricultural resources of this valley would give a sustaining power to our commercial capital on the seaboard, a healthy impulse to manufactories, and would not fail in advancing the State at once to the position in the Federal Union, to which her natural advantages so justly entitle her.

It is evident that the citizens of this State have not heretofore been fully impressed of the great value of our public domain. The golden opportunity which occurred at the time of the separation, for Maine to acquire of Massachusetts her interests in the public lands, was suffered to pass unsecured by us, and the appropriations heretofore made for the construction of roads towards the interior, and for public improvements, seem to have been reluctantly yielded, instead of being the spontaneous acts of the whole Legislature, and as indicating a spirit and feeling worthy of our great resources. So long as the public mind is possessed of doubts and fears, and misgivings, and until there is manifest an honest feeling of State pride and a just confidence in our own means and resources, it will be in vain to undertake any public work of magnitude with any rational hope of success.

I am aware that serious objections are entertained by many against all works of internal improvement, when undertaken by the State, and where it becomes necessary to borrow money. It cannot, however, be forgotten that such objections have been raised in other states, particularly in New York and Pennsylvania. When the former State commenced upon the great work of the

Eric canal, it was denounced as the 'big ditch' that would engulf the fortunes of the State, and men high in public estimation pronounced the scheme to be 'visionary and chimerical, and at least one hundred years in advance of the age.' The result has shown how much this portion of the community has been mistaken, and I can entertain no doubt that a judicious system of public works on the part of the State, having reference to the settlement and cultivation of the public lands, would, in the end, be as signally successful as have been the public works in other states."

In looking back over the eighteen years since the above was penned, who can possibly doubt, to-day, that had the above suggestion of a railroad\* from the Aroostook to the Penobscot met with public favor, and been carried out at an early day, that, whatever might have been its success merely in the light of a pecuniary investment, the public domain would have greatly increased in value, and the whole State would have gained in population, wealth and power, with a persistence and rapidity to which we are now utter strangers.

DEVELOPMENT—PAST AND PROSPECTIVE. At the time of the separation of Maine from Massachusetts, a large portion of our territory was an unexplored wilderness. Nearly a quarter part was a public domain, and held by compact, in joint ownership, by both States. At this time, very little importance was attached to timber lands, as such, and the chief value of the territory was supposed to consist in the inducements it held out for agricultural purposes. But a short time elapsed, however, before it was discovered to contain great wealth of forest, with streams sufficient to render the same available at an early day. An impression somehow rapidly obtained in the public mind, that timber, and not agriculture, was the great interest here involved. Large tracts speedily passed into the hands of speculators, whose only object was to realize therefrom the greatest amount of money, by stripping them of timber, and not to have them settled by an industrious and enterprising population. The evil influence of a proprietary system upon the interests of agriculture, is both too great and too glaring, to require discussion here.

---

\* Perhaps for no desirable road in New England is there a favorable route more distinctly marked by nature, than for this, viz: by the east bank of the Penobscot from Bangor to Mattawamkeag Point, thence toward the Forks of the Mattawamkeag, near where the Baskaheagan comes in, thence by a natural valley to near the origin of Presque Isle river, and following its valley to near its junction with the Aroostook.

To what extent the wishes or efforts of proprietors have, in fact, availed to discourage settlement, it is not easy to determine; but as we know self-interest to be a governing motive to large extent, and their aim to be profit from timber only, that settlements would ere long result in increase of taxation for constructing roads and other needful purposes, and of liability to the accidental destruction of timber from the fires necessary for clearing lands, we may safely conclude that they exercised no small influence.

It is true, also, that the idea was industriously circulated that "timber lands" were both very distinct in character and wide asunder in locality from "settling lands," whereas the fact is now well known to be, that while some timber lands are ineligible for settling purposes, the very best of settling lands are those, which among their mixed growth, contain the choicest and most valuable timber.

It will also be borne in mind, that prior to the treaty of Washington, negotiated A. D. 1842, the ownership and jurisdiction of a considerable part of the northern portion of Maine, including nearly all of what now constitutes the county of Aroostook, was in dispute, and a subject of controversy between the government of the United States and that of Great Britain. Such controversy must necessarily, of itself alone, exercise a very retarding influence on settlement, and we accordingly find, that, prior to the treaty adjustment, settlements within its present limits were comparatively few, and mostly confined to the banks of the St. John, and consisted in large proportion of Acadian refugees and French Canadians.

The first decided and efficient move towards the development of this region, was in 1838, when Dr. E. Holmes, under direction of the Board of Internal Improvements, then recently established, with a corps of assistants, made an exploration and survey of the Aroostook valley, with particular reference to the feasibility of establishing water communication between the tributaries of the Penobscot and St. John rivers, but including also its agricultural capabilities and general topography. The valuable report which he made the next spring, together with those of Dr. Jackson, who at the same time was engaged in the geological survey of the State, afforded the first reliable information given to the public of the character and resources of this district, and attracted general and favorable attention.

There seemed at this time a strong probability that Maine was speedily to become a point of attraction for agricultural immigration. Shortly after this, the border troubles broke out, sometimes called the "Aroostook war," during the continuance of which, large numbers of our citizens visited it, in the capacity of "civil posse," or otherwise; some of whom eventually settled down upon the soil; and those who returned, spread a good report of it; and on the conclusion of the treaty in 1842, the promise of speedy settlement was more flattering than ever before. How has it been fulfilled? In 1840, the census returns state the population of Aroostook county to be nine thousand four hundred and thirteen, from which, if we deduct eighteen hundred and seventy-six as the number given of those residing in that part of Madawaska north of the St. John, and to which the United States relinquished claim by the treaty, we have seven thousand five hundred and thirty-seven as then residing within its present boundaries. Ten years subsequently, including all attracted thither by the circumstances above referred to, we find the population to be only twelve thousand five hundred and twenty-nine.\* In what proportion it has increased since then, there are no means of ascertaining with precision; but the opinion of those best informed, of whom inquiry was made, was, that in the seven years since, there may have been added three thousand or thirty-five hundred inhabitants—perhaps five hundred per annum. This would show that the population had about doubled in twenty years. At such rate of increase, when will its capabilities be developed? It may not be practicable to make an accurate estimate of what these are; but leaving out of account its mineral resources, its water power, standing timber, and all else, let us attempt a rude approximation to an estimate of the agricultural capabilities of a part.

In that portion to which the foregoing remarks are confined, say a third of the whole county, there are not far from a million and a half of acres. To be moderate in our estimate of its natural fertility, we will assume that it is capable of yielding ten bushels of wheat, or thirty of oats, or a ton and a half of hay per acre, supposing

---

\* The remarks on page thirteen in regard to frosts in the unfavorable seasons, from 1842 to 1846, will suggest one active cause in preventing more rapid settlement at that time. Since then, comparatively little has been done toward bringing these lands to the notice of the public.

these to be nearly equivalent the one to the other. We will also assume that each individual of its population, including men, women and children, require for sustenance fifteen bushels of wheat, or forty-five bushels of oats, or the equivalent of either in other forms of human food. We have then, here, the means of producing sustenance for a million of inhabitants; a number considerably larger than the whole fifteen counties in the State contain at the present time. In this calculation, it is true, no deduction has been made for the necessary fuel, nor for the maintenance of domestic animals, a portion of whose consumption would not be returned in meat, dairy products, or other form of human food; but after making all due allowance for these or other matters which should properly be subtracted, a vast and almost astounding amount of capabilities remain.

What shall be done to develop them? This is a question for the legislators of the State charged with care for its best interests, to decide; and it is one which may well engage your earnest and thoughtful attention. Without intruding any opinion, it may be admissible for me to suggest, that, preliminary to its solution, it would be pertinent to inquire why they have not been developed more rapidly hitherto? There they have lain for many years as good as now, and during these years large numbers of our citizens have left us and gone thousands of miles to less healthy climes, and settled down to cultivate no better soil.

The State has not only been willing all the while, that they should be occupied, but it has been a cherished policy for many years, to aid and encourage their rapid settlement. To the truth of this, the enactments annually made, for years past, aimed at this result, (however small the success which has attended them,) bear ample testimony. So too, and emphatically, does the large purchase of lands made a few years since of Massachusetts, and for which the State credit was pledged, in order that they might be distributed among actual settlers at a merely nominal price.

What have been the obstacles hitherto? This inquiry was put to the settlers on every fitting occasion, and received a uniform reply—"we lack facilities of communication—we are virtually out of the world—nobody knows of us—nobody cares for us—we are few, and cannot build roads alone. The State is largely owner of the lands, and the roads she has built are inadequate, besides being always out

of repair, and for these even, you people west of us oppose every appropriation made. Give us a railroad, and Aroostook will speedily become as a garden." Of this feeling of isolation, I may here remark that it is evidently no sham, but a reality, and unconsciously betrayed in many ways, even in the most casual remarks or inquiries; as, "you are from *outside*, I presume;" "when did you come *in*?" &c.

It is very possible that you, viewing the subject from a different stand point, and bringing to its examination the analysis of statesmen, may be able to look deeper and to discover causes less patent and obvious to them, why progress hitherto has been so slow, and not merely in connexion with this comparatively small fraction of our territory, but with regard to the State at large. Into other sister States there has poured an unceasing tide of population from abroad, during the very years in which we have scarcely held our natural increase. May there not be something radically defective in a policy, which, with all our acknowledged resources, has thus resulted, and is there not a probability that a broader and more liberal policy, one which shall be equally removed from any just imputation of heedlessness or imprudence on the one hand and of the torpor of ultra conservatism on the other, may produce a healthy, active and permanent improvement?

Pertinent also, as preliminary to its solution, may be the inquiry, what has been done effectively in other similar cases to induce rapid sale and settlement? It is believed that examination will show that in all such cases, facility of communication is the first point, an indispensable requisite, and in this age, if there be none furnished by nature sufficient to float a steamboat, nothing short of an iron rail will suffice. Who would expect rapid settlement of lands, be their fertility what it may, which are located neither in the vicinity of navigable water, nor within fifty miles of a railway?

Next in the list of successful means, may be found some efficient agency to diffuse reliable information regarding the fertility of soil, character and proximity of markets and all other inducements to purchase for settlement; perhaps a hint might be obtained from the operations of other States who appoint commissioners of immigration or of land companies who employ agents. The men thus engaged, leave no means untried to accomplish their aim. The press is put

under contribution—personal effort is plentiful and earnest. They do not fold their hands and wait for immigrants to come, but push outwards in every direction. A few weeks since, I received a note from an agent of the Illinois Central Railroad Company, inquiring the time and place of holding the county agricultural exhibitions in Maine. He did not state his object, but who doubts that he intended to avail himself of every gathering, to advertise the lands held by this company, to distribute broadcast among our citizens, pamphlets setting forth golden prospects to emigrants. Who that attended the late State Fair at Bangor, could have failed to observe the huge boxes, filled with pamphlets, for gratuitous distribution, piled up near the entrance to the grounds, or to have one of them offered him? Through tickets are provided, and for sale at every depot, and the walls of each, placarded by showy hand bills. All this, and more is done, not only here, but abroad. Documents are scattered with unsparing hand, in every hamlet in Europe; arrangements are made with emigrant lines, and every man, woman and child, who can raise the passage money, is taken by the hand and ticketed through.

It is hoped and believed that the time is not far distant, when regular lines of passenger ships will ply to and from one or more of our spacious and unequalled harbors and Europe. Is it both inexpedient and impolitic for us to avail ourselves of agencies which have proved so signally successful? Should the claims of our soil to consideration be utterly ignored, go by default, for lack of simply and honestly making known what they are?

“As land is the great capital of our State, it is evident that it is population alone that can stamp a value upon it, and lay the foundation for agricultural improvement. It is population also that will develop our dormant resources, and give us rank and power in the Federal Union.”\*

The remark was made at the outset, that one of the noticeable signs of the times was, a partial staying of the tide of emigration from Maine westward, which has prevailed so largely in years past. True, it is suspended in a measure, but the disposition which brought it about remains. As a people, we Yankees have a peculiar propensity

---

\* Land Agent's Report for 1839.



this way; instead of the inborn love of birthplace, and strength of early association and local attachments, which are found so strongly developed in some peoples, we possess an inborn restlessness. It has been said that the impulse which sent our fathers across the Atlantic has grown with our growth and strengthened with our strength, and this it is which is pushing us westward still. But this can hardly be deemed a correct statement of the fact. The impulse which brought our fathers here, was a desire to avoid tyrannical fettering of conscience, and improper restraint of that liberty of action and freedom of thought which is the God-given heritage of every man. These we enjoy fully, at the east as fully as at the west. Let us look farther. Is it not rather a spirit of enterprise, an activity, an energy which can only be satisfied by subduing, conquering, achieving something, somewhere? a spirit which leads to great practical results in every other direction not less than in emigration westward?

Farmers' sons have left us largely; why? The sons see what the father's arm hath wrought—the forests felled, and in their place bounteous harvests. There is tradition of a log-house—possibly the elder sons have some recollections of it—but in its place is now a fine dwelling, filled with all comforts and not a few luxuries. The soil, it is true, having been somewhat imprudently taxed, begins to show signs of giving out; the crops gradually growing less; and it seems to require a different mode of treatment—something or other, they don't know exactly what, and to ascertain what, requires *patient labor and study* which are not so much to their taste as muscular exertion connected with novel adventure; but notwithstanding which, the old homestead has a large market value compared with what it had on the day when the father went on to it, axe in hand; great results have been achieved; and as the tale of Robinson Crusoe has turned the face of many a lad seaward, to buffet billows and find a watery grave, so fireside tales send farmers' boys to endure the hardships of a settler's life, and to reap his rewards. Thousands such we have among us, to-day. They will go somewhere; and provided they can find their proper sphere, and an ample scope for pent-up powers, connected with prospect of success, they would as lief go east as west. Maine is big enough to give every such one a new farm for a long time to come.

Are there not also among us, numbers of those who, feeling with terrible severity the late reverses in commercial and manufacturing pursuits, turn anxiously to the soil, and would gladly invest the remnant of property left them, in a narrow axe, and settle down upon a goodly lot in the public domain, which promises with a degree of certainty of fulfilment which commerce and manufactures cannot do, even in their palmiest days, a comfortable support and sturdy independence for themselves and their children, forever? Such may be assured, that although neither health, energy, nor a determination to succeed, can safely be dispensed with, nor a willingness to encounter privation of many of the conveniences which abound in our cities and large manufacturing villages, there is a wide difference between the inconveniences and privations of him who goes now, and what was experienced years ago by those who went earlier. Black flies and mosquitoes are not extinct as yet, it is true, but the roads, if not just what could be wished, are, by no means what they once were, nor is the mill, the school-house, and the church, so rare as formerly.

It might do none of us any harm to bring to mind oftener than we have been accustomed to do of late years, the trials and arduous labors of the pioneers of our State, and I accordingly insert here a quotation or two as illustrative not only of what these were, but also of the actual progress which has attended their efforts. The following is from a communication lately received from one of the early settlers of Penobscot county :

“DEAR SIR: Your circular requesting agricultural statistics from me, duly came to hand. In reply, I would say, that I am an uneducated man; that I seldom, if ever, put my ideas and observations on paper for the perusal of others, and shall not probably be able to give you much information that will be of interest. Suffice it to say, that I have already lived to the age commonly allotted man, viz., seventy years. I was born in Little Compton, R. I., in August, 1786. In 1788, my father moved from Rhode Island to the town of Union in this State.

After we left the vessel on Georges river, our only means of conveyance was a simple boat, known as a ‘Dug-out,’ not much like the steamboats of modern days. We landed by the side of Seventree Pond. At this time the only roads were the rivers and ponds, and the only carriage the *Dug-out*. There were a few little huts scattered about on the margins of the streams. I remember well the hut that my father put up, with a poplar log with notches erected for stairs. The first of our clearings were sown to rye. Corn on the burn was

but little known; what was planted was called 'lazy corn.' When they planted on the plow, the custom was to harrow three times, and hill it up, the higher the better, to keep the wind from blowing it over. We got along in this manner without making much improvement, until the *hard times* (consequent on the laying of the embargo, and the war of 1812,) was upon us, at which time all the wages I could command was seven or eight dollars per month. I resolved to get me a piece of land and make myself a farm. About this time I chose me a helpmeet. I suppose the young men will want to know what kind of a one I got. I will tell them: I selected one that knew how, and was not afraid of work, and to this day I have not regretted it. I had heard of Exeter, situated sixty or seventy miles northeast of us, and in June, 1813, in company with another young man, I took my fowling-piece in hand and started in search for said Exeter. We found land that suited, but were poor and had to buy on credit. I went into the woods about one and a quarter miles from any inhabitants and put up a camp with a shed-roof, split some basswood logs for a floor, built a chimney of stone and coated with clay. In May, 1814, I moved in; had covered the roof with boards, and battened with cedar splits. We had not been there long when there came a heavy shower; it came in torrents upon us, and the only place we had to keep our bed dry, was to put it under the table.

I took my axe and cut an elm, from which I took the bark and covered our camp, and we lived under it a long time. I found here and there a person with his log hut covered with long shingles and bark. We had no roads, no carriages, nor any market. If there were articles that we must have, we had to go to Bangor, twenty miles, either on foot or on horseback after them. It took two and sometimes three days.

We had farms to make, and buildings for the farm; we had also county buildings and houses of worship to build and pay for.

Those sons of toil that have been laboring beside me for years, who had ready means to pay for their land, have for the most part made their 'pile.' I consider our roads and buildings now, as second to none in any country place I am acquainted with.

Our town has the appearance of thrift; instead of the 'Dug-out,' we have railroads and steamboats; instead of log huts we have good painted houses. On our principal roads stages run daily," &c.

The next quotation is from an address delivered before the North Aroostook Agricultural Society, some years ago, by Rev. E. Knight of Maple Grove, (in Letter D, of first range, and near Fort Fairfield.) It will be found, in part, descriptive of that vicinity, which is probably as attractive as any section of the county:

"Most heartily do I congratulate you upon the fertility of your soil, upon the various resources you enjoy, upon your past success, and upon your future prospects. In comparing this with other portions of New England, I have no

desire to exalt one or degrade the other. I wish to correct the erroneous views which exist in reference to this favored portion of our State, and to remind you that the lines have fallen to you in pleasant places, that with cheerful hearts, and willing hands, you may meet the unfinished task that lies before you.

The valley of the Aroostook is not, as many suppose, a narrow strip of land, upon either side of this important tributary to the St. John, hemmed in by lofty mountains or barren hills. On the contrary, we have a wide spreading country, neither mountainous nor hilly, with a surface generally undulating, interspersed here and there with a narrow swamp of ever-verdant cedar, not unfrequently diversified with the more stately tamarack. As every portion of this extended valley is similar in its general aspect, so also is there an uncommon uniformity in the productive power of the soil. And without fear of contradiction, I assert that it is more fertile than any other county in New England. The reports of this society show that our soil, without the addition of any fertilizer, is capable of producing forty bushels of wheat to the acre, and of oats more than one hundred. The other cereal grains are also produced in corresponding abundance, with the single exception of Indian corn. Even with this, many have met with fair success, some growing forty, some sixty, and some eighty bushels to the acre. But whether corn will ever be, with us, a safe and profitable crop, is in my opinion a matter of uncertainty. The potato crop, naturally abundant and of superior quality, has suffered from that mysterious blight, the potato rot, as it has in other portions of our State and country. As yet, compared with other portions of the potato-growing world, we have escaped almost uninjured by this fell destroyer.

Our soil, almost free from stone, and easy of cultivation, is well adapted to the culture of other esculent roots. Various kinds of turnips, beets, and carrots, have been no mean agents in augmenting the farmer's wealth.

The hay and grazing crop, the chief production of New England, that from which nine-tenths of all her agriculturists derive their greatest profits, is not more partial to any portion of the eastern States, unless it has been pampered by a higher state of cultivation.

In our northern climate we do not expect every advantage of Southern New England; yet with judicious management, the cereal grains, with a single exception, do not fail to reward the laborer's toil. If we are more exposed to untimely frosts, we are more secure from the intrusion of the insect tribes, and the drought of summer; and hence, with proper care, I consider a crop in North Aroostook, as certain as in any portion of the eastern or northern States.

But let us turn from the natural resources of the country, and inquire what has been done by the first settlers of this infant community. When I reflect, that within the last ten or twelve years, nearly all of them, with little or no property, have settled upon lands covered by a dense forest, and that by the unremitting toil of their own unaided hands, they have sustained families they loved, changed the wilderness to a fruitful field, erected dwellings, and

built giant barns wherein to stow their bounteous harvests, I venerate the self-denying enterprise that enabled them to overcome the obstacles inseparably connected with the settlement of a new country. This may seem like an over-drawn picture, yet it is the brief history of the mass, and not of a few, as many who are now present can bear me witness. In this region, few indeed are the men who have given their energies to agricultural pursuits for eight or ten years, and have not risen from poverty to a competence, or increased the wealth they at first possessed. I was bred in a new country, and have ever delighted in tracing the early history of the different communities in which I have resided, but I never before met with an instance where so little wealth was brought into a country by the first settlers, or where so large a portion of them have, so soon, secured for themselves, such a desirable competence.

But think not that these blessings have been obtained without privations and toil. I love to turn back the wheels of time, and gaze upon this valley when only here and there an opening was to be seen in our primitive forests. As the vision opens before me, I seek not thrilling incidents, nor hair breadth escapes from the most ferocious of wild beasts. I love to dwell upon the realities of every day life. Here, I perceive two men, guided for miles by a spotted line, cheerfully bearing to their wild homes, the half barrel of pork, that had cost them twenty days of toil. Here, I behold a man bowed by the weight of his burden, as he leaves a beautiful river, and penetrates the dark forest. For two successive days has he traveled, by land and water, that he might get the precious grain, the first fruits of his own soil, crushed and restored to his expectant family. For four miles must he yet wend his way along the uneven foot path, ere he reaches the abode of his loved ones. Yonder the cooling beverage is borne from the limpid spring, in a rude vessel hewn from the solid wood, for in that family a pail is a luxury they do not enjoy. In that opening resides a toil-worn family that has subsisted for weeks upon potatoes seasoned only with salt.

But why dwell I upon trials and privations? These are common in every community; with *you*, fellow citizens, that day is past; the fruits of your labors are to be seen on every side, and want with measured step, is rapidly fleeing from your borders. The remembrance of former days will enable us to contrast the present with the past, and furnish bright anticipations of a prosperous future."

Below are added several communications which were received in reply to a circular of inquiries issued and distributed throughout the State last spring, and which, besides affording some additional items of information, may be of interest, as showing the degree of progress made, the prevailing practice, and tenor of feeling on the part of the settlers at the present time :

FORT FAIRFIELD, November 1, 1857.

DEAR SIR: In answer to some of your inquiries, I would say that the number of farmers in this vicinity has, in my estimation, increased fifty per cent. within five years past. I think the income realized from capital invested in farming operations is twenty per cent.

Average yield of hay, one and a half tons per acre. The crop can be increased fifty per cent. by plowing and manuring. We seed our grass land wholly in spring, from 20th April to 1st of June. Buckwheat is the best grain to seed with.

But few full blooded animals have been introduced as yet, although there is a large mixture of English blood in our stock. The Hereford and Durham, principally.

Average cost of raising a horse to four years old, is about sixty dollars, and the average value at that age is one hundred dollars. The cost of raising neat cattle to four years old, will average about twenty-five dollars, and their value at that age will average about forty dollars.

The varieties of seed which have succeeded best, are white bearded wheat, Russia oats, two rowed barley, and rough buckwheat. Our earliest sowing is about 25th of April, on an average of years, and the latest plowing, middle of November.

We generally feed from winter stores about six months; but as pastures keep good until late in the fall, and do not dry up in summer, we are not obliged to feed any thing to our stock while at pasture, as is the custom in Massachusetts and other places.

I have answered your inquiries as well as circumstances will admit. Our country is too new and our system of agriculture too imperfectly developed to answer them all fully.

Yours, &c.,

B. CUMMINGS.

GOLDEN RIDGE PLANTATION, }  
(No. 3, 5th Range,) July 10, 1857. }

DEAR SIR: In reply to your circular of inquiries, I send you a few answers, hastily written in the intervals of my daily toil, and trust you will excuse the many imperfections.

So far as this town is concerned, I should say the increase of farmers is about ten per cent., for the last five years, not by immigration, that being about equal to what has gone out, but by natural increase. As for the income which is

realized, I can give no information. Some make rapid advance, but a large proportion, I am sorry to say, depend on other sources, to the neglect of their farms. Of course we have nothing established in relation to a rotation of crops. On such farms as have been partly plowed, the average of hay, is one ton per acre; on those which have nothing done, and the hay sold off, it would fall below, and others, well treated, yield two, two and a half and even three tons. On the whole, there has been no increase of late years. My method to increase the crop, (in old fields,) would be to let the grass grow without feeding, till the last of June; turn it under with the plow; harrow thoroughly, soon after haying; cross plow in October; harrow the succeeding spring as soon as dry. At a proper time sow down to wheat and grass seed; then roll to smooth the surface. In a fair season the wheat would cover expense, while the hay would probably be increased three or four fold.

With regard to the average quantity of milk per cow, and of butter and cheese, I am unable to answer definitely. Some of the dairies in this town, and generally in number two, (called *Benedicta*,) and which is settled with Irish, are managed well and made profitable; while I am sorry to say that many of the Yankees of number three, with an equal number of cows, are butter buyers. From my own experience, I should judge that a good lot of cows properly managed on good hay and pasturage, would average two hundred pounds of butter and fifty of cheese, per annum. I have a cow four years old, which calved the first of October last, that made one hundred and ten pounds of butter from that time to the first of April, five months, and raised the calf. We sold eighty pounds at twenty cents per pound. The calf drank its milk, probably half new for the first four weeks, after this, wholly skimmed, with meal and water, scalded. I raise all my calves in the same way; prefer oat meal in small quantity at first, and increase. This calf is now worth twelve dollars. Same cow yielded, the last week in June, eight pounds of butter; the weather was very warm.

Cost of raising a colt, to the age of three years, (including pay for the foal,) about fifty dollars; not many sold at this age, except a fancy one, which will command from one hundred to one hundred and fifty dollars; twenty-five dollars more may be added to the cost at four years old; average value, one hundred and twelve dollars. From four to five, they may be used nearly or quite enough to pay the keeping; average value, at least one hundred and twenty-five dollars.

Cost of neat cattle, at one year old, twelve dollars; average value ten dollars; at two years old, twenty dollars; average value twenty dollars; at three years old, thirty-five dollars; average value thirty dollars; at four years old, fifty dollars; average value, if steers, seventy-five dollars; if a cow, probably she has her second calf, and if good, she may have reduced her keeping twenty dollars; average value twenty dollars. At five years old, if oxen, the labor of the last year, properly employed, will pay for keeping, leaving the cost for raising, fifty dollars; average value one hundred dollars; if a cow, probably she has reduced her keeping twenty dollars, bringing the cost to ten

dollars; average value twenty-three dollars. In my judgment, twenty-five per cent. at least, may be saved in the present cost of feeding cattle, by providing more comfortable and warmer stables.

The cost of growing and housing corn, wheat and other grains, I am unable to answer definitely. This year I intend to keep debt and credit, hoping others will do the same, so that we may in future, give the desired information. All the varieties of grain can be raised here in abundance, as cheap as elsewhere, with as good a market as can be found in the United States. Wheat, the white bald, and a bearded kind called the Madawaska or Kimball wheat, and the Dutton corn, have succeeded here as well as any. We have different kinds of oats and barley, all of which yield abundantly. Rye, but little raised, although it does well. The cost of growing and storing the carrot, beet and turnip crop, I am unable to answer. They yield abundantly in this section.

Instead of exhausting our lands still further, we ought to keep the leaks well stopped in the barn and hog yard, keep them well supplied with vegetable matter, muck, sink water, suds and slops from the house; take care of the hen manure and privy; look well to the compost heap; have it understood that time is money, which should be employed systematically; by thus doing we shall never be subject to the western fever. Many of us in this vicinity are deficient in care and economy, while others keep but little stock, and sell hay from their farms until they become exhausted; others make shingles, almost to the entire neglect of the soil. I fear this state of things will exist for years, unless the State pursues a different policy, with regard to settling wild lands. There may be exceptions, but so far as this town is concerned, the settling act has been no advantage, any further than the old settlers were concerned, who had not paid for their land. With a large proportion of the new ones who come in, the first thing to select is a shingle berth. If the State, instead of the policy now pursued, would give a portion of its land towards defraying the expense of a rail or plank road, it would bring in capital and enterprise. In my humble opinion, the county never will rise to compete with other places, until the State puts forth her strong arm, and assists, with an outlay, which will soon return to her coffers fourfold. There is no place within my knowledge, more capable of producing wealth, than the county of Aroostook.

Yours, Respectfully,

MORGAN L. GERRY.

PRESQUE ISLE, Aroostook Co., August, 1857.

DEAR SIR: As your circular has fallen into my hands, and being interested in the agriculture of the county, I take this opportunity to answer such queries as I deem applicable to this portion of the State.

The number of farmers in this plantation has increased in the last five years, probably one-sixth.



I think that the per cent. of income realized is not known to a farmer in town, but little capital being invested in farming operations, because of the uncertainty of the market.

Hired labor can be profitably employed, when it happens that grain, grass seed and hay can be sold at a fair, or moderate rate.

New lands are generally sown first to wheat, oats, or planted to corn. Oats are sown the second year after wheat, and wheat after corn, oats after oats. The third year oats or buckwheat is generally sown and seeded to grass. Lands which have been broken up, or plowed, are generally proceeded with in the same manner when not first planted to corn, beans, or root crops.

The average yield of hay is about one ton per acre.

The increase of the hay crop has been very good in the last five years, both from plowing up of fields and pastures, and clearing new lands. Swamps are not cleared in this vicinity.

To sow clover and herds grass seed on new land, would be the best preparation for a good hay crop. Any land in this vicinity, however poor, may be made to produce good crops of grass, by being well plowed and cropped for two years, and seeded to clover. Buckwheat is the best to seed with, by far.

Lands are generally, and always should be, seeded in the spring, and sown with other grain, or at the same time, and harrowed—from the 10th of May to the 20th of June. When sown with buckwheat, the grass is shaded, and the ground is more moist, and all the seed grows, and gets well rooted before harvest. Seed—ten pounds of clover, two quarts of herds grass seed, mixed.

It is useless to top-dress lands with manure in this section, so it has proved, on a small scale; plaster is said to do well on certain lands.

The cost of horses to the age of five years, is about ten dollars a year. Three years old colts are worth from fifty to one hundred dollars; four years old, sixty to one hundred and twenty-five dollars; and five years old, from eighty to one hundred and fifty dollars.

Neat cattle could be raised to the same ages at an expense of five dollars per head per year; and average value here is about fifteen dollars for three years old, twenty dollars for four years old, and twenty-five dollars for five years old. This is a low estimate, but the prices here are variable and uncertain.

The cost of clearing land, seeding and housing an acre on "new land," of either corn, wheat, barley, rye, oats, peas and buckwheat, is about nineteen dollars. For plowed ground, where we break up the sward and turn in the grass, without manure, is about eleven dollars per acre. New land—wheat, average crop, twenty-five to thirty bushels; price, one dollar and fifty cents to two dollars. Corn, forty bushels to the acre; price, one dollar and fifty cents, to two dollars. Barley, twenty-five bushels to the acre; price, one dollar. Rye, thirty bushels to the acre; price, one dollar and twenty five cents. Oats, seventy-five bushels to the acre; price, forty cents. Peas, twenty bushels to the acre; price, two dollars. Buckwheat, forty bushels to the acre; price, fifty cents.

Wheat on the plow, as mentioned above, will produce an average of twenty

bushels to the acre, and more, were it not for the weevil; and oats fifty bushels. Other crops are nearly the same as on new land, when sown thin.

The cost of growing an acre of carrots, beets, or rutabagas, would depend much upon how richly the ground was prepared. Of carrots, one thousand bushels can be easily raised from an acre. This has been proved. Of the others, I cannot answer.

To recover the fertility of exhausted lands, the cheapest and easiest way is to plow in the grass, in the month of July or August, or perhaps in June would be still better, and 'summer till,' as 'tis called; sow some crop on it, and plow in the same. To enrich the country, *enrich* the soil.

I will illustrate by facts. On the farm of Benjamin Whidden, in this town, *one acre* of impoverished grass land, which never had been plowed, and did not produce over half a ton of hay, was stumped and plowed in August; after laying a few weeks, was harrowed well; in November following, twenty cords of old manure, from the barn-yard, was hauled and spread, and then plowed in; in May following, it was plowed again, and planted to potatoes. The planting and hoeing were done principally with the plow. From it was raised three hundred and twenty bushels of good potatoes. In the spring following, the same land was plowed once only, harrowed, and sown with two bushels of white bald spring wheat, from which was threshed and cleaned forty-two and a half bushels of beautiful wheat, the flour of which was equal to any western flour. As soon as the grain was taken off the ground, it was again plowed, and in the following spring sown to the same kind of wheat, without any more dressing than the plowing in of the stubble of the former crops. And from the same was raised thirty bushels of wheat of the same quality. The next season, the same acre was sown to oats, and seeded again to grain, producing a fourth crop, of forty bushels.

In this case, the manure cost nothing; it was never housed. Any person knows what it costs to plow an acre of easy land. To plow and harrow after the first time is not a very hard day's work for a span of horses. To house and thresh such an acre of wheat, would not cost more than eight dollars. But here are seventy-two and a half bushels of wheat, three hundred and twenty of potatoes, and forty bushels of oats. I make an estimate:

Breaking up, stumping, &c.,	. . . . .	\$4 00
Hauling manure,	. . . . .	8 00
Plowing and harrowing,	. . . . .	3 00
Plowing and harrowing, again,	. . . . .	2 50
Seed potatoes, twelve bushels, 40 cents,	. . . . .	4 80
Seed wheat, four bushels,	. . . . .	6 00
Seed oats, four bushels, 40 cents,	. . . . .	1 60
Planting and hoeing potatoes,	. . . . .	8 00
Digging,	. . . . .	8 00
Plowing three times, and harrowing three,	. . . . .	6 00
Threshing and harvesting the three crops of grain,	. . . . .	24 00
		<hr/>
Cost,	. . . . .	\$75 90

320 bushels of potatoes, 40 cents per bushel, . . . . .	\$128 00
72½ bushels of wheat, \$1.50 per bushel, . . . . .	108 75
40 bushels of oats, 40 cents per bushel, . . . . .	16 00
	<hr/>
Income, . . . . .	\$252 75
	75 90
	<hr/>
Profit,* . . . . .	\$176 85

The same profits can be made again, and on almost any farm in this section, in a common season; and from this, I conclude, and say emphatically, that it is *best to enrich the soil*.

What I consider the defects of our farming, are, first, that the farmers in this vicinity undertake to go over too much ground to raise their crops. It would be far better for them and the country, to let the forest stand, ('till better days,) and till what they have cleared more thoroughly. It would pay better according to the labor expended.

Secondly, farmers depend too much upon a home-market for grains. Whereas, they should raise more cattle, hogs, horses, butter, cheese, &c., and depend upon a distant market. Doubtless there are many defects in the manner of farming in this vicinity, and there is only one thing necessary to open the eyes of farmers, and start their enterprise in improving their agriculture, that is, a *market*, a good *safe market*. The soil of this place is unequalled in fertility in New England. We can here produce in greater abundance and better quality, and at far less expense, most kinds of grain, (except corn,) than any other place, in this State, at least.

This is also a good grazing country; and as good cattle, sheep, hogs, and horses can be raised here as in the world, and as cheap as can be raised elsewhere in the State. But there is little inducement for the farmer to raise large crops of grain; if he does, he may be but little richer than his neighbor who raises just enough for his own consumption and a little to trade off for the groceries which he will give his grain for at a low price, and buy at a large one. So it is better for the farmer when there is just enough grain raised for home consumption. Thus, 'tis unsafe to hire labor and raise large crops of grain, for sometimes he could not realize twenty-five cents for his oats, and one dollar for his wheat; neither could he sell his hay. Then, again, he might get a good price, and make something handsome. Then for other things, cattle, horses, &c., there are only certain times that a farmer can get a fair price. We are too far from a market—one hundred and sixty miles.

What we want is a railroad to Bangor or some such place. Then the Aroostook will become the garden of the State of Maine. It is of but little use to lec-

---

\* The omission of "twenty cords of old manure" in this calculation, coupled with the remark above, that it "cost nothing," tells, better than any amount of description, its estimated value in this vicinity. If included at the price which some farmers in the State would put upon it, there would be a material variation in the figures.—Ed.

ture to farmers in this portion of the State, upon the best mode of producing. They well know that there is wealth in their soil, but there is no incentive to draw it forth—there is no substantial market. They want a *railroad*. Give us a railroad, and we will show you the most thriving portion of New England, and hundreds of the most enterprising men of Maine will not go to the west, and all other parts of the world, to find a place where the soil will repay their enterprise and hard-handed toil.

The usual date of earliest sowing, is May 10th. Latest plowing, 15th of November. Corn is usually planted May 25th, and harvested about the 20th of September. Cattle must be fed on winter stores between six and seven months.

I have thus imperfectly and hastily answered your queries, and am,  
Yours, &c.,

GEORGE F. WHIDDEN.

MAPLE GROVE, Aroostook Co., August, 1857.

DEAR SIR: In reply to some of the questions of your circular of April last, I would say that I reside in an unincorporated township, and not a town. The number of farmers in it has probably increased fifty per cent. within the last five years. But few of them have got their lands cleared from stumps and under cultivation with the plow. Where this has been done, the crops of grass, grains and roots indicate that we have great treasures in our soil, if made available by proper cultivation. I think I can make more money on my farm by carrying it on, than by working out and receiving twelve per cent. on the value of all which is invested in my farm, implements, buildings, stock, &c., &c. Hired labor can be profitably employed by those who make farming their business, even at the fluctuating prices of produce and labor which have existed here. If we had a railroad into this county so that farmers could realize a fair and comparatively steady price for their products, when ready for market, I do not hesitate to say they could make more profit here at farming than they could in Illinois.

Grass grows luxuriantly; we generally seed down in spring; if to be cut for hay, with twelve pounds clover seed and four quarts of herdsgrass to the acre; if to be cut for clover seed, with twenty pounds clover; do not often seed with herdsgrass alone. Buckwheat is deemed the best grain to sow grass seed with.

Pasturage is remarkably good in this county, and with our facilities for fencing, it pays a great profit to divide our pastures. By managing thus, a large stock of cattle will eat a small lot clean, and when the same lot is again used, the feed is all young and sweet; but if it be all in one lot, a part grows up hard and worthless. Twelve acres divided, are as good or better than sixteen in one lot.

There have been four full blooded animals introduced into this township, within a few years; one Hereford bull and cow, one Durham bull, and last spring, a North Devon bull was purchased by our Agricultural Society; the

same one which received the first premium at the State Fair last year, and from his reputation, we anticipate much improvement to our stock. The Durhams, we look upon as good milkers, but not so hardy as the Herefords; when crossed, they make fair milkers, good workers, and are docile and easy to fatten. We can raise cattle easily and cheaply. To show how our farmers are waking up to their true interests in this matter, I will refer you to the inventory of our assessors for the last two years. In April, 1857, the number of yearlings was twenty-five per cent. greater than in April, 1856; and from what I can learn, should judge that in April, 1858, there will appear at least fifty per cent. more than the present year.

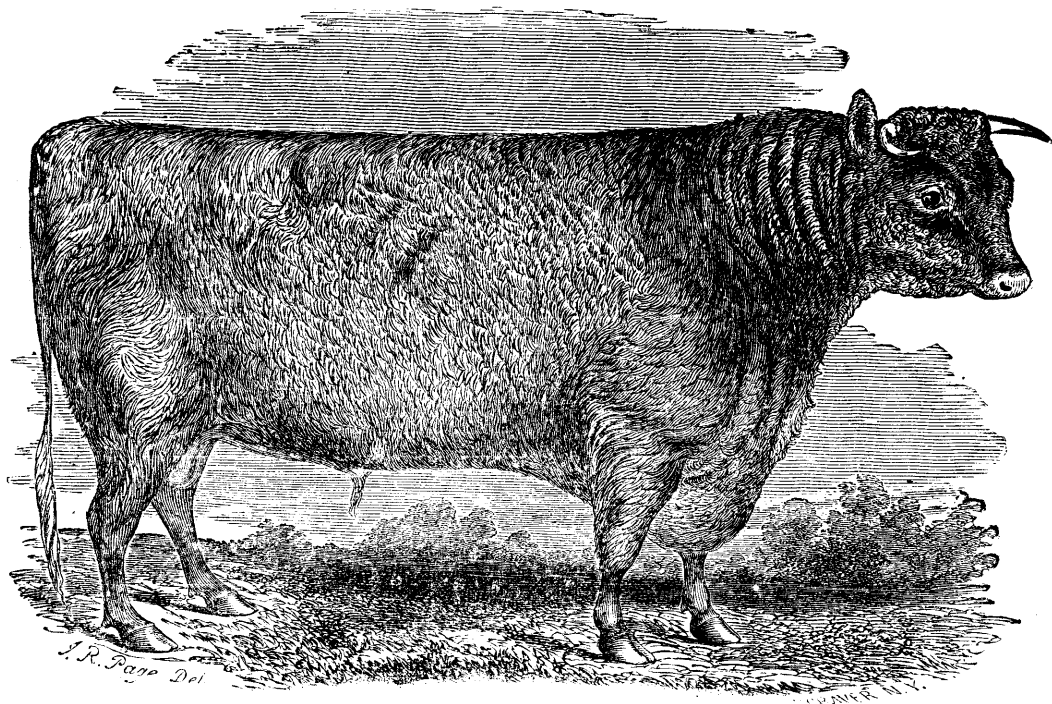
Rutabagas are raised here, as the principal root for feeding stock. They cost but a trifle, compared with their value. I have grown and harvested them for eight cents per bushel, and from experience I find that a cow fed with a peck per day, with plenty of straw, is wintered better than on plenty of the best hay alone.

Lumbering, although it makes a market for our produce, has, in one respect, injured the farming interest. A great many men who pretend to farm it, work in the woods in winter and drive timber to market in spring. When they return to their farms, the work is hurried, and badly done, the manure has wasted, and the seed is got in too late; the risk of crops not maturing is greatly increased; and it is from such men that the cry comes, of the seasons being so short that it is no use to try to farm in this country. The great majority of our farmers pay but little attention to fertilizers. With some, barn yard manure is shamefully neglected. The more intelligent are getting barn cellars and sheds, so constructed as to preserve their manure. Very few, if any, compost it or use muck.

Respectfully, yours,

HIRAM STEVENS.





**DEVON BULL, "COMET," (162.)**

Imported by R. Emsley, in 1852. For pedigree, see Davy's Herd Book.

In resuming the consideration of agriculture as it exists in the older parts of the State, what strikes one first and most forcibly after viewing these new lands of Aroostook, suggests an unpleasant topic, but nevertheless one which we are compelled to entertain and deem it a duty to discuss; namely, that a large proportion of our lands now under cultivation have not maintained their original productiveness, but are more or less exhausted. This none will deny. It is too stern a reality and too painfully realized by all; and if it be asked how this came to pass, there can be as little doubt with regard to the reply as there is with regard to the fact, to wit: by injudicious taxation of the soil and by making too scanty returns to it, of the elements of fertility which were carried off in the crops. The system of husbandry pursued from earliest times, or more properly, the husbandry without system which was pursued, had for its object the acquisition of the greatest crops, (at least expenditure,) and *without reference to the continued fertility of the soil*. Labor was dear and land cheap. A little labor would purchase a goodly tract of virgin soil, which possessed every needful element for luxuriant growth. When the land, after repeated croppings, began to fail, it was deemed *cheaper* to extend the clearings and occupy new soil, than to recover to fertility the old, and so the exhausting practice became the prevailing one, and has continued to be up to a late date, if, indeed, it may not be said that a better course is not rather the exception than the rule, at the present time. That it was so at first, is more to be regretted than to be wondered at. Whether it shall continue or not, is a matter worthy of grave deliberation, and one for the farmers of Maine to decide.

In a circular issued in April last, besides inquiring as to the best means of renovating such lands, the question was put, whether, in a pecuniary point of view, it was now the better policy to exhaust them still further and then to abandon and emigrate, or to recover them to a generous degree of productiveness. The replies are numerous, and show conclusively that while some difference of opinion may exist as to the more advisable course if immediate gain be the only



object, regardless of all other considerations, yet taking these latter into account, the decision is unanimous. One correspondent says :

“ It may be the better policy for a temporary purpose, to adopt an exhaustive system of farming, just as a man hiring a horse for a day, may find it more profitable to work him without food or rest, but there is neither honesty nor economy in the long run, and the man who would do either, has neither care for his own interest nor conscience for that of others.”

Another writes as follows :

“ This question covers a broad field, though the word ‘ pecuniary ’ somewhat limits its area. If taking from the land all that nature gave it and then abandoning it, is good policy in one place, it must be in others, and thus in the end good policy would lead to exhausting all the earth and leaving it a barren waste, incapable of producing food for man. This policy, we of Maine, have been practicing for years. The farmers of the south have pursued the same policy to a greater extent, and the farmers of the fertile west, on a still grander scale, are using up\* the deposits of food for man and beast which nature for ages has been storing up. That these efforts to exhaust the soil of the north, the south and the west, have been eminently successful, the statistics of the country clearly show. Without going to other countries for examples to prove that this result is not necessary—that land may be profitably cultivated not only without being exhausted, but with increasing power of production, we can find them in every neighborhood. Every farmer, if he examines his own practice and experience, will see that his greatest profits are derived from some small part of his farm which receives better treatment than the rest. If then, this exhaustion of soil is not necessary, if good culture pays best, why practice it here or elsewhere? Is it wise to waste or destroy, for a small present saving, that which would in the future yield constant returns? Rather would not true policy, no less than philanthropy and justice, dictate a course of culture which would improve instead of exhausting our farms?

That this may be done, is abundantly proved by examples all around us, and still more by examples abroad, (you have the accounts of the enormous crops of wheat, &c., in England, Holland, &c.) One farm in this immediate vicinity, I have in my mind, of *not more than forty acres of mowing and tillage*, which by the policy I would advocate, now produces, (this year,) more than

---

\* A recent editorial in the “ Wisconsin Farmer,” contains the following : “ The only difference is that the east is already skinned, and the west is *being skinned*—not slowly, either, but as much faster than were the eastern States as steam and telegraph have quickened the spirit of the age. The easier and faster modes of cultivation, the reaper, the threshing machine, the railroads, are only so many additional helpers and accessories to the more rapid depletion of the soil of the fertile virgin prairies of the west.” And again—“ Nine tenths, at least, of Wisconsin farms are being skinned as fast as sharp knives and folly can do it.”

one hundred tons of hay. The other crops, wheat, barley, oats and roots, you saw and can judge of.\* The hay must have averaged three tons per acre.

I would say, then, to the farmers of Maine, stay where you are; if you have many things to discourage you, don't suppose that others are free from all care and vexation. The world always puts the best side out, and few care to show their troubles and trials. In times like the present, many a merchant prince, or western land-holder, or southern patriarch, would be willing to exchange places even with the humble farmer of Maine."

Other replies are appended, as follows :

"To exhaust and emigrate, is ruinous to the individual, the neighborhood, the town, State and country at large. Any land which the Creator ever designed for cultivation, may and should be so husbanded, that the husbandman may live independently upon it."

S. F. PERLEY, Naples.

"Exhaust such lands still further? By no means, for then dearth will surely follow, and we *must* emigrate. Have faith in the land, and by the application of works, a generous culture, fertility will be restored, and competence and even plenty, ensue. As a general thing, farmers have not faith enough in the capabilities of their soil, and consequently do not put forth efforts sufficient to develop its resources."

E. R. FRENCH, Chesterville.

"It is the better policy to recover such lands, to a general degree of productiveness, rather than leave and emigrate, even in a pecuniary point of view, to say nothing of the inconveniences to which we should be subjected, and the numerous privileges which we now enjoy, and of which, we must necessarily be deprived by emigrating into a new country."

C. B. SUMNER, Appleton.

"If a man has lived upon a spot of soil, until that spot will no longer afford him a living, it should teach him the great truth that Dame Nature can't be cheated. Mother earth should no more be expected to yield her fruits, without a corresponding return of nutriment, than the farmer should be expected to perform his labor without his accustomed food. In my opinion, it would cost far less to recover these partially exhausted lands to a "generous degree of productiveness," than it would to emigrate to the west, where

---

\* The writer here refers to a farm in the extreme eastern part of the State, visited in the course of my tour the past summer, and to which I may have occasion to allude in connexion with the use of bones, as a manure. It is one of a number in that vicinity, an examination of *any of which*, will not only yield a high degree of gratification, but prove conclusively that by the application of skill and energy, farming may be made a *lucrative*, as well as safe business.

lands are said to produce without fertilization. Had I time, I should be happy to give you my views, at length, upon the folly of leaving a home in New England, surrounded with the comforts and conveniences, aye, the *luxuries* and *blessings* of New England life, for a hovel in the west, with its fever and ague, its reptiles, and malaria. Suffice it to say, that Nature has not been so partial as to bestow all her blessings upon a single spot. I can truly say, after traveling somewhat extensively in different States, New England, 'with all thy faults I love thee still.'

J. W. AMBROSE, Wells.

"Little is known of the science of agriculture, or, in other words, of restoring the partially exhausted elements of the soil. It might be better in a pecuniary, if not in a moral point of view, for a man to leave such lands, and settle on others, whose fertility has not been impaired. It is, however, difficult for every farmer, however disadvantageous his situation, to emigrate when he pleases. As it respects exhausting them still further, some of them cannot be much more exhausted than they now are, and if the occupant cannot manage to make them better, they will neither pay for cropping or exhausting any farther, nor afford him the means of emigrating. However hard the case, we must do the best we can while we have them in charge."

J. ADAMS, West Newfield.

"I have long thought that as cheap as new lands are in this country, if a man wished to see how much money he could accumulate in a given time, without regard to the interests of posterity, or the welfare of his country, he could do it by cropping his land, and selling his produce, till he runs out his land, then purchase new land and go through the same operation again; but would be *very slow* to recommend that plan, and *would not* have it understood that I consider it a judicious course."

AUGUSTUS SPRAGUE, Greene.

"By all means stay at home and reclaim the lands now exhausted. I mean by staying at home, that every farmer should abandon the airy castles, and golden visions, that come floating on every breeze, from distant climes, and go to work in earnest on his land; neither sit in fashionable saloons nor stand at the corners of the streets crying "hard times and short crops." There are now, in this vicinity, hundreds of acres of land, that are tilled and don't pay for tilling. The course pursued is to skim the top of the ground with a plow, which is called plowing, then spread what little dressing is at hand upon the surface, there to remain and dry up, and waste away; putting the seed into the ground pell-mell, without much care or thought, and let nature have the care of the crops in preference to the hand of men. Such farming pays poorly, and such people don't reclaim exhausted lands. To remedy these defects, I would, with all sober earnestness, recommend that the time that is now spent

at wasteful and unproductive places, should be spent upon waste and unproductive lands. About one-quarter of the farmers pursue the above mentioned slovenly practice."

J. DAVIS, Webster.

"I have not much doubt, if we take a pecuniary point of view, solely, that emigration would be the better policy, but when we look at the case in all its bearings, doubtless in most cases the other would be the wisest course."

W. H. POWERS.

"The former is the common idea. Easy to prove that the latter is our true policy. Capital and labor expended on our farms is well expended."

E. S. HOPKINS, New Portland.

"If there was no other consideration by which to be influenced than where can be obtained the greatest returns for the least amount of labor, there can be no doubt but the west must be preferred to Maine. But there are other considerations which in my mind, far outweigh the increased fertility of the soil."

ELIJAH BARRELL, Greene.

"The policy now seems to be, to exhaust the land, go west and practice there the same exhausting principles. There seems to me to be nothing noble in walking over God's heritage in this ruthless manner; rather let us be generous and return something to mother earth in the shape of fertilizers, and we shall have no reason then, for pulling up stakes and going to the west."

S. HASKELL, Cape Elizabeth.

"I should not think it best to exhaust it, nor to emigrate, but to crop less. I had about twenty-five acres that I cultivated, and my health became poor, and one of my boys went to sea. I had but one at home, and I found my land was running out. I turned about one-third of it into pasture, and now I get a third more than previously from the whole, and at less expense."

N. HINCKLEY, Monmouth.

"We do not think man was designed to be a mere migratory animal, continually moving onward and leaving desolation behind them, but that the God of nature has given us means, if we will discover and attend to them, by which we may keep our 'mother earth in heart,' and leave her in as good condition as we found her."

E. JONES, Minot.

"The better policy would be to recover the lands to a good state of productiveness. I believe it is more for the interest of Maine, to encourage her

hardy sons to cultivate and improve *her own* soil, than to send them to the far west, to improve other States and Territories, and far more conducive, both to the physical and moral welfare of the young men."

MARK DENNETT, Kittery.

"The most prudent course, in a pecuniary point of view, is undoubtedly to try and better the ills we have, than fly to others we know not of; and generally, I believe it the better policy to improve the road we have always traveled and are perfectly well acquainted with, rather than to try another entirely new and perhaps unbroken. We have at home, all of us, plenty of good land; most of us in Maine have more than we can cultivate thoroughly with our working capital; we have a healthy and invigorating climate, the great advantages of schools for our children, the means of ready communication with each other, easy access to good and steady markets for all we have to sell, and an absolute certainty, that if we will work industriously and intelligently, we shall realize a comfortable provision for ourselves and families. Now, with all these advantages, which are real and irrefragable, and a thousand others, true and genuine, which each of us can detail from this train of thought, and with the knowledge too, that if our lands have been exhausted, we possess every facility and can recover their fertility by paying up the drafts that have been made upon them, and keep them in good condition forever, by just selling live stock instead of hay, the pernicious practice of these parts. I believe it is by far the wiser and better policy, to make good that which we have, rather than to sell, as has been too often done, in a hurry, and then subject ourselves and families to the stinging annoyances of a new home in the west, (the usual goal,) where we have, perhaps, neither friends or neighbors, schools nor a healthy climate; where we may perhaps, raise to a redundancy, but find nobody to buy our crops; where we cannot be out of doors early in the morning or at evening, without a risk of ague and fever; where the stock we keep to consume our produce, is so poor from the weary way to a market, that we can sell but skinny bags of unground bones at whole bone prices; where we cannot keep turkeys enough to defend us from the ravenous armies of grass-hoppers and locusts which annually march through the land, and every third year rival their exploits of olden time in Egypt. I say let us remain in our native State, upon familiar ground, and maintain a laudable pride in living where our fathers lived and died. Let us encourage thus the healthful memories connected with the associations of our childhood and youth, and enjoying all the varieties mental, moral and physical of New England life, return by labor, all our lands have lost, instead of emigrating, to undergo quite as fatiguing and more wearing labor, surrounded by inconveniences and malaria."

J. F. ANDERSON, South Windham.

The fact being admitted that exhaustion prevails to a greater or less extent, and that it is preferable to attempt renovation, rather

than either to continue the course which has led to this condition, or to abandon the land, a broad and important field of investigation opens before us. Nothing else in the whole range of topics connected with the agriculture of Maine more imperatively demands serious attention.

To obtain the views and results of the experience of practical agriculturists among us upon this point, and bearing in mind the limited capital of a great majority of our farmers, which effectually prevents their resorting at once to such measures as ampler means would readily suggest and command, the following question was propounded in the circular of inquiries before alluded to:

“What method of procedure would you recommend, in order to recover the fertility of partially exhausted lands, (under ordinary circumstances,) and where there is lack of capital to purchase fertilizers?”

The replies, as might be anticipated, are widely various, and few, probably, in attempting an answer, proposed to themselves to touch upon all available means which might assist toward the desired end, but rather only such as most readily suggested themselves to the writers. Allusions to the subject of *saving* and *making* manures are perhaps more numerous than any other—as in the following:

“Haul muck, if to be had, into the barn yard and hog yard; collect weeds and all kinds of vegetable rubbish from low places in pastures; turves from the road-side, and increase the manure heap in every possible way. Use all the ashes you can make, buy more if you can, and add a few casks of plaster; plow deep and thoroughly.”

D. NOYES, Norway.

“Eat your hay at home; save all manure; yard cattle in summer; haul in muck, sods or any thing; plow in spring and manure. In the fall scrape your yard; get earth where the yard has washed, and top dress.”

E. S. HOPKINS, New Portland.

“Reclaim waste and swamp lands; keep the hog yard, cow yard, and barn cellar, well provided with muck. Turf, leaves, muck or other vegetable matter mixed well with the excrements of hogs and cattle, judiciously applied, is almost our entire dependence.”

REUBEN WINCHELL, South Acton.

“If far in the country, we would make great use of the bog or swamp muck, leaves, ashes, lime and plaster. Sow clover and turn it under. If

located by, or near the flow of salt water, make great use of muscles, salt marsh mud, sea weed with fresh mud. Keep up a rotation of crops, and cultivate thoroughly."

JOSEPH FROST, Elliot.

This matter of manures is one of the greatest importance to every farmer, whatever be the condition of his lands; if they are fertile and productive as could be desired, he needs them not less to maintain fertility and so to be able to transmit to his children an unexhausted soil. If his lands be already exhausted, he is in more immediate and urgent need of such a supply of the elements of fertility as shall, at least, restore it to pristine productiveness, if not to improve it beyond its original condition. In the report of last year, considerable attention was given to this topic, but it is one which is in no danger of being soon exhausted, and one concerning which line upon line and precept upon precept is as needful as for any which claims the farmer's attention, and it is also true, that whatever else may be attempted or left undone, in the way of renovation, little can be accomplished unless *accompanied with diligent heed to save, to preserve, and rightly to prepare and use all the fertilizing materials at his command.* It was there shown to be the opinion of many of our best farmers that not less than one-half of the means of fertilization at present within the reach of the farmers of Maine, is now lost or wasted for want of reasonable diligence to preserve them, and that if this great loss could be arrested and the whole employed in the best manner, it would cause a most astonishing change to come over the face of the State, *and millions of dollars to be annually added to its wealth.*

Whether this loss is to be attributed to ignorance of its true value, or to a reckless disregard of it, an immediate stop ought to be put to such practice. Every farmer should at once see to it, that so far as his own premises are concerned, this reproach upon our agriculture be wiped off.

On no one point is there greater mal-practice than in allowing the liquid excretions of animals to run to waste, and this probably in many cases, if not most, may be owing to ignorance of their value compared with that of the solid; not every one is aware that it is not merely of equal, but of greater value—not that we could afford to dispense with either, but if compelled to do so, we could

replace the fertilizing elements of the solid at less expense than we could those of the liquid, for the urine contains more largely of nitrogen, which, in practice, is found to be the element needful to vegetation most difficult and costly to supply. It is true, that more than three-fourths of the atmosphere consists of nitrogen, and so plants are constantly enveloped in it, but plants do not possess the power to appropriate it as thus existing, nor in any way except it be first combined with some other body. Hydrogen and nitrogen combined, form ammonia,\* and this is the source whence plants obtain nearly all their nitrogen, and the special value of urine arises from the fact that during its decomposition, ammonia is freely evolved, while the solid portion of the excrements contain very little from which it could be evolved.

Every one is familiar with the great efficacy of the excrements of poultry, or other bird manure, compared with ordinary farm-yard manure, and this great superiority is owing to the fact that in that of the bird is all of the liquid as well as the solid, and hence the abundance of ammonia yielded by manure from the hen-roosts or by guano. Ammonia is contained in very small proportion in rain-water; enough, it is said, to afford to growing plants vigor sufficient to enable them to perfect seed and so secure reproduction, but that if, in addition to this, we would have plants yield a supply of human food, more nitrogen must be supplied.

The liquid excretions of animals may be saved by means of tanks, cisterns, &c., and applied directly to the land; but situated as a great majority of our farmers at present are, the preferable way is to use absorbants.

The time will probably come, and perhaps at no very distant day, when a large part of our fertilization, and especially upon light soils, will be effected by means of the application of liquid manures, for in some respects this mode is vastly superior to any other, but it involves an outlay for necessary apparatus beyond the present means of our agriculturists.

Nearly all have on their own premises, or can easily obtain, an

---

\* Ammonia is usually present in the atmosphere, but in very minute proportion. It can be detected also in rain-water, and the peculiarly invigorating effect of brief summer showers is in part attributable to the ammonia which the rain has absorbed from the air in its descent.



abundant supply of muck, and when dry, there is no better absorbant than this. Peat, or muck, varies greatly in its composition and value, some being almost worthless for direct application to the land, while other produces immediate good effect; but however trifling its present value as taken from its native deposit, it is not only of use to save the urine, but by means of the ammonia generated, a large amount of excellent food for plants is developed from the crude vegetable matter which is abundant even in the poorest; or, in other words, the vegetable matter is prepared or cooked so as to be available as food to growing plants.

Stockhardt in his field lectures, says: "A farmer who does not carefully preserve the urine of his house and live stock, acts like a miner who throws away dull, rich silver ore, because it does not shine like white silver.

"A farmer who buys guano, bone dust, or other artificial manures, but does not look carefully after his drainings, is an extravagant farmer; for he brings the same thing into his yard at great cost, which he might have for nothing, if he did not suffer it to flow or evaporate uselessly away from the same."

Another saving to which special heed should be given, is that of bones. Not a bone upon the premises of the farmer, the butcher, the soap boiler, or elsewhere, should be wasted. They are worth a great deal too much. The value of a manure depends chiefly upon its capacity to furnish the needful constituents of crops. One of these, and the one which next to nitrogen is the most difficult and costly to supply, is phosphoric acid. An analysis of bones shows that in every one hundred pounds we have thirty-three pounds of organic matter, consisting of gelatine and fat, and composed of nitrogen, carbon, oxygen and hydrogen; and fifty five pounds of phosphate of lime, consisting of nearly equal proportions of phosphoric acid and lime. Thus it is seen that something more than a quarter part of the weight of bone consists of phosphoric acid.

This exists in most soils in limited quantities, and is usually the first among the necessary elements of plants, to fail, and especially is this the case if the land be cropped for grain. The ashes of wheat (that is, the mineral portion of the grain, which it must obtain from the soil, and cannot get from the atmosphere or from moisture,) are found to consist of forty-six per cent. of phosphoric acid; of barley,

thirty-five per cent.; of rye, forty-six per cent.; of Indian corn, thirty-nine per cent.; of oats, eighteen per cent., or if the husk be first removed, forty-four per cent; hence, the necessity of an adequate supply in order to secure satisfactory crops.

There is an obstacle in practice, but not an insurmountable one, to the application of bones in such a way as economically to supply the want, arising from their toughness and solidity in their natural state. To pound them up finely by hand, is a tedious and difficult undertaking. To burn them to ashes, involves the loss of the organic matter; to dissolve them in acid, without first being reduced to powder, is rather too costly, and not a very easy process.

Various mills and other contrivances have been made for crushing bones, and whenever their value is properly appreciated, some apparatus will be introduced into every section for this purpose.

The machinery most approved in England for crushing bones, consists of two or more sets of rollers or cylinders, with serrated surfaces, fixed in a frame-work, and adapted to the ordinary gearing of horse or steam power, with a hopper for the bones, which, after passing through one set, pass through the next, which have closer teeth, and crush them into smaller pieces. There are also wire cylinders which act as riddles, the meshes of which are adapted for the purpose of retaining the larger particles, while the smaller fall through. I saw at St. John, N. B., a bone mill constructed on this principle, but with only a single pair of rollers or cylinders with serrated surfaces, which answered the purpose, but required that the bones be passed through several times. An apparatus of this sort should be both powerful and weighty, in order successfully to overcome the resistance of the bones, and crush them to a proper degree of fineness.

By the addition of sulphuric acid, in the proportion of one part by weight of acid (diluted with an equal quantity of water) to two parts of ground bone, we secure the combination of the acid with a portion of the lime, leaving the other combined with a double proportion of phosphoric acid. This is called biphosphate or superphosphate of lime, and differs from the phosphate as existing in bones, in being much more readily soluble, and so producing immediate effect—a very small application thus sufficing for the wants of one crop. If bones be crushed so that the largest pieces will not exceed

a quarter to a half inch, we secure by a liberal application both sufficient immediate effect, and also endurance for a considerable term of years. This is, on the whole, the more economical way to apply them in most instances. Where there is a deficiency of phosphate in the soil, the application of crushed bone is the cheapest mode in which the want can be supplied, unless in some instances where leached ashes can be had at low price, in which case it can be supplied thus at even less cost, but crushed bone will supply it decidedly cheaper than by the use of low priced varieties of guano, whose efficacy consists principally in the phosphate they contain, as the Mexican, or by the use of the superphosphates of commerce.

But in estimating the value of bone-dust as a fertilizing material, the organic or animal matter should by no means be lost sight of. If phosphate of lime were the only ingredient of value, bones could easily be burned and reduced to powder, as none of the phosphate would thus be lost, but the organic matter which would be dissipated contains no less than eighteen per cent. of nitrogen, and is substantially similar in chemical composition to hair, horn and wool, and differs from muscle and blood chiefly in containing less water, dried blood and dried muscle being almost exactly the same as to their chemical constituents and properties.

All these substances are well known to be among the most powerful of fertilizers, and their value depends mainly upon the nitrogen they afford. It will of course be borne in mind that the office or function of nitrogen and of phosphoric acid in the nutrition of plants, is essentially distinct. Neither can take the place of the other, and neither can be dispensed with. Nitrogen induces rapid and luxuriant growth of the plant—phosphoric acid assists in the formation and ripening of seed. If nitrogen be abundant, a luxuriant straw could be grown; but if phosphoric acid be wanting, the head could not fill with grain. On the other hand, if nitrogen be absent, or the plant could obtain it only from the atmosphere, there would not be sufficient power, vigor or vitality to induce growth and form seed, even if phosphoric acid be abundant.

The application of bone-dust to agricultural practice in Maine has been quite limited hitherto. I noticed remarkable proof of its efficacy and value in several of the easternmost towns of Washington county last summer, where it has been used for ten years past,

more extensively (so far as my knowledge extends) than in any other part of the State. Some fields on the farms of the brothers Lincoln in Dennysville, were similarly treated when laid down to grass eight years ago, except that on alternate strips an application of ground bone was made at the rate of eight to ten hundred pounds to the acre. On these the grass, ready to cut when I saw it early in July, promised a heavy crop, while the strips to which no bone had been applied was yielding not more than a third as much. This was shown me as a fair sample of the results attending its use in numerous instances. The Messrs. Lincoln prefer it, weight for weight, to the best Peruvian guano. Such has been their success, that one of them has erected an apparatus for crushing or pounding bones, (consisting of three heavy iron mortars and pestles, the latter being lifted by water-power,) and he purchases all which are brought to him, at fifteen dollars per ton, or he will crush for others at the halves. Some sixteen miles distant, I saw a quantity of bones which had been collected and loaded, ready to be carried to mill, crushed and returned; and here I learned that their efficacy had been proved to be such as to render this operation a very profitable one. Perhaps one reason why bone manure has been so very successful here, may be found in the fact that when the lands were first cleared, the wood, instead of being burned upon the spot and thus returning to the soil a good quantity of phosphate, was all carried off—the merchantable cord wood to be shipped to Boston and the remainder for fuel for home consumption. One other fact mentioned in connection with their experience is not so readily accounted for, namely: that while before the application of bone-dust it was impossible to get good crops of hay, (even with liberal application of ordinary farm yard manure,) there was no special difficulty in obtaining satisfactory crops of grain.

At Perry, in this vicinity, guano (Peruvian) had been used with highly gratifying results, proving itself a cheap and effectual manure. It had been applied in quantities varying from one hundred and fifty to one thousand pounds to the acre. The result of experiments indicated three hundred pounds as the preferable quantity, that amount doing as much good as more, and lasting as long, its effect being visible for several years. The soil here is apparently of granitic origin, and overlies a red sand stone formation, which occasionally crops out.

Should the farmers of Maine make dairying and grazing as prominent branches of their husbandry as seems warranted by their facilities compared with those of others, some application which would restore phosphates to the soil might be the only form of manuring to which they would be obliged to give *special* attention, for the abundance of barnyard manure, if properly cared for, would yield in sufficient quantity all the other elements needful to bring their farms to a high state of fertility—phosphates, which enter so largely into the composition of bones, and of milk, being carried off and not returned. The manure from grown animals (not giving milk) contains considerable, but that from young cattle, (rapidly forming bone) and milch cows, very little. Bone manure is applied with great success to pastures used for milch cows, and which are thus more rapidly deprived of their phosphates than when fed by other animals. Prof. Johnston states that in every forty gallons of milk there is at least one pound of bone earth. Estimating a cow to give seven hundred and fifty gallons of milk per annum, it will require nineteen pounds of phosphate of lime, equal to about thirty pounds of bone-dust; and in the calf sold, there may be a farther loss of twenty pounds of bone.\*

“The extent to which animals grown and fed upon a farm, draw upon the phosphoric acid contained in the crops upon one hundred acres of arable land, has been calculated by Mr. Hayward to amount to four hundred and thirteen pounds, equivalent to the amount supplied by one thousand four hundred and ninety-one pounds of bones.”† Thus it is seen that even where animal products alone are sold from the farm, and all the manure arising from the home consumption of the crops is retained, there is still a heavy draft upon the phosphates in the soil.

The use of bones as a manure has been increasing in Great Britain for many years, and such is the estimate in which they are held, that not only is their collection at home a regular and important branch of trade, but large quantities are annually imported from other

---

\* A writer in the Edinburgh Review states the amount of phosphate taken away in the milk of a cow annually, to be as much as is yielded by eighty-two pounds of bone-dust.

† Mr. Hayward's calculation was probably based upon crops considerably larger than the average of ours.

countries. Some have even been exported thither from the United States. The declared value of the bones imported into Great Britain (according to their statistics) from 1837 to 1841, was one million two hundred and seventy-one thousand seven hundred and sixty-two pounds sterling, or about six millions of dollars; and from 1841 to 1847, there were imported into one port alone (Hull) an annual average of upwards of twenty thousand tons. A late English writer says :

“Amongst the many improvements in agriculture which modern practice has adopted, there is none of higher importance than the introduction of bones as a field manure. It is quite possible that many who have looked with admiration on the achievements of industry in every branch, and have marked with satisfaction the immense increase in the production of human food which has taken place during the last fifty years—an increase which has been trebled in the space of time that population has doubled, and who have noted the augmented value of property, the improved condition of the laborer, and the extended field for enterprise, skill and capital, which the occupation of the farmer now affords, will overlook the fact that the use of bone manure has been one chief mean by which all this has been accomplished. But the fact is so; the adoption of bones as a farm fertilizer has opened sources of production that have been the means of providing, to a mighty extent, food, labor and wealth for the community. What draining has done for the wet and cold soils, bone culture, by promoting the system of root husbandry at a period when every other means had been found incompetent and useless, has done for the rest.”

The use of bone-dust in some parts of the continent of Europe has greatly increased within the last twenty years. Formerly large quantities were exported to England from the German states. Now, Stockhardt writes, (or rather he so wrote in 1851,)

“That bones exert a vigorous manuring influence upon our soil can no longer be doubted, for the results of practical experiment are now before us to a sufficient extent to convince every one who is open to conviction. Manuring with bone-dust has become general over all parts of Saxony during the last fifteen or twenty years. How important an extension of this mode of fertilizing land has obtained in this part of Saxony more particularly, is revealed to us by the fact that the first bone-mill, constructed by an intelligent farmer, ground a total of six hundred weight during the year 1837, but in 1848 some fifteen thousand hundred weight; as also by the additional consideration that in the last mentioned year, in this Province alone some fifty thousand or sixty thousand hundred weight were prepared and sold, yet without satisfying all demands. The total quantity of bones which are to be obtained from the

animals annually slaughtered in Saxony, amounts, on an approximative calculation, to one hundred thousand hundred weight, and half this quantity, if not still more, is imported from the immediately adjacent countries. If, on a moderate assumption, the total produce from one hundred weight of bonedust is estimated at two Saxon bushels\* of rye, the quantity of this substance that is yearly consumed in Saxony, leads to an increased yield of three hundred thousand bushels."

He further remarks, that

"Complaints are often heard, that by the consumption of English cotton fabrics in Germany, thousands of English laborers are supported by German money. Germany has done far more; for nearly half a century it has given grain to English laborers by the exportation of German bones and German oil cake. According to trustworthy information, the produce of English fields since the importation of bones and oil cake has been doubled. The revivifying power which has been lost to our father-land by this exportation of manures, would assuredly have been preserved to it, if during this period the importance to agriculture of the constituents contained in bones and oil cake had been clearly understood in Germany. This is the triumph of intelligence, that it makes powers serviceable which remain neglected and useless where intelligence is wanting."

Not only should the above-named items of saving be effected in the matter of manures, but every other possible source should be made to contribute what it can, and the whole should be preserved with care, and by means of barn cellars or sheds be protected from the sun, air, and especially from rains, which dissolve and carry off the most valuable portions, the very life of it. The farmer is constantly engaged in obtaining from his soil products, every one of which carries away from it certain elements of fertility. He should be just as constantly busied to return to the soil, in some form or other, an equivalent at least, and more than an equivalent, if he aims at higher productiveness. Good husbandry implies the faithful husbanding and use of every thing which will add bread and meat to his store, and his success will in great measure be parallel to his diligence and attention thereto.

I am here again reminded of the marine manures which our State possesses in larger abundance than any other in the Union, and upon which some observations were made in the last report, by the

---

\* The Saxon bushel is larger than ours, being no less than one hundred and sixty lbs.

mention which is made in a communication from Mr. O. W. Herrick of Brooklin, a shore town in Hancock county, of the remarkable success which has attended the application of "poggy chum," both as a top-dressing for grass lands, and as an ingredient in composts.

In answer to an inquiry respecting this article, he informs me that the fish known as menhaden, and often called along shore "hard-heads" and "poggies," are taken, by means of nets, in large numbers, and after being boiled, are pressed by screw-power to extract an oil which sells readily in Boston and other markets, at from fifteen to eighteen dollars per barrel; what remains after extracting the oil, is called "poggy chum," and sells at twenty cents per barrel; two barrels are equal to a load (forty-eight cubic feet, or three-eighths of a cord,) of farm yard manure; one hundred of these fish yield a gallon of oil—four hundred give a barrel of chum. Sometimes a man and a boy, besides carrying on a small farm, catch fish enough during the season to make fifteen to twenty barrels of oil, and one hundred to one hundred and fifty barrels of chum. Occasionally enough are taken in a night to make a barrel of oil—at other times none for several days. Mr. H. farther informs me that some farms in that vicinity which six years ago cut only five tons of hay, yielded thirty tons the present year, and this large increase is wholly attributable to the application of "poggy chum."

That this may be found as profitable a business at many other points on our coast, as at Brooklin, seems highly probable, and I am informed that it is rapidly attracting increased attention. Mr. H. remarks: "in our town of about two hundred voters, there are over fifty employed in this business." Poggy chum, it should be recollected, is only one of the thousand forms in which the treasures of the deep may be made to enrich the farmer. These have never hitherto been duly appreciated. Not only in the form above named, but as salt muck, sea-weed, kelp, muscle-bed, and many others now known, together with the probability of still other forms yet to be discovered, they are, beyond all question, a rich provision placed by a beneficent Providence within the reach of all cultivators of the soil near the sea shore, and which, it is well known, is generally inferior in natural fertility to that of the interior.

The first settlers were drawn hither by the facilities for fishing,



lumbering and commercial pursuits, in which signal success has crowned their efforts, Maine now ranking first among the states of the Union, in the amount of tonnage built, and sustaining high rank regarding the amount of tonnage owned and sailed, the carrying on of fisheries, lumbering, &c.

A proper appreciation and a practical application of the marine manures so bountifully furnished, would at once elevate the condition of agriculture along our coast from its present subordinate position, to a corresponding rank in importance.

#### FALLOWS.

"This question is of the utmost importance. I would not abandon such lands, nor exhaust them further, but *would let them rest*, or turn them into pasture, and in three or four years, plow to the depth of one foot, seeding down without cropping, sowing on ashes, lime, salt, &c. I have no doubt but that many soils could be brought to, by simply plowing deep, and exposing to the sun and air."

G. H. ANDREWS, Monmouth.

"When land has become exhausted, if there is not capital to cultivate the same, I think that if it could be preserved from cropping or grazing, it would recover, to a certain degree, on the principle that we always find nature prompt to restore its own wounds."

ABRAM COFFIN, Waterborough.

"We *think* it might be well to plow and let the land lie fallow one year; but deeming "a bird in hand worth two in the bush," we take off all the grass. My next neighbor, however, has turned in a few acres of grass, and we think he will get his reward. This question is a very important one to us, many of whom, live on old and partially worn-out farms."

E. JONES, Minot.

We find indicated in the above, and similar replies, a second mode which is recommended as a means of recovering fertility, namely, fallow, or summer tillage, as it is sometimes called.

The naked fallow has been practised from a remote period of antiquity, and up to a comparatively recent date was the only known means (aside from manure) to this end. The theory of it was anciently understood to be that the land became *tired* of bearing crops, and needed *rest*. However incorrect this theory, the practice of fallowing lands was accompanied with beneficial results, not only in

greater fertility but in greater cleanliness, it being easy thus to rid the soil of noxious weeds which had become thoroughly established in the soil, by reason of imperfect or slovenly cultivation. Fallowing was enforced by the Hebrew law, which commanded that every seventh year the land be permitted to rest, and although the primary object of this enactment was undoubtedly of a typical or figurative character, we may see in this, as in numerous other instances in the Mosaic economy, a thorough fitness to the circumstances by which they were surrounded, and a special adaptation to the requirements of their system of husbandry.

It was practised by the Romans, and by them introduced into England, where it has been more or less in vogue ever since the Roman invasion; but notwithstanding this, it is said not to have obtained in Scotland until the end of the sixteenth century, and that a Mr. Walker, of East Lothian, was the first who ever attempted systematically to fallow land there.

“ Like all innovators and improvers, he had to endure for a time the ridicule or contempt of his neighbors, who pityingly concluded that he was either insane for allowing a portion of his land to lie waste a whole year, or so poverty stricken as to be unable to find seed to sow it with. So successful, however, were Mr. Walker's repeated trials in summer fallowing land, that twenty years after its introduction the practice had become nearly general throughout East Lothian.”

The success attending the operation of fallow depends in part, as above remarked, upon the greater cleanliness given to the soil by the destruction of weeds, which rob the soil of so much nourishment—more upon the improved mechanical condition, the greater fineness and mellowness induced by the action of frost, and by the repeated plowings to which it is subjected, but probably most of all to chemical changes which are produced during its existence. These are chiefly the evolution of a new supply of plant food in the form of alkalies and soluble silicates, which are furnished from the disintegration of the soil, and of the rocks in the soil, which progresses steadily during its continuance, and also the more thorough and complete decomposition of the inert organic matter also contained in the soil, which now entering into new combinations with the elements furnished by air and moisture, becomes of increased value.

But in the course of time it was discovered that the benefits of a

bare fallow could be had, and a crop also; hence, such crops came to be known as fallow crops, as turnips, &c., for during their culture the land could be well stirred and exposed to the air, and the wide spaces between the drills permitted the thorough eradication of weeds, and in addition to this, there is an actual gain by their using some elements of fertility not required by the grain crops. In the decomposition of feld-spar, for instance, by the combined action of air, frost and water holding carbonic acid in solution, there are liberated one equivalent of potash for every one of silica, and of these, grains require five or six parts of silica to one of potash, while root crops appropriate to themselves largely of potash, but very little of silica, so that there is economy in saving so much of plant food; and if the elements of fertility thus used by the crops are returned to the soil in manure, the product of their consumption, the fertility may be maintained, and gradually increased.

The advantages of fallow crops over naked fallows are so great that they have taken their place in nearly all good practice, the only exception being in the case of very stiff clays, where they are by some yet retained. It is on soils which contain largely of alkaline silicates, as in clays, that the practice of bare fallowing is most advantageous.

Fallow crops will be considered more at length in connection with the subject of rotation.

We will now notice a third method pointed out in the recommendations following, viz., that of green manuring:

“In answer to this question, I can do no better than to give you my own experience. Seven years ago this spring, I bought a piece of land that had an old worn out field of twelve acres upon it, that had been mowed as long as it would bear any thing, then the best spots mowed, and the remainder left to grow weeds and bushes. I repaired the fences around it, and turned in a flock of sheep, and in the course of the summer cut the bushes. The following spring I fenced off four acres, plowed it in June, and sowed to buckwheat. The first of September I rolled down that crop, and plowed it in. I sowed buckwheat again the next season, putting on twenty-five bushels of clover chaff to the acre, and I harvested about one hundred bushels of buckwheat. The next year I put on what manure I could spare, and planted to corn and potatoes. The fifth year I sowed to wheat, and seeded down. I have not failed of a fair crop since; and this year I have eight acres to grass, from which I shall undoubtedly cut twelve tons of hay. The remaining four to

corn and potatoes. I have not kept an exact account of the expense or profit, but think the pasturage and crops have well paid for what I expended."

N. S. HOOPER, Cambridge.

"I should recommend first, muck composted, if not practicable, plow and seed with buckwheat or clover; to be turned under."

ELIJAH BARRELL, Greene.

"Plow in green crops, such as buckwheat, oats, or corn, sowed broadcast, and repeat the operation."

S. HASKELL, Cape Elizabeth.

"I would recommend sowing oats, and plowing them in when fairly headed out. A repetition of this, for three successive years, would produce a marked change in the soil, and I think would be the cheapest way to obtain the desired result."

J. W. AMBROSE, Wells.

"Rake and save all the manure of every description. Break your ground ten inches deep, sow clover to plow in; turn out old fields to pasture, and plow up old pastures."

D. H. THING, Mt. Vernon.

"In order to recover partially exhausted lands, when there is lack of capital to purchase fertilizers, I would recommend sowing clover, or buckwheat, and turning under, with frequent and deep plowing."

C. B. SUMNER, Appleton.

"I would plow in green crops, use swamp muck, and be more economical in the saving and application of every thing that contains fertilizing properties."

N. H. POWERS.

"Exhausted lands may be recovered by plowing in whatever grass may be growing about the first of July, and sow with oats, or almost any thing else, and plow that crop in, in the autumn."

MARK DENNETT, Kittery.

"Apply labor unstinted. Cultivate your land. Do not skim the soil, and turn it over, and sow or plant it, and let it lie until foul, and get all you can from it, and then put it to grass and mow it as long as you can get any hay from it. You must plow it as though you meant it; dig it, work it, see what it is made of; beat it all to pieces; then sow a bushel of buckwheat, and when it is eight inches high, turn it over, and sow another bushel, and after turning that in, try grass, or some other crop, and if it wont grow, you may give it up. But it will grow."

AARON HOAG, Gardiner.

The plowing under of green crops is justly considered one of the most feasible and economical methods of bringing up and renovating worn and exhausted soils. In its practice, as in that of growing

fallow crops, we have many of the advantages of the bare fallow, and connected with it a very considerable addition to the organic matter of the soil. This has been satisfactorily shown by experience, and where from inability to purchase fertilizers, or from distance, or any other cause they cannot be obtained or employed at remunerating rates, green manuring (the term by which this operation is familiarly called) is strongly recommended. If it were true, as was once believed, that plants obtain *all* their nourishment from the soil, the known effects of green manuring could not be accounted for. But such is not the fact. Plants derive their nourishment partly from the soil in which they are grown by means of their roots, and in part, and sometimes in very large proportion, from the atmosphere by the action of their leaves. These sustain to the plant a relation similar to that of both stomach and lungs to the animal, and not only do they digest and assimilate all the inorganic or mineral substances which enter into their composition, dissolved from the soil and brought up in the sap, but they take in largely from the atmosphere of carbon, which is always present in it in the form of carbonic acid, and which goes to make up the bulk of the plant; nor is this the only element of growth which is thus obtained. Nitrogen, which, if not more absolutely necessary than any other, is certainly the one which in practice is found most difficult to supply, is to a limited extent thus derived by the plant, and so much as is thus obtained is safely laid up for the use of future crops. But it is not alone by the leaves that a gain is effected. By the action of the roots, which in some instances, as in clover, run very deep, in bringing up from the subsoil food which otherwise would lie there beyond the reach of many cultivated plants, we effect another positive gain; and when the crop is turned under, we enrich the surface soil not only by the addition of all the organic matter obtained from the air, but by the addition of both vegetable and mineral substances brought up from below. In the case of clover, a portion of the crop is sometimes in practice fed off by cattle whose droppings return directly to the soil nearly an equivalent for their food, and the remainder being turned under, together with the manure, the gain is nearly as great.

We see something very similar to green manuring in the operations of nature, and on a grand scale in the case of forests, where

roots striking wide and deep assist in hastening the decomposition of soils, gather all they can reach of what is needed to build up their organisms, while at the same time the leaves draw from the air and from moisture. They deposit annually a considerable portion of what is thus obtained, and the ultimate result is that the soil attains a great degree of richness and fertility—when the forests are felled, we call such, our virgin soils, our very best.

It would appear then, that such plants as present the greatest surface of leaves wherewith to obtain atmospheric food, and send down the deepest roots to levy contributions from the subsoil, would be those best adapted for this purpose, and perhaps there is no plant which better combines both of these than the clover, and it is found to be in actual experience one of the very best. A closely calculating and very successful farmer remarked to me last summer, in speaking of this subject, that "clover seed was the only manure he could buy and use at a good profit." Buckwheat and oats are also favorite crops for green manuring. The former succeeds on poorer soils than either of the others, and on light sands it is said to give an improved consistency to the soil as marked in its way, as is the loosening and mellowing of heavy clays by the action of clover. Whatever crop is used, it should be plowed under when in full flower. It is at this period that it most readily decays, and also yields more enriching elements to the soil as the luxuriance of foliage is greater, and the leaves contain more soluble matter to afford nutrition to the succeeding crop. The process may be repeated several times in the season, and in practice it is found that the crops will be more effectually covered if a roller be first passed over them. It is sometimes objected to as a waste of time and labor to grow one crop merely that it may decay and give place to another; that we may just as well grow the crop we intend to take off, and let that one do its own work of collecting from the air and from the subsoil, or wherever it can get its food, as to spend time and labor to induce vegetation in one form with the intent to take off the same elements in another.

If a sufficient answer to such objection is not indicated in the foregoing remarks, we would like to have the objector explain why, and how, we may feed our cattle directly upon the elements of fertility in the soil, instead of being at so much trouble as we now

are, first to convert these elements into forage crops. When this is satisfactorily done, it will be time to consider theoretical objections to what is proved by experience to be of great utility.

ROTATION OF CROPS. Nothing relative to agriculture is better established, than the fact that a rotation of crops is necessary to profitable farming; and all the farmers of Maine practice, if not a systematic rotation, yet a succession or alternation of some sort, that is to say, none allot to their grass, grain, corn, roots, &c., certain parcels of land, and then crop each perpetually for the same product; but they change in some direction, and to some extent. At the same time it is evident, that in comparatively few instances is there any thing like a well considered, systematic and judicious rotation of crops practiced among us, but that convenience, or chance often—indeed, may I not say usually—determines the course of cultivation, rather than any carefully digested plan, or steady aim, to develop the powers of production possessed by the soil, in the best and most economical manner. This is a hard saying, and to show how fully I am justified in the assertion, some answers are annexed, which were received in reply to the following question in the circular sent out last spring—“To what extent is any method of husbandry practised involving a systematic rotation of crops?”

“I do not know of a farm where a systematic rotation is practiced.”

J. W. AMBROSE, York Co. .

“Such a thing we have heard of, and cannot question its importance; but in practice it is wholly ignored; every thing of the kind is left to chance. Generally the reason why a piece of land is broken up, is because it has become too poor to bear grass.”

WM. GREGG, Cumberland Co.

“No regular method or system of rotation is practiced.”

J. S. POWERS, Oxford Co.

“There has been none practiced.”

A. SPRAGUE, Androscoggin Co.

“None.”

J. CARGILL, Lincoln Co.

“Systematic rotation has not been practiced so as to enable me to give any reliable information.”

G. H. ANDREWS, Kennebec Co.

"Don't know of any."

O. SEWALL, Franklin Co.

"None practiced."

A. ARCHER, Somerset Co.

"No systematic rotation of crops is practiced worth naming; indeed, none that I know of."

B. F. WILBUR, Piscataquis Co.

"None."

H. HOBBS, Waldo Co.

"No systematic rotation here."

L. RIDEOUT, Penobscot Co.

"Our husbandry does not embrace systematic rotation."

O. W. HERRICK, Hancock Co.

"There is no systematic rotation of crops generally practiced."

D. J. FISHER, Washington Co.

"Nothing established in relation to rotation of crops."

M. L. GERRY, Aroostook Co.

Let us first inquire, what is to be understood by a *judicious* rotation, and the reply is, such an one as shall result in *obtaining the greatest product* from a plot of ground, in a course of years, *connected with the least exhaustion*. If manure and labor were always, and to sufficient amount, at the command of the farmer, there would be no absolute necessity for alternation of crops,\* for he might take from his land the same product, year after year, indefinitely, but it is because these are the two very articles which the farmer has need to economize with utmost care, and make both go as far as possible, that a judicious rotation demands his serious consideration. To determine in any given instance what may be the best rotation to secure this end, is a matter to be definitely settled only by experience; this experience our farmers do not possess; and they cannot attain the best success until they learn how, so that my present purpose is rather to show the desirableness of such knowledge, and give reasons for diligent inquiry, experiment and observation, than to lay down rules for practice.

---

\* Boussingault states, that on the coast of Peru are tracts which have produced crops of corn in succession, from a date anterior to the discovery of America, and on the table lands of the Andes are wheat fields, which have yielded excellent crops annually for more than two centuries.



Theory may assist in determining by way of suggestion, but theory alone cannot dictate with confidence, *until we are sure that it is in all respects correct*. No theory yet broached has been able *fully* to account for, and explain, all the well ascertained results of experience on this point. Many and various are the theories which have from time to time been promulgated to explain the known facts attending rotation. The earliest in point of date was, that the land *got tired* of producing any particular crop, and required rest or change of employment, which is perfectly absurd, for soil is not a *being* possessed of a nervous system, or of organs of any kind, or capable of fatigue, or of recovery from fatigue by rest. To be sure, we sometimes speak in a loose way of driving, forcing, or stimulating the soil, but such expressions are all wrong, and should be carefully avoided, if only for the reason that incorrect language often leads, even unconsciously, to incorrect belief, and incorrect belief leads to incorrect practice.\* Our land should be looked upon rather as a reservoir, or a deposit of plant food, of materials or elements, such as plants, (which *are* organized bodies,) take up, feed upon and assimilate to themselves, and so are enabled to increase in growth and ripen seed. If the soil does not contain all which the plants need, we add manure, and manure is only food for plants, and whatever contains food for plants may properly be called manure, whether it be dung or gypsum, urine or ashes, leaves or guano. If we add to our soil just what food is required by the crop which the soil

---

\* We can *stimulate growth* by furnishing the needful elements of fertility which may be lacking; and sometimes in this way, where little is wanting, and the want of that little is imperative, a slight application of the right kind will result in great yield; but to say that the *soil* is stimulated thereby is no more true than that a decanter is stimulated by putting brandy in it.

Not unfrequently cases like the following (which was related by a member of the Board, at one of its informal evening meetings last winter,) occur: A certain man applied to a piece of land so poor as to yield less than five hundred pounds of hay per acre, a dressing of muscle bed. The next year, he cut three tons per acre; the second year, nearly as much; the third, rather less; the fourth, less still; and the fifth, scarcely any. He then applied muscle bed again, but it produced no effect. He then tried a few loads of barn-yard manure, which did but little good; his soil appeared to be hopelessly barren, and he cursed the muscle bed for *driving his land to death*. Now let us look into this a bit. Within four years after the first application, he had removed from the land thirty or forty times as much hay as he could get in a year previous to it. Where did all this come from? What furnished

lacks, we add to its growth, and the application is a profitable one ; if we add such as the crop did not require, or such as existed already in sufficient quantity in the soil, no effect is produced, and however useful it might have been on other soils, its application here was not profitable. Another theory formerly received with favor, but now discarded, is that of De Candolle and his followers, who supposed that the roots of plants excrete certain substances similar to the excretions of animals, and that these excrements were injurious to a succeeding crop of the same kind, but harmless and even fertilizing to some others, and so, when a field after repeated crops of wheat refused longer to yield the same, but would produce a fair crop of something else, the fact was explained by this "excretion theory" in an apparently simple and intelligible manner, and when it was found that wheat would again grow after a bare fallow, it was explained by saying that the poisonous excrements of former crops had in the meantime become decomposed and converted into food for a new crop of wheat. Plausible as this theory at first appears, and popular as it once was, it is now universally discarded by the best authorities as without foundation in fact, and of course utterly valueless.

The one most generally received at the present day, is what is known as the "mineral theory," which, although it does not satisfactorily and fully account for *all* the known results of rotation, some of which suggest the idea that collateral circumstances, independent of the inorganic constituents of the soil, may exert a hitherto unob-

---

its mineral constituents? Certainly not the soil alone, for that produced but four or five hundred pounds before; not the muscle bed alone, for if it did, the second application would have given another eight or ten tons; but both together—the muscle bed supplied the deficiencies of the soil, and by its means, very soon every thing in the soil which Nature's processes could convert into hay was drawn forth and carried off.

If the manure yielded by the three tons cut the first year had been returned, and the same repeated each succeeding year, instead of ever failing, the productiveness of the land would doubtless have been fully maintained, and even steadily increased.

Now which in reality was the more blame-worthy of the two—the muscle bed for doing all the good it could, by bringing the land into a condition to yield three tons per acre, and which yield could have been, *by making proper returns*, maintained forever, or the farmer, who, not content with this, nor willing to deal honestly with his land, so used, or abused, its assistance as to utterly exhaust it? Such wisdom is equalled only by his who killed the goose which laid the golden egg, instead of properly caring for it and allowing it a reasonable amount of food.

served or unestimated influence on production, yet being in a good degree at least based on known truth, is worthy of careful consideration, and may prove suggestive of improved practice. It may be briefly explained as follows: The analyses of plants show that they all contain a certain amount of inorganic ingredients, or in other words, of mineral substances, which, after the combustion of the plant, remain behind in the form of ashes. This ash is that portion of the plant which it obtained from the soil, (the portion which was obtained from the atmosphere and from moisture having all passed away in gaseous form,) and consists of lime, potash, soda, silica, phosphoric acid, and other substances, and *in proportions varying greatly according to the plant, from the combustion of which the ash is obtained.*

Thus we find that clover, potatoes, turnips, &c., have drawn heavily upon the potash in the soil, while wheat and other cereal crops demand more largely of phosphoric acid, and leguminous plants, as peas, beans, &c., abstract lime in abundance, and so of all others, the ingredients or the proportions of the ingredients of no two being exactly alike; each having its own distinct and specific requirements. As these mineral substances could not be furnished to the plant either from the atmosphere or from water, it is clear that they must have been derived from the soil, and it is demonstrably certain, having been proved by the most careful and decisive experiments, that the absence from the soil of the proper quantity of any one of the necessary elements, will prevent the perfect development of the plant, and that its presence in the soil or its addition to it by means of manure, is as necessary a condition of successful growth as is light, air or moisture.

Some of these mineral substances, as potash, phosphoric acid, &c., exist in different soils in widely differing proportions, and in most cases in very limited quantities. Now, as the requirements of different species or families of plants vary so much from each other, that a soil, which, after successive crops of one plant being removed from it, refuses longer to produce a remunerating crop, (that is to say, will not produce a respectable crop without a too costly manurial application to supply its wants,) may yet yield freely of another species, the value of a judicious rotation stands out in a strong light.

To illustrate this principle farther, let us suppose the capital of a merchant commencing business to consist of coin lying in a bank of deposit, and to be composed of eagles, sovereigns, napoleons, roubles and doubloons, which he could draw thence to be employed *only for specific purposes*, and by no manner of brokerage could he use them interchangeably, to wit: with the eagles he might purchase cotton and flour, with the sovereigns cloths and steel, with the napoleons silks and wines, with the roubles hemp and duck, and with the doubloons sugar and molasses. It surely needs no argument to show that if he employs only a portion of his capital, he is not a farthing the richer for the possession of the rest. So with the farmer—he has deposited in his banks various elements of fertility, and existing in various proportions. These are of no value to him until drawn out, and if it be wise for him to draw at all, it is wise so to adapt his drafts as to obtain the greatest amount possible. The cases are unlike in this respect, that while the merchant might draw for only one at a time, the farmer in any crop would draw not for one, but for several, perhaps, for most, but the fact that different crops draw in so different proportions, still leaves a substantial similarity between them.

If we suppose, farther, that the merchant be ignorant of the exact amount of capital thus subject to his drafts, and of the relative proportion of each sort of coin, and has no means of ascertaining but by drawing for it; that he could draw only once a year, in April or May, and his drafts be honored or protested in October, we have a case still more nearly parallel to that of the farmer who has an unknown amount of the elements of hay, grain, roots, &c., and existing in unknown proportions; and it behoves both alike to draw for all they can. The universally acknowledged importance of manure to the farmer is based upon what? Just this: that by its application he restores to the land the needful elements which were removed from the soil in the crops taken off. Now, if by modifying our modes of operation, we can more economically employ the elements of fertility which are in the soil, or draw for them in such proportions that we should realize a greater amount of products, it would be an actual gain, equivalent to the addition of as much manure as would suffice to produce the difference; and if we thus effect a gain, we may hold on to it, for it is certain that the greater the

products of the farm, the greater will be the means of the farmer to enrich his lands. If he consume his crops at home, as he should always do to large extent, he has an annual supply of manure at hand. If he sell them, he can well afford to purchase enough of fertilizing materials to make good to the soil the deficiency occasioned by cropping. As we have before seen, plants derive a portion of their subsistence from the atmosphere. Their roots are constantly at work decomposing, rendering soluble, and appropriating portions of soil before unavailable; so that if due heed be given to returning what manure the crops will yield, our lands may be forever gaining in fertility.

In speaking of manures a few pages back, reference was made to the great waste now existing in the State, as testified to by many of our best farmers in the report of last year, and of the immense gain which would result from simply saving what is now needlessly lost. But supposing all this fully accomplished, to-day, would the limit of improvement be reached? By no means; for we have in our soil capabilities which have never yet been called into action, and which never will be and never can be until drawn upon in such a way that nature can honor the draft without violation of her unalterable laws, and this can only be done by a judicious rotation of crops.

With the hope of obtaining some valuable results from the experience of our best farmers as to the most judicious rotations to adopt, so far as proved upon our soils, some questions of the circular were directed to this end, but I regret to say that little has been elicited. From some sources, whence satisfactory replies were looked for with most confidence, the following answers, or similar ones, are received: "I do not know." "Am not prepared to express an opinion." "That is just what we need most to know," &c. In other instances, the prevailing practice is stated without any expression of opinion as to its merits or faults, as thus:

"Pretty generally corn or potatoes is planted on greensward, turned over in fall or spring, with manure the first year, and the next, it is stocked down with wheat, barley or oats, to remain as permanent mowing until it no longer pays for getting. This is sometimes varied by taking a previous crop of oats, sometimes by planting two years in succession."

In not a few instances, there is an apparent misapprehension of the term "rotation," as it seems to be understood to mean any sort of succession, whether recurring at regular intervals or not, and a course is recommended as a rotation which is evidently not intended to be immediately repeated when once gone through with, as for instance :

"My favorite rotation is potatoes the first year, corn the second, and wheat with grass seed the third."

Now if this was actually intended as a *rotation*, it follows that the fourth year the land would be again planted to potatoes, and the fifth to corn, and the sixth sowed to wheat with grass seed, and so on; for the very idea of a regular rotation involves a return to the same crop with which we started, when once the series is gone through with, and after a definite, and not an indefinite or uncertain number of years. By rotary motion we understand such as that of a wheel turning on its axis. Let the spokes, if you please, represent the crops—they may be many or few, of one kind or another—when the wheel has rotated once, it comes to precisely the position whence it started, and if the rotation be kept up, we have repetition of the same.

There are two very good reasons for believing that the course above recommended was not intended as a rotation, however "favorite" the practice might be with the writer; first, the grass seed would be thrown away, and next, no Maine farmer (of my acquaintance) proposes to dispense with a hay crop, and here it is entirely omitted.

Some few recommend a definite rotation; one as follows :

"Our rotation is first year potatoes, second corn, third wheat with grass seed, fourth, fifth, sixth and seventh hay."

Another, who cultivates a light soil, says :

"Potatoes first year, corn the second, wheat the third, with grass, fourth and fifth hay; and if we think the land equal to it, take oats for a sixth, or the last year."

Another :

"On our grass farms we turn the sod smoothly early in September, having added coarse manure; in spring put on compost, sow wheat or barley with grass seed, mow three years, and then repeat; and on farms which grow mostly stock; oats and peas first year, potatoes the

second, corn, or part corn and part turnips the third, grain the fourth, hay fifth, sixth and seventh. We do not pasture our tilled lands, having plenty of broken and rocky land for this purpose, which is unfit for tillage."

Another says:

"There is very little regularity in this matter, generally speaking. The rotation which I have adopted and found successful, is for first year potatoes, or part of other roots, on the sward, with five cords green manure turned in; second year corn, with ten cords good compost; third year, split the bills with a small plow and harrow cross-wise, adding a little manure if I have it, and sow wheat or barley, with fifteen to twenty bushels of *good* hay chaff (I grow my own seed) to the acre. This I consider equal to so many pounds of clover, and so many pints of herds grass. Then cut hay for three years, and pasture for two; so I get round in eight years, and find my crops improving every time with the treatment. Hay yields about three tons first year, two to two and a half the second, and one and a half to two the third, varying with the season, but the land being in good heart, the difference of seasons is not felt so much as on poorer fields."

Another says:

"First year oats or buckwheat, second potatoes, third turnips or sometimes corn, fourth wheat and seeded down, fifth and sixth hay, not forgetting a liberal coat of manure the first, second and third years."

Our correspondent who writes thus from Washington county, is fortunate indeed, if he can command a "liberal supply" of manure for half his tilled land every year. This is an excellent rotation without doubt for his soil, and very likely to beget an annual increase of manure. Most of our farmers, however, must for the present be content with a "liberal coat of manure" for one year out of six; and one desirable point to understand fully in this matter of rotation, is, on what crop it will do the most good, both immediate and ultimate.

Another recommendation is:

"Corn, potatoes or roots the first year, also for the second, but changing the particular crop; third year grass seed, with wheat or barley; fourth, fifth and sixth years, hay; then plow and repeat."

This, as a rule for practice, lacks definiteness, there being some margin for choice between "corn, potatoes or roots," also in the

order of succession, and with regard to which crop or crops should receive the manure.

Another writes :

“The almost universal practice is to plow sward for corn and potatoes in the fall or spring; corn to be followed by wheat, potatoes by oats or barley. My own plan is to plow late in autumn, and as early as possible in spring sow three bushels of oats and fifteen pounds southern clover per acre; harvest the oats early; let the clover grow until near time for frost, then plow it in, and in spring plant corn, manuring well with compost in the hill, to be followed by wheat and grass seed, and mowed four years. On a portion of my land this is varied by using long manure on the sward, and planting potatoes, to be followed by barley, and then hay.”

Another says :

“The best rotation must vary with the circumstances of the farm. A good course, ordinarily, is—pasture—pasture—oats—roots—wheat or barley—hay—hay. Or if this is too long, and oats are not needed for the stock, leave them out, and the land would improve more rapidly by taking off only one crop of hay in the course. The great amount of straw and roots will keep the stock.

In studying out the best rotations for our soil and climate, we may learn something from the practice of others; and as the favorite rotations in England, where farming has attained its greatest perfection, may not be familiar to all, it may be well to mention a few; not that they are to be *copied* by us, (for if there were no other reason, it were enough that they cannot and do not grow Indian corn,) but useful hints may be gathered. The system most in favor there, on good and light lands, is the one known as the Norfolk rotation. In this, nearly half the land is carefully and richly kept in permanent pasture, and the rest, or the arable land, is cultivated in a four field course, viz. : first year, roots, chiefly turnips; second, wheat; third, clover, or clover and grass; fourth, barley. By this rotation, nearly or quite double the crops are obtained as were yielded by the old fashioned mode. The starting point, and, in fact, the pivot of the system is the turnip crop, with its treatment, and the amount of manure yielded by its consumption. No pains are spared upon it, and to it is given almost all their manure. Thus it insures the crops following it, and produces largely of meat, wool, milk, &c.



“Wherever it is introduced and thrives, fertility follows. The value of a farm is most frequently estimated by the extent of ground which can be profitably devoted to this crop.”

On the less fertile soils of Northumberland, what is called the easy-going five shift course is in use, viz. : first, oats; second, turnips; third, wheat or barley; fourth, clover and grass; fifth, clover and grass.

That of the Lothians extends to six years, viz. : first, oats; second, potatoes and beans; third, wheat; fourth, turnips; fifth, barley; sixth, grass. In other sections, different rotations prevail, but these are the more prominent; and it is to be noticed that great importance is attached to root crops in all, except on soils so very stiff that they cannot be cultivated to advantage. In such, beans are often substituted; but this crop adds very little to the manure heap, compared with roots, nor can it in most cases so well economize the elements of fertility in the soil.

There is a plain, sensible little tract “On the general management of a farm, showing how an exhausted soil may be rendered fertile without the aid of any capital,” purporting to have been written by a farmer in the district of Montreal, which has been extensively circulated in the Provinces adjoining Maine on its north-eastern and north-western borders, and as I am informed, has been instrumental in effecting great improvements in the general style of husbandry; and as the soil and climate of these sections is not materially unlike our own, it may be well to quote from this also.

“The *habi'ans* of Lower Canada are in general thrifty and industrious: their farms look well, although they are, for the most part, worn out. All that they want is a *good system*, and such a system, to be available, ought to possess the following qualities, viz. :

First. It ought to be economical, and not require more capital than the actual system, or rather than the present absence of system, requires. It is undoubtedly of great advantage to apply capital to the land, but this advantage is in general beyond the reach of our farmers, as their means are not sufficient.

Second. It ought to restore fertility to the soil, and maintain it by the products of the land itself. Manures got from other quarters than the farm itself are always expensive, and, at a distance from town, are often not to be had at all.

Third. It ought to be simple and of easy application.

Fourth. Finally, it ought to have experience clearly in its favor.

The author of this essay, having for a long time made the prac-

tical application of a system which unites all these advantages in a high degree, believes that it is his duty and privilege to submit it to his fellow Colonists, and he feels certain, that if this plan is adopted, it will render the country more productive, and consequently more prosperous; it will, in the space of six years, convert worn out, worthless, weedy land into smiling, rich and fertile farms, and the small miserable animals of Lower Canada into valuable stock, and all that without a greater expenditure of labor and money than is incurred by the system actually in use.

Before explaining his system, however, the author will take the liberty of relating his own experience, and for greater clearness, he will speak in the first person.

I came to the country thirty years ago, and burdened with a debt of forty pounds; I leased a worn-out farm in Lower Canada of eighty-four acres, in the midst of a French population, and at an annual rent of forty-five pounds. Well, in the space of twenty-one years, I have paid my original debt, and saved enough to enable me to purchase in the same neighborhood a much better farm than the one I rented. The owner of the farm which I bought, was going on every year from bad to worse, until he was forced to sell it, whilst I, the tenant of a less productive farm, and paying rent all the while, was enabled to buy him out, as just said. What was the reason of this anomaly? The Canadian was stronger than me, had equally good health, and had no rent to pay. The reason was, that he had no system; he let his land become exhausted, and full of weeds; he let his stock starve; he wasted his manure, the gold of the farmer, and let everything go to ruin for want of method; but when I had got hold of this same farm, and had applied the system which I am about to describe, the whole was brought gradually, field by field, into good condition by the end of six years; since then, the condition of the land has steadily improved, and that by resources drawn wholly from within itself.

The system to which I allude, is known to all good farmers everywhere as the basis of all improvement, I mean that of a rotation of crops.

**ROTATION OF CROPS.** There are two sorts of reasons in favor of this plan of rotation of crops.

First. Because different plants draw from the soil different sorts of food, so that one plant will grow freely in a soil which is worn out as regards another.

Second. Because the crops being various, the occasional failure of one is not so much felt, seeing that the others furnish subsistence sufficiently without it.

The cultivation of a fair proportion of all the varieties of crops which Providence permits to grow readily, ought therefore to be considered as the best means of averting a famine; and what intelligent farmer, with the case of Canada and Ireland before him,

would wish to be limited to the culture of wheat and potatoes only?

I shall now explain the system of rotation, which, during thirty years' experience, I have found best suited to the climate, the soil and the actual condition of Lower Canada, and which I believe to be generally applicable to the lands held by the French Canadians, and herein I shall speak of nothing that I have not done myself and practiced with success.

**PLAN OF THE ROTATION.** Divide the arable portion of the farm, whatever may be its size, into six parts, as equal as possible, with a direct communication from the barn yard to each field, and from one field to the other, so that the cattle may pass from one to the other when required. This division into six fields may require on most farms new fencing, and it will be proper, beforehand, to see how this can be done with the least possible expense. I shall now suppose the farm prepared to receive the application of this system, and that is the one which I have found the best for even the poorest settler.

First. Root crop, such as turnips, carrots, beets, potatoes, parsnips, &c., and in cases where the land is not sufficiently open for a crop of this kind, the field must be left in fallow.

Second. Crop of wheat or barley.

Third. Crop of hay.

Fourth. Pasture.

Fifth. Pasture.

Sixth. Crop of oats or peas.

In beginning the application of this system, that field of the series which is in best condition for a root crop, should be called field

field	A
The best for wheat or barley,	B
That which is actually in hay,	C
The pasture fields,	D & E
That which is best for oats or peas,	F

Each field for the first year ought to be appropriated to the crops above mentioned, and after the fashion now in use, except in the case of field A. By this plan, they will at all events still get as much from their five fields as they get at present.

The culture of field A and of crop number one come up together for the first year, and ought to be the object of special attention, as this is, in fact, the key to the whole system; for the good culture of this field has for object, and ought to have for its effect, not only a good crop the first year, but also to improve the land for the five other years of this rotation of crops.

In the following year, the cultivation of the different crops will be according to the following order:

- Crop number two in the field A,
- Crop number three in the field B,
- Crop number four in the field C,

Crop number five in the field D,

Crop number six in the field E,

Crop number one in the field F,

and so on, changing each year until the seventh, when crop number one comes back to field A, and the whole will then be in a good state of fertility, and free from weeds. The above system has been proved to be capable of restoring old land, and extirpating all weeds.

In order to render the thing more simple and easy of comprehension, I shall suppose myself to be again obliged to take a worn-out farm in the autumn of 1849. The first thing that I should do would be to divide the land into six fields, by proper fences, to prevent the cattle going from one field to the other; and I would then take for field A, that which appeared best for green crops or root crops; I would collect all the manure which I could find in or out of the barns, I would take up the flooring of the cow-house, stable and piggery, and I would take out as much of the soil underneath as I could get; for this soil is the essence of manure, one load of it being as good as four or five loads of common dung. The portion thus removed ought to be replaced by an equal quantity of ordinary soil, or, if it be possible, of bog earth, which might be removed when necessary afterwards.

The dung and other manure thus collected should be placed on the field A in September, or the beginning of October, spread with care, (as far as it will go,) and covered up in a shallow furrow. Manure aids the decomposition of straw and the weeds of the soil, and frees it from these plants, which thus help to keep the soluble portion of the manure until its juices become necessary for the crops of the succeeding years. The greater variety there is in the crops of this field, the better it will be, provided the soil is suitable for them. Thus this field ought, as nearly as possible, to look like a kitchen garden.

Under the actual circumstances of the country, I would particularly call the attention of farmers to the cultivation of the carrot as being one well adapted to our soil and climate. The carrot has fewer enemies than any other plant that I know: the best sort for field culture is the red Altringham, and the method of cultivating it is as follows:

**CULTURE OF THE CARROT.** The land which has been manured in the fall, as above described, ought to be plowed at least twice in the spring, the one furrow across the other, and both as deep as possible. It is then to be harrowed until it is properly mellow. You then make with the plow two furrows, distant two feet, or two feet three inches from each other, taking care to raise the soil as much as possible between each. You pass the roller over this plowed portion, and then with the corner of a hoe, make a small furrow or drill along the top of the rows; drop the seed into this furrow, and pass the roller over it again; this last operation will cover the seed sufficiently.

If you can get a seed-sower, that will simplify matters considerably. A roller is essential in the culture of root crops which spring from small seeds, but it can be readily got by all farmers. A log of twenty inches diameter, and five feet long, with a pole fixed at each end, will do the business admirably.

Carrot seeds (and you may say the same of the other seeds) ought to be soaked in rain or soft water, until they are about to sprout, and then rolled in quick-lime until the grains are dry enough not to stick to each other. When there is no lime, wood ashes will do as well. A pound of seed, if it be good, (and you ought always to try it before sowing.) will be sufficient for one acre of land. By the above plan, the young plant will come up before the weeds, so that it will be easy to distinguish the rows of carrots before the weeds appear; this renders the cleaning comparatively easy, since it may be done (except the thinning) by means of a cultivator. A man or a boy may guide it so as not to touch the rows of carrots or other crops, but only to raise the soil to a greater or less depth, at pleasure. As soon as the weeds appear, you draw it between the rows, so as to bring the soil as close as possible to the young carrots, but without touching or covering them. This process will keep the plants sufficiently clean until the time of thinning them and leaving them four or five inches apart from one another; soon afterwards, you may plow between the rows thus harrowed and raised. These operations do good to the plant by permitting air and moisture to have access, and by facilitating evaporation. My plan for gathering the carrots in autumn is to pass the plow along the right side of the plants as close as possible, without injuring them; this frees them on one side, and the stem is strong enough to allow us to haul up the roots by it afterwards.

This method of culture requires a good deal of labor, but the return is more than enough to recompense the farmer.

When we consider the large amount of nutritive matter contained in this root, and its general application to all the living things on a farm, its culture cannot be too strongly recommended; besides, it is relished by all animals, especially by working horses, to whom it may be given instead of oats.

I have dwelt particularly upon the culture of the carrot, because the same method applies to the culture of all the root crops which can be advantageously grown in this climate, such as parsnips, beets, mangolds and turnips.

Parsnips will grow in a close soil, almost in clay, and do not require cellars, since they will remain uninjured all winter in the ground. In this case, you will have them in the spring, affording a new and succulent food, at a time when it is most necessary. Every animal will eat parsnips with relish, and cows fed upon them yield a very rich milk.

Beets and mangolds have the same value as a crop, and as food

for milk cattle; but I do not consider them to be so good for fattening cattle.

[In spring all the manure made during the past winter should be carted to the field, placed in a heap, and twice turned. All bones should be gathered and broken up with a hammer, all coal and wood ashes, scrapings of sewers, the dung from the fowl-house, and the contents of the privy, should be collected and made into a compost, with dry loam or bog earth.

The above manure may be used for that portion of the field devoted to cabbages, potatoes and turnips. It should be put in the bottom of the drill on which the above are to be planted or sown.

When the ground is properly plowed and harrowed, and a sufficient quantity of sound seed sown, say at least four pounds to the acre, the turnip crop is as certain as any other.

The sowing of turnip seed should be commenced early in June, and may be continued up to 20th July. If the fly takes the first sowing, a second will be likely to succeed.

The turnips, when well up and getting strong, should be thinned out to a foot apart, and the hoe and cultivator passed through them, at least twice before they meet in the drills.]

If the land is too heavy for root crops, beans and peas will suit for number one, taking care to sow them in drills, and to prepare the land as above described for root crops.

If it be thought absolutely necessary to summer-fallow, that is, to plow without sowing, which only happens when the soil is so hard and heavy that it cannot be pulverized in any other way, you ought not to spread the manure on the land in the preceding fall, but plow the land and ridge and furrow it with as much care as for a crop. You need not touch it again before the month of June, when you must plow it again and harrow it so as to render it even, and destroy the roots of the weeds. You may then draw the furrows in a straight line, giving them a uniform breadth, and so as to facilitate drainage. About the middle of July, you must plow it again, and sow it with plenty of buckwheat. At the end of September, plow it again, having previously spread it with dung. In this case, the buckwheat is plowed under with the manure, and serves greatly to increase the latter. The land thus prepared ought to be sown with wheat in the ensuing spring, and you may add a little timothy and clover. A bushel of timothy will suffice for four or five acres, and three or four pounds of clover to each acre.

By following the method above described, you will have, in the year 1851, quadrupled, or more than quadrupled the fertility of the soil.

I have now done all that I can for field A. I have weeded and manured it as well as I can; and after having taken the crop of roots and the crop of wheat or barley next year, I leave this field to rest until the other fields have been improved in the same way, and

according to the method above described. When this shall have been effected, that is to say, in the space of six years, or in the year 1856, the worst will be over, and the battle may be considered as gained. The fields will then be in a clean and fertile condition, and their value will consequently be greatly increased. The farm of seventy or eighty acres, which in 1849 only sustained three or four miserable cows, and perhaps no more than an equal number of sickly sheep, will be capable in less than ten years of furnishing an abundant subsistence for ten or twelve cattle, and other stock in the same proportion.

One of the great advantages of this system of rotation of crops is, that the pastures, which in summer furnish summer-feed for the stock, are in due proportion to the quantity of roots and hay destined to winter-feed them, and in due proportion to the straw which the grain crops yield for their bedding. I will observe here that farmers—except those who live near towns where they can easily procure manures—ought never to sell a single load of hay, straw, or roots, since the whole ought to be consumed on the farm, with the view of procuring a sufficiency of manure therefrom, whereby the fertility of the soil is to be sustained. But if the farmer is not to sell hay, or straw, or roots, what is he to sell? I answer, the third of the land being under this system appropriated to grain crops, he will always be able to sell a part of them. The half of the farm being in hay and pasture, will allow it to produce a large quantity of butter, cheese, butcher's meat and wool, and to sell a considerable part of these after having supplied the wants of the family. It may be said, that six years is a long time to wait for the renovation of the whole farm; but I will reply, that I know of no other means by which it may be done in less time, from its own resources; and it is worthy of observation that the land is improving every year. The produce is larger, even for the first year under this system, than it is under the present method of culture, and from year to year the land is improving, field by field, and is producing more and more, so as to pay the farmer better than it does at present, and to recompense him doubly afterwards, when the whole shall have been improved under a system of rotation.

It may be objected that two years of pasture is a long time of rest for the land; but you will observe that the land does not remain unproductive during this period of repose. This plan not only contributes to re-establish the almost exhausted fertility of the soil, but it is also the best means of furnishing the farmer with the first necessaries of life, and the articles which, so to speak, will most readily find an outlet in our markets, such as beef, lard, mutton, butter, cheese, wool, and other products already named."

If deemed desirable to try the above plan on such of our farms as have a sufficiency of pasture lands unfit for tillage, the benefits of

pasturing might perhaps be secured by a sufficient top-dressing, (also leaving the aftermath,) and a crop of hay be taken instead, during one of the pasture years, if not both; but no rotation can be deemed perfect here, which does not include the culture of Indian corn; and it should be borne in mind, that if potatoes be substituted for the other roots named, inasmuch as they neither demand nor receive at our hands so liberal manuring, nor so deep and thorough tillage, nor send their roots so deeply into the subsoil, the subsequent condition of the land must be correspondingly inferior, and the practice might be of no substantial benefit over what is ordinarily practiced at present.

Another rotation which has been highly commended in the Province of New Brunswick, is an eight years course, and embraces both potatoes and other roots. It is this: supposing the land to be in sod and in low condition, it is plowed late in the fall in furrows six to eight inches deep, laid flat and rolled; the first crop oats, seeded thick, harrowed and rolled; as soon as the oats are off, plow in the stubble; second crop potatoes, manured in the drill with at least ten cords barn-yard manure to the acre; third year wheat; fourth, turnips, carrots or beets, or a part of each, manured and planted in the drill, with at least as much manure as for the potatoes; fifth, barley or rye, and seeded down to herdsgrass and clover; sixth, seventh and eighth, hay, and at the expiration of the eighth year plowed again, and the course repeated. Sometimes this is varied by substituting Indian corn for the fourth crop, in whole or in part. This, it will be seen, gives eight crops, and all remunerating ones, for two years manure, and leaves the land better than when the course began.

I have just received from a highly intelligent and practical cultivator in the eastern part of the State, the following communication, in which a six years rotation is proposed, not in itself materially unlike several above named, but connected with so judicious treatment as renders it a most valuable contribution:

“If the primary object, or the sole object is to bring back the fertility of partially exhausted land, I would recommend the careful husbandry of all the resources of the farm—the slops from the house, the liquid from the stables and cattle stalls, the contents of the privy, poultry house and hog pen, mixed with sufficient *dry* muck, sods or loam to absorb all the liquid, and kept from the wasting influ-



ences of the atmosphere, will be found sufficient to annually renovate quite a piece, say one acre. This will give roots enough to keep three hogs, and these, if well supplied with material, will manure half an acre more; thus the ratio is ever increasing. I see but one practical objection to this course; that is the great amount of labor involved; but the farmer who has an exhausted soil may practice this course to the extent of his ability. Then—but it is impossible to give directions without knowing the situation both of the farm and farmer. I may suppose a case or two, such as we frequently see: Farmer A has one hundred acres of cleared land, fifty of which he mows over and gets twenty-five tons of hay; he plants three acres, and sows grain on ten more; the produce of his farm may be set down at twenty-five tons hay, ten tons of straw, fifty bushels wheat, two hundred bushels oats, one hundred bushels potatoes, twenty bushels corn, and five hundred bushels roots. This is as much as one man can do—more than most men can. How shall he dispose of it, so as to get a living out of it, and still improve his farm, is a question many have asked, and are still asking. It must in the first place be made to produce more hay; it now keeps fifteen head of neat cattle, or a pair of horses and eleven head of neat cattle (say cows.) Now sell five cows, and give the pasturage, together with twenty acres of the mowing land for pasture to the remainder; buy with the proceeds of the stock so sold, guano and bone-dust enough to manure six acres sufficiently to produce two tons of hay per acre, for three years at least. This, with the increased crop of roots, will enable him to turn out the remainder of his grass land to pasture, and still have fodder for his stock, and he will probably find that the six cows, with their increased quantity of feed, are fully equal to the eleven sparingly fed; then by a rotation, in which the land has three years in pasture, and three years in mowing and tillage, a farm may be rapidly improved. But I find this improvement much more easy in theory than in practice. The absolute necessity of eating and wearing clothes, to say nothing about keeping up appearances, makes such a draft upon the farmer's time, as to leave him but little opportunity for improving either the farm or the mind.

To throw aside this scribbling, and answer the question more directly—'Where there is lack of capital to purchase fertilizers,' there is probably lack of capital for any improvement, as this is one of the least expensive. This lack must in some way be supplied, by selling part of the stock or farm, if no other means offer; and when capital is obtained which can be spared, let the farmer divide his farm into two equal fields—pasture one—manure as much of the other as his means will allow him to do *well*, putting five hundred to one thousand pounds bone-dust on an acre of such as is intended for wheat or barley, and to be laid down to grass. Till this manured part *thoroughly*, and mow the remainder. Next year, fence off from the pastured field one-third, to be manured and cultivated with

corn, beans, roots, &c.; and also from the other field fence off one-third, which was mowed last year, to be turned into pasture; lay down with wheat or barley, not forgetting the bone, that which was tilled, and mow what was in wheat last year. Next year divide and change again, and so on around, as shown in the annexed sketch:

Field of 24 acres producing 12 tons of Hay.						
1st year . . .	Corn, Roots, &c.	Wheat.	Hay.	Pasture.		
2d year . . .	Wheat & Barley.	Hay.	Pasture.	Pasture.		Corn, &c.
3d year . . .	Hay.	Pasture.	Pasture.	Pasture.	Corn, &c.	Wheat, &c.
4th year . . .	Pasture.	Pasture.	Pasture.	Corn, &c. Drained.	Wheat, &c.	Hay.
5th year . . .	Pasture.	Pasture.	Corn. Drained.	Wheat.	Hay.	Pasture.
6th year . . .	Pasture.	Corn. Drained.	Wheat.	Hay.	Pasture.	Pasture.
7th year . . .	Corn, &c. Drained.	Wheat.	Hay.	Pasture.	Pasture.	Pasture.

The product of this seventh year may fairly be set at one hundred bushels corn, one thousand bushels roots, beans, pumpkins, &c., fifty bushels wheat, twelve tons hay, four tons straw, corn fodder, and pasturage for eight cows.

The first three years will require all the spare time to build division fences; after that, the spare time may make drains."

In concluding upon this topic, it may be remarked that if an examination of the subject of rotation of crops by our farmers at large, should result in nothing further than a reduction of the number of successive hay crops, so as to retain a tolerable degree of fertility in the land, with which to commence anew their series of crops, there would be an immense gain—for it is very certain that one of the most active agencies which has effected the exhaustion of soil, from which we now suffer, is the practice so lamentably common of cropping fields for hay, so long as a scythe in being swung over them meets with perceptible resistance.

Perhaps the easiest way to accomplish this, would be to reduce the number of acres under cultivation, either by selling off, or turning out to pasture, or allowing to grow up to wood, so much as would

leave only what could be well and profitably managed. If in addition to this, some *system* be adopted and faithfully adhered to, leaving to chance, whim or convenience no dictation as to the operations of any one year, much more will be gained. Such system each farmer should make a matter of careful study, as thus only can he find that best suited to his own soil and circumstances; *and it should embrace a much larger proportion of root culture than at present prevails, for thus we may get more food per acre, at less cost, and more economically maintain the fertility of our soil, than in any other way.*

ROOT CULTURE has received so little attention at the hands of the great mass of the farmers of Maine, (excepting that of the potato,) that it was deemed advisable to obtain, so far as practicable, the results of the experience and observation of such as had given attention to the subject, and several questions of the circular were directed to this end. It will be noticed that great diversity of opinion is expressed in the replies which are appended, in regard to the comparative value of carrots, turnips and beets, as food for stock. That one root is preferable to another as better adapted to particular localities and the varieties of soil, climate, &c., is doubtless true; but with regard to their *comparative* value as articles of food, when each is well grown, it is impossible that all the opinions below expressed can be correct. We have great need, not only of increased attention to their culture, but of accurate and reliable experiments to prove their value compared with one another, and also with hay and other forage crops.

“Beets and carrots will require three or four times the labor per acre as corn, rutabagas twice as much. Beets and carrots will yield five hundred bushels per acre, and rutabagas six hundred to eight hundred bushels. For cattle and sheep, seventy-five bushels of rutabagas, forty-five of beets, and forty bushels of carrots, are equal to one ton of hay. Potatoes require less labor per acre than corn, and, of late, produce one hundred to one hundred and fifty bushels per acre, but carrots are worth fifty per cent. more than potatoes for cattle, especially cows.

The rutabaga is much easier cultivated than the carrot or beet, and yields more, but it is not of half the value. They are worth the most for sheep, but are valuable for other stock, especially if poor hay and straw are fed out to cattle. My mode of culture is, to sow in drills, two or two and a half feet apart; in the first weed-

ing, thin out where too thick, but thin sparingly the first time; and at the second hoeing, thin from nine to twelve inches distance between plants; then hoe the third time, and more, if necessary. Carrots and beets I sow in drills, eighteen to twenty inches apart, and if kept clean from weeds, will bear to be a little thicker in the row. The ground should be well dressed with fine manure, and occasionally a sprinkling of ashes and plaster mixed, during the fore part of the season."

D. NOYES, Norway.

"I am not prepared to say what kind of roots are best for field culture. Carrots are raised more extensively in this town than any other root, car loads of which were sent to the Kennebec last year for the market. On the light sandy soils of the sea-board, they are probably better adapted to field culture than any other root; but on less porous soils, the rutabaga is successfully cultivated, though it probably would not yield so many tons to the acre as the carrot. I think a ton of rutabagas are actually worth as much as a ton and a half of carrots. Roots are no doubt valuable for neat cattle in winter, but carrots have been over-rated in this vicinity, while turnips (and perhaps parsnips) have been too much neglected."

JAMES W. AMBROSE, Wells.

"Beets are, in my opinion, decidedly the most profitable. I have tried them all. I can grow one-third more beets at the same cost than carrots."

AARON HOAG, Gardiner.

"Turnips first, carrots second, beets third. Modes of culture similar for all. Plow deep, say twelve or fourteen inches; harrow, and if lumpy, roll, and spread on six to eight cords of old stable manure to the acre; plow again eight or ten inches deep, harrow well, then furrow for the rows two feet apart, as deep as possible. Strew along in the bottom of the furrow, eight cords of old well rotted manure to the acre. Fill up the furrow with a hoe, pulverize the soil well, so that no hard lumps go into the furrow. Ridge up four or five inches above the surface; then sow on the top of the ridge; if sowed by hand, make a little trench along on the ridge before sowing, sow in the trench, cover one inch deep, hoe often, and thin to a proper distance. One-half less dressing, and one-half of the earth on top of the dressing, in the furrow, will be right for turnips. Feed carrots to hogs from harvest time to the last of May. Feed carrots and beets to milch cows through the winter season. Feed turnips to young stock while using coarse or rough fodder; the poorer the fodder the more turnips."

J. DAVIS, Webster.

"I think turnips the best field crop, although carrots might do as well. I have never cultivated them as a field crop. They do well

in the garden. As to the value of roots, I think carrots the best to feed all kinds of animals, even to hogs. I wintered a pig, principally on carrots last winter, and he grew well. I raised them in my garden, at the rate of one thousand bushels to the acre; special care was taken with them."

T. J. BURBANK, Cooper.

"Carrots are the principal root crop raised in this vicinity; our sandy soils furnish a good bed while the other requisite, quick acting manure, we find in sea manure. Carrots grow best on the same land a number of years in succession; it is less work to clear them of weeds. They are generally cultivated in flat beds, with from fourteen to eighteen inches between the rows, and from four to six inches in the rows. They are good food for all kind of stock. Since the failure of the potato crop, they have taken the place of that root for feeding hogs, raw carrots making better feed for store hogs than potatoes, and by boiling and mixing with meal will fatten them very fast."

JOHN S. WELLS, Wells.

"I cultivate carrots, sugar beets, rutabagas, and flat English turnips; the three first by themselves in the field. Have been accustomed to sow them by machine, which answers excellently for turnip, and perhaps for carrot seed, if mixed with something to prevent their running too thickly through the large aperture required by their peculiar form and character. I have lately heard an equal quantity of radish seed suggested to regulate the measure, and from its rapid growth and early maturity, prepare the way for the carrot, and perhaps somewhat check the intrusion of weeds upon its slow moulded companion. From several years experience, I am satisfied that we cannot, except in a very wet planting season, dispense with soaking beet seed, which would prevent its passing readily through the machine. I have therefore determined to sow them by hand hereafter. Of flat turnips, I have for several years obtained a crop of from one to three hundred bushels, by sowing the seed from a machine between the rows of corn after the last hoeing—sowing and harvesting being the only labor bestowed upon them. I feed out to my stock all the vegetables which I raise, and I know that they contribute directly to the health of the animals, and by the aid they afford to the process of assimilation, gain for them a greater amount of nutrition from their dry food."

J. F. ANDERSON, So. Windham.

"The cost of an acre of rutabagas, as we grow them here, is:

Plowing, . . . . .	\$2 00
Harrowing, . . . . .	1 00
Opening drills, two and a half feet apart, . . . . .	1 00
Three hundred pounds guano, . . . . .	12 00

Sifting and applying guano,	1 00
Covering drills,	1 00
Leveling down drills and sowing seed,	3 00
Thinning and weeding,	6 00
Cultivator and hoe,	4 00
Pulling and trimming,	8 00
Drawing home and housing,	4 00
Seed,	2 00
Total,	\$45 00

We grow our rutabagas on land which was in oats the previous year, plowing in the stubble in the fall, and harrow, drill and sow about 15th to 20th June, and usually obtain from six to ten hundred bushels. Eight hundred bushels may be considered an average crop. We have no experience in roots, as a *field crop*, except the rutabaga and potato. Have tried various other kinds of turnips from imported seeds distributed by the Patent Office, and have pronounced them all worthless, as compared with the rutabaga, either for cattle or the table. Our method of culture of this root, adopted from many years experience, and successfully practiced for the last eight years, is as set forth above; or to repeat:

1. Plow deep in the fall, (our land is clay loam.)
2. In June, harrow.
3. Open the drills two and a half feet apart, twelve inches deep—we use the common two-horse plow, going twice in each drill, turning a furrow out upon each side; to do this with ease and regularity, have your double tree five feet long.
4. Strew guano, (previously pounded and sifted,) in these furrows, at the rate of half a pint to a rod in length of row.
5. Cover, by turning back the two furrows thrown out, letting the plow run as deep as the bottom of the drills.
6. Level down the drills thus made, and make the surface fine, by a fine garden rake or drag hoe.
7. Sow the seed *immediately*, while the turned up earth is fresh and moist.
8. Thin to ten inches apart as soon as the second or rough leaves are well grown, say an inch long.
9. Stir the ground between the rows and about the plants with cultivator and hoe, as often as weeds show themselves or the soil gets hard; hoe no earth to the plants, but keep it light about them.
10. Seize the plant by the top with the left hand, pull it up, and with one light blow of a knife made of a piece of old scythe, strike off the tap root and dirt adhering; another blow strikes off the turnip from the top; drop two rows of turnips together and throw the tops into piles; in this way where the crop is good, a smart man will pull and trim one hundred and fifty bushels a day. I have been thus particular in detail, because so simple a thing as raising turnips is considered a great mystery by many. Every thing depends upon rapid growth at first start, and seasonable thinning and weeding.

Carrots we have grown only to the extent of quarter of an acre

per annum, and that by spade culture. The best method I have found as yet, is to spread and dig in a good coat of fresh stable manure in the fall; dig the ground again in the spring, eighteen inches deep, rake fine, sow about 1st of June, (May with you,) keep clean; thin early, to six inches apart in the row, the rows fifteen inches apart. Crop, three hundred and twenty bushels on quarter acre. I have no doubt carrots can be successfully cultivated as a field crop by plowing in deep, in the fall, a good coat of fresh stable manure. I have not practiced it, from having too many other things to do. I usually have a piece of couch grass to kill, or something of that kind to do, in places where the plow cannot safely be used, and I find the spade and a crop of carrots very effective for the purpose. As for the use and value of roots, rutabagas will make fat beef, good milk, and will keep store hogs in good condition, and is valuable for feeding *rats*, unless your cellar is rat proof. For hogs, chop up, with a root cutter, half a bushel for each hog, twice a day, (Suffolks will keep fat on half a bushel a day.) For cows, one bushel a day, and for fattening oxen three to four bushels a day each. Horses will thank you in a way perfectly understandable for a small feed occasionally. Carrots are more valuable for any of the above purposes. I should put the value of rutabagas for stock, at ten cents per bushel, and of carrots, at twenty cents. Either of them can be raised for less than that amount, and by their aid the straw and coarse fodder of the farm can be made available as cattle feed. More stock can be kept, more manure made, and more roots, straw, grass, grain, &c., grown, ad infinitum."

W. D. DANA, Perry.

While deeming it a duty to urge increased attention to root culture, from a conviction that it would result in notable benefit to agriculture, it is deemed not less a duty to caution cultivators from expecting too great results from a given amount of roots. Some of the estimates above given are believed to be decidedly larger than facts will warrant, so far as regards the actual amount of nutritive matter which they contain. Where only a small quantity of any one of the roots mentioned is fed out in connection with coarse, dry fodder, the help which it affords in the process of digestion may be fully equivalent, and perhaps even greater, than the good to be derived from an equal weight of hay, and to this extent, and in this connection, they may be said to be of equal value, but when used in larger proportion we must depend for profit upon the actual nutritive matter which they contain, and this it is highly desirable to ascertain with precision and accuracy. It can only be done by

repeated, protracted, and carefully conducted experiments, weighing the food daily, and weighing the animals fed at proper intervals.

The indications of analysis would hardly lead us to anticipate finding fifty, or even seventy-five bushels a fair equivalent of a ton of good, well cured herds grass or clover; yet in connection with what we know of the expense attending their culture, the amount we can grow, and the subsequent condition of the land where a good crop has grown, they do lead us to anticipate a greater amount of food, and cheaper, than we can otherwise obtain, and better crops in after years.

The analysis\* of the (white) turnip by competent chemists shows it to contain in one hundred parts, of

Nitrogenized, or flesh-forming principles, as albumen, fibrine, &c., . . . . .	1.14
Heat-producing and fat-forming principles, as starch, sugar, gum, pectin, &c., . . . . .	7.80
Mineral substances, or ash, . . . . .	.63
Water, . . . . .	90.43
	100.00

In the Swede, or rutabaga—

Nitrogenous matters capable of producing flesh, . . . . .	1.45
Non-nitrogenized substances, which support respiration and lay on fat, . . . . .	8.67
Ash, . . . . .	.62
Water, . . . . .	89.26
	100.00

In the carrot are found, of

Flesh-forming principles, . . . . .	1.48
Heat-producing, &c., . . . . .	11.61
Ash, . . . . .	.81
Water, . . . . .	86.10
	100.00

---

\*An analysis in which the *proximate constituents* are arranged into the two great classes of alimentary substances, is deemed to be more useful for the farmer-student, and for our present purpose, than one in which the roots, &c., are resolved into their *ultimate elements*, as potash, soda, lime, phosphoric, and other acids, &c.



In the Mangold wurtzel,				
Flesh-forming matter,	.	.	.	1.81
Heat-giving, &c.,	.	.	.	11.19
Ash,	.	.	.	.96
Water,	.	.	.	86.04
				100.00

Now, if we compare these with the analysis of red clover, as freshly cut in the field, which is as follows :

Flesh-forming principles,	.	.	.	4.27
Heat-producing, &c.,	.	.	.	9.15
Woody fibre,	.	.	.	3.76
Ash,	.	.	.	1.82
Water,	.	.	.	81.00
				100.00

we see that the nutritive matter of the carrot, the beet, and newly cut clover, to be nearly alike in amount, and about thirteen per cent. of their weight, and that of the turnip to be about nine or ten per cent. of its weight, or about two-thirds to three-fourths as much as the others.

If we take the above as the basis of our estimate, and allow a shrinkage of two-thirds in curing the clover, we cannot rate the roots at more than a third its value when dry, nor over a quarter, if it shrink three-fourths;\* and so far as we can judge from the analyses of the various grasses usually cultivated, it seems hardly safe to reckon the actual nutritive power of roots at over a fourth that of *good* hay. It should be borne in mind, however, that the economical value of any article of food cannot be absolutely and accurately determined by analysis, inasmuch as a great deal may depend upon peculiarities of constitution in each, the practical results of which, when used as food, it is beyond the power of analysis to compute or predict; and hence the necessity of careful and accurate experiments in feeding. In some respects, the carrot seems to

---

\* This may seem a large allowance, but if the sample analyzed was cut so green as to contain eighty per cent. of water, such allowance would still leave a fifth of its whole weight, or twenty per cent. of water remaining in the cured clover, which may be not far from the usual fact, when simply dried in the open air.

possess advantages over the turnip and beet, in being more uniformly relished by all kinds of stock. It keeps horses in good condition, is excellent for fattening oxen, causes a free flow of milk in cows, and imparts no bad taste to it; with manure and good treatment it succeeds well in soils which are sandy, and naturally inferior; is less liable than the others to disease and the ravages of insects, and by its long fusiform roots and minor rootlets penetrating to great depth, obtains a good share of its nutriment from the subsoil, and does good service in loosening the same, both finely and deeply.

**DEEPER TILLAGE.** Aside from the means heretofore alluded to for the restoration of lost fertility, several of which depend in part for their efficacy upon mechanical improvement of the soil, and a deeper culture of it, much may be accomplished by this alone. One correspondent replies to the query as follows:

“If I were to undertake the renovation of worn out lands, I would mainly rely upon deeper tillage, and by bringing to the surface the yet untried elements of the soil, endeavor to find something which would serve as a basis for new crops. In practicing this, however, I would take up no more at once, than could be dealt thoroughly with, and left in an improved condition.”

The suggestion is a valuable one. Deeper tillage and better tillage are means not to be neglected, for experience has long shown that the physical structure of a soil has much to do with its powers of production, and that where land has given out, it is not always because it is actually, as it is seemingly, exhausted, but because its latent or buried fertilizing powers have not been fully brought into requisition. All operations which tend to a more thorough pulverization and deepening of the soil, will help to bring them forth—of these, plowing ranks first.

Good plowing, in fact, lies at the basis of a good practical husbandry. No other work done upon the farm is so important as this. If it be not such as it should be, the resources of the soil cannot, in the present state of the art of agriculture, be made available. Deep plowing is repeatedly recommended as a means of renovation for exhausted lands, and there cannot be a doubt that by its means a great deal of land, which now produces little, might be improved. Unlike green manuring, it does not add directly to the amount of plant food in the soil, but rather serves to bring forth what is already

there, but not hitherto drawn upon. There is often, within a moderate distance from the surface, a great amount of mineral matter, which only needs full and free exposure to the atmosphere to yield food in abundance; but while lying undisturbed, is not in a condition to be of any practical value.

That there are occasional instances in which deep plowing may for the present be injurious, by bringing up some salt of iron, or other substance, which before protracted exposure, may operate unfavorably upon the growth of plants is true, and should induce caution with regard to going very deep at once; but the cases are rare, if they even occur at all, in which an additional inch may not be added to the depth of plowing every year, until it reaches a foot in depth, at least, not only without harm, but with positive advantage. This is now so well understood by our best farmers, that the average depth of plowing is probably nearly, or quite double what was customary thirty years ago, and it is believed that had the depth of plowing in years past been as great as now, the exhaustion from which we suffer would, in many instances, have been much less than it now is.

The action of the plow is not wholly beneficial, for with all the good which it accomplishes, it tends to render the soil beneath it more compact, and less penetrable to the roots of plants; consequently there is the more reason why it should run deep enough to allow the roots of plants plenty of good pasturage. If these have ten inches in depth of well loosened soil in which to ramble and search for food, it is plain that they can thrive better than if confined to five. If the plowing have been year after year at the same depth, say five or six inches, the stratum immediately below it is every time rendered more compact—we often, in such cases, find a crust formed, which is impenetrable alike to the roots of plants and to water, and not only is the soil above exhausted at an early date, but the plants suffer from drought, or from excess of water, as the season proves wet or dry. Besides bringing into action material for the use of plants, deeper plowing, by allowing excess of moisture to pass readily away, is of great use, and not less so in a dry time, for then the soil is in condition to bring up moisture from below, by capillary attraction. To obtain the full benefits of deep plowing, or of subsoil plowing, upon lauds overlying an impervious subsoil,

under-draining is necessary, and should be considered an indispensable pre-requisite to best success; but there is a large extent of such as can be greatly benefitted by deep plowing and subsoiling, without previous under-draining.

Another advantage of deep plowing, not unfrequently obtained, is that thereby we effect a mixture of unlike soils. Everybody is familiar with the advantage of carting sand upon clay, and clay upon sand, or swamp muck upon either, or upon any soil deficient in vegetable matter—now, where the surface soil and subsoil are unlike, as we often find them, no small good is found to result from their mixture, irrespective of other considerations; and where it can thus be effected, it is by far the cheapest method of accomplishing the end. At a much higher cost even, than when thus effected, the mixture of unlike soils may be often adopted as a profitable means of improving their mechanical condition and structure, and thus increasing their powers of production.

My present purpose, however, is not so much to state the uses of plowing, nor to discuss the best methods of doing it, nor to urge that its importance in practical agriculture is so great as to warrant all the care and skill which can be brought to bear upon it, nor to dwell at length upon all the advantages which may be expected to result from deeper plowing, some of which are hinted at above, as rather to bring prominently into view the important fact that there are, beneath the surface of thousands of our exhausted fields which have been only skimmed over, great resources for fertility, which have not hitherto been made to contribute to the farmers' wealth, and that *by simply putting in the plow deeper than before, he may bring into action soil which never saw the light, and thus virtually work upon a new farm within his old enclosure.*

So, too, every other operation, be it digging, rolling, hoeing, or whatever else which tends to more perfect comminution of the soil, adds to fertility, and although we may reject so much of the creed of old Jethro Tall as avers that "fine particles of earth are the very pabulum on which the plant subsists," all experience shows that we may safely adopt, and use our utmost endeavors to carry out, the practice which such creed would dictate.

FOREST GROWTH. "Let exhausted land grow up to wood for the next generation," says another correspondent, and this suggestion is also a valuable one; it would be well, indeed, to devote a very

considerable portion of our most exhausted lands to the growth of wood. Fuel and timber are becoming objects of steadily increasing importance, and the effect of a growth of trees on the redemption of land from sterility is very considerable. Their roots exert great power in decomposing the rocks in the soil, evolving from them the mineral elements of plants, and besides deepening and mellowing the soil, a forest growth would add to it, by an annual deposit of leaves, a great amount of vegetable matter. In truth, no small part of the productive power of newly cleared lands is attributable to this very process having gone on year after year, and why may it not be the part of wisdom to profit by the hint thus furnished in the operations of nature? Besides this, a collateral advantage of no mean worth would result from the lessening of the number of acres under cultivation, which would enable the farmer to work the remainder more thoroughly, and of course more profitably.

Still another method of securing this desirable end, and the last specific mode which it is proposed to introduce, is suggested below:

"This is a hard question. I should say, from my own experience, that in order to reclaim land, or check it in its downward tendency, you should pasture sheep five to eight years, and the land will then be in order for a series of crops. If the slow process of pasturing cannot be waited for, plow in green crops, if enough of anything green grows upon them to make it profitable. Plow deep"

J. DAVIS, Webster.

"With regard to the recovering of partially exhausted lands, I would recommend the pasturing of sheep for a number of years, but by no means exhaust it still farther. I would consider it poor policy to wear land wholly out and then abandon it."

RUFUS BIXBY, Norridgewock.

"Turn it out to sheep pasture."

D. HOLDEN, Otisfield.

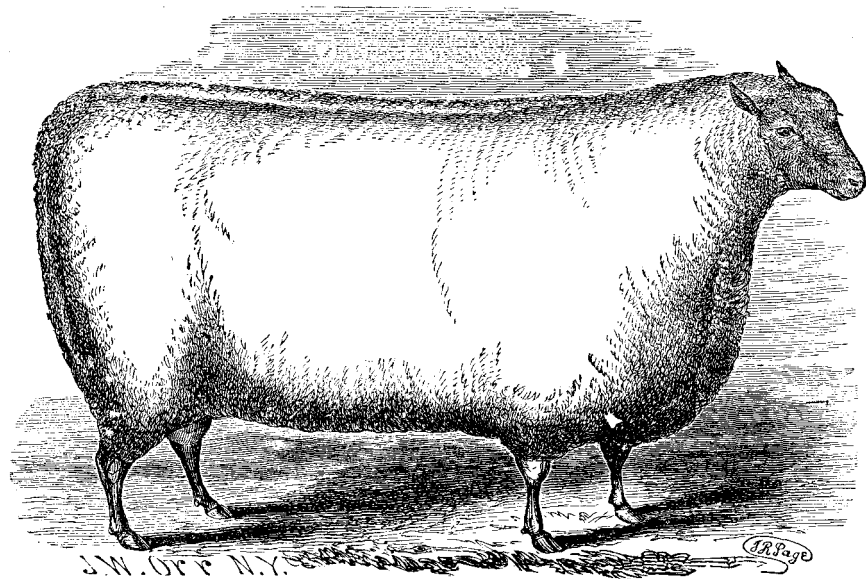
"I would recommend summer plowing, if you have not sheep to turn on and pasture. When grass is run out, sheep will bring it in again. If you wish to crop, put on your cattle and yard a piece. If the land is not entirely exhausted, the fertility of the soil will be recovered the following summer."

T. J. BURBANK, Cooper.

"Under the circumstances you name, I would recommend plowing in clover or turning out to sheep for a restoration of such land."

J. F. ANDERSON, So. Windham.





**"MASTER FORDHAM," (Southdown Buck.)**

Bred by L. G. Morris, and now the property of J. C. Taylor, Esq., of Holmdel, Monmouth Co., N. J. Winner of the 1st prize, as a yearling, at the New Jersey State Show and the Monmouth-Co. Show, in 1857.

The keeping of sheep is also repeatedly referred to by other correspondents, as a means of restoring lost fertility, and its importance and value in this light is believed not to be generally appreciated. Indeed, sheep husbandry, viewed in any of its aspects, has not received the attention in this State which its importance demands. It is not proposed, at this time, to dwell at length upon the general subject, but only to mention some points worthy of consideration; for when its advantages are fully understood, no doubt is entertained that sheep husbandry will take more prominent rank in our agriculture than it has done hitherto.

Wool is an article of prime necessity—it must always be in demand; and from some source or other, a supply will be obtained. Now the question for the Maine farmer to solve, is this: Can we find some grade of wool which, in connexion with mutton, can be profitably grown at a price enabling us to compete with anybody anywhere? for as long as the question of protection is so vexed an one in our national councils as it has hitherto been, this is the only safe ground. If we can, then we may always have a remunerating market, tariff or no tariff; and that it can be, seems highly probable from the fact that some have kept sheep, and profitably too, through all the fluctuations heretofore experienced, and these fluctuations it is, which have been a chief cause of discouragement, rather than the actual cost of production and market value. A critical examination of the facts bearing on this point, connected with judicious and carefully conducted experiments, will probably decide the question affirmatively.

But wool is not the only product yielded by sheep, and experiment may show that it is not, with many of our farmers, the one chiefly to be relied on. They yield mutton also; and while poor mutton is the poorest meat, good mutton is the best, certainly the most nutritious and digestible, which finds its way to our tables. Very little of such as would be deemed of really prime quality in a mutton-eating community, like that of England, is found in our markets, and hence its too general lack of appreciation in the popular taste. There is gain, however, in this respect. It is becoming gradually a more important element of food, and when occasionally that which is really choice is offered, the price which it commands is so amply remunerative that wool may be deemed of secondary



importance. The demand in the large cities has always been good, and the increasing facilities of communication with their markets make them accessible to a degree formerly quite unknown. Among the advantages of sheep husbandry may be enumerated the following :

They demand less care and attention during the busiest part of the farmer's season than any other stock. They leave the barn before he is most occupied, and return after his severest labors are over, and later than any other.

The fecundity of the sheep is scarcely equalled by any other domestic animal. They are available for the shambles from the period of early youth to extreme old age, and if they die, the wool and pelt insure against total loss. Another point worthy of consideration is, that sheep will thrive upon, and enable the grower to reap good returns from, much of our land which is unfit for tillage, and not so well adapted to the requirements of other stock. We have thousands upon thousands of hilly and rocky acres, where sheep will thrive and fatten, and yield a better profit than can be obtained from them in any other way.

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

The reasons why, and the way in which, an increased culture of sheep may avail to the restoration of lost fertility, are thus suffi-

ciently indicated. Wide tracts, which now produce only coarse and inferior vegetation, and scant at that, may be easily and profitably redeemed in this way.

One principal reason why the profits of this branch of rural economy have not been duly estimated, is believed to be owing to the absence of accurate accounts, a besetting sin of farmers generally. The aggregate returns yielded by sheep has thus come to be underrated; for instance, when a farmer sells a yoke of steers, which for three or four years have been steadily increasing in cost, at a fair price, and one yielding a moderate profit, it looks in his eyes a round sum,—something of a pile—and is duly appreciated. But if, instead of these, he keeps during the same years just so many sheep as will cost an equal sum, he often fails to estimate fully the returns which they make, if not quite so regularly as the semi-annual dividends on bank stock, yet in the two payments each year which they actually do make, in the clip of wool and the lambs annually dropped.

The same sum, received in the course of three or four years, and in six or eight separate instalments, is apt to be thought less of than the gross sum at the end of the term; and yet, in fact, it is rather more, reckoning interest, and not less.

We may learn a useful lesson as to the value and intimate connexion of sheep with a profitable husbandry, from the results of experience in England, where their extensive introduction has worked a vast improvement, and where they have been steadily gaining in estimation ever since Sir Anthony Fitzherbert, a farmer, lawyer, judge, and the father of agricultural literature in that country, wrote his "Booke of Housbandrie," (A. D. 1532,) in which he says: "Shepe in myne opinion is the most profitablest cattell that any man can have."

The rearing of sheep in England is now considered the most important of agricultural pursuits, and there are many farms scattered throughout Great Britain, where scarcely any other stock is now kept.

"As if symbolical of the importance which the nation attaches to this production, the Lord Chancellor of England, as President of the House of Lords, sits upon a 'wool-sack,' (so called.)"

Some have attributed the profit of sheep in England to the mildness of their winters, and deem the case widely different here, but

it is believed that their advantage in this regard, is fully offset, if not more than counter-balanced, by the enormously high price of land there, as compared with ours.

Thus have we gone over the suggestions afforded by correspondents regarding means to restore a larger productiveness to our lands: Manures—fallows and fallow crops—green manuring—rotation of crops, (including root culture)—deeper and better tillage—forest growth, and sheep husbandry—perhaps quite enough for once; “a dose for a grown person,” as the doctors would say, and as much as may be advisable at the present time; but I can hardly consent to drop the subject, without suggesting what is deemed fundamental, and ought to underlie, and direct, and control all our efforts; and this is, a steady aim to make stock husbandry, in some of its branches, the leading object, and tillage subordinate and contributory thereto.

As at present situated, we cannot grow grains farther than to supply ourselves and our animals; (we don't do this now.) We can *live* by the plow, but can we *thrive*? and is there any doubt but that we can thrive by the sale of animals and animal products? not young or lean cattle alone, for Massachusetts farmers to grow and fatten, but oxen, horses, sheep, *fat* beef, fat mutton, pork, butter, cheese, and the like.

If objection arise, that should all our farmers at once and earnestly adopt this plan, (and especially in view of the fact, that the great west is awaking to a sense of the importance of stock husbandry, to save itself from exhaustion,) there is strong probability of a material reduction in prices, it is readily and frankly admitted. Nay, more; in order to prevent disappointment, such a result should be counted upon for a certainty. Our answer is, that *we can afford* to sell at lower prices, and then do better than by neglecting it.

This policy is *not* advocated in view of the high prices which have ruled of late, *but for reasons of an entirely distinct character*. Our most pressing need is an increase of fertility, and to accomplish this end, the grand means is the consumption of the crops of the farm, upon the farm itself, coupled with due care in the preservation and application of the resulting manure. Improved modes of prac-

tice should contribute all they possibly can, but this should be the reliance, the corner stone, the pivot of all our operations.

If the objection be urged, that should all our farmers at once adopt the policy proposed, bread would soon be scarce and dear, and bear undue price compared with animal products, the answer is, that we may safely calculate, that before such result ensues, we shall be in condition to grow all the bread we need, and possibly some to sell. By the plan advocated, if faithfully carried out, and accompanied with good management, every farm should increase in its powers of production at least ten or fifteen per cent. every year, and when our fields average upwards of two tons of hay per acre, our corn sixty bushels, our wheat twenty, and our oats sixty bushels per acre, we may safely sell the excess—cannot this be done? and if not, why not? Greater advances in practical agriculture have been made in individual instances among us, and if it cannot be done usually in Maine, we have yet to learn what the insuperable obstacles are which prevent. In Great Britain the average grain crops throughout the kingdom have more than doubled within a comparatively recent period, and though something is due to the importation of bones, guano, oil cake, &c., all this is as nothing compared with the degree of success which has arisen from the attention paid to the growth of animals—the care that green crops bear due proportion to grain crops, and both these to the amount of stock fed upon the products of the land.

There has been for some time a general move in this State in the right direction—the amount of live stock on Maine farms having largely increased of late. The doubtful point in the matter is, whether the move be not in view of recent prices, and so liable to be abandoned when these fall; rather than in view of ultimate results, with a determination to depend mainly upon animal products, *until we can afford to sell our crops.*

In the circular before alluded to, other inquiries were introduced, and, while upon some points, the facts obtained are deemed too scanty, partial and imperfect to be considered reliable as a basis for general conclusions, upon others, information has been elicited which may prove of practical value. One of these is the HAY CROP.

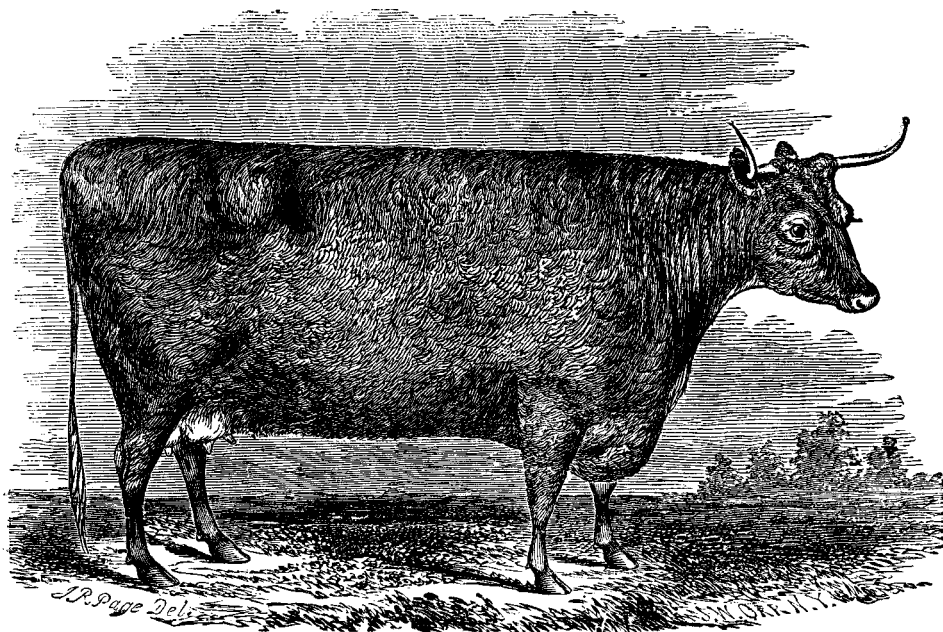
There is no occasion among us to invite attention to the production of hay as a forage crop, or to urge its importance as the principal dependence of our farmers for wintering their stock. This is already sufficiently understood and felt. The necessity in our case is rather to suggest caution, lest the exclusive or undue reliance upon it for the above named purpose do not result in too long continued successive cropping, with consequent exhaustion of our fields, and the neglect of green crops, with all the collateral benefits attending them. This has been already alluded to in the remarks on the rotation of crops. Still, as the grass crop is, and always should be, the great staple crop of Maine, it is highly important that we endeavor to learn all we can, of the conditions necessary to its most successful culture.

Respecting the best preparation for grass, the general tenor of reply amounts to little more than a recommendation of previous tillage with corn or roots,—some for one, more for two years, and a few for three or four years,—applying manure, and seeding down with grain, generally wheat; although where buckwheat is extensively grown, the preference for seeding with this grain rather than with any other is expressed in strong terms. Some prefer seeding alone, and these name August or early in September as the best season. Late fall sowing is condemned by nearly or quite all who refer to it, but August sowing seems growing into favor, although not much practised as yet, four-fifths of the replies being in favor of spring. Some statements are here appended which embrace several additional points worthy of consideration:

“ Grass lands are seeded the last of April and May, with herds grass, clover and red top. Many of our farmers would dispense entirely with clover, were it not for the great advantage to their grass land from the amount of food for other grass supplied from the clover root, and especially the condition in which heavy lands are found when the clover is killed out.

Many consider the after crop more than doubled from the porous state of clayey soils after clover. Any one can imagine the condition of a piece of ground with holes in it as *thick*, as *large* and as *deep* as each clover root





**DEVON COW, "FAIRY," (696.)**

Imported by Linsley Brothers, in 1851. For pedigree, see Davy's Herd Book, vol. 2.

would make after the roots had two or three years' growth and then died. Have you ever estimated the amount of vegetable matter left in the soil, after a full clover crop had been grown and taken off? If so, will you give us an idea of it?\*

Many of our best farmers are of opinion that it is decidedly the better way, all things considered, to seed down grass land, *without* grain, in August or September, or in the spring—the seed to be sown, if possible, when the ground is covered with *anchor frost*. This we consider just the nick of time to sow our grass seed, if not sown in the fall."

E. G. BUXTON, Yarmouth.

"My present idea of the best preparation for grass, is three or four successive seasons hoeing of manured crops, and then a generous allowance of several different sorts of clean grass seed, sown with wheat. A greater variety than the customary sowing of timothy and clover I deem of great importance to insure a heavier, better and more permanent grass crop.

I generally sow grass seed in spring, from the 10th to the last of May; sometimes in the fall, about the 1st of September. For seed, to an acre, seven pounds southern, and three pounds northern clover, four quarts red top, eight quarts timothy or herds grass, and four quarts sweet-scented vernal. To the above I would add, if the seed could be got readily, for upland, four quarts orchard grass, and for low ground, substitute for the sweet vernal four quarts fowl-meadow."

J. F. ANDERSON, South Windham.

"All things being considered, I think it is best to follow a crop of corn or potatoes, though I have had the best crops of grain and hay where I have summer tilled and never planted, and it is my opinion that wheat is the best, spring rye and barley next, and oats the worst grain, to seed down land with.

We seed down our grass land always in the spring; our light land from the 20th to the 30th of April. Much of our land, however, is a clayey loam, and in wet seasons, it is often as late as the 20th or 30th of May before we get our grain in; but I believe the earlier we sow our grass seed, the better. We sow herds grass, and clover seed, and some times red top. Our usual quantity of seed is about twelve quarts of herds grass and ten or twelve pounds of

---

"\* In an old pasture or meadow field, when plowed up, *the living roots left in the soil are equal to four times the weight of that year's hay crop*. If a ton and a half of hay have been reaped, then about six tons of dry vegetable matter remain in the soil in the form of roots. In the case of clover, at the end of the second year, the quantity of *dry* vegetable matter left, in the form of roots, is equal to upwards of one-half the weight of the whole hay which the clover has yielded. Suppose there be three cuttings, yielding four tons of hay, then *two tons of dry vegetable matter are added to the soil in the form of roots when the clover stubble is plowed up*."—[Johnston's Lectures on Agricultural Chemistry.]



clover seed to the acre. It is natural for our land to produce any quantity of white weed, and for some years past, we have sown the New York clover seed. It ripens about as early as the white weed. It grows short and fine, and makes better hay than the northern clover, and for these reasons, we are much in favor of it."

JOSEPH CARGILL, Newcastle.

"We consider the best preparation for grass land is, to plow the ground, and after it is sufficiently manured, to seed it down to grass. We generally sow the seed with wheat in the spring; consequently, it is up about the time that the drought come on, and a great many of the plants die. Sometimes, even, we lose all the seed sown, and then we have to plow and sow again. There is a prevailing opinion that the fall of the year is the best time to sow down grass land, say August and September. If it is sown later in the fall, it is more apt to winter-kill, while, on the contrary, the earlier it is sown in the fall, the better it will be the next year."

THOMAS GARVIN, Shapleigh.

"For a preparation for grass, I like muck, sea-weed and ashes, say five parts of muck, two parts of sea-weed, one part ashes. This is not only a good preparation for grass, but for almost anything else. If grain is to be sown with grass seed, I should prefer barley. Of late, some of us have practiced the plan of preparing our ground in the fall and sowing the grass seed on the snow in the spring, just as the snow is going off. I like this plan much, though I should not recommend it for side hills, where the seed would be likely washed off by the running of the melted snow. I prefer clover and blue top for high lands, herds grass and red top for low lands."

JAMES W. AMBROSE, Wells.

"Lands that are fitted to raise any kind of crops had better be planted two or more years, with a plenty of manure and thorough tillage, before seeding down. Lands that are so wet that they cannot be planted with profit may be turned over and seeded down after haying. Any kind of grain will answer except oats.

We seed down mostly in the spring; sometimes we fit lands, that are wet, in the fall, and sow grass seed when the frost is coming out in the spring. We sow a peck of timothy, and half a bushel of red top, and from six to eight or ten pounds of clover to the acre."

JOHN L. WELLS, Wells.

"Deep plowing and subsoiling, on all lands, (except heavy clays, which should be under-drained) I esteem the best preparation for grass seed. Cultivation with root crops, and good manuring, for two years, places our land in the best possible condition for grass. To insure the seeds catching, we consider wheat the best grain to sow with grass seed in the spring. We by all means put off sowing our wheat until about the 20th of May, that we may

avoid the weevil; and I think this is as good a time to sow grass seed—fourteen or sixteen quarts of timothy, and as many pounds of clover, to the acre.”

JOHN C. BLANCHARD, Searsport.

“I consider deep plowing, and a thorough mixing of the dressing with the soil, and draining where necessary, are indispensable preparations for a good crop of grass. The kinds of grain I sow with the grass are: first, peas; second, wheat; third, barley; fourth, oats. I sow my grass seed as early in the spring as possible—for then the seed has the benefit of the spring rains—say from 20th of April to middle of May. I sow, on lands highly manured, about ten or twelve quarts to the acre; on pasture lands, sixteen or eighteen quarts of seed—for light soils, three-fifths clover, two-fifths herds grass; on clayey lands, one-third clover, two-thirds herds grass; on low swampy lands, one-fourth clover, one-half herds grass, one-fourth brown top.”

JESSE DAVIS, Webster.

“My best preparation for grass is to put on a good dressing of manure before plowing. Let the plow run deep—say ten or twelve inches—and, let me add, it will depend upon the depth of plowing as much as upon the manure. Wheat or barley is the best for mixing seed for sowing. Many, however, among us, sow their seed clear, and with good results. Clover and herds grass are the principal seeds sown—on rather wet land, red top does well—twelve pounds clover and one-fourth or a half bushel of herds grass to the acre. Our lands are generally seeded from the 10th of May to the 1st of June.”

G. H. ANDREWS, Monmouth.

“The best preparation for grass *alone*, on an old field that can be well plowed, is: Turn it over ten inches deep, spread and harrow in a sufficient quantity of good compost, with ten or twenty hundred weight of bone-dust per acre, and sow half a bushel of timothy, clover and fowl meadow seed, in September or August. Harrow smooth and roll. Or, if grass is *not* the only crop sought, the rotation of two years pasture, one year roots, one year wheat or barley, with grass seed, and one or two years hay, not omitting *draining*, *deep plowing* and *bone-dust*. We usually sow in April, if the surface of the ground gets sufficiently dry to harrow, or as early as the ground is in proper condition to work—unless the object be grass alone, then sow in September. Timothy and clover are almost the only kinds of seed sown here. Fowl meadow and brown top make a valuable addition, and for pasture, orchard grass; but this comes to maturity before other grasses are fit to cut, consequently should not be mixed with them for *hay*. This last is in flower the last of June, and ripens in July.”

W. D. DANA, Perry.

In reply to the question of the circular regarding the present yield of English hay per acre, answers from about a hundred towns state it variously at from half a ton to a ton and a half; nearly

three-fifths stating it to be three-fourths of a ton; nearly a third at a ton. The others at less and more, from which it appears probable that the actual yield is something less than a ton per acre. Regarding the probable increase during the last five years, it appears to have been on an average ten to twelve per cent, and principally from better tillage, comparatively little waste or swamp land having been reclaimed. As to the extent to which it may be profitably increased still farther, and the means of accomplishing the same, some replies are here appended:

“The present crop of hay can unquestionably be doubled by a more liberal application of such dressing as it is in the power of almost every farmer to obtain, without cash expenditure beyond the team and hands he ordinarily employs for the summer’s work, if he will haul muck, or turf, or loam, or decomposed vegetable matter of any kind, to his barn cellar, or shed, and yards, and hog-styes, thus working up some of his leisure time. Saving the liquid manure and wasted wash would more than double the amount and value of the manure on every farm that I have observed closely enough to form an opinion upon.”

J. F. ANDERSON, So. Windham.

“It can be doubled by discontinuing the present practice of fall feeding, by under-draining, and top-dressing.”

E. G. BUXTON, Yarmouth.

“Guano has been applied to grass lands in this town, both last year and this, on almost every variety of soil with uniform success, in every case increasing the crop. In one instance, one hundred and fifty pounds of guano, with two hundred pounds of plaster, spread on three-fourths of an acre—soil a clayey loam, quadrupled the crop of grass.”

WILLIAM GREGG, Freeport.

“Three tons per acre might be raised as easily as to cut but one, and the three tons costing no more. Now for an experiment that I made. I had a piece of ground, from which there was cut but a half ton per acre. I plowed it up in the spring, manured it well by spreading on the green-sward, plowed and planted to corn, which was manured in the hill. The crop of corn and fodder paid for the labor, manure, and seed. Next year, spread manure over it, plowed in the manure four inches, sowed it to oats and grass seed. I took from that piece, August 2d, three tons of oat straw to the acre; up to this time the crops were worth all I had expended, and interest on the value of the land. The first two years it yielded three tons to the acre; then, by application of top-dressing on<sup>ce</sup>, I was enabled to cut the same amount up to this time, which has been three years more.”

S. P. MAYBERRY, Cape Elizabeth.

"From twenty-five to fifty per cent., by keeping your hogs in the pen, and at work, with material enough to work profitably. I make five to six cords of manure from a hog, which is worth very much more than an equal amount of cattle droppings. I make my sty (which has stone floor and walls, with no yards,) the common receptacle of all refuse animal and vegetable matter of every description, with all the slops and washing suds from the house, keeping the mass as dry as possible without heating. When it is too dry, carry water from the pump; when too wet, go to the woods and get a load of leaves. To my knowledge, there is scarce a farmer who keeps a hog the year round, and mows ten acres of grass, who cannot at a very small expense, with that one hog, increase his hay from three to five tons per year. This looks like a great story, but I can make it good. I consider your twelfth question of more importance than any other to the farmers of Maine, therefore I would say to them, *make manure, save manure, and judiciously apply manure.*"

D. H. THING, Mt. Vernon.

"The hay crop can be profitably doubled by draining our swamps, and under-draining our high lands, carting muck into our barn cellars and yards, loam into our hog yards, and saving the waste from the sink-spouts. In short, cultivate less ground, and do it mere thoroughly."

J. O. KEYES, Jay.

"The hay crop here may (in my opinion) be increased nearly or quite one hundred per cent., by leaving the dry, worn out knolls, which have been worked time out of mind, simply because they would work easy, and bear corn, by leaving these knolls that have been *over worked* and *half fed*, and descending to the meadows and low lands, that have received the wash and deposits of the uplands year after year, until one is impoverished, and the other enriched. Let these low grounds be drained and cultivated, and farmers will secure an increase in their hay crop, that will more than realize their most sanguine expectations."

JAMES W. AMBROSE, Wells.

"I think by a judicious application of manure to the land, and the blessing of seasonable rains, the crop of hay in this town for the coming five years, may be increased one-third, or perhaps one-half. Grass lands this year are fast recovering from the effects of the drought of 1854, so that the crop of hay this year will considerably exceed *that* raised in 1855, or 1856. In order to increase this crop, more manure must be applied to the acre. Swamp muck I find to be very beneficial in increasing the quantity and value of manure, especially if spread over the yard in the fall, and incorporated with the straw and other manure before hauling to the field the next fall. It may not be improper to mention, in this connection, that none of our most able farmers in this vicinity, so far as I can ascertain, have made any experiments in the use of the more active manures, such as poudrette, guano, &c. It is so late in the spring before corn and the grains can be put in the ground, that corn, in particular, seems to require some more active manure than is usually hauled from the

barn yard. I think the Board of Agriculture would confer a favor on the community, if they would publish the result of their researches and experiments in the application of manures to the corn crop, &c., and at what price a farmer might expect a remunerating return in the crop."

J. ADAMS, West Newfield.

"Three hundred per cent., simply by a proper cultivation of the soil. Land may as well yield four thousand pounds, as one thousand per acre."

AARON HOAG, Gardiner.

"It might be increased to almost any extent, by reclaiming bog lands, the free use of muck, and such other fertilizers as we have among us, together with a judicious system of cultivation."

AUGUSTUS SPRAGUE, Greene.

"I have found, by many years experience, that sward land plowed four to ten inches deep, twenty to twenty-five loads manure (fifty bushels to the load) thoroughly incorporated with the soil, planted with corn or potatoes; second year seeded with grain and grass seed, gives us the best crops of corn and grain, and a succession of good crops of hay. We receive much heavier crops by prosecuting this mode, and continue to work over larger breadth of land, and keep the soil in a higher state of cultivation. We have increased our hay crop by this mode from a half ton to two tons per acre."

JOSEPH FROST, Elliot.

"By thorough draining, deep or subsoil plowing, and the use of bone-dust, with a careful husbandry, and the use of the sources of fertility on and about the farm, the crop of hay can be profitably increased from the present average of half a ton, to two tons per acre."

W. D. DANA, Perry.

"It can be increased one-half, and that profitably—not by sending to Boston or New York for fertilizers—but let every farmer treble his amount of manure every year. There will be enough to doubt this, and I will just show you what I am doing, and ask if I have not some reason to believe that I shall double my quantity of grass in a very few years. I have a cellar under my barn, where all my manure is deposited until wanted for use. I keep there one hog to every two or three head of cattle, and haul in three loads of all kinds of material that will absorb moisture, to one made by the cattle; and in spring I have three loads of good manure, instead of what would have been one of ordinary, if it had been thrown from the window. Some will say it costs a great deal to keep hogs, and so it does; but if you have any to sell, they bring a great price. Now, I say, instead of laying out money for fertilizers, buy corn and feed it to hogs, and make your own manure. This is the best way to make a compost heap that I know of. I will add, that my cellar is so warm in winter, that it never freezes so but the hogs can work in the manure just as well as in summer."

JOHN C. BLANCHARD, Searsport.

TOP-DRESSING, as a means of increasing the fertility of grass land, seems not to have received any great amount of attention at the hands of Maine farmers, and yet, judging from the replies of those who have practiced it, the result of their experience is almost universally in its favor, as an effectual and profitable means.

“There is but little practice of top-dressing of grass lands, yet I believe it to be *the way*. The attention of farmers should be called to this fact. I care not what your dressing may be, (the better the dressing, the better the crop, of course;) you may take the gravel from the ditch, and you will be handsomely paid for all trouble. The roots of grass, of late years, are more or less thrown out by the action of the frost, and they are left exposed to the cold of spring, and the action of the sun, causing them to be dried and withered. Now take a dressing of sand or loam and apply it early in the spring, covering up these roots. We shall find, instead of one blade of grass, (*and that slender*;) several blades luxuriantly growing. This is no whim, neither does it require any art to understand it. It is nothing less than plain common sense. It should be laid on to the depth of a half or whole inch. I am satisfied the expense would be met by a return of many fold.”

G. H. ANDREWS, Monmouth.

“I have not practiced top-dressing to much extent with manure, but will name one experiment. Four years ago, immediately after haying, I carted from the shore eight loads of sea-weed, and spread it thinly over about one acre, where I cut less than half a ton of hay that season. Before winter had set in, there sprang up a fine second crop of clover and herds grass. The next season, I cut at least two tons of good English hay from that piece, and have cut two fair crops from it since, without any more being done to it. This piece of soil is a clayey loam. I have tried sea-weed in fall and spring, but with less success. I think the great benefit derived from it in this case is on account of its effects as a mulching. I am satisfied that in dry seasons, if we only throw over something that will keep the scorching sun from the roots, immediately after taking off the crop of grass, it will do as much good as a light dressing of manure.”

JOHN C. BLANCHARD, Searsport.

“I do not practice top-dressing to great extent at present, although I have faith in its economy as well as efficacy, where one gets a chance to try it on. Liquid manure, or finely pulverized compost, in the spring, is undoubtedly the best; but I have received great benefit from a single application of clayey mud, the cleanings of a small pond. The land was of a gravelly nature, and the quantity hauled on to it, in the fall of 1853, was not over five cords to the acre. Its effects are still very marked.”

J. F. ANDERSON, South Windham.

“Top-dressing is not extensively practiced. I am preparing a heap of soil that has washed into a valley by the side of the road, by mixing refuse lime, that I get at the kilns of Rockland at a nominal price, and shall apply it this fall. I think a top-dressing may be made of washed gravel, chip-dirt, muck, or almost anything, by mixing lime and ashes from the kilns, that will pay well for the application. Top-dressing keeps the surface from binding.”

HENRY HOBBS, Hope.

“Land properly drained, that has been several times plowed deep, so that a part of the manure has been mixed with the soil to a good depth, may be kept in a state to bear two tons of hay per acre, by judicious top-dressing. I top-dress, because it is the cheapest method of raising grass. I use a light dressing of manure from the barn, and cover immediately with salt dressing that I procure from the river. I also use plaster on lands that contain much clay.”

SAMUEL FORD, Newcastle.

“I have not practiced top-dressing to much extent, owing to a want of dressing. I have used lime, plaster, ashes and stable manure,—the last is best—have it well rotted and made fine before using. I think, from my own experience, that it is an excellent method for making cold clayey soils yield the most profit. I will here state my reasons and method. The hay crop is the most important crop that the Maine farmer can raise.

Spread on a moderate coat of dressing, plow it and lay it down to grass, so that no water will remain on the surface. Spread on yearly, before the fall rains commence, (as such lands are invariably soft either in the fall or early in the spring) two cords of compost manure to the acre, prepared as follows: One bushel of plaster, four bushels of ashes to the cord; mix thoroughly with old yard dressing, and spread immediately. On certain kinds of cold clayey soils, the grass, after it has been mown a year or two, grows in tufts or bunches, leaving from a quarter to a half of the land bare of grass roots. By putting on the above composition, the ground will keep swarded all over, producing hay over the whole surface.”

JESSE DAVIS, Webster.

“Have never practiced top-dressing for grass, but from observation deem it very important on soil that washes by plowing—particularly on hill sides, and stiff clay soils.”

JOSEPH FROST, Elliot.

“Top-dressing is not generally practiced, yet it is profitable. Almost any kind of mud or dirt from the sides of the road, and muck, (when composted,) lime or ashes are really very beneficial to grass land, when applied as a top-dressing. It is confidently asserted that the present hay crop may be increased at least one-third from such means.”

CHESTER B. SUMNER, Appleton.

“Top-dressing is not practiced to any considerable extent in town. I think, however, that in many localities, a top-dressing, with well rotted compost manure, would be highly beneficial and economical, if applied in the fall or early in the spring. My reasons are, that we have much land that is not profitable to plow, unless it is underdrained at a great expense, which, after it is seeded down and made fit to receive the scythe and horse-rake, an application of manure once in four or five years, would, at a small expense, keep in good condition for grass for a long term of years.”

E. A. BRADEEN, Waterborough.

“Ground that is too wet for good tillage, is very much benefitted by top-dressing, as it improves both the quality and quantity, and will hold out very much longer. Apply it early in the spring, and if compost manure cannot be spared, common earth will richly pay the labor.”

DAVID NOYES, Norway.

“I practice top-dressing only by carting rich mould or soil upon low land, and find much benefit therefrom. I pursue that course, because it is not so convenient to cultivate wet lands. I apply it in autumn.”

MARK DENNETT, Kittery.

“Not much done in this way. I have, on a very small scale, top-dressed with fine, well rotted manure, and with admirable success. My only reason is, that God, the greatest agriculturist, puts manure at the top.”

E. JONES, Minot.

“Top-dressing causes the land to hold out to grass longer than any other mode of dressing. Barn manure, loam, dirt from the ditches, almost any kind of manure, spread on in the month of November, about ten loads to the acre, would increase the crop of hay one-third. It keeps the land warm, and it starts earlier in the spring, and is not so liable to winter kill.”

THOMAS J. BURBANK, Cooper.

“Our hay crops might be increased by top-dressing with guano or bone dust, but it is so expensive that but few here use it. Some farmers have top-dressed their grass land with swamp muck, which makes the grass grow finely. Plaster sown very early in the spring on clayey loam grass land, in the proportion of one or two bushels per acre, will, in a dry season, be of great benefit.”

RUFUS BIXBY, Norridgewock.

“I am of opinion that liquid manure is the best dressing for all mowing fields. A year ago last spring we had occasion to clear out one of our manure pits when it was filled with water, and to get rid of it, hauled it out in hogs-heads to some old grass land, applying it on the driest parts. At mowing



time the effects of every pailful was visible in great increase, and I am so well satisfied of the great benefits to be derived from this kind of manure, that in a new barn to be built another season, I shall have water-tight manure vaults, with the yard so graded that all the wash from it will run into them, to be pumped up into sprinklers, and applied to the mowing land."

E. K. FRENCH, Chesterville.

"Top-dressing is not extensively practiced by farmers in this town, but I am in favor of it, and have done something at it for several years. I believe it an economical way to improve grass lands. When my grass land gets run down, and has a smooth surface, I spread about ten (thirty-five bushels) cart loads of fine compost, made of marsh mud and lime, to the acre, which costs me about fifty cents per load. This will generally increase the crop from fifteen hundred per acre to thirty hundred weight, for about four years; so that for one dollar and twenty-five cents worth of manure yearly, and twenty-five cents for laying it on, making one dollar and fifty cents, I get fifteen hundred weight of hay of an excellent quality, being a mixture of herdsgrass and clover. I have tried double the above amount per acre, but made a perfect failure of it. It brought up weeds, and the grass grew so rank that for two or three years it was good for nothing. I spread it invariably in the fall."

JOSEPH CARGILL, Newcastle.

Another question was: What do you consider the principal defects of the agriculture of your vicinity, and by what means within the present ability of the farmers, may they be obviated? Some of the answers are:

"This double question of yours is not in itself long, but to be properly and fairly answered would require a reply in the style of an old-fashioned sermon of points, with an immense salutatory, and considerable length of valedictory; not feeling competent to the full task, I will designate a few of what I consider the principal defects of our agriculture. In the first place, we all of us cultivate too much land—much more than we have means to work thoroughly—we never deposit enough to warrant the drafts we are constantly making upon our land bank; consequently we are always overdrawn and out of credit, and then we are, as a class, one-third of the year lazy, (it is truth) and always short-sighted. The obviating means are evident to those who will admit the assertions."

J. F. ANDERSON, So. Windham.

"The principal defects of agriculture in this vicinity, are want of system, and a better understanding of the business, and more thoroughly working the lands. Neglect, and a want of care is the cause of a great portion of all the failures in other business, as well as farming. Farming is carried on too

carelessly. If there was that care and attention given to farming as is required in other business, we should see a vast improvement in the farms throughout the State.

C. B. SUMNER, Appleton.

“The greatest defects are shallow plowing, and little of that, and gross negligence in regard to increasing the quantity and quality of manure.”

D. NOYES, Norway.

“Want of system is the first great defect in our agriculture, and we never can succeed profitably until we adopt some regular system, and then carry it out. Some farmers are so situated that sheep husbandry would be the most profitable; others would do better to devote themselves to raising neat stock, their farms being better suited to that purpose than for tillage; others, again, from the nature of the soil, would do better to devote their acres to the cultivation of cereal grains; but we find almost every one pursuing a course of mixed up husbandry, doing a little of every thing, and complaining when they get it done, that there is no profit in farming.

I agree with them, that there is but a very small margin for profit, as farming is at present carried on, and while the present system, or rather want of system, prevails, I see no chance for much greater profits. How to bring about a change and the adoption of such a system as is best calculated to result in profitable agriculture, I leave to wiser heads than mine.”

W. H. POWERS.

“There are many defects in the cultivation of the soil in our vicinity. Farmers do not plow deep enough; they go over too much ground, consequently their manure is thinly spread, and being shallow plowed, it dries up, doing but little good. Many let their manure lie exposed to all weathers; also, one of the most valuable manures that the farmer might have is often entirely lost. I refer to night-soil. Instead of having a suitable place for the reception of it, and saving all the liquids by absorbents,—such as muck, loam or saw-dust—it is almost invariably thrown away, and then we send to New York for some of theirs, which is not worth one half as much as that they throw away every day. Much might be said upon this subject, but as your thousand correspondents are better able to talk upon this matter, I will leave it to them.”

G. H. ANDREWS, Monmouth.

“The principal defects in the agriculture of this vicinity are: plowing and tilling too much land, sowing too many oats, farms too large for the amount of labor bestowed upon them, and not a sufficient quantity of manure. In my opinion, one-half of the land that is now plowed, well manured and properly cultivated, would afford more profit to the owners than they now receive from the whole. Let every farmer in this State, who can obtain it, deposit in his barn and hog-yards, at least once a year, as many cords of swamp muck

as his cattle and hogs would make of manure, and he will find his compost heap almost double in quantity and nearly equal in quality. By this means, we can prevent our farms from being exhausted."

DAVID FROST, Norway.

"The principal defects of the agriculture of this vicinity are these: first, cropping land without putting on a proper quantity of dressing; second, allowing manure to go to waste. The remedy for the first is plain; we must cultivate no more than we can properly manure. For the second, keep the manure under cover, and use absorbents to save the liquid of the barn, sink, back-house and hog pen."

D. J. FISHER, Charlotte.

"Skimming, going over too much land, want of study and plan. Grazing is our proper business. Improve the mowing grounds about the barn, till two tons grow on an acre; advance out by plowing and top-dressing, and increased crops of hay and larger stocks of cattle will be the result."

E. S. HOPKINS, New Portland.

"Want of drainage, want of agricultural knowledge, want of system, want of some means by which reports on agriculture may be put into the hands of the *farmers* by the State, instead of their being distributed to lawyers, doctors, and indeed to everybody but farmers,—the number finally authorized by the Legislature being inadequate, even if they should be fairly distributed. The two copies which I received have been circulated in at least fifteen or twenty families, and caused them to inquire why such information is not imparted to the whole community.

WM. GREGG, Freeport.

"I think the principal defects are, light manuring and not stirring the soil often enough while the crops of corn and other hoed crops are growing, to let in the air and keep down the weeds—although our farmers are a very industrious class of people and strive to do their best."

HENRY HOBBS, Hope.

"I believe the first and leading defect is, plowing more land to plant than we have manure to dress well. I remarked before that it would be advantageous to the owner of a hundred acres of land, to turn that part he could not till and dress well, to grazing. But in the division of his farm as it now is, he has more fence to repair than he can now look after. To lay out his farm again would make the burden greater, so he continues on in the same course. Still, with favorable seasons, I have hope that fields during the next five years will yield a better harvest. Farmers must, if possible, make more manure—that is wealth.

J. ADAMS, West Newfield.

"Too long cropping in one kind, without rotation, is doubtless our principal defect. Some people seem to think that nothing is manure unless it has actually passed through the digestive organs of their cattle. There is some improvement, however, in this respect, and we hope to see more."

E. JONES, Minot.

"The principal defects in agriculture in this vicinity, are: first, a lack of thorough working and pulverizing of the soil; second, light manuring. We have great advantages for getting salt and fresh mud. A great number of the farms of this town have muck bogs on them, and many are inexhaustible; and many have the privilege of salt marsh. York and Kittery have greater privileges, but few farmers make use of the privilege or take *any* means to increase the manure heap. It is my opinion, that if the farmers in this and neighboring towns, would make use of the advantages within their power, double the amount of crops might be produced yearly."

J. FROST, Eliot.

"The principal defects may be readily stated. 1st. Leaving farming for other employments, especially lumbering. 2d. A neglect to work properly the soil intended for the production of crops. 3d. Too little attention to the care and culture of the crops themselves.—Evils which can be obviated in no other way than by a reversion of action in the matter."

B. HAMILTON, Six Mile Falls.

"So far as my observation extends, farmers improve or rather plant, sow and mow over too much surface. It makes more labor and less profit. More attention should be paid to manures, and adaptations of stock and crops to each farm, also to its location, which should influence the farmer in his produce and stock. The increased expense of labor has induced farmers to calculate with more care what crops pay best."

ELIJAH BARRELL, Greene.

"The principal defect in this vicinity, is the lack of manure. The means to obviate this lie in saving every material for the compost heap that is worth saving. Let the droppings of the animals be carefully saved; give the hogs muck or loam enough to work; let the out-house and sink spout be well fed with the same, and the hens looked after. Every farmer can make and save twenty-five per cent. more than he does now. This going to the Pacific after guano, when we might make double the manure we do now, is not the thing. We had better by far plow in one or two green crops every year, for the very purpose of enriching our land. In our town we have plenty of deposits of muck, besides sea dressing all along the Cape, which is pretty well cared for and looked after by those living near the shore."

SAMUEL HASKELL, Cape Elizabeth.

"One defect with farmers is that they do not think and study enough, and do not take interest in their farms; they see others speculating and making

money and are apt to think that all may do the same. They lack system about their business. They should have more self-respect, and remember that they are in good business, that will bear to be well followed."

JOHN S. WELLS, Wells.

"Too much land and other business carried on at one and the same time. Less land, and less business away from that land, would give a better and more thorough cultivation to our farms, and where one blade of grass is now permitted to rear its head, two, three, yea, four, would soon be made to come forth in its place. We should be *surer* of better crops, (potatoes excepted)—never realize a failure in grass catch as is now too often the case; we should soon learn to dig and plough deeper, considering the fact that, as we haven't all creation to go over, we could better afford to go over a little deeper, and feed better old mother earth.

We should cultivate less acres, and confine our observation, experience and means more directly to one and the same end.

Friend Goodale, I presume it will be excusable in me, if I should digress a little from the queries in your circular. In answering those questions, I have confined myself as strictly as possible to, and within the limits of this town. As a town, we have varied and multiplied interests, but that of agriculture seems just at this time to predominate; there is a manifest interest aroused among our farmers, and a good deal of zeal is showing forth its good work among the tillers of the soil in this vicinity.

The interests of our citizens are so varied and scattered, that concentrated action upon any one point is no easy matter.

This will account in great measure for the fact, that among the three hundred horses, six hundred oxen and cows, and one thousand swine in this town, there cannot be found a *full* blooded animal in either department, unless it be a yoke or two of oxen imported from some other town. So you see, for the many valuable horses, oxen, cows and swine we have in town, we are dependent upon those who are ahead of us in these matters.

On the nine or ten thousand acres of land which constitute the area of this town, we have quite a variety of interests drawing counter to that of agricultural improvements, but still we are bound to be up and doing. Our four hundred thousand dollars interest in navigation must, as a natural consequence, hold in check much of the *real* interest that would otherwise go directly in favor of agriculture and its improvements. As a town, we are small in territory, but are highly favored; we have within our borders a chance to obtain unlimited discounts, if we will but learn to appreciate the value of our *beds* and *banks*. When we take into consideration the fact that we have shipped *annually*, for years past, more than *twelve* hundred tons of hay, it will be seen that within the five years past, we have taken and carried from our soil more than six thousand tons of its production.

Now, the question naturally comes up, how long will our soil hold out under such treatment? This is robbing Peter *without* paying Paul, and

neither can survive any length of time unless a change of treatment, more favorable to the life and health of the patients, shall soon take place.

Old mother earth is generous; but with all her generosity, she will not always *give* without receiving something in return. It is not her nature to always give out, without being *foddered* occasionally, and I am thinking that if she isn't 'stall fed' pretty soon, we shall forfeit her good graces entirely.

We have an inexhaustible resource in marine dressing, if the same result continues to follow their application to our soil that attends it now. But this is supposed to be somewhat doubtful, and hence let us guard against every leak and waste place on our premises that will deprive our soils of one pound, one quart or one foot of substance that will, if given, enrich the soil in any degree. We should guard well our *ashes* that they may not be wasted—there are more *pearls* in a bushel of ashes than some pearl hunters are aware of; then if we wish to save the LIFE of our manure heaps, we must put them under cover, or they will surely be frozen or bleached to death.

The ladies are frequently treated in our agricultural journals with a chapter on 'house plants.' Now, brother farmers, the ladies never had, and never will have, in my opinion, a plant that needs *housing* and in-door treatment half so much as our manure heaps, and none will pay half so well for the change of treatment, if it is but done as it should be. Again, there are riches in our swamps and muck holes, and little will be our profits from them if they are not disturbed; they must be dug over and exposed to the air, and worked into the hog-pen, &c.

I see that I am straying away into forbidden paths, so I will 'haul up' by wishing you every success in your labors in behalf of agriculture, the *best* interest of Maine."

E. G. BUXTON, Yarmouth.

These replies suggest several particulars which have already been considered at some length, and others, a simple allusion to which may suffice to bring to mind the necessary obviating means, and this is all which is requisite, *except to put them into operation*, which each must do for himself.

There is, however, one other very serious defect in our husbandry, which must not escape notice and comment. It is not alluded to above, probably by reason of its having been made the topic of a special inquiry. The question was asked: What per cent. of saving can be effected in the present cost of feeding animals, during winter, by *suitable* shelter and protection from unnecessary exposure? to which a few reply ten per cent., some fifteen, some twenty; but from many, who have given the subject most careful consideration and the test of actual experiment, the saving is stated at no less than a quarter or a third, and a few make it as high as forty per cent.

If these opinions are well founded, the conclusion is inevitable, that, whether it arise from ignorance of the facts, or from extravagance, recklessness, or any other cause, there is here a most serious defect in our prevailing practice.

The wintering of farm stock is one of the heaviest bills which the farmer is obliged to meet in the whole course of his experience, and in not a few instances greater than any other; and if he were compelled to respond to a needless call from his winter stores, for enough to supply his animals during an additional six weeks or two months, he would deem the case a bitterly hard one, and justly, too; and yet, what can be more clearly capable of mathematical demonstration than the statement, that if a saving of a quarter or a third of the present cost of wintering stock can be effected, that it would be equivalent to an actual shortening of the winter, a lessening of his expenses, an increase of his profits,—call it what you will—by just so much? And what would such a saving amount to on the three hundred and fifty thousand\* head of neat cattle in the State, (let alone all other stock)? This problem is commended to the farmers' boys, to cypher upon during some of the winter evenings. The answer will probably be found to count up dollars, not by hundreds or thousands, but by *millions!*

Experience has amply proved, and every body is ready to admit, that animals *comfortably* housed, and well cared for, can be wintered more cheaply, and come out in spring in better condition, than if exposed to the inclemencies of a northern winter, (or a western winter, either). *Shelter is cheaper than fodder*, and no farmer or herdsman, who wishes to thrive in his calling, *can afford to neglect to furnish the full amount of shelter and protection which can be economically done.*

To sustain a due degree of animal heat, is a prime necessity of bodily existence—no individual can live without it. In order to understand how comfortable shelter and the warmth thus saved, is connected with the economical keeping and growth of animals, it is necessary that we first endeavor to understand by what process of nature animal heat is generated; and although we may not find the

---

\* The census returns in 1850 give the number then as three hundred and forty-three thousand three hundred and thirty-nine.

obscurity which formerly involved this subject completely cleared away, yet we may easily learn as much as will serve intelligently to guide our action. Eminent chemical physiologists will tell us, that animal heat is generated and sustained by a process not different in kind from that by which we warm our rooms, or obtain heat for any of the other purposes of every-day life. To this end, we burn fuel; and fuel, whether it be wood, coal, or something else, is composed largely of carbon, which, in the process of combustion, combines with oxygen, forming carbonic acid gas, and as a *consequence of the combination*, heat is evolved.

Careful experiments have shown conclusively, that the amount of heat thus evolved, corresponds to the quantity of oxygen which enters into combination with the combustible matter, be it carbon, hydrogen, or something else. This can be measured, and we find, too, that the result is the same, whether the combination takes place so rapidly as to produce intense heat, or so gradually that there is no appearance of fire at all. The essential point is the combination of oxygen with the combustible matter; when this takes place, whether slowly or rapidly, heat is evolved.

Let us next inquire, what is food, and what becomes of it when eaten? Take, for instance, the case of an ox fed upon hay, roots and grain. Without going into the minute details of analysis as to their ultimate elements, we find the proximate constituents of these articles of food to consist of, first, albumen, gluten, casein, &c., which are composed of nitrogen, carbon, hydrogen and oxygen. These mainly go to form muscle, cartilage, &c., and are familiarly known as the flesh-forming principles. We also find another class of alimentary substances composed of the same ultimate elements, with the only, but important, difference of being *minus the nitrogen*. These are starch, sugar, gum and others. They are known by the generic name of elements of respiration, or familiarly called the heat-producing principles. They are thus called, because, when absorbed in the process of digestion, they are conveyed in the blood to the lungs, there to be exposed to the action of atmospheric air; and during the exposure, the carbon combines with the oxygen of the air, and passes away from the lungs as carbonic acid gas mixed with the expired air. (A portion of the hydrogen also combines with oxygen there, and passes away as watery vapor.) *Con-*



*sequent upon the combination*, as stated above, heat is evolved, and this the arterial blood conveys to all parts of the frame, and so sustains the heat of the body. If more food is digested than is needful to sustain the required warmth, these elements, after contributing to supply the constant waste going on in the system, (and which is greatly increased by exercise,) are converted into fat and suet, and stored away. To this end, also, the oily or fatty portions of food (as the oil in Indian corn) contribute, and even more directly; but these and the sugar, starch, &c., are so similar in their constitution, that either can be, in case of necessity, substituted in place of the other.

From this, we infer that animal heat, being indispensable to life, must first be supported from the consumption of food, which, to the extent required for this purpose, may be viewed as fuel; for the animal may *live* without fattening or growing. When this want is supplied, the balance of the food digested may supply waste and contribute to growth or fatness.

It is a well-known fact, that in cold weather, and in high latitudes generally, food which is rich in carbon, as fat meat, &c., is required in larger proportion than in lower latitudes or in warm weather. The voyagers in arctic expeditions have required large quantities of the heartiest food, a pound or two of tallow serving one for a lunch there, much as a piece of bread might do here. The Esquimaux, and other natives inhabiting such latitudes, eat almost incredible quantities of blubber, or other food of the fattest kind. The combustion of fat, as fuel to sustain vitality, is farther illustrated by what we know of the hibernation of animals. The bear, for example, goes into comfortable winter quarters, with a thick fur coat outside and rich stores of fat inside, becomes dormant, (for exercise would demand a supply to make good the waste caused by it, and more than he can well afford, under the circumstances,) and his fat is gradually absorbed into the system, the carbon and hydrogen burned in the lungs, and thus his vitality sustained. It is no figure of speech to say that his lamp of life was fed during the winter with (bear's) oil; it is the literal fact.

The question above, it will be observed, refers to *suitable* shelter. This does not preclude a proper degree of ventilation, which is highly necessary. Perhaps the hay-mow might not be the worse off

for somewhat more than is absolutely necessary; but to indulge cattle in an excess of it when the thermometer is below zero, is very expensive, in fact, grossly extravagant; and when the matter comes up for the farmer to decide upon in his own practice, whether it be the better policy for him to warm his cattle in winter on beef-tallow, (or what will make it) or on pine boards, plenty as these are in the State of Maine, the question is believed to be one *not very difficult* of solution.

And this may remind us that there is often more of beneficence in the arrangements of the All-Wise than we are apt to give credit for. So many trees, so much timber as exists in our State, were not made to grow here for nothing. There is deep meaning in it, deeper by far than we have yet fathomed; and this topic of SUITABLE SHELTER is particularly commended to the thoughtful attention of every grumbler at the dispensation of Providence which compels him to feed his cattle at the end of the pitchfork for half the year.

Another question was: Can hired labor be profitably employed in farming operations, at present prices of labor and produce? Upon which point it is somewhat remarkable, that although the replies are divided about equally, half being of an affirmative and half of a negative character, an analysis and comparison of such as do more than simply affirm or deny, show a substantial agreement of opinion. It is deemed advisable to quote several of these, as the suggestions thereby presented may be of more profit than any generalizations which could be drawn from them:

“It cannot under present system of farming.”

D. J. FISHER, Charlotte.

“Under judicious management it can.”

S. N. WATSON, Fayette.

“Few can make it pay.”

G. H. ANDREWS, Monmouth.

“All hired labor does not pay, but it can be made to.”

J. C. BLANCHARD, Searsport.

“It pays well here—high prices, good conveyance, and cash markets, do wonders for farming.”

WM. BURNS, New Gloucester.

[New Gloucester, it will be borne in mind, is on the line of the Atlantic and St. Lawrence Railroad.]

“Not with present imperfect systems of husbandry, and lack of facilities for market.”

W. H. POWERS, Bridgton.

“But few can carry on farming wholly by hired labor, and make it profitable.”

J. S. POWERS, Fryeburg.

“Not unless the employer either ‘hold or drive,’ and then it can.”

ELIJAH BARRELL, Greene.

“Near a good market it can, if rightly applied.”

J. FROST, Elliot.

“Not under ordinary circumstances.”

R. WINCHELL, Acton.

“Divide the farms into five classes—the first and second will pay; third doubtful; fourth and fifth won’t pay.”

JESSE DAVIS, Webster.

“I am able to work but very little; have one hundred and sixty-five acres, and no help but what I hire. Keep two men constantly for seven months, and three in haying; hire considerable by the day besides, and I am making money by it; but my farm is better than the average in this county.”

D. H. THING, Mt. Vernon.

“As a general rule it will not pay, but where large grain crops are grown, it will, though we think the same amount invested in improved implements and machinery for carrying on farm operations, would pay better still.”

R. BIXBY, Norridgewock.

“Not except in haying.”

T. J. BURBANK, Cooper

“Yes, on new farms.”

D. BLANCHARD, Blanchard.

“By managing work to best advantage, hired help *will* pay.”

D. FROST, Norway.

“Proper management, and adhesion to the old maxim, ‘He that by the plow would thrive, himself must either hold or drive,’ will make hired labor profitable.”

J. W. AMBROSE, Wells.

“It depends upon circumstances; on a strong, fertile soil, judiciously cultivated, it will pay handsomely; under other circumstances, loss will ensue.”

JAMES WALKER, Fryeburg.

"Not except under favorable circumstances, as to manure and markets, connected with judicious supervision."

J. L. WELLS, Wells.

"A man who understands farming, pursues it systematically and judiciously, can pay high wages and make good profits."

[No signature.]

"Hired labor will pay at present rates, being lower than for some years past."

C. B. SUMNER, Appleton.

"It will now, but would not three years ago."

J. CARGILL, Newcastle.\*

"Many farmers have an idea that they cannot afford to hire labor to carry on their farms, but my experience is to the contrary; and having tried the experiment with care, am *fully* satisfied that it is profitable to employ as much help as is necessary to carry on farming to advantage."

E. K. FRENCH, Chesterville.

"With the ordinary shrewdness which induces success in other business, and makes hired labor there profitable,—a proper system and the direct personal attention of the farmer himself, I think he will get a handsome return from the wages paid to every man he employs, even at the present high prices; the number of employees to be limited only by the extent of his farm, his means for enriching it, and his ability to direct and control."

JOHN F. ANDERSON, Windham.

The question is practically one of considerable magnitude, as on its decision in the mind of each farmer will depend his course of action, whether he pursue farming *as a business*, striving to obtain a profit from his operations, or whether he be content to employ his own labor alone, and *earn* what he can.

It is a question for each to decide for himself, upon a careful examination of what is within himself, and of all the circumstances surrounding him. If called upon to venture an opinion, after asking that of others, it would vary in form rather than in substance from those above quoted, being, that with skill and capital, and executive talent to direct labor to best advantage, farming could be made profitable by hired labor in any location, (as to market) or on any soil in Maine, ordinarily cultivated.

---

\* At Newcastle, and probably also at Appleton, the price of farm labor is regulated, in part at least, by the condition of the shipbuilding interest, at present depressed.

The conditions, it will be noticed, are very broad; embrace a great deal—but being granted, will any one venture to affirm that such soil is any where too distant from a manure market, or a muck hole, or a bed of forest leaves, to be profitably improved by some of the means before alluded to for renovation of exhausted lands, or any location in Maine so far from a produce market, that horses, cattle, or meat, or butter and cheese, (if good as they should be) or wool, or timothy or clover seed, or some other product, will not pay to carry to market?

It will be seen, by referring to the report of the doings of the Board at its last session, in January of the present year, as published in the "Abstract of returns" from the agricultural societies in the State, for 1856, that several committees (ten or eleven in all) were appointed to investigate divers subjects connected with agricultural pursuits, and report to the Secretary facts, experiments, views and conclusions, for publication in his annual report. Up to the time of the present writing only two of these reports have been received, and it is therefore with greater pleasure that I am able to add a communication from an eminent veterinary surgeon, on the subject of shoeing horses—a subject intimately connected with the usefulness of this valuable animal.\* If it be true, that a horse with useless feet is of no worth, it follows that whatever may tend to correct erroneous practice, and diffuse a knowledge of the principles upon which success in securing the full use of his feet can alone be obtained, must be of widely extended, and indeed almost universal benefit; for, although every person may not be an owner of horses, few are not more or less dependent on their services. To shoe a horse properly, involves, as will be seen below, a familiarity not only with the mechanical art, but with the structure of the foot, the laws of motion, and of the principles of mechanical science.

Maine ranks deservedly high in the production of horses—we rear many, use many, and sell many, and good ones, and we might profitably rear, and use, and sell more and better. But, as a State, we

---

\* Besides our obligation to Mr. Cuming for his valuable letter, we are indebted for the illustrations accompanying it, and which add much to its usefulness, to the courtesy of the Directors of the St. John County Agricultural Society.

are lamentably deficient in veterinary science, either in theory or in practice. Indeed, it is more than doubtful whether large numbers of those who have need of the benefits it may confer, be not ignorant of its very existence in the advanced condition which it has attained abroad. They may know of some who pass for "horse doctors," and whose skill is justly estimated to be on a par with that of a "seventh son of a seventh son," or of the practitioners of medicine during the dark ages, but have yet to learn that within a comparatively recent period the structure and diseases of domestic animals have been made the subject of patient study and investigation by men of great scientific attainments, and that results have flowed therefrom greatly to the benefit of the agriculturist; more especially, of course, in the department of stock growing.

Agricultural societies abroad have exerted themselves to diffuse a knowledge of the principles of veterinary science, and with notable results. Why may not our societies accomplish something in the same direction?

In Scotland, within the last thirty years, the losses of farm stock from disease have diminished one-half, partly from better treatment where disease occurs, and partly from the introduction of better systems of ordinary hygienic treatment, resulting in the prevention of disease, and which is equally the fruit of veterinary research. By reason of the latter, it is said that some diseases formerly prevalent there, have entirely disappeared.

To care properly for the foot of a horse is a part, but a very small part, of the province of a veterinary surgeon, for his science embraces every thing pertaining to the anatomy, physiology, pathology and hygiene of the ox, the sheep, and the swine even, not less than that of the horse, and it is as intimately connected with the agricultural interest, as medical science is with our bodily welfare.

ST. JOHN, N. B., Nov. 18th, 1857.

S. L. GOODALE, Esq., *Dear Sir*:—In the course of one of the agreeable conversations we had when you were here last summer, I recollect our discussing the subject of horse-shoeing, and of showing you some specimens evidencing the wretched state the art was in when I came here, and the improvements that have since been made. I recollect also of your saying at the time, that a similar reform was much needed in many parts of your State, and of your asking me

for a contribution to your annual report, on the subject; and your letter of 9th instant puts me in mind, that if I am to furnish anything of this sort, it should be set about now. But as my present leisure will not permit me to write you an original communication, such as I would wish, and as, besides, I am ignorant of what faults are most prevalent in the practice of the art in your quarter, the best I can do is to send you, in substance, the views I urged on the community here some years ago, through the medium of a letter addressed to the Directors of the St. John County Agricultural Society. How far what I then wrote may be applicable to the state of the art now, and with you, I am of course unable to say; but if, on perusal, you deem my suggestions deserving of a place in your publication, they are very much at your service.

In the course of the correspondence which led to my coming to this Province, the Secretary of the St. John County Agricultural Society wrote:

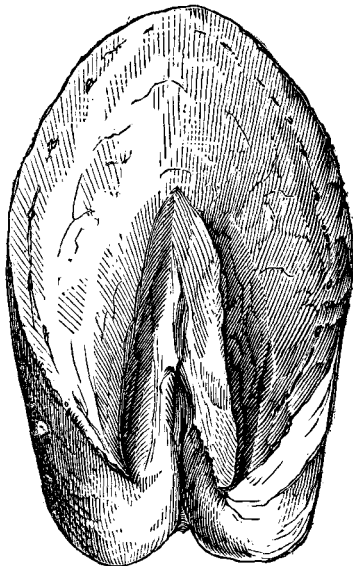
“It is greatly desired by members of the society that the Surgeon should have in connection with his establishment, or under his charge, *a forge* where horses could be shod in a proper manner. At present, we are very badly off in this respect, there being but few smiths with whom a good horse can be safely trusted.”

This was written in the summer of 1851, and my own observation after coming here in 1852, fully bore out the truth of the statement. It was not necessary to take off shoes, or examine feet, or enter into any other minute kind of inspection, to find out the evil. The long donkey-like hoofs every where seen, and the number of horses lame from corns, contractions, ringbones, spavins, sprained tendons and interfering, were sufficient evidence that the society had not instructed its Secretary to write as he did without abundant cause.

Such being the case, there was need for little further proof that the horses here were not generally shod as they should be, nor was it required that I should argue the benefits of a better system. The adage “no foot no horse,” is equally applicable here as where it was first used. In this country, where horses are hard driven, and too light generally for their work, it is of the greatest importance that as few defects should exist in the plan of shoeing them, and as many advantages be combined, as the state of the shoeing art will admit of, and it was to further this desirable end that the following remarks

were meant. In writing my ideas, therefore, on horse-shoeing. I had no wish that they should be looked upon as a complete or formal treatise on the subject. So many of these having already been published by men eminent in the art, as to supply to the scientific or inquiring reader all the information nearly, that books can give. My object was of a less pretending but more practical character, namely, to point out the errors most commonly fallen into as the thing was done among ourselves, the effects of these errors, and their remedy.

The first thing that took the notice, at the time I wrote, of any one accustomed to see horses well shod, on looking at the feet of almost all he met here, was the preposterous length of the toes. So strange indeed did this feature seem to me at first, that I doubted if the internal parts of the foot could be the same as those I had been used to see elsewhere, or if nature had not in a freak made them different here from what they are in other places. Subsequent inspection however showed me that this was not the case, that nature forms the feet of horses here the same as every where else, and that the absurd and often ludicrous forms I saw them fashioned into, was only the work of the shoeing smith.



*Fig. 1.*

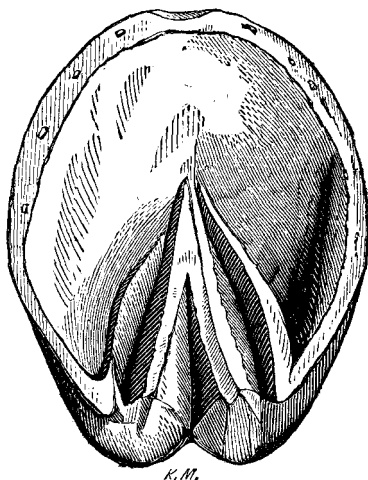


FIGURE 1, is a good exemplification of this. It is a sole view of a foot elongated and contracted by a long continued course of bad shoeing. The frog has almost disappeared between the contracted heels, the bars have been cut away, the sole and crust scooped out with the buttris to a thin edge, and the toe left untouched. The foot from which the sketch is taken, is in the exact condition in which it last left the blacksmith's shop, with the exception of the shoe being off; and is a good illustration of the common mode of buttris paring. It is also a good illustration of the long uncouth form of feet, to which I have adverted, as attracting my notice on first passing up the market slip of St. John, and of which a sample is now rarely to be seen on our streets. The plate is an exact representation of the foot in all its proportions. The foot itself had originally been a very good one; the quality of the horn being still unimpaired.

When the foot is unshod and the horse at liberty, the growth of the hoof is barely sufficient to provide for the constant wear and tear of the sole and toe, and consequently no part is either wanting or superabundant. But when the horse is put to work on hard roads, and to stand in dry stables, the foot becomes inadequate to the wear, and to save it we put an iron shoe on. This shoe prevents the wear, without checking the growth of the hoof; and to compensate for this, every time the shoe is off, the foot should be brought as near as possible to the form and size that nature gave it. In the unshod colt, the greatest diameter of the hoof is across the sole. This is especially the case in the fore foot, and it contributes materially to the usefulness of the animal that it should continue so through life.

The function of the fore leg is mainly that of supporting the weight of the body, head and neck, and of transferring that weight forward from point to point, the time the animal is in motion. In performing this latter action, its mechanical bearing is much the same as that of a spoke in a carriage wheel. It is in fact a lever, in which, to give increased speed, the power acts at a disadvantage; the fulcrum or fixed point being at the long end of the lever, while the power and weight act near each other at the short. This long portion or arm of the lever is the leg from the elbow to the ground, the toe being the fixed point over which the body is raised, and

hence any addition made to the length of the toe, has the same effect upon the horse, as the placing of a block before the wheel of a carriage has on it. It acts against the muscular power of the animal as used in the raising and carrying forward of his weight, and if ridden, of the weight of his rider, and though only requiring a small additional effort at each step, tells materially in a day's journey.



*Fig. 2.*

FIGURE 2.—Is a sole view of a foot of the same size and shape as figure 1 had originally been. It appears to be the foot of a young animal, and only to have been shod for a short time. Still the inside heel (that to the left hand) has slightly begun to contract. The foot is prepared for shoeing, the crust levelled, the toe made as short as it will admit of, and the bars and frog left full. The outside circle shows the thickness of the wall of the hoof, which in this foot is very thin. The shading shows the way in which the sole should be cleared out between the bars and crust at the heels, so as to prevent the production of corns. A comparison of the two feet is worth infinitely more than any description. The actual difference of length between them was more than an inch. Therefore the long toed horse (if other things were equal) had the whole weight of his head, neck, and body, to lift this inch more at every step, than his snug footed neighbor; an amount of exertion that would tell plainly on a hard day's work, or a closely tried race. Both feet from which the figures were sketched are still in my possession.

Every one the least a judge of horses can tell of the advantage of having them short below the knee, and is ready to despise as misshapen any one that has the reverse defect. But there seemed few (hereabout at least) who had got so far as the consecutive idea, namely, that to cultivate an additional inch of unnecessary toe, was just the same as to put that much to the length of the bone below the knee, in fact for the horse, worse, as the addition is made at the point of greatest disadvantage.

In the hind leg, though the functions of the part be different, the effects of a long toe are equally an evil, if any difference, worse. The main use of the hind leg is the propulsions of the body forward, and when hauling of the load also. In effecting this the leg from the hock to the ground is a lever also of the second class. The power is the muscles whose tendons are inserted into the point of the hock, the resistance is concentrated in the *tibia* or bone of the leg, where it forms the hock joint, and the fixed point of the lever is the point of the toe upon the ground. From this it is plain on the simplest mechanical evidence, that anything added to the length of the toe, is so much leverage placed against the animal's power of hauling, and consequently that he must either do less work, or else exert himself more in the doing of it.

Mechanical disadvantage to the horse in the performance of his work however, is but one of the evils following the long toes that were then so common in this country. Another equally great, often arises when the animal is standing at rest.

Every one knows what is meant by a horse being "sprung in the knees." For the information of those who are curious to know how this condition is produced, I will explain one of its causes. The bones of the foot and pastern of the horse do not stand perpendicularly above each other, but slope backwards, a considerable portion of the animal's weight resting on the tendons that pass down the back of the leg, and hence the greater the slope, the more the strain the tendons have to bear. If we put a horse to stand with his head up hill, more exertion is needed to sustain himself than if standing on a level. The reason is, that the bones of the foot and pastern are thereby placed more obliquely, and more of his weight is thrown upon the tendons and muscles, and thus a wearied horse, if left to himself, always feeds with his head down hill. But we add to the

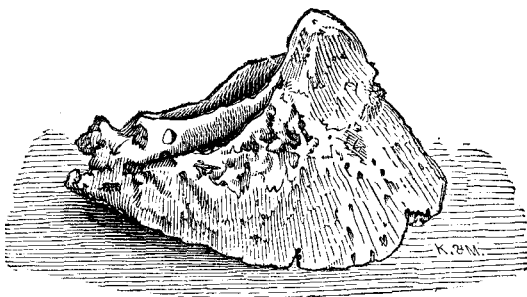
slope of the foot and pastern the same by adding to the length of the hoof and shoe, as by placing the horse's head up hill, and with greater permanency of effects, as we leave him no power to relieve himself. Often the two conditions are conjoined, the toes are injuriously long and the horse is confined nine-tenths of his time in a sloping stall. Here the muscular exertion of sustaining his weight soon becomes irksome. He shifts from one foot to another, but finds it only a temporary relief. The muscles connected with the tendons that pass down the back part of the leg to the foot soon begin to relax, till the weight falls on the ligamentous straps behind and below the knee. Then the bones of the pastern and foot become still more sloping, and to sustain his body perpendicularly above his feet, and still more to relax the muscles, the knee bulges out in front to a line with the projecting toe. This at first occurs only now and then, when the horse is wearied or forgetful, his postures becoming natural and proper when roused up. By-and-by however, it becomes a habit, and the causes being permanent and constant in their action, the effects soon become the same, and we have the horse for life "sprung in the knees."

Many a valuable animal, tottering on the brink of this condition, has been saved and brought back to usefulness, by having his feet put in a proper shape, and a run at grass, or a loose box to stand in allowed him, while others on whom the torture of long toes and sloping stalls was persevered with, have become permanently useless.

Another evil resulting from the length of toes to which I have been adverting, is interfering. The horse, finding the long projection in front of his foot as so much leverage acting to his disadvantage, gradually gets into a habit of shifting it, by raising himself from one or the other of the quarters. This is still more the case when, in addition to the long toe left on the hoof, a small round knob of steel is set into the point of the shoe, as if in contempt of all that nature teaches. With these absurd contrivances placed between his weight and the ground that supports it, it is next to impossible for a horse to raise himself evenly upward and forward, and hence the number that one way or another interfere. If in raising his weight from the ground, the pressure be upon the inside quarter of the foot, then the thick part of the pastern is thrown inward, in the way of being struck by the upper edge of the hoof of

the other side. If the cant be the other way, and the outside quarter raise the weight, the inside edge of the shoe is thrown round and upward, and runs the risk of cutting with it the opposite leg. Even when the horse from having a naturally good gait escapes both these evils, still he is not free from trouble caused by this shape of shoe.

The fore foot of the horse, as nature makes it, has no such projection in front and downward as that which the smiths here gave it, but rather the reverse. The sole surface at the toe is commonly broken off and notched back at the middle, so that the pressure, when the foot strikes the ground or the animal is raising his weight, is distributed over the whole front of the foot. In accordance with this, the coffin bone (see figure 3) which fills the internal cavity of the hoof, has the same turned-up and notched-back form.



*Fig. 3.*

FIGURE 3.—Is a drawing of a fore foot coffin bone, in a position to show one side entire and a part of the front. The front is to the right hand, the notch indicating the centre of the toe. This blunted form, which the hoof also soon assumes if left bare, and which we do not see in the corresponding bone of the hind foot, has an evident connection with the use of the member it belongs to; and is to give a broad firm opposition to the concussion caused by the foot striking the ground; and a solid and stable base over which the animal may raise his weight. In the English form of shoes, with plain toes, and tips let into the front of the hoof as in figures 8, 13, 14, and 17, this natural position of tread is nearly followed; but more so in that of the French shoe (figure 18) with its rounded up front. Nowhere in the world has so much scientific study and attention been given

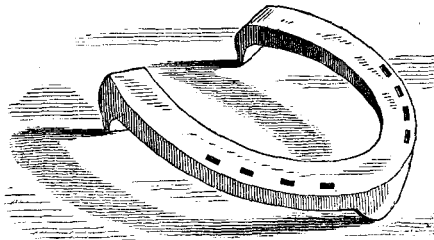
to horse-shoeing as in France, and although the English workman thinks little of some of their methods, (such, for instance, as one man holding up the foot while another drives on the shoe,) still there is no doubt but their form of foot and shoe is the best and nearest to nature that has yet been proposed, and is fast coming into favor among the more scientific of their British neighbors.

The main point of inquiry among the French of late, is to find the proper *aplomb*, or tread-posture, (if I may put two expressions into one,) of the foot; convinced that the nearer they approach to nature in this, the more will they facilitate the easy working of the other locomotive powers of the animal. If we take the cut, figure 18, as in any way making this approach to the proper form of shoe, we will find it presenting a very marked contrast to the pointed, peaked, and pivoted shape represented in figures 4, 5, 7, &c.

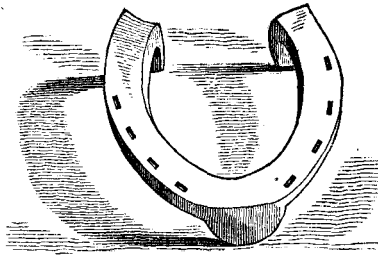
In England, France, and on the continent of Europe generally, wherever veterinary schools exist, and scientific attention is given to shoeing, this natural form of foot is more or less followed in the shape of the shoe, (see figures 8, 13, 14, 17 and 18) and the animal has preserved to him, along with the protection from wear which the shoe gives, the position of tread for which nature has constructed the other mechanical arrangements of his organs of motion. Why it is not so here is partially perhaps due to the use of the buttris for cleaning out the foot when it is shod, as it is almost impossible with this antiquated instrument to bring the hoof to the proper shape in all its parts; but it is more so to want of study on the part of those who shoe, of the structure of the foot, its uses, and the relation existing between it and the other motive organs, the bones, tendons, and ligaments of the limbs.

Let me describe for an instant the way the horse was commonly shod here a few years ago, and still sometimes is. The foot an inch longer at least (often more) in hoof than it should be, and brought out to a point instead of being rounded back. (Figure 1.) On this point is placed in addition to the unnatural length of the shoe, a round button like knob of steel, (figures 4, 5, 7, &c.) with perhaps only a fourth part of an inch of level bearing to rest upon the ground. When the ground is soft it is all well, as this projection penetrates till the flat of the shoe comes to bear the weight; and all the extra labor the horse has is that of raising himself an inch or

two more than he needs at every step, and digging up an unnecessary quantity of dirt or gravel. But the case differs when the horse treads on anything impenetrable, as a piece of stone, or smooth hard rock. Then the difficulty of raising his weight is added to by that of balancing himself while doing so, upon the pivot by which the point of his toe is terminated. The horse not being furnished by nature with muscles of abduction and adduction in the fore limbs (that is muscles for drawing the legs outward or inward, from or to the body) has but little power of balancing himself from falling sideways. The instant he begins to raise his weight upon the narrow base of less than half an inch on which the smith has propped him, the tendency is for him to topple over, which he does till the side or quarter of the shoe, either outside or inside, takes the ground and gives him farther support. This, however, is not done without a cant or jerk to all the joints of the foot. True, it is the work of an instant, and the horse recovers himself, and goes on before we can almost see it is done. But then the same occurs a hundred, it may be a thousand, times a day when the roads are rocky, or dry and stony; canting, twisting and jerking the coffin pastern and fetlock joints at every step, and yet, we daily meet with those who gravely wonder how the ringbones, swelled fetlocks, sprains and spavins, are all produced. The wonder rather is, considering the improper and unnaturally shaped feet and shoes, that there are any sound. (See figures 4 and 5.)



*Fig. 4.*

*Fig. 5.*

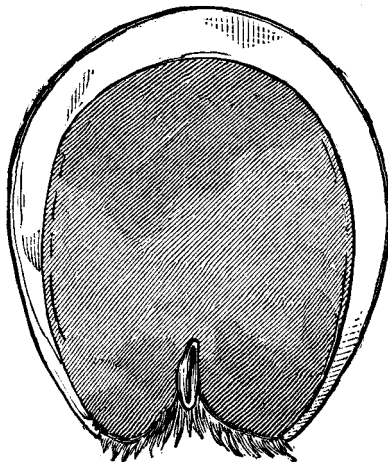
FIGURES 4 and 5—Are perspective views, the one of a fore, the other of a hind foot shoe, showing in slightly different aspects the objectionable forms of the toe caulks to which I have above alluded; and representing a system that was, at the time I speak of, all but invariable here in the formation of this part of the shoe. Both shoes were taken off feet in which severe lameness had been suddenly caused by a false step, jerk or twist, the fault being, (as in hundreds of other cases where it is never suspected,) from the animal's treading on something hard or impenetrable, with the narrow point on which he is propped up. I have often admired the almost artistic care bestowed by some of our smiths, in bringing to the nicest point this part of the shoe, which, after all, has nothing but the dirt among the horse's feet to come in contact with, while leaving the other side, to which the elastic and often tender foot has to be nailed, twisted, uneven and unworkmanlike. From the degrees of care they bestow on the different sides of the shoe, one would almost think the foot was the insensible body and the road the animated and sensitive being; but the reason probably lies in the fact of the side of the shoe next the foot being hidden when it is nailed on. Both the shoes from which the sketches represented were taken, were made in St. John.

Another of the errors in shoeing which I found current when I came here, was the want of a tip or projection, turned up on the point of the shoe for an abutment against the toe of the hoof. It seemed to me that in respect of this, the smiths had turned the shoe wrong side up, giving a tip downwards where nature never designed it to be, and denying one upwards where it was essentially wanted. As from the long toes, so from this also the fore feet are the greatest



sufferers. I have already mentioned the function of the fore limbs to be mainly the support of the weight, and its transference forward from point to point during the motion of the animal. In doing this, a considerable degree of concussion is inflicted upon the foot every time it strikes the ground. The direction of this concussion is neither right downward, nor right forward, but between the two; partaking of the horizontal motion of the body of the animal along the road, and of the perpendicular direction of the descent of his weight.

Every one knows the additional power of resisting or sustaining concussion and weight, any fibrous substance has if struck or pressed in the direction of the fibres, besides if acted on in any other. The hoof of the horse is composed of an infinite number of dense fibres, strongly agglutinated together; and to enable it with the greatest advantage to meet and support the concussion there is when it strikes the ground, these fibres are every one of them so placed in the unshod foot as to receive the shock directly on their ends. (See fig. 13.) In addition to this, the front part of the hoof, where the force of the concussion is greatest, (see fig. 6,) is twice or thrice as thick and strong as the side and heels, its slope indicating exactly the direction of the descent of the horse's weight.



*Fig. 6.*

**FIGURE 6**—Is a section of a fore foot cut across half way between the ground surface and the top of the hoof, to show the increased

thickness of the crust at the front, over that of the sides and heels. The circle round the outside represents the cut edge of the hoof. The foot is one of about the same size as that in figure 2, but has a thicker and better crust. The thinning of the crust from the point of greatest width of the foot, back to the sides and heels, shows the evil of driving our nails into these parts; and a comparison of the cut with the shoes figured 9 and 10, will at once explain how the lameness they caused was brought about.

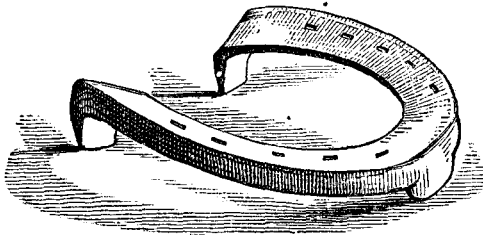
Now, all this thickening and strengthening and sloping at the toe of the fore foot is not without an obvious design, which is to enable it to receive without injury the shock upon it when the horse is thrown forcibly forward, as in leaping, galloping, or even hard trotting, especially if down hill; and by turning up a tip on the shoe as an abutment for the toe to press against when it strikes the ground, we make both shoe and foot to act together in harmony, we save the shoe from being knocked off, and at the same time promote the natural action of the foot. In shoeing without this simple expedient, we frustrate the design which nature evidently had in making the toe so strong, and throw the concussion this strength was designed to meet, upon the nail holds of the weaker parts of the foot, the sides and heels. These have not only to support the weight of the shoe, but also to bear the force of the foot striking the ground; and the shoe being found from these two causes more inclined to come off than is wished, recourse is had to an extra amount of nailing, not only at the toes, where from the thickness and want of spring in the hoof, it is harmless, but round the quarters and even to the heels, where by its pinching and fettering effects it is productive of the worst of consequences; corns, contraction and founder being its daily fruits.

No disease is more certainly a consequence of shoeing than corns, and the number of horses lame from this is almost beyond belief. I have met with them in feet where they had caused lameness for years, and been shod over all the time without discovery. In such a case we may blame the shoer for oversight, but not for wilful mis-doing; but what shall we say when a corn is discovered, and to some extent relieved by the knife, and then the shoe refixed on the very plan by which the evil was originally produced; yet such things happen not once or twice, but daily.

Two causes mainly contribute to the production of corns; nailing of the shoe too far back, by its preventing the spring of the foot, is one; the other is unequal pressure of the shoe upon the sole and heels. When both are combined, corns are next to inevitable.

A reason, or at least a pretext for heel nailing, I have already noticed. The extent to which it is carried, and the uniformity of its occurrence show, that those who practice it never entertain a doubt of its propriety, nor a suspicion that the hoof of the horse is an elastic and organized structure, contracting and expanding alternately at every step, and consequently suffering in proportion to the extent to which it is fixed and fettered.

The unequal pressure between the hoof and shoe which leads to corns and other hurtful consequences, may arise either from the shoe being improperly made, or the foot insufficiently pared out. It was rare to meet with a shoe here four or five years ago, on which even an attempt had been made to form a seat for the sole; more rare still that the attempt was successful. The seat, when tried to be made, was commonly only a concave form given to the entire surface of the shoe next the hoof, instead of extending only as far outward as the sole, and leaving a level rest for the edge of the crust. Such shoes (see figure 7) should be called scooped rather than seated, and are worse to make a horse go with, than even those flat made.



*Fig. 7.*

FIGURE 7—Is a sample of the form of shoe here referred to, and presents about as many faults as any one shoe can well have. There is neither abutment, nor even rest for the toe part of the hoof on the shoe, the front of the latter being depressed a full fourth of an inch from the level of the two sides. The foot surface is dished quite to the outside edge, with not the least space of level bearing

for the foot; so that even were the crust made level, only its outside edge could touch the shoe. Then the heels, instead of being level, slope to each other at a not very obtuse angle, the foot being *in* this part of the shoe, instead of on it, and performing the action of a wedge every time it receives the animal's weight. And to keep all these vicious contrivances in action, it is fixed with five nails on each side driven back to the very heels. No wonder the poor beast from which it was removed, went hirpling lame; the wonder would have been had it been otherwise. Yet it was no uncommon thing to see the same form of shoe in daily use on many of the best heavy horses in the city, and the owners all the time complaining of the badness of their feet.

But the cause of corns is often to be found in the way the foot is prepared. I have already adverted to the buttris as being instrumental in the production of long toes. It is equally so in that of corns. Of this no better proof is needed than the disappearance of the one simultaneous with the disuse of the other; this has happened generally in Britain within the last thirty or forty years, and particularly in the practice of regimental shoeing.

Professor Coleman, of the Veterinary College of London, writing in 1809, says: "There are very few horses that are not attacked with corns. This is so common a disease, that nine hundred horses out of a thousand have it." Mr. Percival, Veterinary Surgeon to the First Life Guards, in his work on lameness in horses, published in 1852, says: "That faulty shoeing is the chief and predominant cause of corns, cannot anywhere receive more satisfactory demonstration than in the Army. Corns, and quittors, and contracted feet, were in former days as rife in the Cavalry as in other places, whereas at the present day these diseases are all but unknown to Veterinary Surgeons of Regiments; and all is owing to an amended practice of shoeing."

My own experience, if it could add anything to the above, is this: During seven years practice immediately preceding my coming here, I did not meet with more than five or six cases of lameness from corns; and in a record of more than a thousand cases that I kept during a part of that time, noting them in the order in which I treated them, there is only one of corns, and that a slight one. Since I came here, there are few days that I do not see horses lame from

this cause, although it can be but a fractional part of the evil that comes under my observation.

In blaming the buttris for producing corns and other evils, a few words of explanation is necessary. From the shape of this tool, its tendency in cleaning out a foot with it, is to cut away both crust and sole, bars, heels and all, to one level. In fact it is hardly possible when using it to leave one part more prominent than another, especially when it is the crust and bars that should be left, and the sole removed. The hoof of the horse, though strong and tough to resist external agencies, is by no means a stiff or rigid body, but springs and expands at every step, and along with this expansion the sole descends and flattens out from the weight of the horse resting on the coffin bone inside. Now if this descent of the sole be not allowed for in fitting the shoe, either by a seat worked in the shoe itself, or by cleaning out the sole to a lower level than the crust, then the sole in its descent presses on the shoe, and the sensitive part inside is squeezed between it and the coffin bone. As the heel is the part of the foot in which expansion is greatest, and the descent of the sole and coffin bone most, and as the angle between the bar and crust is the place from which the sole is with greatest difficulty removed; so it is in the heels that the bruising and corn producing action of bad shoeing is most to be met with. Yet I have seen on all parts of the sole round near the crust, bruises caused by pressure of the sole downwards on the shoe. The way therefore in which the buttris aids in the production of corns, is from its unfitness for effectually removing the more depressed parts of the unnecessary horny sole. In the hands of a person aware of how the foot should be dressed, and who will take the drawing knife and rasp to give the sole, heels, and toe, the proper form, after doing the rougher part of the work with the buttris, it is an efficient and useful tool; and so long as people allow the feet of their horses to grow six months at a time without removing the shoes, they can hardly expect it to be laid aside. Its abuse, however, if better understood, would be easier guarded against; and it is to this, rather than to its entire disuse, that I wish my remarks to tend.

The common way in which I have seen feet prepared and shod here, is this: After removal of the old shoe the buttris is brought over the frog, bars and heels first, and these being soft and easily

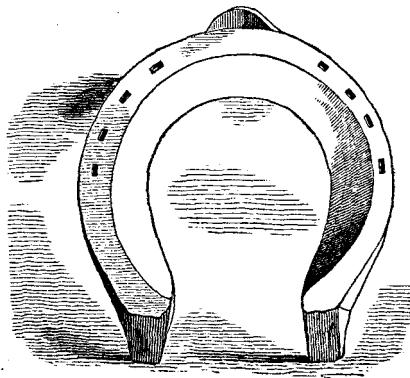
cut, get a liberal slicing; a scoop is then taken out of the sole on each side, extending nearly to the toe, and forming a uniform concave from the point of the frog to the out edge of the crust, so that when a scooped shoe is placed on it, instead of the foot and shoe presenting two level surfaces to each other, they rest upon two thin edges; and even with the level shoe, it is the thin out edge only of the crust that bears the weight. This scooping out of the sides of the sole, is all the implement can conveniently effect. It is not handy for rounding or shortening back the toe, and so is seldom applied in this way, that part being left entire, except a little out of the sole surface, which rather adds than otherwise to its projecting point. Neither is it available for cleaning out the sole from the angles between the heels and bars, leaving these parts prominent to rest upon the shoe. All it can do here is to bring the whole to a uniform level, and this being done with the foot off the ground, the instant it is set down all the parts change their relative positions, and if the sole was left equally full as the crust and bars (parts designed to bear the horse's weight,) it is now more so, and a week or two's work and growth brings such a degree of pressure on it as to bruise the sensitive sole underneath, rupturing some of the minute blood vessels with which it is studded, and showing the evil that is done by the effusion of the blood through the pores of the horny sole as in the condition called corn.

The foot being prepared in this way, the shoe was fitted (so far as it got any fitting) to its elongated and pointed form, and being turned wrong side up so far as the shape of the toe went, it was nailed as far back towards the heels as nails could safely be driven, and the same process being repeated time after time when the shoes were removed, we had the long, contracted, mule looking feet produced, that were seen daily on our streets.

A system of shoeing free from these defects is just as easy to practice, equally cheap, and productive of far more satisfactory results. The following is an outline of its most important points.

In making the shoes whether fore or hind, the elongated and pointed shape should be studiously avoided. Even when from previous bad management the feet are contracted at the heels and flattened in on the sides to an extent admitting of only a partial restoration to the proper shape; still the projecting point upon the

toe can be dispensed with, and a broad and solid bearing given in front. The fore shoes if they have a concave seat should have a perfectly level bearing of the breadth of the crust round the outside. (See figure 8.) The hind shoes do not need seating, as the hind feet have a greater concavity and less descent of the sole than the fore. Both fore and hind shoes should have a tip or projection turned up in front, as a rest for the toe to bear against, in the descent of the foot, and an aid to the nails in keeping it on. The web or body of the shoe should be of a uniform thickness all round, and when heel caulks are worn, they should be both one length, (figures 8, 17); and when only one caulking is worn, the other heel of the shoe should be thickened up to the same level, as in figure 15.



*Fig. 8.*

FIGURE 8—Represents the form of shoe here referred to. It is the fore foot shoe in common use generally in all parts of Britain; and is easily adapted for light or heavy work, and for having the ground side plain or fullered, and with, or without toe and heel caulking. It represents the upper sides of the shoes figured 12, 16, and 17. By replacing the shoes figured 7 and 11, with others made in this form, and confining the nails to the front part of the foot, the wearers were restored to comparative soundness, from being completely and uselessly lame.

When toe caulks are required, either to give foot-hold for heavy draught, or for sharpening in winter, they should extend as far laterally as the breadth of the foot will admit, (figure 12,) be as little prominent as may be to afford sufficient hold, be of a uniform

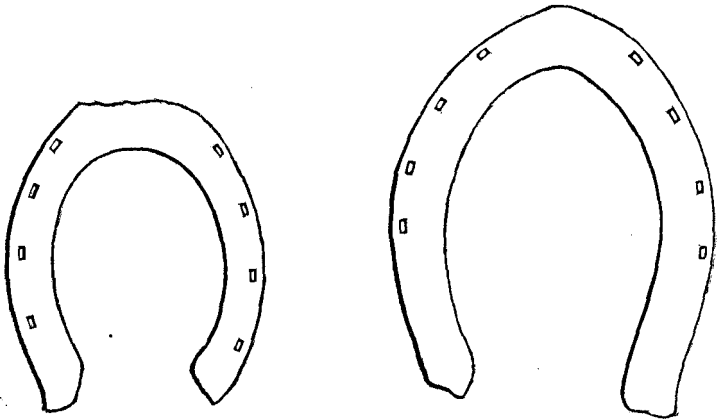
depth from end to end, so that all parts bear equally on the ground, and have the bearing edge on the same level as a line drawn between the points of the heel caulks.

The fullering or grooving of the shoe is a useful device for securing the even punching of the nail holes, and protecting the heads of the nails from wear. Beyond this I am not aware of any benefits from it, and it certainly has the disadvantage of weakening the shoe and facilitating its being worn down. In France, many parts of Britain, and in all the English Cavalry Regiments, (figure 16,) the nail holes are simply punched and counter-sunk, without any groove or fuller, and have a nail suited to the size and form of the hole. The shoe made thus has a greater solidity and durability, and I have little doubt will ultimately be the form preferred. But whether fullered or not, there are one or two things about the punching of the nail holes not to be overlooked. They should all be so punched that the nails may enter the wall of the hoof on its inner edge. No nail hole should ever be seen on the seating of the shoe, nor nail in any part of the edge of the sole. To do this properly, requires some nicety, as both the thickness and slope of the crust alter as we proceed from the toe to the heels, and it is one of the things much neglected in the making of shoes, there being but few in which you will see a well graduated range of nail holes. A point worse managed, however, is the placing of the nail holes properly as regards their distance from the heels. No nail should ever be driven into the feet further back than its broadest part. This is a rule of nature's indication, and she will not suffer its violation with impunity. Behind the broadest part of the hoof the spring and expansion is such that it cannot be fettered or confined without harm; yet it is quite common to see shoes with one or two nails into this forbidden ground, and sometimes they are nailed to the very heels.

As an instance: a gentleman drove a horse from Fredericton to St. John, which had been shod the day before leaving. He was two days on the way, and before reaching here was lame on all four feet. On taking off the shoes no special cause of lameness was found in any of the feet except the fettering effects of the nails; but these were driven to within half an inch of the heel caulks, so as to destroy entirely the natural action of the foot. (See figure 9.)



In another case, a gentleman's horse in the neighboring parish of Portland, had been lame from corns nobody knew how long, as the hoof was so over-grown that the corns had never been discovered. In this case the fore feet admitted of being shortened back more than an inch, and a proportionate quantity taken off the sole; and the nail holes of the old shoe, instead of extending only half round as they should have done, occupied more than two-thirds of the circumference from the toe to the heels. (See figure 10.)



*Fig. 9.*

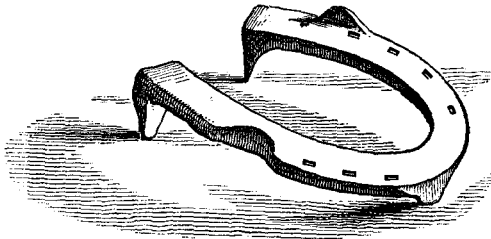
*Fig. 10.*

FIGURES 9 and 10—Are plain views of the sole surface of the two shoes above referred to. In form, proportion, and position of the nail holes, they are the exact representations of the originals. The long pointed toe of the one, and the proximity of the nail holes to the heels of the other, obviate the need for farther notice of their merits. The one was of Fredericton workmanship, the other St. John.

A third instance may be mentioned. A gentleman from Sussex brought a colt for me to see, being in the belief himself that he was foundered, as he was equally lame in both fore feet. The most careful examination could detect no acute disease as a cause for his lameness, but both fore shoes were nailed on with ten nails each, five on each side, and back almost to the heels, as if intended not to need removal during the animal's natural life.

During the time I was preparing these remarks, the following case occurred within a few doors of me, as if to impress more strongly

the necessity of exposing the system referred to. A dray horse was lame on a fore foot, and was taken to a forge and had a new shoe put on. Three or four days afterwards, (the lameness in the meantime having increased,) I was called to see him. I found the cause of lameness to be a suppurated corn in one of the heels, the inflammation from which had run so high as to break out at the top of the hoof, between the hair and horn. The cause of the corn was equally obvious. The shoe had no toe tip to steady it on the foot, but instead, had a large one turned up at each heel, (see figure 11) so as completely to fix the foot and make its lower part rigid as if in a vice. On inquiry, I learned that a shoe of the same kind had been on before the recent shoeing, and had no doubt produced the corn and lameness for which he was re-shod; while the more complete fixture of the new shoe caused the inflammation and suppuration I was called to treat.



*Fig. 11.*

FIGURE 11—Is a faithful picture of the shoe found on the foot in this case. It is a contrivance so absurd and hurtful under the circumstances, that had I not seen it, I would not have believed that any one possessing the slightest knowledge of the subject would have practiced it. Happily, such blunders are now of rare occurrence among any but the most ignorant of our shoeing smiths.

These were not singular instances; similar ones were occurring almost every day, and anything approaching to a well made shoe or well shod foot was the exception rather than the rule, at the time I write of.

In the preparing of the foot for the shoe, there is also, as I have already noticed, room for much amendment on the way it is practiced. The back parts of the hoof, having less growth and more wear on them than the fore, seldom require anything removed, except

it be a little from the outside heel. The frog should only be touched to remove any cut or ragged portions. The bars, those angular ridges that lie between the frog and heels, should be left at their full strength, and the sole between them and the wall of the heel thinned down, so far at least, as to prevent the possibility of its descending on the shoe. The sole at the toe where it has the protection of the shoe, should have all the dead and ragged horn removed, and the crust should be shortened back in front, and a notch taken out for the reception of the upturned tip, and its whole lower surface where it rests upon the shoe made plain and level.

The last is a most important point. The weight of the horse is supported by the attachment of the coffin bone to the inside wall of the hoof, the lamina by which the connection is formed, permitting of a very perceptible amount of motion of the parts. It is consistent with this that the rest of the hoof upon the shoe should be greatest at the inner edge of the crust rather than the out side, so as to give the weight the most direct support. In the scooped out form of shoe and foot, (see figures 1 and 7,) where the bearing of the one upon the other is by the extreme out edges, this is widely departed from, and the effects are seen in the broken, twisted, and contracted edges and heels produced. When the fore shoes are made without a seat, as in case of having the side next the ground concaved, (figure 14,) the same holds good with respect to the flattening and leveling of the crust, but the sole requires to be more cleaned out so as to prevent its descent upon the shoe. For doing this, as well as shortening back and forming the toe, the drawing knife will be found a far fitter tool than the buttris. In applying the latter to the foot, the heels, frogs and bars, are what first present themselves, and stand most in the way of its cutting edge; with the knife, the toe and sole are the parts easiest to cut, the back of the foot being out of the way rather; and it is owing to this perhaps more than anything else, that in the hands of those who shoe by rote only, without rule or reason for what they do, the one tool may be taken as the emblem of a good plan of shoeing, and the other the reverse. It is quite possible to make a bad shaped foot with a drawing knife, and not impossible to make a good shaped one with a buttris, but it is more convenient with each tool to do the reverse.

Few general directions can be given about the driving of the nails.

Different kinds of feet requiring different depths of hold. None of the nails should be so far to the inside of the wall as to press on the sensitive parts, (see figure 6,) nor so near the out edge as to split or break the hoof; and as a mark of fair and uniform driving, the nail points should come out all about one height. The rasp should be used to finish off with, but should be applied but sparingly to the upper part of the hoof, and wherever it has gone the surface should be coated over with a composition of greasy and resinous matters to stop its pores and prevent its drying and cracking on the surface; this should be done occasionally to the feet of all horses going much in snow and wet.

It is only horses used for heavy draught that should be shod with toe caulksings; and where the animal is to be used for saddle only, even the heel caulks had better be avoided on the fore feet, as in figures 14 and 16. Of course this only applies to summer. In winter, when the roads are icy, there is a necessity for caulks to give foothold, but even then the inside caulk should always be left blunt for fear of its cutting the other leg.

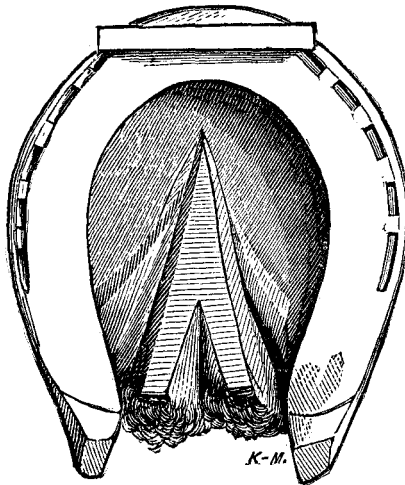
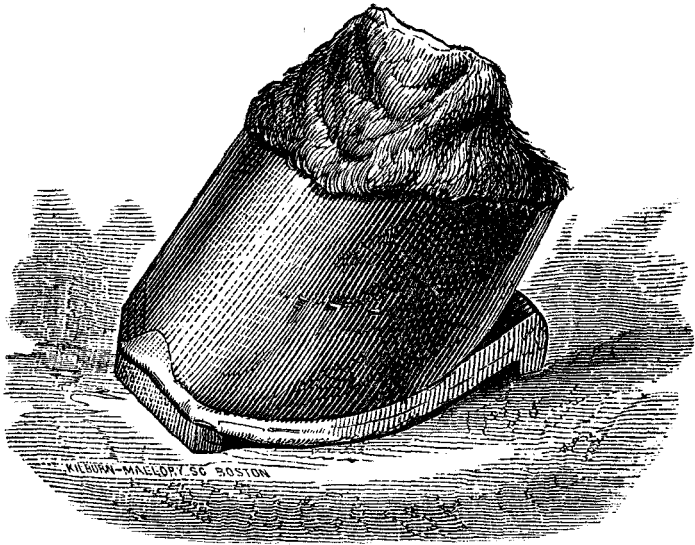
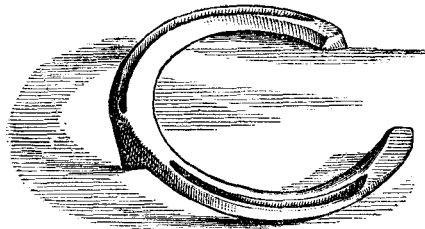


Fig. 12.

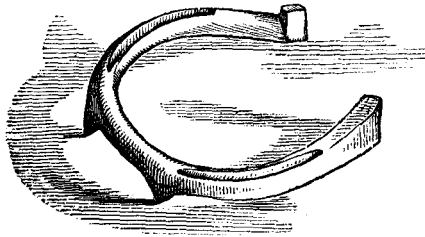


*Fig. 13.*

FIGURES 12 AND 13—Are sole and profile views of a thoroughly good foot, properly shod for heavy draught. The sole well cleaned out, and the frog and bars left. The toe caulk extending sufficiently far across the toe to give a solid support to the limb when only the toe is on the ground; and the upturned toe tip affording a firm abutment against the sloping point of the hoof. The direction of the fibres of the hoof as shewn on the cut will enable the reader the better to follow the arguments used at pages 146-7.



*Fig. 14.*

*Fig. 15.*

FIGURES 14 AND 15—Represent (ground side upward) an English fore and hind foot hunting or racing shoe, suitable for any kind of light saddle work. The fore foot shoe is dished or concaved on the ground surface, so as to give as near as possible the same form of tread and grasp as the hollow surface of the unshod foot. The hind shoe is rounded on the lower side, for the threefold purpose of affording strength in small bulk, giving a firm hold to the foot in leaping or galloping, and coming easily out of deep ground. It is commonly fitted with two tips, instead of one, to allow of the hoof projecting slightly beyond the shoe right in front, and preventing the annoying custom of forging, or striking the front of the hind shoe on the fore one, and the more dangerous one of over-reaching.

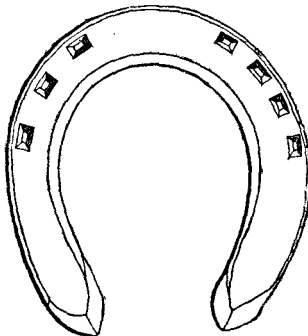
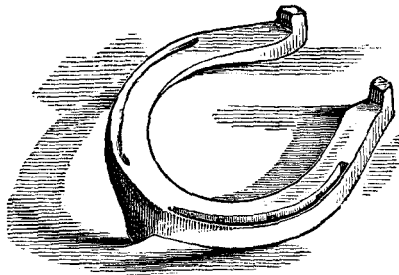
*Fig. 16.*

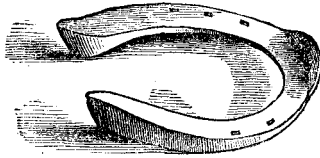
FIGURE 16—Represents the ground side of the shoe worn at present in all the British cavalry regiments. Until a few years ago the shoeing of each regiment was under the entire direction of its own Veterinary Surgeon; and though all agreeing in the same general principles, considerable diversity existed in some of the details,

especially the outside form of the shoes. Lately a committee conversant with the subject was appointed to inquire into it, and report to the Horse Guards, accompanying their report with a plan for a uniform system, for the adoption of all the different regiments. The cut represents the shoe thus recommended; and though some good authorities have found fault with it, preferring to have the lower surface concave, as in figure 14, rather than flat, as in this; yet it is a good useful shoe for a saddle horse, where there is much riding on hard roads to do, and admitting easily of having toe and heel caulks raised on it if needed for draught work. The cut is from a fore foot shoe, the side not shown being represented by figure 8.



*Fig. 17.*

FIGURE 17—Shows the ground side and toe tip of the common English fore foot shoe, with double heels, for light harness work. In all these shoes, and in all the different kinds of shoe used in any part of Britain, provision is made in this or some similar form for the steadying of the shoe upon the foot, and preventing of the forward action of the foot upon the shoe. In all these shoes also the rounded form of the toe shows a palpable contrast to the pointed shape of the shoes, (figures 4, 5, 7, 9, 10 and 11,) which are but fair samples of the form of shoe worn here till within the last few years. In all, the nail holes are confined, as they ought to be, to the part of the foot anterior to its point of greatest breadth; and in all, a perfectly level bearing is given to the wall of the hoof all round.



*Fig. 18.*

FIGURE 18—Gives an idea of the French form of shoe, spoken of at pages 142-3. The pattern from which the cut is taken is a shoe for light riding, but can be easily adapted to any kind of work. The cut represents the upper or sole side, the deep shading at the toe, and the light below it, showing the manner in which the whole of that part is turned up to a right angle with the slope of the front of the foot, the better to resist its concussion and forward action. For horses weak in the back tendons, or inclined to bend at the knees, or stumble, it is an excellent shoe to enable them to do their work with greater ease and safety; and if sanative with them, why should it not be prophylactic to those that are sound.

It would be easy to multiply these illustrations to any extent, either from faulty shoes taken from feet in which they had caused lameness of one kind or another, or of varieties of improved ones that have been put forward from time to time in Britain, during the struggle that has been going on for the last fifty years for superiority. But it is not required. Enough has been shown to prove the need there was for a reform in the art in this country, and the need once shown, an important step is gained towards reform. To the scientific inquirer I would only say that the subject is far from being exhausted, my aim having been to confine myself to points plain and obvious, and to errors common and glaring. Could our horse-shoers generally be brought up to the standing I have indicated, it would *then* be time to introduce inquiries of more strictly scientific interest. But we must not attempt nor expect too much at once, nor on the other hand give up hope, although reforms are but unwillingly adopted. Here in St. John, since the preceding views were given to the public a few years ago, a most material change and improvement in the general mode of shoeing has taken place, so much so, that some of our shoeing smiths would hardly



now acknowledge the shoes they put on so recently as five years ago, and that are figured in the preceding pages as their handiwork. The point for all who would excel in this most necessary and useful art to find out, is, that its secrets, and the welfare of the valuable animals depending on it, are not things to be right or wrong, according to this or that one's notion, but are based on mechanical and physiological laws, old as creation, and persistent as nature herself; and that whatever the plan be, whether old or new, unless it square itself by these laws, it is naught.

Hoping, my dear sir, that the foregoing hints, if you think them worthy of publication, may be of some use in your community,

Believe me ever yours very truly,

M. A. CUMING, V. S.,  
Member of the Royal Veterinary College,  
of London and Edinburgh.

## REPORT ON BARNs.

MAINE BOARD OF AGRICULTURE, }  
 January Session, 1857. }

The Standing Committee appointed to report after the close of the session to the Secretary of this Board, "plans and suggestions regarding the best mode of constructing barns and barn cellars," have given such attention to the important subjects assigned them, as to present the following views and suggestions as their report :

The anxious interest with which the people of Maine are now looking for agricultural improvement, the zeal and intense desire in many, manifested in practical agriculture, by the use of improved implements, better breeds of animals, imported seeds, skilful culture, increased attention to fertilizers, drainage, growth of green crops, feeding of stock, and improvement in other forms—the general desire to advance the condition of husbandry, seconded and fostered by recent liberal legislative enactments,—these cheer and encourage us to press onward, leading the way, or pointing to general or particular achievements.

Our farmers complain that winter interferes with, and diminishes their profits. To what extent it does so, is an important subject of inquiry. It may be another's privilege to teach and show the ameliorating effects of winter or arable cultivation, and its beneficial influence on the hay crop and grazing.

We cannot possibly shorten the period in which our stock must wholly be fed at the barn ; and it is only left us to adapt our system of husbandry to the production of the largest amount of feed to the smallest area, and learn to appreciate the truth, that "*shelter is cheaper than fodder.*"

An improvement on our present practice of shelter, and care of our animals, would be equivalent to an actual shortening of winter. It can hardly be questioned that exposure of cattle to extreme cold injures their health, and thus interferes with the owner's profit. Chemical physiology teaches us that warmth is equivalent to a certain portion of food, and that an animal exposed to more cold will eat more, and one better housed, and warmer kept, will eat less. To keep an animal comfortable, therefore, is to save food ; and this alone is a sufficient inducement to provide that comfort to the full extent. (1.)

(1) It is asserted on good authority, that exposed animals will consume a third more food, and come out in the spring in worse condition.

As we are appointed to the honorable and responsible duty of furnishing good and proper plans for barns, to all who may want barns hereafter, we cannot stop here to show both sides of the picture of *barns as they were*. Much improvement is seen on every hand over the old style, consisting of a wooden frame standing on a few wooden blocks or cobble stones, covered with single boards, with a generous crack at each joint for ventilation, rendering the inside rather the colder side.

In building, we study convenience and adaptation to the uses and purposes intended. To this we join economy, and look to a prudent disposition of material to secure strength and permanence to the erection, and greatest convenient space in proportion to the outside. This last point is often lost sight of in the many long, low, narrow buildings everywhere to be met with. (1.) Let us look at the plain, simple teachings of geometry in this connection.

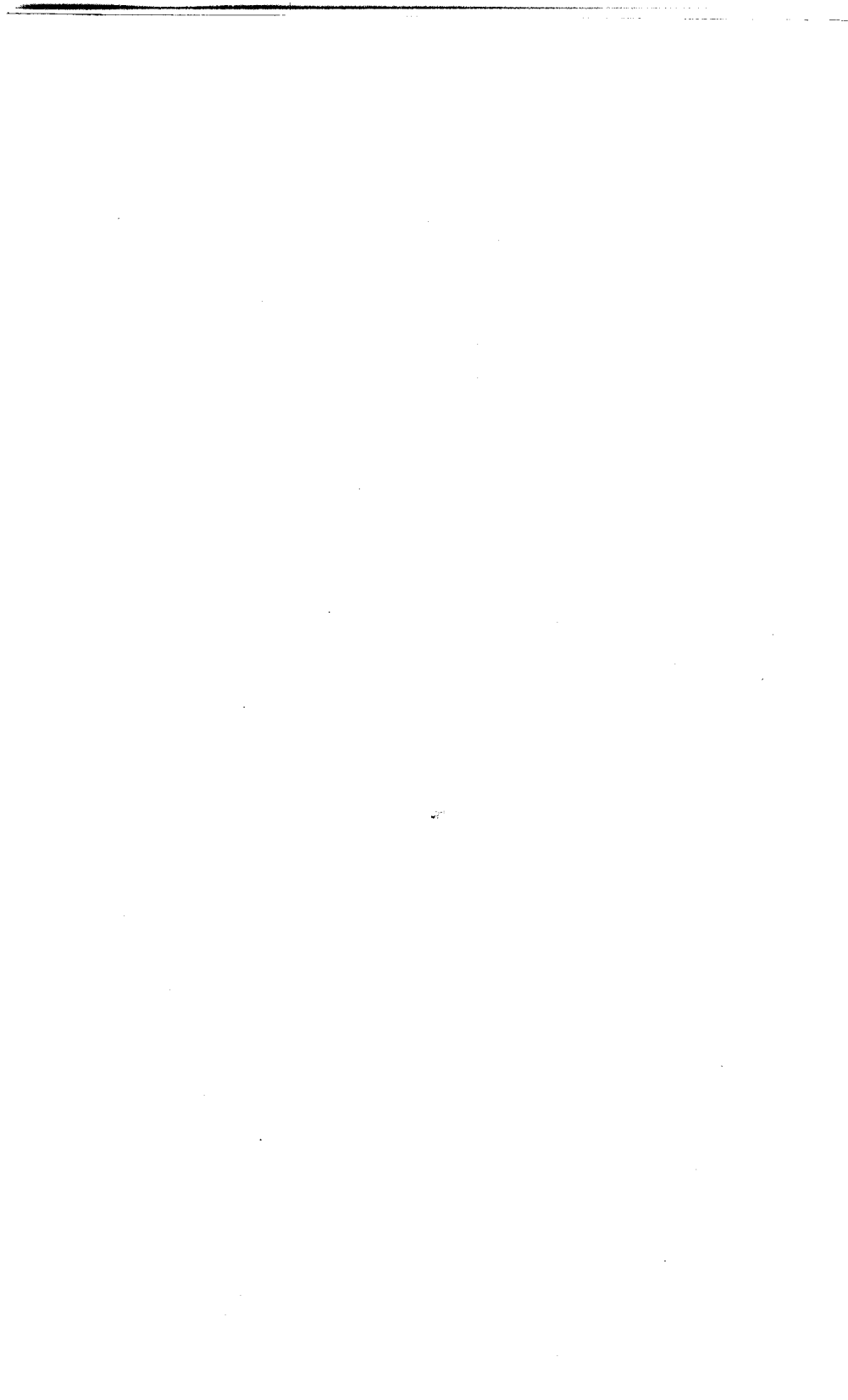
Take a barn fifty by thirty feet, and height of walls fifteen feet. This gives us of enclosed cubic feet of space,  $50 \times 30 = 1500 \times 15 = 22,500$  feet. Take a barn forty by forty feet, and fifteen feet high, and we have of enclosed space,  $40 \times 40 = 1600 \times 15 = 24,000$ . Thus we see a clear gain of fifteen hundred cubic feet of space in precisely the same number of square feet in the outer walls. This is obtained in the change of form from the parallelogram to the square. Then the roof is the same on a barn of fifteen feet in height as one of twenty. An economical plan as regards enclosed space for the quadrilateral form, is, to adopt the full width for convenience, as proved by experience, and also the full height; then extend in length to meet the demands of the case.

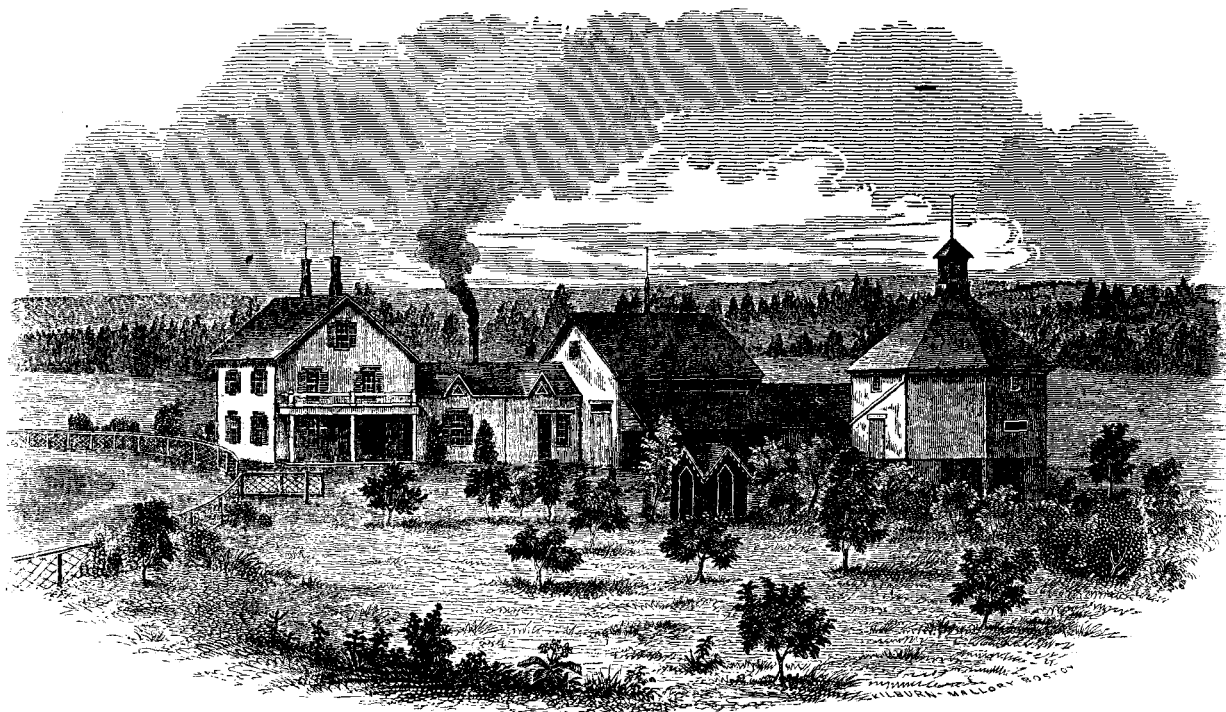
In economy of enclosed space, geometry teaches us farther in this matter. It is consistent with our general purpose to show a practicable approximation to the circle in the erection of our buildings, of whatever materials.

Take a barn thirty by thirty feet, and twenty feet high— $30 \times 30 = 900 \times 20 = 18,000$  feet. Compare with this an octagon of the same extent of wall, each of its eight sides being fifteen feet. We

---

(1.) The committee, in consulting European authority on barns and stables, find one point in their practice to commend—permanence in their structures. Beyond this, we have only to say, they are long, low and narrow, not generally designed for the storage of grain or hay, and affording no shelter for manure.





Farm Buildings of Calvin Chamberlain, Foxcroft, including Octagon Barn described in his report.

here have  $15+10,61-10,61=36,22\div 2=18,11\times 15=271,65\times 4=1086,60\times 20=21,732$  cubic feet, showing a gain by this approach to the form of the circle, of 3732 feet in this small barn; the capacities of the two being as 6 to 5. In most cases, it proves good economy to unite in the erection of a barn as many objects, purposes and conveniences as practicable, saving the expense of numerous smaller buildings, and a loss in time and travel in conducting each day's routine of business. An octagon of fifteen feet in the sides is too small for a farmer, yet many suburban occupants of a few acres will find this size just the thing wanted.

One of your committee a few years since changed his residence, taking a few acres of land with unfinished buildings, and wanting a barn. We decided on the octagon, but never having seen a building in that form, and no mechanic being at hand with the skill to aid us, what we did in the case is claimed as an original thing *with us*, and may be pertinent for the occasion, inasmuch as it may add our test of the thing to theory.

The plat of ground favored our design for a cellar under the whole, eight feet deep, and a cart-way leading out on a level. The cut (figure 1,) shows the floor plan.

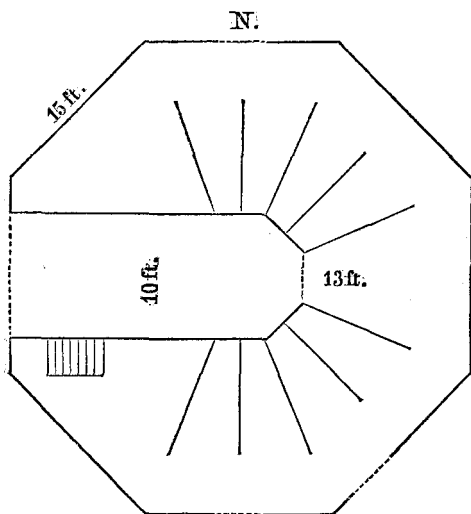


Fig. 1.

Scale 15 feet to the inch. Diameter of barn 36 ft. 2½ inches.

Floor, ten feet in the clear; doors same width and height; height below scaffold, seven and a half feet clear; entire height of walls, nineteen feet. A door is shown opening north to the pasture, four feet wide and seven and a half high; one south, same size, opening to yard; one on south-west side communicates with other buildings. Stairs lead to cellar and hay-loft. Passage way behind cattle stalls five feet wide, admitting wheelbarrow to pass at any time to any manure scuttle. Gates hanging to outer wall close passages to stalls, so that any animal may occupy its place untied. Side-lights at large doors, and a large window on opposite side, one sash of which slides horizontally, light the stable. Four large windows, set quite up to the plates, light the hay-loft. These let down at top, and are left down half the year; the two feet projection of the roof protects them from all storms. Cellar is lighted by four double windows and the side light at head of stairs. The open space, thirteen feet long, at end of floor, admits the horse, so that the hay-cart is brought to the centre of barn for unloading.

Your committee, not being familiar with the use of descriptive mechanical language and terms, must proceed in their own way, at the risk of being misunderstood.

A brief view of this structure may interest and aid the novice, however worthless it may be to the accomplished mechanic. Having laid out the site, we proceeded to remove the earth to the depth of about three feet, then dug a trench a little wider than the designed foundation, to the proper depth, and laid the cellar wall of granite which had been split from boulders to remove them from arable land. This wall was raised six feet, to the surface of the ground, on which was set granite underpinning, showing two feet above. Four granite posts, set deep, support interior sills. The cart-way from east side of cellar is ten feet wide, closed by double doors, secured on outside by strong cross bars, to hold the pressure of a manure heap.

Sills and sleepers are of selected cedar; outer sills seven by seven inches, on top of which is pinned a plank four inches wide. The entire floor is then laid of two inch plank, resting three inches on outer sills, leaving stairway and a sufficient number of scuttles for passing manure, roots, or material for compost into any desired part of cellar. The cattle stalls are afterwards planked within division walls, the forward end of planks raised two inches from under floor. Slots

are cut in floor behind cattle, one inch wide and of length to pass a shovel, for venting liquids.

One-half the earth in cellar excavation, it will be noticed, is left to be incorporated in the manure, and eventually carried to the tillage land. We find the hogs not averse to this sort of sub-soiling, and the dirt, although not the best for an absorbent, is being removed quite as fast as we desire.

The outer sills, girts and plates are all of the same size, and in framing are cut to a board pattern, the ends without tenon or mortice, at the right angle to fit together, and are secured at the corners with bolts of half-inch refined iron, fourteen inches long, a nut worked on a full thread screw at one end, and a large head at the other. These bolts, passed through the timber at such an angle with the grain, with a well fitted heading, are stronger than any device for a union of the wood; indeed, we think even these bolts superfluous in our manner of boarding, except in the plates. The corner posts have their outer sides hewed to the shape of the corner; their ends, cut without tenons, rest on the plank top of sills, and having the girts resting on their heads. Posts above the girts have the plates resting on them in the same manner. The door posts are of the whole height of the wall, and tenoned in the plate.

The door cap has two braces of three feet run above it. These are the only braces in the frame.

The studs are 4 by 3 inches, without tenons, except those on each side of the corner posts, which are of the whole height, halved to the girts, and tenoned in the plates for the convenience of raising. The girts on each side of barn floor extend across the barn, tenoned in door posts and girt opposite; being over corresponding cross sills, these four are the only long timbers required in the frame; and these, from having intermediate supports, may be spliced without detriment.

To raise the frame, put together door posts, cap, plate, studs and braces between them, and the short girts tenoned in door posts and reaching the corner, and raise it; set up all the corner posts, and stay them in place; put on the girts; set the studs in place, and nail them at the ends; then proceed to board up the walls to the girts; provide boards of the proper length for the sides where no door or window occurs, so there be no waste; saw them three-fourths



inch thick, and put them on double, nailing fully with No. 12 nails; put up the upper portion of the frame in the same manner, and complete the boarding of the walls before raising the roof. Erect a temporary staging on centre girts, on which to work in raising the roof; give the roof a good elevation. Ours rises fifteen feet above the walls at the apex; the corner rafters 8 by 3 inches, of spruce; the others two inches thick. This form of roof, when well boarded and nailed, is self-supporting; no beams nor interior posts are necessary; clapboard the walls; shingle the roof, painting as you lay the shingles. A cheap paint may be had of pine oil and hydraulic cement; or Ohio clay, (Blake's patent,) or even Maine clay.

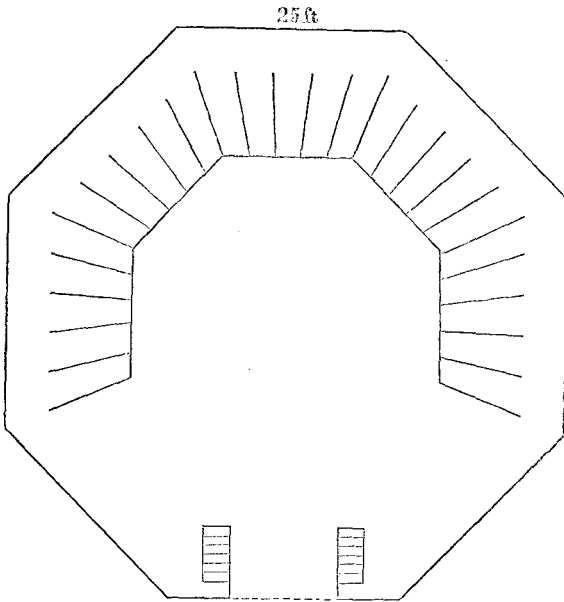
A scaffold thirteen feet long is put over the floor, and twelve feet above it.

The small barn above described will store twenty tons of hay. We find it convenient, and if it has faults or omissions, we have not, in three years, had time to find them.

We are satisfied that no other disposition of the same amount of material will give so strong and spacious a structure. The frame is simple and cheap. The covering, if put on as it should be, takes much time. A considerable saving in labor may be made by cutting the shingles to pattern for the corners at a shop with a burr saw and side-table. A ventilator is left at the apex of the roof, and always kept open. Good scaffold flooring can be made of plank sawed from large elm trees, which are of but little worth for other purposes.

This plan, though rather on the "Chicago balloon" order in its details, is offered with much confidence.

The committee will theorize so far as to present in outline a large structure on the above plan.

*Fig. 2.*

Scale 20 ft. to the inch. Diameter of barn 60 ft. 4 $\frac{1}{3}$  inches.

FIGURE 2 shows a barn of twenty-five feet on the sides. Diameter of barn sixty feet and four and one-third inches. A good height of walls for such a barn would be twenty-four feet. The floor-way should be twelve feet in the clear. Under the girts the centre space is thirty-three feet wide. Five sides give ample room for twenty-five stalls for large cattle or horses, being four feet wide each at the rear. Pillars may be set in front of stalls to support the scaffold, and leave the centre space clear. The loft of such a barn will store one hundred tons of hay. In many locations the cart way could be cheaply made to an upper floor, thus saving much severe labor in the unloading of fodder. When such an arrangement is not practicable, (3) the height of roof on this plan would admit

---

(3.) An upper floor for a cart-way in this plan is not impracticable, even on a level plat. Neither should the cellar be omitted. To a floor elevated twelve feet above the lower one, the lower being three feet above the surface of the ground, an easy grade may be had (five degrees elevation) by commencing an artificial embankment one hundred and seventy feet distant. The twenty feet adjoining the barn should be a bridge, under which a short cart may enter and leave the lower floor. This matter of an upper cart-way is one of immense importance, and should be secured even at a heavy outlay.

a system of pulleys attached to the apex of the roof, and by a horse working below, a load of hay could at once, by a net of ropes laid in the cart, be raised and swung to any side by a changeable pulley, and deposited at will.

We will not tax our artist for many lines and figures on this plan. A general idea based on our convictions of its entire feasibility, is all we here offer.

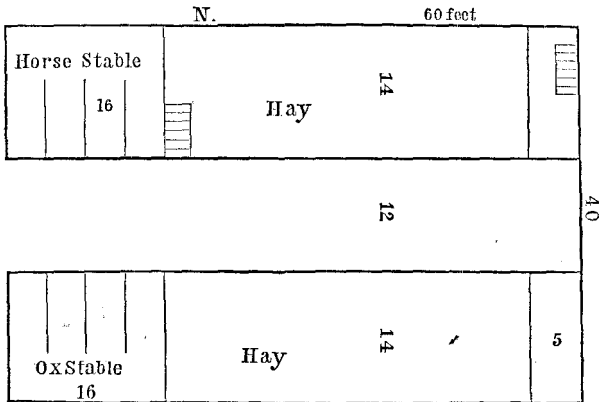


Fig. 3.

Scale 20 feet to the inch.

FIGURE 3 represents the main floor of a barn sixty by forty feet, facing the south, the ground descending east and south, entrance at the west. This figure shows the floor, stables for horses and oxen, hay bays, walk for feeding cattle in basement, and stairs to basement and root cellar. Figure 4 shows the basement to same structure.

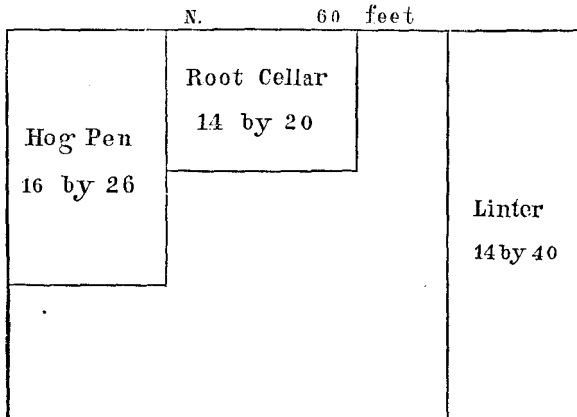


Fig. 4.

This plan is designed for a substantial wall under the west and north. The yard is to the south, and on the level of the bottom of the cellar; the hog pen is shown on the west, sixteen by twenty-six feet, under horse stable and floor; the root cellar at the back, fourteen by twenty feet. The *linter*, (corruption of *lean-to*?) byre, or whatever proper, local or provincial name may be applied to a cattle stable, is at the east, forty by fourteen feet; being above ground and built of wood, is free from damp, and admits of being well lighted and ventilated. The remaining space serves for the manure and a shed for stock.

It will be observed that the hog pen—the farmer's bank—is, in this plan, large, and its location well conceived. Designed to be near the swill-room, it takes the horse manure, and being under the floor, material for composting may be discharged therein through a scuttle from the cart.

The feeding troughs may be placed under the side of the floor way, and kept in place by fixed vertical rods of iron passing through their ends, on which they may be raised as the manure accumulates. The manure is discharged from the hog pen by a large door or window opening into the shed.

The committee offer this plan with much satisfaction; but before leaving it to the criticisms of the farmers of Maine, we will give it the first *cut* ourselves. The owner of such a structure must practice "eternal vigilance" or the liquid excrements from the cattle stables will run to waste. The best that may done by providing dry absorbents through our long winters will serve only a partial purpose, unless the following plan, or some other equally efficient, be adopted:

The width we have given the linter will serve to admit an open reservoir back of the floor, constructed cheaply in the following manner: Take heavy earth,—clay or gravel—raise it to the sills, packing it firmly, forming a trench representing the vertical section of a circle, three feet wide and a foot deep at the centre. Mix hydraulic cement to a semi-fluid state, pour it in the trench, and spread it with a brush broom. Give it a good coating. This will make an indestructible, impervious receiver. Lay the floor tight, a little inclined, with the planks projecting eight inches over the trench, the remainder left open. We have this idea from the lips of Prof. Mapes.

At the risk of infringing on the prerogative of another honorable committee, we quote from the same for authority, on a matter so intimately connected with our subject, and of such vital moment, that it will bear repetition even *in a book*.

Having provided our reservoir for liquid excrement, we will point to the best and most generally diffused absorbent for filling it—*muck*—by introducing

*The "Salt and Lime Mixture."*

[See "Working Farmer," Vol. 3, page 280.]

*"To three bushels of caustic lime, add one bushel of salt dissolved in water."*

The salt water will slake the lime, and a chemical change will take place. Salt is composed of *chlorine and soda*, both of which are valuable as manures. The lime will combine with the chlorine, forming chloride of lime, while the soda, being set free from the chlorine, will take carbonic acid from the atmosphere, and become carbonate of soda. Having commenced with salt and lime, we now have in its stead, *chloride of lime and carbonate of soda*, four bushels of which added to a cord of muck, peat, swamp-mud, wood-earth, or other organic matter, will decompose in a short time, and render it suitable for being composted with stable and other manures.\*

In making the salt and lime mixture, if the lime is not fresh from the kiln, it will not receive all the dissolved salt the first day. When this is the fact, turn over the pile the following day and add

\* [The method of preparing muck for use by means of salt and lime, introduced by Dr. Dana, is a very valuable one, and worthy of extensive use. It is best done by placing the lime upon the muck, slaking it with a *saturated* solution of salt, and then mixing the whole mass immediately and as thoroughly as possible, turning the whole several times subsequently.

But the extract from the "Working Farmer," as above given, makes erroneous statements of the chemical changes which take place. "Common salt consists of chlorine and *sodium* (not of chlorine and *soda*.) If water is added to it, the chlorine will abstract from it hydrogen, and the sodium oxygen, and muriate of soda is formed." This muriate of soda is decomposed by caustic lime, which has a stronger affinity for the muriatic acid than the soda has, and so muriate of lime is formed, (not chloride of lime) and the soda set free, at first in a caustic state, which enables it to act more efficiently upon the muck. It however gradually attracts carbonic acid, and changes to carbonate of soda; other, and more complicated combinations and changes also take place, which it is not necessary here to enlarge upon. The errors of statement thus referred to, do not affect the results of mixing salt and lime in the least, but it is always better to use correct terms; and if the above should lead any to think he could thus make *chloride of lime*, he would find himself egregiously mistaken; for scarcely any two salts in common use are more widely unlike in their uses, and effects when used, than muriate of lime and chloride of lime.—Ed.]

the remainder, or perhaps three or more turnings may be necessary before the salt water will be received by the lime. This mixture should always take place under cover, as both the chloride of lime and carbonate of soda are soluble in water. The mass should be turned over every other day for a fortnight, and it will then be ready for use. We have decomposed with this mixture spent tan, saw dust, corn stalks, swamp muck, leaves from the woods, and indeed every variety of inert substance, and in much shorter time than it could be done by any other means. Many soils are short of chlorine and soda, and for such the salt and lime mixture is an admirable top-dressing; but its great use is in enabling the farmer to prepare a large amount of material suitable for mixing with stable manures as fast as made, and which, during the fermentation of a compost, is capable of absorbing the more valuable portions, and thus be rendered equal in quality to the putrescent part."

Muck prepared by the above method during our dry summers, may be put under cover in such a state of dryness as to be handled during winter. For the convenient storage of this article in quantity, we suggest an addition to figure 4, which we will give without a diagram. Attach to the front of the barn an overshot roof, projecting so as to cover sixteen feet in width. At the east end, in front of linter, inclose a room sixteen by fourteen feet, and communicating with it, or, in other words, lengthen the linter room sixteen feet in front. This space filled with prepared muck to the height of eight feet, is fourteen cords. At the other end of barn, the open space in front of hog pen might be inclosed and lengthened in front in same manner; or perhaps better extend the hog pen over the whole space, in which case, the muck used as an absorbent under the ox stable could be deposited through the barn floor. The committee believe the few plans here offered, by being enlarged or diminished to suit cases, will be adequate to present general wants; and we may take our leave without infringing on our idea advanced at the outset, by introducing plans of sheep barns, dairy barns, or structures to be multiplied on the farm for special purposes. We have no ambition to gratify by an attempt to make a picture book.

*Some fragments gathered up.*

In the plan figure 1, we like cribs for cows at least eighteen inches above the floor, built of hard wood; the front of feed-box five or six inches high; a rack set vertically in the line of the floor-way, and a swing-board at the floor side for feeding long fodder. The space

under the crib is left open for the purpose of placing within reach of the cattle such coarse fodder as may be partly eaten, and the residue to go for bedding.

Lest we should not be understood in our brief explanation of figures 3 and 4, we will add, that the plan is designed for a plat that descends at least eight feet in the length of the barn. This may be secured in part by an artificial embankment at the upper end and the back side. The object is to secure the whole height of the linter in the basement, above ground. It will readily be seen that this plan is an accommodating one; it may be reversed when the entrance is desired at the east end. The root cellar being protected from frost by the earth embankment at the back-side, and by the hay over it, may be secured on the other sides by a double wall of boards, filled between with dry tan or other non-conductor, as an ice-house is built. We would urge the importance of double boarding the walls of barns, whether the frame is designed for horizontal or vertical covering. If it is to have an outer finish of clapboards, the nails hold the better. It is a cheap way to secure warmth and strength to the structure. A barn should be nearly proof against frost in our most severe weather, when well filled with cattle and their fodder. There is not the least difficulty in attaining to this.

A few parting words:

With this brief attempt towards a discharge of the duty assigned, it seems due to the Committee on the one part, and the Secretary and the State on the other, that we should say, that this committee was appointed without their being consulted, and without their knowledge at the time; that the individuals composing it have no personal acquaintance one with another; that they have failed since their appointment to effect a meeting of any two for consultation; that at a late day, when the work could no longer be deferred, the working part of the committee could not be less numerous; that the broad invitation given to "the rest of mankind" by the Secretary in his circular, failed to elicit anything touching this subject. Bred neither to literature nor mechanics, with but an occasional hour for the indulgence of extras of this sort, are circumstances attending the working part of the committee, that mark their impress clearly on the face of the production.

The chairman acknowledges his obligations to his associates, for

the expression of their cordial good wishes for the successful discharge of our duties, and desires they may be richly rewarded by the approval of a just and generous discriminating people, of all such of their timely views and suggestions as have been incorporated in these pages.

CALVIN CHAMBERLAIN, *Chairman.*

FOXCROFT, Nov., 1857.

---

## REPORT ON BEST METHODS OF PRESERVING MANURES.

S. L. GOODALE—*Dear Sir*—Having had no interview with, nor any communication from, any of my associates, except a short conversation with Mr. Parlin, after long delay, by your repeated promptings, I am induced to communicate the following, not as the report of a committee, but as my own views on the subject:

It is to be regretted that a subject of so much importance to the agricultural interests of the State, as that of reporting "facts and conclusions regarding the best and most economical method of preserving solid and liquid manures," should not have had a seasonable and thorough investigation by an able committee, who would have presented a lucid report, in such form, and so well sustained by science and by practical tests, as to secure for it an attentive reading, and prompt to the desired action on the part of the farmers of the country. On no subject connected with the agriculture of this country, is reform in opinions and practices so much needed, as on that of preserving the manure made upon the farms. The loss from want of care, and from erroneous practice, is immense.

Had I confidence in my ability to do it in an acceptable manner, I would not attempt a dissertation on the preservation of liquid manures to be applied in a liquid state, for in the present condition of our agriculture it would be labor lost. Though there can be no doubt of the fact that plants receive all their food in a liquid state, and that nutriment is not thoroughly prepared for their reception until it is liquified, the farmers of this country have not generally the capital to invest in tanks, pipes, and other conveniences to convey



manure to their fields in liquid form, if they could be convinced that it was desirable to do so. The true condition of manure to be applied, and method of applying, for us, is to carry it to the field and thoroughly mingle it with the soil, in a state as completely soluble as can be attained without loss of any of its fertilizing properties.

The important question, in the existing state of things, is the method of preserving manures so as they may be applied in any form or manner.

Without claiming perfect accuracy on the point, it is deemed safe to say, that something more than fifty per cent. of the manure made from the farm stock is lost in the outset, by suffering the liquid portion to run to waste. True, some farmers are saving it by the use of absorbents, but the number is so small in comparison with the whole, that the excess of value in the liquid, above the solid portion, (being, according to the best authority, as five to four,) is so great, that the average waste is more than one-half. This estimate applies only to "housing time"—to stock that is housed, and to the manure made in the house. Manure made by stock in yards, both summer and winter, suffers still greater wastes, and the manure from flocks is, during the warm season, almost without exception, an entire loss; not so much as enriching their own pastures, being dropped in the woods, by the sides of streams and ponds, or wherever the sheep can find a shade. Add to these the waste of pig manure, poultry manure, sink water, night water, night soil, bones, dead animals, and other refuse about farm establishments, and the aggregate waste must equal two-thirds the fertilizing matter made from the consumption of farm produce, which, with proper conveniences and proper care, might be returned to the soil to aid in reproduction.

However important and profitable it may be, in some cases, to apply imported specific manures to renovate exhausted lands, the only reliable source of fertilizers to continue and increase the productiveness of our farms, is *the manure made upon them, and from their products.*

Should any think the waste is here estimated higher than the facts will warrant, let such objectors cast about them for proof of the unsoundness of the position assumed. How many of the floors of cattle "tie-ups" and pig houses of farmers who take due care

that their stock has clean and dry lodging, will he find perforated with augurs that the urine may run off as fast as it is voided? How many cases in which the manure from cattle stalls is thrown outside of the barn to be mingled with the snow and drenched with the rain that falls upon the roof, and left in this position till "after planting," and then carted and spread over the surface of yards, upon the long manure made by "feeding out," to be mixed with it by repeated plowings and the tramping of cattle during summer, these yards generally receiving all the water that falls upon one side of the roofs of the buildings that surround them, and not unfrequently the water from higher ground outside. Manure treated in this way, thus far, is often carted to the field in the fall, containing *two waters to one manure*, dripping all the way, there to remain uncovered through the winter, for use in the spring. How many dead horses and other animals are hauled into the woods to feast foxes and crows, or thrown into ponds and streams for food for fishes, or, worse still, left to rot in the field, to poison the atmosphere with their deadly effluvia! On how many farms will he find any pains taken to preserve bones and apply them to the soil in any form? Will he not oftener find them scattered about the yards and over the grass fields, wherever the dogs have left them? On what proportion of the farms are absorbents collected to receive the water from sink-spouts, wash-rooms and water-closets?

Some or all these things may be witnessed on a great majority of the farms in this State, with others, in a greater or less degree, improvident; and amongst them may be classed that of carting bog-muck and other material into *yards* to receive the droppings of cattle, the sun and rains for a while, till a large portion of the volatile properties of the whole are carried off in the air, and the soluble parts washed out by the rain.

Agricultural writers and speakers have been diligent in exhorting farmers to this course. Perhaps, on the whole, it is better that this should be done than nothing; but in some cases, not so much is gained by all the labor of extra cartage as is lost by drenching and evaporation; and in all cases, the loss from these causes is very great. Had the breath and ink which have been spent in keeping the importance of such a course "before the people," and the labor which has been spent in following such teaching, been devoted to

showing the necessity of having shelter for manure, providing dry absorbents, and keeping cattle housed as far as practicable, both summer and winter, and this teaching been as faithfully followed as it has been in the former case, the benefits would have been greater, at less cost.

The course here taken, without any attempt to point out a remedy for the evils complained of, would subject any writer to the charge of "tearing down." To avoid this charge, and to carry out the design of the present effort, it will be attempted to give the details of a method within the means of every farmer, by which the principal loss—that of the liquid manure—may be avoided.

The management of manure is so connected with the management of stock, that it is difficult to treat of one without reference to the other. To successful farming, it is equally important there should be covering for manure, and well arranged and comfortable stables for stock. A hard, dry and smooth yard or yards, connected with the barns and stables, is not only a convenience, but almost indispensably necessary.

For saving all the manure and keeping the cattle clean, the best arrangement for a stable is for each animal to have a separate stall, with the floor a little inclined from the stanchions back; and in the floor, at such a distance from the stanchions as to give the cattle room to stand, there should be a gutter six inches deep and fourteen to eighteen inches wide. From the gutter to the back of the stable, the floor should be horizontal and level with the outside sill. This horizontal part of the floor, in a stable fourteen feet wide, will be three or three and a half feet wide—wide enough to allow cattle, in coming in, to walk upon till they arrive opposite their own stalls or stanchions; they will then step over to their places. By this arrangement, there is a dry walk in the rear of the cattle, which may be kept clean, as both the solid and liquid manure, drop into the gutter; and if the stanchions are so near the partition in front that the cattle do not step forward into the manger or crib, they will never drop manure where they can lie down in it. Independently of the advantage of the gutter for the reception of absorbents, the benefits of a dry walk behind the cattle and of keeping them clean, is a full compensation for the extra cost of the floor, which cannot exceed two shillings a head for the cattle in a stable thirty or forty

feet long, if made at the time of building or repairing. The idea of this gutter was taken from "The Working Farmer," and acting upon the suggestion, in repairing the stables on the farm of R. H. Gardiner, Esq., I made a gutter of the kind here recommended, in stable room enough for the accommodation of thirty or forty head of cattle, seven years ago. An advantage, not before named, is that of less liability of the manure freezing to the floor in the gutters than on a floor where the urine runs off. The gutters described by the editor, and which he has adopted on his own premises, are much larger than those here described—large enough to hold the manure made for several days, with the addition of muck to absorb the urine for the time. Those recommended above will need clearing out every day.

Having these preparations—the shed or a dry cellar for the reception of manure, the dry yard, and the gutter in the stable floor—there should be provided a supply of dry material to be used in the gutter as an absorbent. For this purpose, bog muck, rotten wood, leaves, saw dust, spent tan, charcoal dust or loam, may be used with profit. If the material, whatever it is, is not dry at the time of collecting, it should be stacked in or near the yard, and in the dry part of the season spread a few inches thick over its surface, and as it becomes dry, removed under cover, and the yard spread over again. In this manner, the matter intended for absorbents may all be prepared. A convenient place of deposit is one end of the stable, if not wanted for cattle. When this cannot be spared, an open shed, with ground or floor so raised as not to be exposed to water, may be used; and in the absence of this, it may be re-stacked and a temporary roof thrown over till better preparation can be made. In cases where it is necessary to make additions to the farm buildings in order to adopt this method of preserving manure, a good arrangement would be to make an addition to the stable, twelve feet wide or more, upon the side or end in which are the cattle stalls. If the ground falls off, or the stable stands a foot or two above the level of it, the floor over the lower room which is designed to receive the manure as thrown from the gutters, may be so low as to admit of conveniently throwing the material to be used as absorbent from the cart into the room directly above that which is to receive it after being saturated in the gutter. From this second floor, (on the sup-

position there is a floor near the ground,) the absorbent may be shoveled directly into the gutter through doors made to rise and fall in opening and shutting. Besides this being a convenient depository of muck, &c., it may be lighted and made comfortable quarters for poultry, both summer and winter.

With these fixtures, and a supply of dry muck on hand, the arrangements are complete for "preserving solid and liquid manures," so far as the manure of neat stock and poultry is concerned; and to secure all the benefits of them, it will be necessary that the dairy cows, and such other stock as come home at night, should be put in the stable, and that all stock should be fed under cover during winter, the gutter daily supplied with as much muck as the urine will saturate, and be cleared out every day. The practice of "putting up cattle" at night will never be abandoned by any farmer who has tried it long enough to learn its advantages. By pursuing a method similar to the one suggested, the last two summers, the manure of five cattle, with the addition of three or four cords of charcoal dust, has been made of as much value to me as that of fifteen or twenty for the same time would have been if dropped in the yard.

To save the manure from sheep, they should be fed under cover, in boxes or cribs, either in sheds open on the warm side or with wide doors that open by raising them with pulleys. Sheep, if left to their choice, will leave most of their manure under cover, both winter and summer. The floor of the sheep house should have an occasional covering of muck, that nothing be lost. Pastures for sheep should be so arranged, if possible, that they can have access to their winter quarters in the summer, which they will be sure to occupy on hot days, if the sun is excluded and there is a free circulation of air through them. If sheep cannot come to the barns in summer, low roofs may be built on high ground in their pastures, and dry muck thrown under for them to leave their excrement in. Sheep prefer this kind of shade to any other, and to be out of the sun and the trouble of flies, will occupy it during most of the warm days. In this manner, a few loads of manure each year may be saved, which would otherwise be an entire loss. This manure is not inferior in quality to that sometimes sold for guano.

To go through with describing the methods of preserving other wastes about farm establishments is more of a task than I feel

inclined, at present, to undertake, and close by suggesting that it be recommended to the Trustees of the Maine State Agricultural Society to offer premiums for the best fixtures, conveniences and *practices* in saving all manures, and materials capable of being converted into manures, on the farms of competitors. By this, something practical and valuable to the public may be gained.

In treating of the method of saving the manure of neat stock, perhaps it should have been added that the bedding of the stock, whether straw or other matter, should pass into the gutters and be saturated before thrown out.

Another after-thought: it will be observed that in this communication, the practice of carting rain water into the field for manure receives little favor; though indispensable in agriculture, it is thought it may be had on the spot in sufficient quantities at less cost.

Yours truly,

NATHAN FOSTER.

GARDINER, Dec. 11, 1857.

---

### REPORT ON GRAPES.

FREEPORT, Sept. 30, 1857.

MR. GOODALE—*Dear Sir*—I received a circular from you, in which I notice that I was appointed one of a Committee, by the Board of Agriculture, to report on the best varieties of hardy grapes for open culture, and such varieties only, as will, in their opinion, mature fully in this State.

It is well known that a number of varieties of grapes will fully mature in this State in favorable seasons, in sheltered positions, while in cold seasons, like the present, there is scarcely a variety which will fully ripen, unless in some city enclosure, where protection is afforded by brick walls, and therefore can hardly be called open culture, which leads to the inquiry—to what extent can grapes be cultivated with profit in this State? If, in good seasons the leading kinds of hardy grapes can be ripened only in favorable positions, while in other seasons they cannot be ripened at all, it would seem that they cannot be expected to be grown as a leading article, so far north and east as Maine. Still, when it is considered that almost every owner of buildings and land, has some *sunny side*

—some sheltered position by building, fence, ledge, or belt of trees, where the vine would grow well, and to calculate what an amount would be added to the products of the State, could each person having such a place be induced to plant a grape vine, it would seem that too much cannot be done to encourage their growth. When fully matured the fruit is really very delicious, and has the advantage of most small fruit, in being so easily kept for winter use; and when it fails to ripen, it will be found to be very valuable for many purposes—for preserving, jelly, &c. As regards different varieties, it is not necessary to say which is *the* best to cultivate. If only one variety is wanted, I should say select according to your place—if in a very warm exposure, either the Isabella, Concord, Hartford Prolific, Diana, Rebecca, Delaware, and some others, will be found worthy of cultivation—and after a few more years of trial, perhaps the question of “which is *the* best variety of hardy grape for open culture,” may be answered more satisfactorily than at present.

Yours Respectful'y,

WILLIAM GORE.

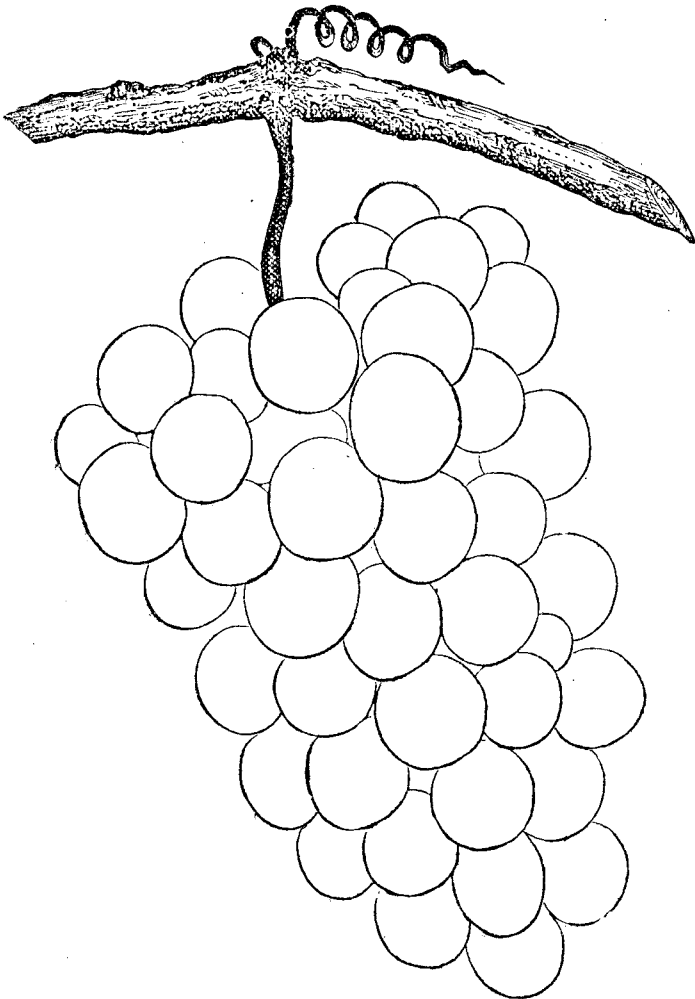
Lacking communications from the other members of the committee, either upon the subject of grape culture in general, or with regard to any of the new varieties which have been but recently brought into notice, and sharing in the very general interest which has been awakened throughout the State upon this branch of horticulture, it may not be amiss to add a few observations regarding them. As Mr. Gore very properly remarks, it would be quite premature now to decide as to which one is *the best* for culture in Maine, yet we have abundant evidence that some of newer sorts possess decided advantages over those hitherto cultivated in Maine.

The Isabella is the grape best known and longest cultivated in the State; and while, in favorable seasons and locations, it approaches so near maturity as to be very desirable, and especially considering its great vigor and productiveness, it cannot be deemed reliable for a crop of *ripe* fruit.

Among those ripening earlier may be named the Northern Muscadine, brought to notice by the Shakers of New Lebanon, N. Y., which is as good as any of *its class*, being a native fox grape, and partaking strongly of the foxy flavor and odor peculiar to all of its class—the bunch small, the berries large, with a tough, sweet pulp,

and liable to drop from the vines as they ripen. To those who like the native flavor strongly developed, it is a desirable sort, and also for making jellies, &c.

The Diana, a seedling of the Catawba, which originated in Massachusetts, proves a week or ten days earlier than the Isabella, and a most delicious variety,—bunch and berry of medium size—is nearly or quite free from pulp, and possessed of a delicate aroma and rich flavor. It will not show all its good qualities without such careful and rich culture as all kinds need, but do not often receive with us.



*Diana.*



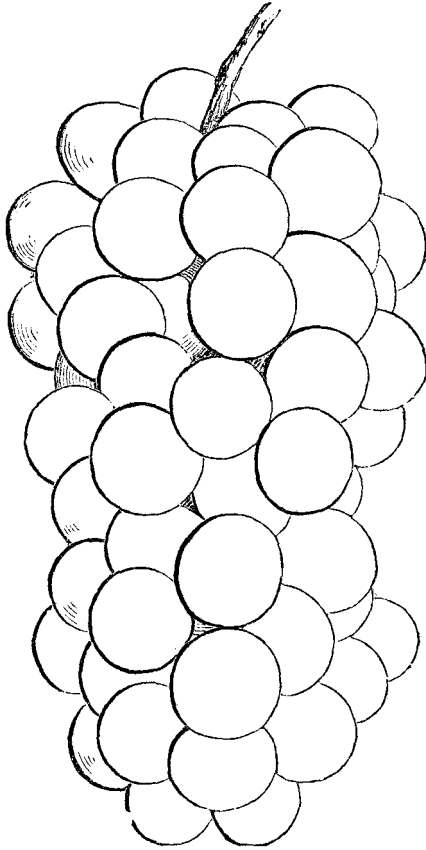
With regard to the Concord, which has attracted considerable attention, the experience of growers is not uniform—with some it ripens scarcely any earlier than the Isabella. Such has been my own experience, while with others it proves earlier, and is deemed a very desirable kind.

The Clinton is a small, early grape, of the easiest culture, harsh to the taste when first colored, but improves by hanging, and late in the season is by many preferred to the Isabella, for its high flavor.

The Hartford Prolific has ripened here for several years, and is a good second-rate sort as to quality—the vine vigorous and productive to a fault, requiring a good deal of thinning out of fruit to have it in perfection. Bunches large, flavor rich and vinous, rather than sweet, and with perceptible native aroma—is likely to prove a profitable variety to grow for market, and a favorite with all who bestow but ordinary treatment, i. e., neglect, as then it bears well, and is better than Isabella, from being surer to ripen.

Among those still newer, and less proved, having ripened fruit here for the first time the past season, and that on vines only two or three years planted, may be named the Delaware, a seedling from Ohio, which, judging from what it proves where better known, seems likely to take a higher rank than any above mentioned, not excepting the Diana. The vine a moderate grower at first, vigorous when established, hardy, productive and early. The fruit small, both in bunch and berry, but in quality equal to the grapes of Europe. The farther developments of experience with regard to it will be looked for with much interest.

The Rebecca is a seedling which originated in Hudson, N. Y., and is in quality equal to the Delaware, and with this, may not improbably inaugurate a new era in the culture of grapes in the open air in the United States. Hitherto we have had no out-door grapes which could compete in quality with foreign varieties, and these, as is well known, can nowhere here be grown to perfection, except under glass, on account of their liability to mildew in this climate. The bunch and berry of the Rebecca are of medium size—fruit nearly white, with an amber tint in the sun, free from pulp, flesh firm and sweet, and of rich and delicious flavor.



*Rebecca.*

When at Hudson some years since to examine the original vine of Rebecca while in fruit, another variety was spoken of as somewhat resembling the Isabella in quality, but several weeks earlier. Endeavoring to see this and test its quality, the fruit was found to be all ripe and gone—this was on the 12th of September—and when the Diana and Rebecca were in perfection, and the Isabella coloring, but not ripe. It has since been introduced to public notice as the “Early Hudson,” and with many others of reputed merit for quality and earliness, may ripen fruit here another season.

The Strawberry, Sage, Lowell Globe, Charter Oak, Fitchburg, Amber, Limington White, and some other native sorts, are considered proved sufficiently to warrant their being discarded entirely,

except for yielding a grateful shade when trained on arbors, or fruit for cooking purposes. The White Sweetwater, Black Chester, and some few other foreign varieties, although they are less subject to mildew in Maine than in most other States of the Union, and may be wintered with safety if well protected, are not deemed worthy of cultivation.

Besides the reasons given by Mr. Gore for the culture of the grape, may be named another, which will be felt to be of great force, after winters so disastrous in their effects upon fruit trees in general as the two last past, viz., the ease with which vines may be protected. To take down a vine from the wall, stake or trellis on which it is trained, and cover with evergreen boughs, is the work of a few minutes, and thus, at almost no cost, are insured from the effects of any severity, or of any changes. Even those deemed the hardiest, and which are never killed by the winters, will start stronger and ripen fruit earlier for a little protection.

The following communication, from another member of the committee, and a distinguished pomologist in the eastern part of the State, comes to hand while the above was in type, and is barely in season for insertion :

#### “GRAPES.

The cultivation of this most desirable fruit, has thus far been limited, in by far the greater portion of our State.

From present appearances, we are about entering on a new era in open air grape culture.

Pomologists have long been searching for new and hardy native varieties, which are sure to ripen in open culture in Maine, and also of first-rate flavor.

Success has at length apparently crowned these efforts, and varieties of native grapes have been found rivaling even some of the valuable foreign varieties which are cultivated only under glass, and some of which require artificial heat to ripen them.

The Isabella and Catawba have long been considered as standard varieties for open culture, more especially in the Southern, Middle, and some of the Western States; but these varieties are too late in ripening for Maine.

This, however, is now not considered so much of a misfortune as

it otherwise would be, had not *other* more valuable varieties been found to rival them in flavor, early ripening, and other valuable properties.

In Bangor, Augusta, Saco and Portland, and their immediate vicinities, success has attended the culture of the *Diana*, *Concord*, *Hartford Prolific* and *Northern Muscadine*, the last being a favorite variety of the Shakers. All these are eclipsed in flavor by the introduction of two new varieties, the *Delaware* and the *Rebecca*. These two already noted varieties give promise of carrying success wherever they are introduced into our State.

The Delaware is nearly or quite three weeks earlier in ripening than the Isabella, and about five weeks earlier than the Catawba. It is also very hardy, having stood unprotected when the cold was twenty-seven degrees below zero, uninjured, and where the Isabella and Catawba were killed to the ground, standing close to the Delaware. Nearly the same good qualities are also given to the Rebecca as to the Delaware. Should the two last named varieties prove as valuable in Maine as they give promise, they will be planted very extensively through the States of New England, and doubtless vineyards will be planted of them; and it would not be surprising if they become as popular in Maine as the Baldwin apple, and the Bartlett pear are in Massachusetts and New York. If suitable varieties be planted, it is probably a fact that no fruit is more reliable for a good crop than the grape, when the vines are well fed, pruned, and protected by a covering of boughs in the winter. In proof of this, several vines in Bangor and vicinity, and probably in other parts of Maine, annually pay, by actual sales of the fruit, from ten to fifteen dollars each vine; yet these vines were old varieties, the fruit of which does not bring the highest price. The grape vine, running on the building, the wall, fence or trellis, is highly ornamental, and the fruit desirable and the most wholesome in the catalogue of fruits."

HENRY LITTLE.

BANGOR, December, 1857.

REPORT ON CONCENTRATED AND SPECIFIC  
MANURES.

The committee to whom was referred the matter of "concentrated and specific manures," by the last Board of Agriculture, would beg leave to report, that they have attended to that duty, according to the best of their ability and the time and opportunity afforded them, and submit the following as the result of their investigations :

It is believed by the committee, that such manures have been used to but a very limited extent in this State. Guano, poudrette and superphosphate of lime are believed to be almost the only kinds of this class of manures that have been used by our farmers. Concerning these, there does not seem to have been any very carefully conducted experiments with reference to securing definite and specific information as to their economical value. With some men, all these fertilizers have produced satisfactory results, while with others they are reported to have proved a total failure. The causes of their diverse and contradictory results, are unknown to the committee; but they regard it as a matter worthy of the special consideration of the Board, and of sufficient importance to demand a special commissioner for its investigation, at the expense of the State, if the Secretary of the Board does not feel that his time and the claims of other duties will allow of his attending to that work in person. Why are results so contradictory obtained? is a question that ought to be speedily answered, if possible; for, as the matter now stand, no man can judge beforehand whether it is prudent for him to procure such fertilizers to supply the deficiency in his manures or not. We need to know whether the trouble is in the articles themselves, the condition of the soil, or the mode of application.

Beside, we need to have those who use these fertilizers and are satisfied that they attain good results, make experiments which will afford definite information as to the *produce* on the capital thus invested. We need to know whether the results attained show that a *profit* can be made on capital so invested. If it will not afford a fair profit, economy most assuredly dictates, that their use should at once be discontinued and some other modes of fertilization be sought out. We hope, therefore, that every man who may hereafter use these articles, will keep accurate accounts, so as to be able to

do more than make the general statement, that he has secured favorable results—tell the State what is the result in definite numbers, so that every body can see whether it is a safe and profitable operation or not.

The two following statements are all that has been received, throwing light on this subject. The first is from Calvin Chamberlain of Foxcroft, and as will be seen, is a mere general statement of results, and his judgment on the same :

“For myself, I have this season used no manures except such as have been produced on my own premises. My new barn cellar, in which my hogs are kept, poultry house, &c., have all been drawn on, I trust to pretty good advantage.

For the three years before, I have bought and used considerable of Mapes' Imp. Superphosphate of Lime, and I think to greater advantage than I could have taken stable manure at this village, at the prices farmers were paying. But I have arrived at no conclusions that are admissible in a report, because not brought to a mathematical demonstration.

In the use of this phosphate, by the application of a hundred pounds to an acre of grass in April, I have raised the crop of hay from one to fully two tons. By applying it to a part of a field of potatoes, putting it in the hill at the rate of two hundred weight per acre, the potatoes were much benefited; and the succeeding crop of oats was doubled in straw and grain by the application.

My 'conclusion' is, that the concentrated fertilizer above named has 'efficacy,'—that it can be used even at this distance from navigation with 'utility,' and that no one thing in connection with my business is more fully proved to my mind and settled as a 'fact.' I have had no experience with the other fertilizers to be had in the market.”

Yours, truly,

CALVIN CHAMBERLAIN.

The writer of the following statement is one of two minor sons of the late William G. Clark, Esq., of Sangerville. Their statement coincides entirely with the experience of the writer of this report, and he can only regret that he has not more definite statements to make, on account of the loss of his memoranda of weights and measures, in his experiments. Mr. Clark was a very intelligent

and enterprising farmer, and we are glad to know that he has left sons behind him, who are worthy to be his representatives:

“We first made use of concentrated manure in 1855. At that time we procured three bags (480 pounds) of Mapes’ Imp. Superphosphate of Lime. This amount we used in making various experiments, viz: First, we used enough to manure half an acre of corn in the hill, using about one gill per hill. Second, we sowed it on grass land. Third, sowed on summer rye. Also used some about our gardening. The land on which we planted the corn had no other dressing. We also took a crop of beans off of it the year before—no dressing then. The corn grew well, and we got a good crop. Under one row we put no phosphate, and from that we got scarcely any corn. On the grass land it did not have any marked effect. On the rye the effect was very visible. The rye on which we sowed phosphate was stouter, the heads much longer and better filled than rye beside it where no phosphate was used. In our garden it had a marked effect on every thing on which we used it.

Thus much for 1855.

For use in 1856, we procured half a ton of phosphate—five hundred pounds of the Nitrogenized, and five hundred pounds of the Imp. Super. We manured with three hundred pounds of each, two acres of corn—using no other dressing—an acre of each kind.

The corn grew as stout as where we spread on twenty loads per acre and then manured in the hill with horse manure well rotted and worked over by hogs. The yield of corn was also as large. The land, intervale pasture, “broken up” the fall before.

About two hundred pounds we sowed on an acre of wheat—it grew *immensely stout*, but the weevil got most of the grain, so we have no “bushels raised” to give. The remainder we used on our roots, (beets, carrots, turnips, &c.)

Our experiments thus far convinced us that we could use the manure to better advantage in raising corn than in any other crop.

In 1857 we planted four acres of corn, and manured in the hill with concentrated manure, as follows, viz: One acre with Poudrette, using four barrels; one acre with Nitrogenized Superphosphate; half acre with Imp. Superphosphate; and half acre with guano.

Where the Poudrette was used, we had corn last year—land well

manured; also, fifteen or twenty loads spread on this year. Corn stout and good.

Where Nitrogenized Phosphate was used, the land was in the same condition. Spread on same amount of manure this year as where Poudrette was used—used three hundred and twenty pounds of Phosphate for the hill. Scarcely any difference between this piece and where Poudrette was used—if any, in favor of Phosphate. The half acre on which we put the Imp. Phosphate was the stoutest piece we had. It was planted on sod turned over last fall—with a good coat of manure—used one hundred and sixty pounds of Phosphate for the hill.

Where we used guano, we got a fair crop, but the corn did not grow so stout as on the other pieces. We used on one and a half acre, three bags.

We think we can use the Phosphate *profitably* in raising corn.

Our land is all a light sandy soil. We harvest nearly, if not quite as many bushels of corn where we manure in hill with Phosphate as where we manure in hill with horse manure, worked over by the hogs."

In conclusion, your committee would recommend, that the Board, at their next session, take measures to secure the further investigation of this matter, and that the Legislature be petitioned to appoint a State Assayer to analyze such articles and substances as may be ordered by the Governor and Council, at the State's expense, for the purpose of exposing frauds in the sale of concentrated manures, or such as claim to be such.

In behalf of the committee.

DARIUS FORBES.

---

#### REPORT ON TREATMENT AND VALUE OF MUCK.

The Committee to whom was committed the subject of "the value of swamp or bog muck, and the best method of treating and composting the same," having attended to that duty, beg leave to make the following report:

That they have been unable to obtain any such definite information, as will enable them to show by figures, the specific or compar-



ative value of this substance. From their own experience and observation, they have learned enough to know, that there is a very great difference in the value of muck obtained from different localities, and sometimes in that from the same locality. We think we shall say only what will be found to be universally true, that muck formed from the accumulation of leaves and the small limbs from hard wood timber, is much more valuable than that formed from the lichens, mosses, and small shrubs, and the roots and stalks of swamp grasses and weeds. Such muck is usually much less perfectly decomposed, and abounds much more in deleterious acids, than the former. We have seen instances where muck composed of the roots and stalks of such grasses and weeds, mingled with the leaves of the resinous woods, such as the pine and hemlock, have been so surcharged with acids, that it was perfectly fatal to vegetable life. There is a deposite of muck in the town of West Bridgewater, Mass., that is so deadly that a shovel full of it thrown on grass land will kill every root of grass, and it takes from two to three years before the rains, frosts and snows, and atmospheric influences can dissipate the deadly salts, and restore the place to its previous fertility.

In all deposits of muck, that near the surface is less valuable than that below, but there is more difference between these parts, in that formed from weeds and grasses growing on the surface, and having a peaty character, than where it is composed mainly of the decaying deposites from a hard wood growth. Indeed, the surface of the first, as it comes from its bed, is entirely worthless as manure. It is only by heaping it up, and allowing it to decay, that it can be rendered of any manurial value.

The manurial value of muck can be determined with a tolerable degree of accuracy by the eye, in most cases. When it is of a very dark color, approaching a black, of a fine texture, and when partially dry of a pasty character, and when well dried, and cut with a sharp knife, a smooth, shining surface is formed, it may almost always be written down as of the very first quality. Indeed, it is always so unless as is sometimes the case, some destructive acid salts have been formed out of some of the materials of which it is composed, in the process of decomposition, or deposited there from the water that has overflowed it. But muck that is of a light brown color, and of coarse texture, is of little value as manure, if not

absolutely injurious, until it has been worked over and decomposed. The only sure way of determining the manurial value of muck, as it lays "in place," as the geologist would say, is to apply it to different crops fresh from its deposit, or to obtain an analysis of it, and thereby obtain a knowledge of its constituents. This last resort for information, it seems to us, is one that should always be had when practicable, as it will reveal more accurately how it may be most advantageously and effectually prepared for the most economical use, and to render it, at the least cost, the most effectual. Analysis will at once reveal what may require a long series of carefully conducted experiments to discover, if ever discovered at all, in this way.

But diverse as may be the specific, or the comparative values of different deposits of muck, all of them, we believe, may be made of economical value, as a source of fertilization for our farms. Every deposit has some value. All of it is formed from vegetable matters, in which there is usually mingled more or less animal matters. And when we say every thing of animal or vegetable origin is of value as a fertilizer, we simply utter a mere truism. All such matters are of organic origin, and all the remains of organisms that have fallen to decay, are materials from which other and fresh organisms are built up. In other words, they are food for living organisms, and can hardly be applied amiss. Throughout the vegetable world, death is the spring-tide of life and vigor—the source of reproduction and growth.

The value of decayed remains, however, no matter whether animal or vegetable, must depend in some measure on the treatment they receive. Some of these, as they are usually found, may be of little or no manurial value, while with suitable treatment, they may become of the very highest economical value. Indeed, it is probable there is no quality of such remains to be found which may not be greatly improved by proper treatment. This we deem emphatically true of the organic remains found in our swamps and bogs. And it is a very important, as well as interesting, inquiry, to ascertain the best method of preparing the contents of these places so as to secure the best results from their application to the soil.

It is a matter of regret to this committee, that they have not more specific data from which to make up a judgment as to the

comparative economical advantages, when all things are taken into the account, of the different methods of treating swamp and bog muck. In the absence of these, they can only state what are their impressions from their own experience and observation.

In the decomposition of all vegetable matters, acids are always generated in the mass, except when in the presence of alkaline substances. It is so with swamp and bog muck. More or less acids are always found in them which are detrimental to vegetation. The first thing to secure in the preparation of muck for manure is the removal of these acids. This can be done in two ways—by mixing an alkali with the mass, or by exposing it to the action of the sun, the rains and the frosts. The first is speedily accomplished; the other will require a comparatively long time—two or more years, according to its more or less perfect exposure to the action of these agencies, and the amount of acid to be neutralized. Both our experience and observation lead us to prefer the first, as the most effectual and economical, as well as expeditious method, though both may be combined with advantage, to a certain extent. In the use of an alkali, and especially lime and wood ashes, certain very valuable elements of fertility are added to the mass, as well as important chemical changes and combinations secured.

We are very decidedly of the opinion that the very best method of preparing muck for use is to mix lime slaked with salt water with the mass, in sufficient quantities not only to neutralize the acids, but to hasten the decomposition of any partially decomposed particles that may be mixed with it. This is especially important when the muck is of a peaty character, or abounds in the roots of grasses and weeds. We have never found anything so effectual in accomplishing these two purposes as this preparation, which is made by dissolving a bushel of salt in water sufficient to slake a cask of lime. After being mixed well together, the muck should be allowed to lie in a heap for three or four months or more, when it will be fit for use, in any way that may be desired.

We believe, however, that the best and highest results in the use of muck, can be obtained only by being composted with stable manure, after being prepared as above indicated. Its effect is not only to add certain very important elements to the stable manure, but if in a green or unfermented state, to absorb and retain the

gaseous formations evolved by the process of decomposition. In this way, the value of both is increased, so that the mass, bulk for bulk, is really worth more as manure, and will be more effectual in its operations, than the stable manure alone. This has been demonstrated by repeated experiments, so that it is now to be recorded among the most reliable facts of agriculture. This is most emphatically the case as an application to potatoes and Indian corn. Experience has shown that such a compost is immensely more effective on these crops, than any other preparation of stable manure alone that has ever been found. And when its composition is carefully considered, it is not difficult to see why it is so. Its very composition would lead any intelligent agriculturist to expect such a result.

When prepared as above indicated, muck may be spread over the barn-yard, thrown into the pig-sty and the privy, and under the sink-spout, with great advantage, to absorb and retain the volatile evolutions of these places. Indeed, it is better that these places should be supplied with muck without any preparation, than not to have anything. In an entirely raw state it will be of some service, though very far from the highest. In fact, we believe it is better that it should be applied to highlands, which are usually deficient in organic matter, raw from its bed, than to withhold it altogether. It will not produce much immediate effect, unless of a very superior quality, when thus applied, but ultimately it will produce very marked results, as we have seen for ourselves, especially on the grass crop. One member of this committee made an application of this sort to a piece of land to which no stable manure had ever been applied, some six years ago, and the effect is plainly visible to this time, though the amount applied would have been a very light dressing had it been the best quality of stable manure.

In the light of these facts, the committee think they are justified in saying that muck can hardly be applied to our soils amiss, and in urging farmers everywhere to put whatever deposits of muck they may have, under the highest contributions, to add to the manure heap, in particular. We deem that the farmer who has an ample deposit of muck, has a mine of wealth that will prove more productive under proper management, than any of the diggings of California or Australia.

DARIUS FORBES, *Chairman.*

STATISTICS.—As the law constituting the Board of Agriculture makes it a part of the duty of the Secretary to gather and incorporate into his report “such statistics as he may be able to collect,” and as, from the nature of the case, no one man, unaided, can possibly perform more than a small portion of the labor required to obtain accurate and reliable agricultural statistics, and as the Board, at its last session, unsuccessfully urged upon the Legislature the adoption of some system which might accomplish this purpose, a few remarks upon the general subject of statistics may not be out of place.

It is said, that as a people we are far behind the nations of Europe in appreciating the use and value of statistics. All readily admit, as an abstract truth, that we are dependent upon a knowledge of facts both for present instruction and for guidance in future action, but while professedly acknowledging the importance of inductive science we fail to carry out our professions into national practice. As individuals, in our private affairs we do better. No prudent man enters upon any undertaking of magnitude without first demanding a knowledge of all the facts which can be obtained having a bearing on the case, nor does he fail to keep himself thoroughly “posted up” regarding all which transpire during its prosecution. Few would not hesitate in extending a loan to a person of great reputed wealth, when upon inquiry it was found that he himself could only *guess* at the amount of his property, and where and how it was invested, or whether his investments were safe, productive and convertible. What possible evidence can be produced to show that enlightened legislation in behalf of a State is less dependent upon a full knowledge of facts as a satisfactory basis, than private action?

What has this to do with agriculture? Just what a supply of bread has to do with living. No question comes more closely home to the legislator or to the private citizen than that of subsistence. If, as Mr. Everett said in his late address before the New York State Agricultural Society, “our existence as individuals or communities must be kept up by a daily supply of food, directly or indirectly furnished by agriculture, and if this supply should wholly fail for ten days, all this multitudinous, striving, ambitious humanity, these nations and kindred, and tribes of men would perish from the face of the earth by the most ghastly form of dissolution,” then it follows that whatever affects the amount, yes, or the cost or

market price of agricultural produce is really a thing of no mean magnitude.

Agricultural statistics are but a computation of the bread and butter, meat, wool, &c., which our fields and animals yield—their cost, their price, demand, supply, and whatever else concerns them.

The merchant often takes an account of stock; the prudent house-holder, before setting of winter, examines his bins and barrels and woodpile; the farmer looks sharp to see if he can winter all his cattle well; the shipmaster, before weighing anchor on a year's voyage, scrutinizes closely the quantity and condition of his stores, and what other than such like would the State do in collecting agricultural statistics?

It may be said, and with truth, that it is no easy matter to obtain full and accurate statistics on any points, but if we may not obtain complete accuracy we may gradually improve, and approximations to truth are of great value compared with mere guess-work. It is also doubtless true that some minds associate the idea of taxation as closely or necessarily connected with such inquiries, and if they be first made by assessors, many might naturally fall into this error, and so be led to understate facts—to avoid which, might it not be begun at least by district school teachers, whose daily occupation it is to impart knowledge, and a few whose leisure winter evenings might thus serve to gather some for the benefit of a larger school. The full benefits to be obtained by means of statistics are developed very gradually. It is not by one, nor by a few, but by long continued periodical observations alone that data are to be had from which may be deduced all the conclusions which they are capable of yielding.

As a first step, we should endeavor to comprehend their value and use. If such be even yet the case, in some degree, abroad, much more is it needful here. A late English writer\* says: "To arrive at a correct appreciation of the subject, we must first be convinced of its importance and of its expediency, then distinctly apprehend what is required, and lastly by what means it may be attained. On

---

\* L. Levi, in a paper read before the London Society of Arts, urging the necessity of obtaining full statistics at harvest time, and to be completed immediately, for present as well as future use.

the importance and expediency of collecting statistics of agricultural produce, it might seem hardly necessary to enlarge, but the claims of statistical science in this direction have not hitherto been universally recognized. It is a melancholy truth, that, as yet, few believe in statistics. The philosophy of inductive science is with large numbers a mysterious problem. Everybody admits that if in repeated instances over a long space of time, a certain event has happened at certain periods, there is good ground for believing that the same will continue to happen; but a preconceived skepticism in numbers prevents them applying common reason to great but every day occurrences. They have not the power of magnifying figures and of preserving the same faith in them. Besides, other considerations foreign to the purpose, as well as self-interest, political tendencies, or dread of revelations, enter the mind and are sufficient to make them decided enemies to statistical inquiries. The masses, therefore, must be taught the meaning of statistics, their object and province. Statistics is the science of observation. It takes actual facts and studies them in their nature and effects. It is founded rather on experience than on theory. A chemical discovery is made. It is applied to the cultivation of the soil. The statistics of produce of that soil before and after the application of such chemical discovery is the surest test of its worth. Within the domain of statistics is whatever is important to the interest of a State, whether it be institutions, physical forces, education, science, crime, or religion. Its province is to elaborate truths which lie remote from the surface of daily life, and to reduce into statistical analysis, the wants, the resources and the experiences of society at large."

And again: "The collection of agricultural statistics is an essential duty of nations and of individuals—a duty, the performance of which demanding an extensive and permanent machinery, it behooves government to undertake. The difficulties to its performance are more ephemeral than real, and the objections raised against it, are inconsistent with the true interests of the nation collectively and of the individuals composing it respectively. Such inquiry is demanded by the uncertainty to which the people is exposed as to the amount of food it possesses within a certain time, with its ever increasing wants—by the fluctuation which follows in the prices of produce, increasing or reducing its value largely—and by the

necessity of having a timely warning of future wants. Further, that it is a measure both expedient and necessary to the legislators to ascertain and study the wants, the resources and the productive forces of the State whose helm they bear—to the jurist and moralist to ponder over those moral phenomena so powerfully developed by abundance or indigence, by the prevalence or declension of agrarian crimes and offences against persons or property—to the merchant, to appreciate the extent of the field he is to operate, to be prompt, energetic and calculating in his speculation, or to be slow in giving credence to vague fears and apprehensions—and to the farmer himself, to regulate his dealing with his farm and in the market, to learn the productive capabilities of the soil, and to establish the true basis for the adaptation and connection of science with agriculture.”

It seems impossible to doubt that an examination into the character and results of statistical inquiries, will reveal a very great degree of importance as attaching to them, which has thus far been overlooked. Lacking the only reliable basis of action, how can individuals be sure that labor is applied in the best direction, or the State be sure of the most enlightened and correct legislation?

---

SUGGESTIONS.—Before concluding this report, (perhaps already too extended,) the opportunity is embraced to offer a few suggestions which it is hoped may serve as a clue to means by which our existing agencies for the elevation and promotion of agriculture may be rendered more efficient; and first, with regard to *the style of offering premiums* by agricultural societies. These are sometimes offered for the largest crop—for the fattest animal, &c., and may consequently be awarded to the competitor presenting such, irrespective of the cost at which the result was obtained, and of any valuable result to the public. Might it not be more for the general good to give the premium to one who grows a fair crop at least expense; say to one who makes sixty bushels of corn, at sixty cents per bushel, rather than to another who makes seventy-five bushels, at eighty cents per bushel? This course has already been adopted by a number of our societies, and they offer at present more in the following manner:



“For the best conducted experiment in growing the largest crop at least cost,” which is a decided improvement; but might not this be improved still more by making it to read, simply, “for the best conducted experiment,” or, “for the most satisfactory experiment?” This would at once shut off premiums from all accidental crops, or other results, (accidental so far as regards any peculiar efforts of the competitor,) and which have been the effect of some cause, or of a combination of causes beyond the control of the competitor, and which he might not secure again by pursuing precisely the same course of operation. The design of the society should not be so much to reward him who has already got ample pay in his success, as to elicit and diffuse what may benefit others by aiding them to obtain like success. If the offer be simply for the best conducted experiment, the premium might be awarded in a case where pecuniary success did not follow the operation, but by means of which, a knowledge of facts was elicited, which may, if properly diffused, save a thousand others from repeating an unsuccessful process, and from the loss which would be incurred by so doing; and also guide to more successful treatment in future. Such a person is a public benefactor, at his own private cost too, and is deemed better worthy of receiving a premium, than one who has stumbled upon success, and makes up his statement, after the result is known, from memory merely, or by guessing at the details of labor, manure, &c., &c.

Another point touches the *objects for which premiums should be offered*. In case the returns from our societies are promptly made, and if time serve me, I hope to be able to present with this report, a tabular statement, which shall exhibit the various objects for which premiums have been awarded, and the amount of each during the present year, (and if not in season for this report, it may go into the “abstract of returns,” which will be published as soon as may be,) which may show considerable diversity in the objects to which premiums are awarded, and probably more in regard to the comparative amounts given to each. While it is true that the varied circumstances of different localities may render some diversity highly suitable and proper, it may be equally true that the comparative amounts offered to each may be amended by offering more in some directions and less in others, than at present; and by an examination of the operations of all, each may obtain suggestive hints. For

instance, more might be offered in some cases for general farm improvements, or for improvements in some special department, as for underdraining, reclaiming swamps, improving pastures, planting orchards, and the like. Such as these, it is true, would make no addition to the attractiveness of the annual exhibition, but the gain to the community might be not less real on this account. The State society has set a good example in this matter, by offering a liberal list of prospective premiums which are to be awarded after several years of efforts. It is gratifying to notice that some of the county societies are pursuing a similar course. One or more of these have during the present year, offered one hundred dollars for best farm improvements, the farms to be visited by the awarding committee several times before the decisions are made. This necessarily involves considerable time and labor on the part of the committee, but so far as may be judged by the working of it, as tried, the expenditure seems to have proved a profitable one, both to the visitors and the visited. Hints and suggestions may be given and received to the mutual profit of all. It is understood that, in some quarters, these offers have excited greater interest and emulation than any other move which has been made for many years. My impression is, that many of our societies at present make no offers of premiums whatever to stimulate such improvements; and much confidence is felt that they might be generally adopted with great promise of good. To be effectual, the amount should correspond, so far as means admit, to the magnitude of the undertaking; and one or two liberal premiums might accomplish more than a greater number of less amount. More applicants might fail to receive the premium, but none might fail to reap a rich reward for their unwonted industry and application.

Then, too, with regard to encouraging accurate and careful *trials and experiments* tending to solve doubts existing in connection with points of every day practice, as the preparation and application of manures, whether animal, vegetable, mineral, marine or mixed—how best to make composts—whether to turn in manure to greater or less depth or to leave it on the surface—the turning under of green crops—different modes of feeding cattle, the value of the usually cultivated roots compared with one another and with English hay, and many others which would readily suggest themselves to

any one when taking the subject into consideration. In all such, satisfactory evidence should be required, that the trial be faithfully and accurately made, and be accompanied with such a detailed statement of the process and results as may convey to others all the benefits to be derived from them. The bare suggestion of such experiments might excite mental activity and inquiry in some who are now content to travel their daily routine of labor in the tracks of their fathers with no idea that any improvement is advisable or practicable, and the attempt to put them into execution must involve such a dealing with weights and measures as we rarely see on farms at present, and prove an efficient aid to the adoption of habits of system and order which of themselves would be a valuable acquisition to any farmer. An experimental State farm has sometimes been suggested as an advisable means of securing progress. Might not a few hundreds of dollars expended in premiums for trials similar to what would be made at such an institution, accomplish more than as many thousands expended upon it, both of direct results and of incidental benefit to those making the trials? \*

Judging from the little experience we have in this matter, it might at first be safe to offer more than we had means to pay. Several years since, one of the county societies proposed to give a liberal premium for the most satisfactory experiment upon a stock of cattle, not less than four in number, in ascertaining the relative value of the different kinds of fodder commonly used, with a statement in detail of the quantity and value of the same, as compared with English hay, the experiment to be made in the three winter months, and the offer was repeated year after year, and never a single applicant appeared for it. Must there not be a sad degree of apathy and great need of some stimulus to exertion where this could occur? During the three winter months, the farmer enjoys more leisure than at any other season. The four head of cattle must needs be fed

---

\* While the above is in type, a note is received from the Secretary of the West Oxford Society, in which he says: "Would it not be well for the agricultural societies to offer more premiums for experiments? How would it do for the Board to suggest a series of experiments or investigations, and assign to the different societies such as would be suited to their several localities?" and again: "I think it might be better, in many cases, not to pay out money for premiums, but to substitute agricultural books, implements, fruit trees, &c., &c."

somehow, and the premium offered was equivalent to more than a dollar a day for the extra time required to make a careful experiment by weight and measure, and to write out a detailed statement.

This suggests another point, in relation to which there is abundant room for improvement, viz.: the preparation of statements. The law granting the bounty of the State to agricultural societies very properly requires that applications for premiums be accompanied with suitable statements, and it forbids the payment of any premium where this requisition is not complied with. The object of the statement is twofold: first, to aid in guiding the awarding committee to a correct conclusion, and next, but by no means least, to convey such information as may be of service to the whole farming community, and enable any one, so far as instruction may do it, to obtain similar success. It has been well said, that if agricultural societies content themselves with offering prizes for the finest animals and the heaviest crops, without teaching the way to produce fine animals and heavy crops, they will be acting like a person who shows another a fine bunch of fruit on the top of a wall, without offering a ladder with which he may reach it. It could only be gazed at and wished for. Now, let every farmer, when called upon to make his statement in writing, instead of looking upon it as an arbitrary and vexatious requirement of law, and something to be shirked out of in the easiest way possible, remember that he is enjoying an opportunity to benefit others, and that his statement, if carefully and faithfully made, will constitute a round in this same much needed ladder. The State has also provided that all these be gathered together, and, with the reports of committees and other papers, be forwarded to the Secretary of the Board of Agriculture, by him examined, and an abstract prepared and published for circulation among the farmers. If it be demanded that there be something of value in the volume thus prepared by the Secretary, it must needs be first in the materials from which it is to be made. A full tale of brick cannot justly be exacted if the needful straw be withheld.

Reports of adjudging committees at our annual exhibitions also furnish a most admirable opportunity to impart information and instruction. As there is no occasion for a detailed statement of the process by which a pin-cushion, or other fancy article which may grace our tables on the day of exhibition, was manufactured, so

there is just as little need of writing an essay upon such topics. But with regard to many classes of articles exhibited,—to animals, dairy products, fruits, farm operations, like plowing and others,—which come before awarding committees, it is altogether probable that the members composing them are possessed of some facts which they have acquired by experience, observation or research, and which, if incorporated into their reports as prefatory or concluding remarks, would be the means of diffusing a great deal of valuable knowledge, and would render such documents vastly more useful than simple lists of awards which can have only a local and personal interest. Opportunities may not often occur to make such a statement regarding any individual animal, as would be of great interest to those who could not also examine the animal itself; but the committees, having both the animals and the various statements before them, may and should give the public in their reports all the facts and conclusions which may be derived from the examination and comparison. The simple award of a first premium to Mr. A.'s bull over Mr. B.'s, will enlighten the public very little upon their relative merits or faults, or give any clue to the reasons why or the way in which they may rear an animal like Mr. A.'s or avoid one like Mr. B.'s, nor will it give any information as to the peculiar fitness of one breed over another for the shambles, for labor, for the dairy, or for anything else.

It cannot be reasonably expected that a valuable report can be written in a half hour, filled with the bustle and noise of exhibition day; it must require time and quiet; but as committee men are aware of their appointment beforehand, they may, if they will, occupy some previous leisure in thought, research and examination of the subject, and in writing out general remarks connected with it, and finish up their work subsequently to the show, and such occupation would not only result in valuable contributions to our agricultural literature, but the labor would be abundantly repaid to themselves in a deeper interest and more enlightened and thorough understanding of a subject intimately connected with their profession.

The sessions of the Board of Agriculture are necessarily so short, and only one being provided for during the year, it seems desirable that means be taken, not only to secure the full occupation of the time spent together, in the most profitable manner, but, if possible,

to have something prepared for action, or actually accomplished, during the interim. At the last session, an attempt was made in this direction, and the reports in the preceding pages are the result; and this plan may very probably be continued. Might it not also be of service to invite the presentation of views or suggestions as topics for discussion when the Board meets, both from members, officers of county societies, and from other individuals, to be forwarded to the Secretary early enough prior to each session to enable him to lay the same before the members by means of a circular, a month or more before the session, that they may have the benefit of careful previous consideration of the same, and be prepared to submit matured opinions upon their merits, and to act with a better understanding of the subjects proposed.

Up to the present time, such an effort has been scarcely practicable, as the Secretary has had no means of knowing in advance who were to be members at the coming session; but when the Board next assembles, it will be in this, as well as in some other respects, under more favorable auspices than at any previous meeting. Hitherto the members have been elected every year, and in consequence of this, each year has brought together mostly new members, who have not had the benefit of previous acquaintance with, and consideration of, the plans proposed for the furtherance of the end which all desire to see accomplished, to wit: the promotion and elevation of practical agriculture throughout the State. At the last session of the Legislature, the recommendation of the Board on this point was favorably received and acted upon, and it is now provided that a third only of the members constituting the Board be newly elected each year, and a greater degree of efficiency is confidently anticipated from the change. The amount of benefit which shall result from their deliberations must of course depend on the character of the Board itself; and as its members are elected by the agricultural societies, the responsibility actually rests upon them, and too great care cannot be taken to secure the best talents at their command; and for this purpose, something more than a knowledge of practical, or even of scientific agriculture, is needful.

If the aim of the Board was to grow the best crops, or to feed and treat cattle judiciously, or to do any of the thousand and one other things required upon the farm, in the best possible manner, this

might serve; but its object is quite distinct, being to promote the interests of agriculture in the community; and when the inquiry is made, how this can best be done, at what points in the vast field before them, and by what agencies a given amount of expenditure and of effort will accomplish the greatest results, it is evident, that however valuable is an intimate acquaintance with the theory and practice of farming, it is not the only requisite.

To illustrate this, let us imagine what is similar to, or identical with, what may have occurred heretofore. The Board after assembling and organizing, begins to ask, what can we do? what shall we recommend? This seems at first a question very easy to answer, for a thousand things can be done, or recommended, and every one of them good, perhaps very good. The difficulty lies not in finding something, but in selecting the most feasible—that which shall accomplish the greatest practical results, and results best adapted to our present actual and most pressing needs; and here, minds differently constituted and with previous unlike training, have each their own views. And Mr. A. replies, let us adopt means to advance agricultural science, by employing some competent person to engage in *analytical investigations* and *original research*, and so increase the amount of actual knowledge which shall be at the command of the farmer. Certainly a most desirable object, as all will readily admit; but Mr. B. expresses the opinion that a more urgent and pressing need of our condition as a farming community, is, a thorough and complete diffusion of what knowledge is already attained, but not yet well understood and practiced by the masses; and this view commending itself as judicious and sensible, the next inquiry is, how shall this be attempted? Shall we endow an Agricultural College where some, and comparatively few, shall be thoroughly educated and made to reach the highest practicable attainments, and then go forth and be scattered abroad in the community, settling down to become so many teachers or centres of influence, from each of which, by both precept and example, knowledge shall be radiated to the many? or shall we begin our efforts at the common schools, and there attempt to elevate the many to a more moderate standard of attainment? or shall we have both and secure the benefits of each and of the connection between the two, (they being in some degree mutually dependent and parts of a system,) or is there danger of losing all by attempting too much at once.

It is apparent that here is a field for investigation, which to explore so thoroughly as to arrive at the most enlightened conclusions, will require more time than one short session can give, and qualifications other than familiarity with the art or science of agriculture.

Before this subject is satisfactorily disposed of, Mr. C., who is anxious for immediate practical results, and has bestowed some previous thought upon ways and means, proposes that the State establish an EXPERIMENTAL FARM, where conflicting theories and modes of practice shall be brought to the test of experience, and the truth regarding them made known to all, so that we may no longer grope in the dark or find our way into light only by means of protracted and laborious experiments, too costly for the unaided means of private individuals. To this, Mr. D. responds, by saying that this is, only in another form to be sure, just what they had already decided not to attempt at present, viz: an increase of knowledge, and he may further state, that experience has already shown that such an attempt must be made at a cost disproportionate to probable results, at least among us, for it could at best only settle doubtful points under certain conditions of soil, climate, &c., &c., and that when the same trials are made under other conditions and upon other farms, that diverse results will follow, and so we might be as much in the dark as ever—at any rate the public would not be satisfied with its tardy and questionable fruits at the price which must be paid for them. Whereupon, Mr. E. introduces his plan, which is, that the State provide a MODEL FARM, where practice shall be daily exhibited which is fully up to the standard of present scientific attainments—where improvements shall be seen, rather than heard of, or read about,—where every farmer may go and learn, and let his boys go and take lessons of unmistakable value. A capital idea, and one which wins the favor of many, and seems likely to be adopted, when Mr. F. intimates that farmers are not much in the habit of going abroad to view improvements or to study, and to be of any practical utility, there should be at least one in each county, and then something worth the while might come of it, but as for having only one, 'twould be like having a college to educate farmers' sons—there would be a hundred who would'nt go, to every one who would—the only way in which one could servè would be to put it upon trucks and make it itinerate from county to county. Now,



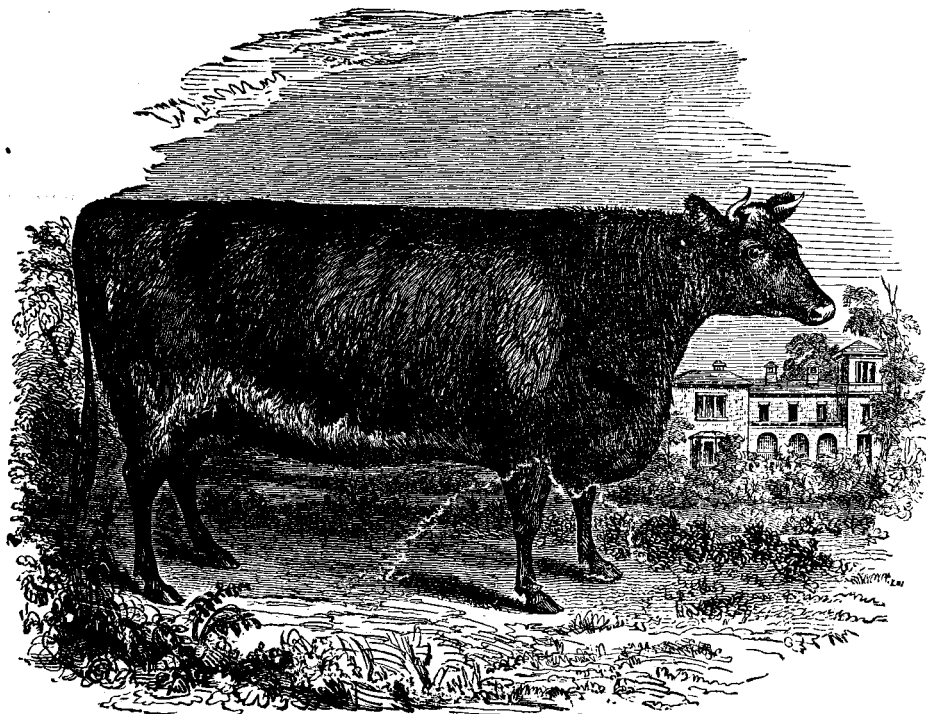
it being none too easy an undertaking to inaugurate one model farm—such as it should be—to get it into successful operation and to keep it so, the idea of a dozen or more operates much like a mill stone around its neck.

In this dilemma, Mr. G., who thinks he sees a way out of the woods, suggests that, inasmuch as various doubts attach to all untried plans; and we have now in successful operation certain agencies, which everybody admits have done and are doing much good, to wit: our agricultural societies, that we would do well to urge increased legislative assistance to these; enough, at least, to make the amount equal to what is granted similar societies in neighboring States, and the Provinces on either side of us.

But Mr. H., while he would by no means underrate the good which societies have effected, is clearly of opinion, that as they have been jogging along at about the same pace for 10, 20, 30 years, in precisely the same old ruts—have struck out no new paths, and might not with increased aid, and have abundant scope for improvement within their own proper province, and thinks we certainly should attempt an advance, would have it in some different direction; perhaps legislative grants could be more usefully employed in offering a few liberal premiums for careful trials, such as are proposed to be made on an experimental farm, or for the invention of labor-saving machinery, and improved implements of husbandry. This meets the views of Messrs. I., J., K. and L., who, however, each have some favorite object or plan; one would prefer to have it expended in the purchase of books for farmers' clubs; another would buy costly, thorough-bred animals for breeding, to be afterwards sold at auction, one, two, or half a dozen in each county, on condition of their being used in, and not sold out of the State or county, and so on.

The idea last thrown out meets a favorable response in the mind of some one who thinks the main chance may be best promoted by improving the breeds of domestic animals; but not deeming the above plan of accomplishing the object the best possible one, suggests an amendment, namely, that we recommend the establishment by the State of a STOCK FARM, where the very choicest specimens of the various breeds shall be bred and reared, and their comparative merits for various uses observed and proved, and at proper intervals





**SHORT HORN COW "JACINTHA."**

Imported in 1853, by L. G. Morris and N. J. Becar. For pedigree, see volume 10th, page 406,  
of the English Herd Book. She is now the property of S. P. Chapman,  
"Mount Pleasant Farm," Clockville, Madison Co., N. Y.

let the animals grown upon it be distributed, by lot or otherwise to the societies, or be sold at auction on suitable conditions, and he urges with much force, that although it might involve a larger outlay at first, that it would be more economical in the end, to say nothing of its being more uniform, beneficial and permanent in its results than could be any spasmodic or temporary efforts in the same direction.

The farm, too, might be, so far as circumstances would allow, a pattern farm and a field for experiments, or if not so at first, it might, if found successful as a stock farm, be expanded by gradual and healthy development, until the institution assume the form and style which future experience may dictate as best suited to our necessities, whether a stock farm alone, or a model farm in connection with it, or a farm school, or something else. What objections Messrs. O., P., Q., or their associates, might urge to this, I cannot say; for none of any magnitude occur to me at this moment, and it strikes me as combining more promise of successful issue with fewer disadvantages than any other, and I have never known the proposition brought up just in this form; but as a plan substantially similar in many of its features was recommended by the Board in 1853, and did not go into operation, it undoubtedly then got the cold shoulder somewhere, although taking into account the great increase of interest felt throughout the State in agricultural progress, it is very possible that some such plan might now receive more favorable consideration, and be carried into execution; for there seems to be no doubt that a wide spread and deeply seated conviction exists, that some decided move should be not only attempted, but something of importance accomplished. The progress made in years past is, in a good degree, traceable to judicious and liberal legislative action, and warrants the hope that the present increasing rapidity of advance may suffer no diminution for lack of its continuance.

Let me here repeat a suggestion made in the last report, regarding the importance and value of town and neighborhood associations of farmers for mutual improvement, by the discussion of matters pertaining to their common interests. Should one or more of these be formed in every town in the State, with a determination to hold weekly meetings during the winter, whether there be many or few at the start, they will be sure to grow in numbers and in interest;

topics for discussion will multiply beyond all previous anticipation, mental activity and emulation to advance in knowledge and practice will be excited and maintained, and progress, such as has never yet been witnessed in our state, will flow therefrom. We at least know of a certainty that such advance has resulted where these have been established, and there is no reason to anticipate that less success may attend future efforts. Legislative assistance has done much to aid the interests of agriculture among us, and it may do a great deal more; but nothing, which any Legislature can do, would equal what must result from a thorough appreciation by every farmer of the true position which he occupies as a member of the community, of the respect to which himself and his calling are entitled, of the progress in the art and science of farming which he needs to attain, with a resolute determination to do what he can to accomplish it.

S. L. GOODALE,

*Secretary of the Board of Agriculture.*

JANUARY 6th, 1858.

---

ERRATUM.

Page 186, 2d line from top, for Black Chester read Black Cluster.

## APPENDIX.

---

THIS being a first attempt to present in tabular form a statement of the financial condition and operations of the Agricultural Societies of Maine, it is very possible that it may prove inaccurate, as it is known to be, or incomplete, in some particulars. The several Secretaries are particularly requested to examine it carefully, and to inform me of all errors and omissions, *as early as possible*, that it may be corrected in season for insertion in the "Abstract of Returns," which is to go to press in February.

COMPILED FROM RETURNS OF AGRICULTURAL SOCIETIES, FOR THE YEAR ENDING FIRST WEDNESDAY IN  
DECEMBER, 1857.

FINANCES.

Societies.	Am't received from the State during the year.	Am't received from Members and Donations.	Am't received from all other sources.	Whole amount of receipts for the year.	Amount of premiums and gratuities offered.	Amount of premiums, &c., awarded.	Current expenses of the Society for the year.	Whole am't of disbursements for the year.	Value of Real Estate belonging to the Society.	Value of other property belonging to the Society.	Amount of the Liabilities of the Society.
Maine State Society, . . .	1,000 00	526 00	6,912 10	8,439 10	5,225 00	2,755 25	5,283 26	9,836 76	-	1,000 00	300 00
Androscoggin County, . . .	300 00	175 00	1,145 80	1,620 80	637 50	455 50	496 00	1,575 92	8,200 00	-	6,500 00
Cumberland, . . . . .	120 17	140 00	297 81	557 98	393 50	301 75	431 33	733 08	-	1,019 70	-
East Somerset, . . . . .	150 00	-	153 64	303 64	161 71	174 14	127 23	301 37	-	-	-
Franklin County, . . . . .	200 00	112 00	76 01	388 01	340 00	-	132 00	-	-	-	-
Kennebec County, . . . . .	150 00	34 00	500 00	684 00	358 20	398 20	395 20	756 40	-	400 00	409 40
Lincoln County, . . . . .	300 00	204 00	197 00	701 00	401 25	386 27	272 93	659 20	-	150 00	-
North Aroostook, . . . . .	300 00	255 00	45 00	600 00	308 00	243 37	19 50	262 87	-	-	-
North Franklin, . . . . .	200 00	8 00	132 31	342 31	425 42	297 19	66 79	308 06	-	-	-
North Kennebec, . . . . .	150 00	256 00	331 90	737 90	454 75	270 00	175 00	-	2,500 00	100 00	1,600 00

North Penobscot, . . .	51 00	22 00	45 42	118 42	200 25	77 75	-	-	-	-	-	-
North Somerset, . . .	150 00	19 00	131 00	300 00	248 55	225 56	74 44	300 00	-	-	-	-
Oxford County, . . .	200 00	130 00	672 29	1,002 29	641 50	503 85	534 52	552 52	1,000 00	150 00	813 35	
Penob. & Aroostook Union,	96 00	-	50 00	146 00	150 00	133 75	27 00	160 75	-	-	-	
Piscataquis County, . .	300 00	-	110 74	410 74	294 02	134 26	99 74	-	-	-	-	
Sagadahoc County, . . .	300 00	-	844 94	1,144 94	1,333 25	585 00	528 74	1,273 63	100 00	3,400 00	2,560 37	
Somerset Central, . . .	-	1,122 00	204 00	1,326 00	811 92	388 25	1,320 00	1,708 00	1,200 00	50 00	650 00	
South Kennebec, . . .	150 00	213 00	1,339 54	1,702 54	1,019 75	588 39	950 00	1,538 39	-	-	-	
Waldo County, . . .	276 50	174 50	101 85	552 85	491 00	409 75	175 52	587 44	-	-	-	
Washington County, . .	300 00	23 00	438 28	761 28	537 00	371 75	366 77	690 77	-	-	-	
West Oxford, . . .	200 00	13 00	75 60	288 60	231 75	184 25	70 00	254 25	-	360 00	-	
West Penobscot, . . .	150 00	12 00	175 00	337 00	320 00	221 68	19 04	240 72	-	-	-	
West Somerset, . . .	150 00	13 00	105 88	268 88	171 00	158 40	76 03	246 84	-	-	168 40	
York County, . . .	300 00	141 00	258 63	699 63	550 00	378 93	209 29	-	-	500 00	714 29	
Totals, . . .	5,493 67	3,592 50	14,344 74	23,430 91	15,705 32	9,943 34						



ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED.

FOR FARMS, &c.

Societies.	Am't awarded for management of farms.	For experiments in draining.	Experiments in subsoil plowing.	For plowing at the Exhibition.	For reclaiming meadow lands.	For manures, and experiments with them.	For orchards of all kinds.	For other farm improvements.	Total am't offered for farm improvements.	Total amount awarded for farm improvements.
Maine State Society, . . . .	-	-	-	95 00	-	-	-	-	930 00	-
Androscoggin County, . . . .	-	-	-	6 00	-	-	-	-	-	-
Cumberland County, . . . .	-	-	-	9 00	-	-	-	-	100 00	-
East Somerset, . . . .	-	-	-	-	-	-	-	-	-	-
Franklin County, . . . .	-	-	-	-	-	-	-	1 50	-	-
Kennebec County, . . . .	-	-	-	5 00	-	7 00	-	-	12 00	12 00
Lincoln County, . . . .	-	-	-	12 00	-	-	-	-	-	-
North Aroostook, . . . .	-	-	-	12 00	-	-	-	-	-	-
North Franklin, . . . .	-	-	-	-	-	-	-	-	10 75	5 25
North Kennebec, . . . .	-	-	-	12 00	-	3 00	-	-	-	-

North Penobscot, . . . . .	-	-	-	-	-	-	-	-	9 00	-
North Somerset, . . . . .	-	-	-	-	-	-	-	-	-	-
Oxford County, . . . . .	-	-	-	12 00	-	-	-	-	80 00	-
Penobscot and Aroostook Union, .	-	-	-	-	-	-	-	-	-	-
Piscataquis County, . . . . .	-	-	-	-	-	-	-	-	-	-
Sagadahoc County, . . . . .	-	8 00	-	15 00	-	5 00	-	-	155 00	28 00
Somerset Central, . . . . .	-	-	-	-	-	-	-	-	100 00	-
South Kennebec, . . . . .	-	-	-	12 00	-	-	-	-	-	-
Waldo County, . . . . .	24 00	-	-	-	-	-	-	-	36 00	24 00
Washington County, . . . . .	6 00	-	-	12 00	-	-	-	5 00	22 00	11 00
West Oxford, . . . . .	-	-	-	12 00	-	-	-	-	-	-
West Penobscot, . . . . .	-	-	-	-	-	-	-	-	-	-
West Somerset, . . . . .	-	-	-	-	-	-	-	-	-	-
York County, . . . . .	-	-	-	25 00	-	-	-	-	31 00	-
Totals, . . . . .	30 00	8 00		239 00		15 00		6 50	1,485 75	80 25

APPENDIX.

ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED, (Continued.)

216

FOR FARM STOCK.

Societies.	Am't awarded for Bulls.	Am't awarded for Working Oxen.	Am't awarded for Milch Cows.	Am't awarded for Heifers and Calves.	Am't awarded for Fat Cattle.	Am't awarded for Horses.	Am't awarded for Swine.	Am't awarded for Sheep.	Am't awarded for Poultry.	Am't awarded for all other Live Stock.	Total amount offered for Live Stock.	Total amount awarded for Live Stock.
Maine State Society, .	89 00	16 00	238 00	93 00	18 00	1,117 00	29 00	40 00	15 00	74 00	2,032 00	1,729 00
Androscoggin County, .	36 50	6 00	26 00	31 50	3 00	44 00	7 50	5 50	4 00	-	474 75	252 50
Cumberland County, .	7 00	38 00	21 00	14 00	7 00	36 00	16 00	13 00	-	12 00	188 00	163 50
East Somerset, . .	8 50	13 50	5 50	20 75	-	26 75	3 25	4 50	-	4 00	90 00	86 75
Franklin County, . .	10 75	14 00	8 00	5 75	3 50	-	-	8 25	-	79 75	190 00	140 00
Kennebec County, . .	30 50	80 00	23 50	22 00	5 00	71 50	9 50	7 00	-	-	249 00	249 00
Lincoln County, . .	17 00	6 00	18 00	9 00	7 00	47 00	6 75	13 50	5 75	23 00	191 00	154 00
North Aroostook, . .	14 00	30 75	6 00	22 50	-	30 50	9 00	16 00	-	7 50	155 00	137 25
North Franklin, . .	7 35	9 00	3 75	3 85	-	19 75	3 50	23 00	2 00	75 15	180 00	148 25
North Kennebec, . .	8 00	38 50	23 00	10 00	4 50	95 00	9 50	11 00	3 00	13 00	344 00	215 50

BOARD OF AGRICULTURE.

North Penobscot, . . .	8 50	22 25	3 00	5 25	-	9 75	3 00	2 50	-	20 50	74 75	29 00
North Somerset, . . .	6 80	7 50	3 75	8 40	-	22 00	2 25	7 50	-	80 00	149 65	138 20
Oxford County, . . .	40 00	10 00	22 00	17 50	-	114 75	28 00	14 00	1 00	60 00	283 50	307 25
Penob. and Aroostook Union,	7 50	4 50	3 50	3 75	-	28 00	-	4 50	-	-	64 75	64 25
Piscataquis County, . . .	10 00	21 00	4 00	6 00	-	20 50	5 00	2 00	-	5 25	161 00	73 75
Sagadahoc County, . . .	23 00	38 00	53 00	43 00	12 00	44 00	22 00	14 50	15 50	28 75	650 50	293 75
Somerset Central, . . .	14 25	21 00	9 50	14 25	4 50	141 25	10 50	13 50	-	-	450 17	289 25
South Kennebec, . . .	22 00	46 00	36 00	10 00	15 00	108 00	26 00	19 00	-	40 00	654 50	322 00
Waldo County, . . .	-	63 00	18 00	18 50	5 00	44 00	7 00	9 00	2 50	20 50	197 50	187 50
Washington County, . . .	9 00	44 00	11 00	37 00	7 00	30 00	10 00	16 00	-	-	172 00	164 00
West Oxford, . . .	8 00	7 00	5 00	2 50	7 00	23 50	4 00	12 00	-	9 50	111 50	86 50
West Penobscot, . . .	8 00	23 50	3 75	12 25	-	42 25	2 00	1 00	-	22 00	172 50	114 75
West Somerset, . . .	9 00	6 00	6 00	9 00	-	18 50	5 25	18 50	-	85 00	157 25	144 00
York County, . . .	15 00	10 00	10 00	7 00	10 00	22 00	20 00	8 00	12 00	40 00	236 00	153 00
Totals, . . .	409 65	575 50	561 25	426 75	108 50	2,157 00	239 00	283 75	60 75	700 00	7,629 32	5,642 95

ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED, (Continued.)

218

FOR FARM PRODUCTS.

Societies.	Amount awarded for Indian Corn.	Wheat.	Rye.	Barley.	Oats.	Any other Grain Crop.	Grass Crops.	Potatoes.	Carrots.	Beets.	Turnips.	Other Root Crops.	Total am't offered for Grain and Root Crops.	Total am't awarded for Grain and Root Crops.	Am't awarded for any other cultivated Crops.	Am't awarded for Fruits and Flowers.	Am't awarded for Honey and Sugar.	Am't awarded for Butter and Cheese.
Maine State Society,	33 00	22 00	-	13 00	15 00	-	18 00	20 00	15 00	5 00	10 00	-	283 00	133 00	41 00	69 00	74 00	180 00
Androscoggin Co.,	7 00	6 00	-	-	2 50	-	5 00	6 00	3 50	2 00	3 00	4 00	78 00	38 00	3 75	8 50	3 00	16 50
Cumberland County,	8 00	-	-	-	-	-	-	-	6 00	-	2 00	5 00	66 00	21 00	-	10 75	5 00	12 00
East Somerset, .	6 50	5 50	-	1 00	-	1 50	-	5 50	3 50	3 50	4 50	3 50	44 20	34 00	50	75	-	12 00
Franklin County,	-	-	2 00	3 00	-	-	-	-	-	-	-	-	39 75	5 00	8 00	1 50	1 50	11 50
Kennebec County,	5 00	4 75	-	3 75	3 00	-	-	3 75	3 00	-	3 00	1 50	27 75	27 75	-	7 00	-	18 00
Lincoln County, .	16 00	6 00	-	-	5 50	3 50	-	9 00	3 00	1 00	5 00	-	60 00	48 00	8 75	25 25	-	28 00
North Arrostook,	-	9 00	-	-	-	8 25	-	3 00	-	-	5 00	1 50	73 50	31 00	4 00	-	1 00	25 75
North Franklin, .	15 70	11 00	3 50	1 00	5 25	11 00	-	8 50	1 00	1 40	3 50	-	67 85	69 15	-	4 55	2 75	7 75
North Kennebec,	9 00	7 00	-	-	-	-	-	3 00	-	-	2 00	-	95 25	21 00	-	7 00	-	11 50
North Penobscot,	5 25	7 50	-	2 00	2 00	6 00	-	3 00	1 00	-	1 00	1 00	35 75	-	2 00	11 00	-	9 00

BOARD OF AGRICULTURE.

North Somerset, .	6 50	6 00	-	2 00	4 50	-	6 00	6 00	1 75	75	1 50	75	30 50	23 25	-	-	1 00	4 90	
Oxford County, .	21 50	10 00	-	3 00	6 00	-	-	5 00	-	-	-	-	113 50	45 50	19 75	20 00	4 75	21 00	
Penobscot and Aroostook Union, }	6 00	4 50	1 50	-	3 00	3 75	-	3 00	2 00	-	-	1 50	40 00	32 21	-	2 50	1 75	7 50	
Piscataquis County,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6 00	2 50	12 00	
Sagadahoc County,	14 00	9 00	4 00	-	-	3 00	-	14 50	6 00	-	50	-	2 61	51 00	-	23 75	3 00	25 00	
Somerset Central,	-	-	-	-	-	-	-	-	-	-	-	-	95 00	-	14 50	9 00	2 00	14 00	
South Kennebec, .	23 00	8 00	-	4 00	5 00	-	-	5 00	-	4 00	-	-	121 00	49 00	14 50	28 75	7 50	23 00	
Waldo County, .	9 00	-	-	2 00	2 00	2 00	-	18 00	4 00	4 00	8 50	-	63 00	49 00	2 75	18 25	1 00	12 00	
Washington County,	-	-	-	-	5 00	6 00	-	9 00	3 00	-	7 00	-	121 00	30 00	-	9 75	1 50	42 00	
West Oxford, .	8 50	4 00	3 00	-	-	-	-	-	-	-	1 00	-	38 50	16 50	-	4 00	4 50	11 00	
West Penobscot, .	11 25	9 25	-	3 00	2 25	-	-	6 75	5 00	-	25	-	63 15	41 50	-	13 95	-	13 50	
West Somerset, .	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5 50	
York County, .	8 00	-	-	-	-	-	-	-	4 00	-	-	-	89 00	12 00	-	16 00	5 00	20 00	
																	297 25	121 75	543 40

APPENDIX.

## MISCELLANEOUS.

Societies.	Amount awarded for Agricultural Implements.	Amount awarded for all other Agri- cultural objects.	Amount awarded for all objects other than Agricultural.
Maine State Society, . . . . .	21 00	2264 00	438 00
Androscoggin County, . . . . .	6 00	118 75	336 75
Cumberland County, . . . . .	8 00	-	53 25
East Somerset, . . . . .	75	-	39 39
Franklin County, . . . . .	-	-	66 57
Kennebec County, . . . . .	2 50	-	85 00
Lincoln County, . . . . .	5 00	25 00	75 00
North Aroostook, . . . . .	6 00	-	-
North Franklin, . . . . .	4 00	-	53 79
North Kennebec, . . . . .	12 00	-	68 50
North Penobscot, . . . . .	22 00	-	8 25
North Somerset, . . . . .	-	-	-
Oxford County, . . . . .	9 00	-	64 60
Penobscot and Aroostook Union, . . . . .	1 50	-	23 00
Piscataquis County, . . . . .	4 25	-	23 42
Sagadahoc County, . . . . .	1 00	441 50	142 50
Somerset Central, . . . . .	12 50	-	43 70
South Kennebec, . . . . .	-	-	131 64
Waldo County, . . . . .	5 00	-	-
Washington County, . . . . .	5 50	23 25	79 75
West Oxford, . . . . .	5 00	-	9 00
West Penobscot, . . . . .	6 50	1 75	37 98
West Somerset, . . . . .	-	-	7 80
York County, . . . . .	-	-	91 00
Totals, . . . . .			

## AGRICULTURAL EXHIBITIONS—1857.

---

Maine State, at	Bangor, Sept. 29, 30, Oct. 1, 2.
Androscoggin, at	Lewiston, October 6, 7, 8.
Cumberland, at	Portland, October 20, 21.
East Somerset, at	Hartland, October 14, 15.
Franklin, at	Farmington, October 8, 9.
Kennebec, at	Readfield Corner, Oct. 13, 14, 15.
Lincoln, at	Waldoborough, October 13, 14, 15.
North Aroostook, at	Fort Fairfield, October 7, 8.
North Franklin, at	Strong, October 6, 7.
North Kennebec, at	Waterville, September 15, 16, 17.
North Penobscot, at	Lincoln Village, October 7, 8.
North Somerset, at	Bingham, October 13, 14.
Oxford, at	Paris, October 6, 7, 8.
Penobscot and Aroostook Union, at	Golden Ridge, October 8.
Piscataquis, at	Dover, October 6, 7.
Sagadahoc, at	Topsham, October 13, 14, 15.
Somerset Central, at	Skowhegan, September 23, 24, 25.
South Kennebec, at	Gardiner, September 23, 24, 25.
Waldo, at	Belfast, October 14 and 22.
Washington, at	Pembroke, September 22, 23.
West Oxford, at	Fryeburg, October 21, 22, 23.
West Penobscot, at	East Corinth, September 25.
West Somerset, at	Madison Bridge, October 7, 8.
York, at	Saco, October 13, 14, 15.



## Officers of Agricultural Societies—1857.

### MAINE STATE.

<i>President,</i>	SAMUEL F. PERLEY,	Naples.
<i>Presidents of the several County Agricultural Societies are Vice Presidents-ex-officiis.</i>		
<i>Secretary,</i>	EZEKIEL HOLMES,	Winthrop.
<i>Treasurer,</i>	WILLIAM CALDWELL,	Augusta.
<i>Trustees,</i>	{ THOMAS S. LANG, DANIEL LANCASTER, SETH SCAMMAN, FRANCIS T. PURINGTON,* JOB PRINCE,	North Vassalboro'. Farmingdale. Saco. Topsham. Turner.

### ANDROSCOGGIN.

<i>President,</i>	ROBERT MARTIN,	West Danville.
<i>Secretary,</i>	WILLIAM R. WRIGHT,	Lewiston.
<i>Treasurer,</i>	WILLIAM P. FRYE,	Lewiston.
<i>Trustees,</i>	{ RUFUS PRINCE. SEWALL MOODY, AMOS NEVINS, H. C. BRIGGS, D. L. WEYMOUTH,	Turner. Webster. Lewiston. Auburn. Greene.

### CUMBERLAND.

<i>President,</i>	E. G. BUXTON,	Yarmouth.
<i>Vice Presidents,</i>	{ S. B. BECKETT, JOHN SAWYER, GEORGE T. FOSTER, JOHN F. ANDERSON,	Portland. Raymond. Saccarappa. Windham.
<i>Secretary,</i>	SEWALL N. GROSS,	New Gloucester.
<i>Treasurer,</i>	GEORGE WOODMAN,	Portland.
<i>Assoc'te Managers,</i>	{ THOMAS J. BROWN, THEODORE M. BRADBURY, DANIEL WESTON, EDWARD T. SMITH, JOHN WEBB,	Yarmouth. Standish. Otisfield. Gorham. Windham.

## EAST SOMERSET.

<i>President,</i>	JOHN ROWELL,	Hartland.
<i>Vice President,</i>	E. R. HOLMES,	"
<i>Secretary,</i>	WILLIAM FOISOM,	"
<i>Treasurer,</i>	JAMES FULLER,	"
<i>Trustees,</i>	{ WILLIAM M. PALMER,	Palmyra.
	{ E. R. HOLMES,	Hartland.
	{ JOHN ROWELL,	"
	{ J. P. ROBERTS,	
	{ ELLIS FISH,	

## FRANKLIN.

<i>President,</i>	OLIVER L. CURRIER,	New Sharon.
<i>Vice President,</i>	JOSEPH G. HOYT,	Wilton.
<i>Secretary,</i>	ALANSON B. FARRELL,	Farmington Falls.
<i>Treasurer,</i>	DAVID C. MORRILL,	"
<i>Trustees,</i>	{ JASON S. CHANDLER,	New Sharon.
	{ CHARLES R. ADAMS,	Wilton.
	{ DANIEL MERRITT,	Jay.
	{ NATHAN GOODRICH,	Industry.
	{ EDWIN R. FRENCH,	Chesterville.

## KENNÉBEC.

<i>President,</i>	OAKES HOWARD,	Winthrop.
<i>Vice Presidents,</i>	{ B. B. DUDLEY,	Mt. Vernon.
	{ T. B. READ,	Wayne.
	{ JOHN BERRY,	Vienna.
<i>Secretary,</i>	D. CARGILL,	East Winthrop.
<i>Treasurer,</i>	ASA GILE,	Readfield.
<i>Trustees,</i>	{ S. N. WATSON,	Fayette.
	{ H. N. HUNT,	Readfield.
	{ D. H. THING,	Mt. Vernon.

## LINCOLN.

<i>President,</i>	CYRUS C. ATWELL,	Waldoborough.
<i>Secretary,</i>	M. M. RAWSON,	"
<i>Treasurer,</i>	SAMUEL FORD,	Newcastle.
<i>Trustees,</i>	{ JOHN CURRIER,	Waldoborough.
	{ JOSEPH AVERY,	Jefferson.
	{ ISAAC REED,	Waldoborough.

## NORTH AROOSTOOK.

<i>President,</i>	JOSEPH BLAKE,	Letter G.	
<i>Secretary,</i>	B. CUMMINGS,	Maple Grove.	
<i>Treasurer,</i>	JOEL BEAN,	Letter G.	
<i>Trustees,</i>	{	J. W. HAINES,	Maple Grove.
		DAVID FOSTER,	Presque Isle.
		JONATHAN HOPKINSON,	Letter D.

---

## NORTH FRANKLIN.

<i>President,</i>	JOHN DYAR,	Freeman.	
<i>Vice Presidents,</i>	{	W. H. JOSSELYN,	Phillips.
		JAMES DAVIS, JR.,	Solon.
		PETER A. J. NORTON,	Strong.
<i>Secretary,</i>	M. W. DUTTON,	Phillips.	

---

## NORTH KENNEBEC.

<i>President,</i>	ISAAC W. BRITTON,	Winslow.
<i>Secretary,</i>	JOSEPH PERCIVAL,	Waterville.
	{	GEORGE E. SHORES,
NATHAN PERRY,		"
OBED EMERY,		Fairfield.
CLARK DRUMMOND,		Winslow.

---

## NORTH SOMERSET.

<i>Secretary,</i>	O. R. BACHELLER,
-------------------	------------------

---

## NORTH PENOBSCOT.

<i>President,</i> <i>Treasurer,</i> <i>Secretary,</i>	JOSEPH HAMMOND,	Lincoln.
	DAVID L. PLUMLEY,	"
	P. M. CLARK,	Springfield.

## OXFORD.

<i>President,</i>	HENRY C. REED,	Norway.	
<i>Vice President,</i>	E. G. HARLOW,	Canton Mills.	
<i>Trustees,</i>	{	MARK P. SMITH,	Norway.
		LEWIS MASON,	Buckfield.
		WILLIAM R. KIMBALL,	Paris.
		FARNUM JEWETT,	North Waterford.
		J. W. ELLIOT,	Milton plantation.
		JAMES BURBANK,	Gilead.
		ISAAC N. STANLEY,	Dixfield.
<i>Sec. and Treasurer,</i>	{	GILMAN CHAPMAN,	Bethel.
		LYMAN RAWSON,	Rumford Point.
		ELLIOT SMITH,	Norway.

## PENOBSCOT AND AROOSTOOK UNION.

<i>President,</i>	ALFRED CUSHMAN,	Golden Ridge.
<i>Secretary,</i>	LUTHER ROGERS,	Patten.

## PISCATAQUIS.

<i>President,</i>	A. M. ROBINSON,	Dover.	
<i>Vice Presidents,</i>	{	THOMAS S. PULLEN,	"
		STEPHEN LOWELL,	Sangerville.
		JACOB LEMAN,	Abbot.
<i>Trustees,</i>	{	CALVIN CHAMBERLAIN,	Foxcroft.
		CHARLES LORING,	Guilford.
		BENJAMIN R. LAKE,	Atkinson.
<i>Secretary,</i>	BENJAMIN F. WILBUR,	Monson.	
<i>Treasurer,</i>	H. DOUTY,	Foxcroft.	

## SAGADAHOC.

<i>President,</i>	F. T. PURINGTON,*	Topsham.	
<i>Vice Presidents,</i>	{	T. J. SOUTHARD, <i>Acting Pres.,</i>	Richmond.
		A. J. FULLER,	Bath.
		L. W. TEDFORD,	Topsham.
<i>Trustees,</i>	{	SAMUEL F. DIKE,	Bath.
		GEORGE A. ROGERS,	Topsham.
		S. R. JACKSON,	Brunswick.
		BENJAMIN M. BROWN,	West Bath.
<i>Secretary,</i>	JOHN H. THOMPSON,	Topsham.	
<i>Treasurer,</i>	ELISHA CLARK,	Bath.	

\* Deceased.

## SOMERSET CENTRAL.

<i>President,</i>	ABNER COBURN,	Bloomfield.
<i>Vice Presidents,</i>	{ HENRY A. WYMAN, HIRAM C. WARREN,	Skowhegan. Canaan.
<i>Trustees,</i>	{ PETER MALBON, AMOS C. TOBY, ELI W. THOMPSON,	Skowhegan. Bloomfield. Madison.
<i>Secretary,</i>	NORRIS MARSTON,	Bloomfield.
<i>Treasurer,</i>	JOHN F. POLLARD,	Skowhegan.

---

## SOUTH KENNEBEC.

<i>President,</i>	DANIEL LANCASTER,	Farmingdale.
<i>Vice Presidents,</i>	{ WILLIAM S. GRANT, SAMUEL DINSLOW, O. S. EDWARDS,	" Richmond. West Gardiner.
<i>Trustees,</i>	{ DANIEL LANCASTER, JOHN A. PETTINGILL, J. D. WARREN,	Farmingdale. Augusta. Pittston.
<i>Secretary,</i>	JAMES M. CARPENTER,	"
<i>Treasurer</i>	JOHN STONE,	Gardiner.

---

## WALDO.

<i>President,</i>	DAVID NORTON,	Montville.
<i>Vice President,</i>	HENRY CUMMING,	Belfast.
<i>Secretary,</i>	TIMOTHY THORNDIKE,	"

---

## WASHINGTON.

<i>President,</i>	JONATHAN REYNOLDS, JR.,	Pembroke.
<i>Trustees,</i>	{ EDMUND LINCOLN, L. T. REYNOLDS, G. W. CHADBOURNE,	Dennysville. Pembroke. Perry.
<i>Secretary,</i>	W. D. DANA,	"

## WEST OXFORD.

<i>President,</i>	F. L. RICE,	Denmark.	
<i>Vice President,</i>	THOMAS MABRY,	Hiram.	
<i>Trustees,</i>	{	J. B. OSGOOD,	Fryeburg.
		WALTER HIGGINS,	"
		WILLIAM BEAN,	Denmark.
		SAMUEL STICKNEY,	Brownfield.
		JESSE COLCORD,	Porter.
		OLIVER ALLEN,	Hiram.
		WILLIAM H. WALKER,	Lovell.
<i>Secretary,</i>	{	WILLIAM WOODBURY,	Sweden.
		THOMAS FARRINGTON,	Stow.
		GEORGE B. BARROWS,	Fryeburg.
<i>Treasurer,</i>	JAMES WALKER,	"	

## WEST PENOBSCOT.

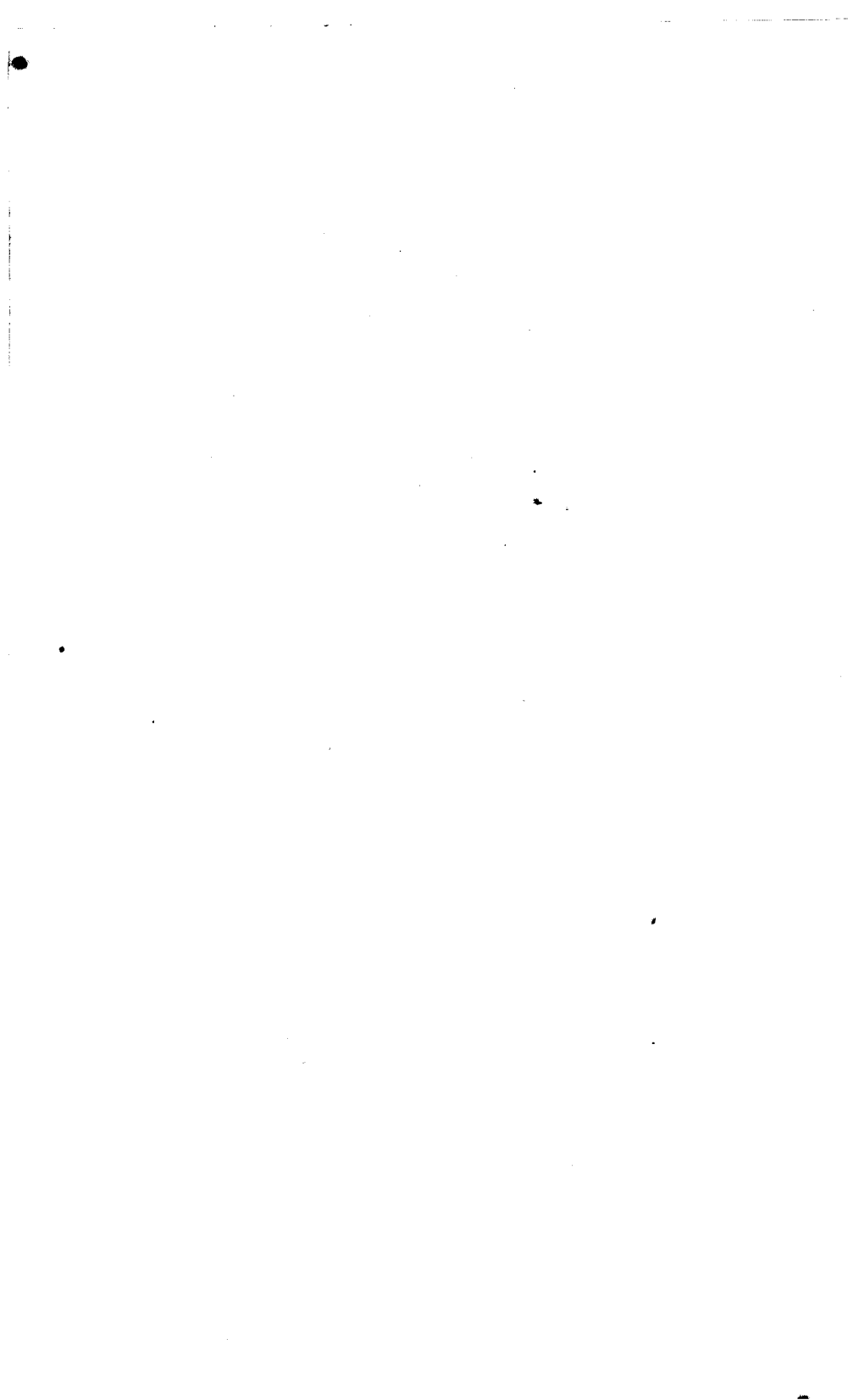
<i>President,</i>	NATHANIEL BURRILL,	Newport.	
<i>Vice Presidents,</i>	{	HENRY K. DEXTER,	Corinth.
		FRANCIS W. HILL,	Exeter.
		V. S. PALMER,	Kenduskeag.
<i>Trustees,</i>	{	T. R. SHAW,	Exeter.
		JOHN THISSELL,	Corinth.
		JAMES O. TILTON,	Kenduskeag.
		T. B. BATCHELDER,	"
<i>Secretary,</i>	J. O. TILTON,	"	

## WEST SOMERSET.

<i>President,</i>	WILLIAM B. SNOW,	Madison.
<i>Secretary,</i>	CYRUS BRADBURY,	Anson.

## YORK.

<i>President,</i>	SETH SCAMMAN,	Saco.	
<i>Vice Presidents,</i>	{	THOMAS DYER, 3d,	"
		ISAAC DEERING,	Waterborough.
		JOHN ELDEN,	Buxton.
		J. M. GOODWIN,	Dayton.
<i>Trustees,</i>	{	T. M. HAYES,	Saco.
		J. M. DEERING,	"
		B. E. CUTTER,	Biddeford.
		JOHN MILLIKIN,	Buxton.
<i>Secretary,</i>	{	ELIJAH HAYES,	Berwick.
		JOHN HANSCOM,	Saco.
		WILLIAM NOYES,	"



# INDEX.

---

	PAGE.
Analysis of Roots, . . . . .	101
Aroostook County, Character of Soil, . . . . .	8
"    Climate, . . . . .	10
"    Productions, . . . . .	14
"    Roads, Distances, &c., . . . . .	30
Agricultural Education, . . . . .	206
Board of Agriculture, objects of, . . . . .	
Bones, use and value of, as manure, . . . . .	62, 65
Bone Mills, . . . . .	63
Construction of Barns, report on, . . . . .	163
Deep Tillage, . . . . .	103
Defects of Agriculture in Maine, . . . . .	122
Exhausted Soils, means of renovating, . . . . .	59, 110
Experimental Farm, . . . . .	202, 207
Farming, high and low, . . . . .	24
Fallows, . . . . .	70
Farmers' Clubs, . . . . .	209
Green Manuring, . . . . .	73
Grapes, report on, . . . . .	181
Guano, . . . . .	65, 116
Hay Crop, . . . . .	112
Hired Labor, profitable, . . . . .	131
Horse Shoeing, letter on, . . . . .	135
Importance of Shelter for Animals, . . . . .	128
Increase in Hay Crop practicable, . . . . .	
Letter of Surgeon Cuming, on Shoeing Horses, . . . . .	135
Liquid Manures, . . . . .	60, 121
Markets, value of, to Agriculture, . . . . .	22
Manures, saving, . . . . .	60
"    methods of preserving, . . . . .	175



	PAGE.
Marine Manures, . . . . .	69, 78, 119
Modes of Offering Premiums, . . . . .	199
Model Farm, . . . . .	207
Muck, report on Treatment and Value of, . . . . .	191
" method of preparing with Lime and Salt, . . . . .	172, 194
Objects worthy of Premiums, . . . . .	200
Poggy Chum, . . . . .	69
Plowing, . . . . .	104
Phosphate of Lime, . . . . .	66
Preparation of Grass, . . . . .	112
" of Reports of Awarding Committees at Shows, . . . . .	204
Protection, equivalent to shortening of winter, . . . . .	128
Report on Construction of Barns, . . . . .	163
" Grapes, . . . . .	181
" best methods of Preserving Manures, . . . . .	175
" Specific and Concentrated Manures, . . . . .	188
" Value and Treatment of Muck, . . . . .	191
Rotation of Crops, . . . . .	76
Root Culture, . . . . .	96
Sheep Husbandry, . . . . .	107
Statistics, Agricultural, importance of, . . . . .	196
Stock Husbandry advised, . . . . .	110
Statements of Competitors at Shows, . . . . .	203
Stock Farm desirable, . . . . .	208
Suggestions of improvement in present agencies for elevation of Agriculture, . . . . .	199
Superphosphate of Lime, . . . . .	63
Top Dressing for Grass Lands, . . . . .	119
Veterinary Science, importance of, . . . . .	135