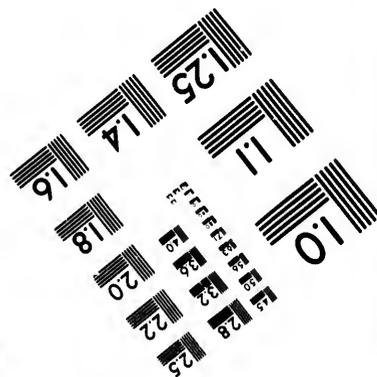
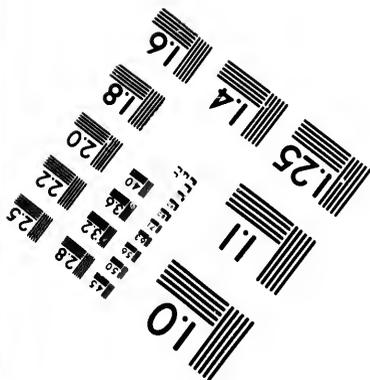
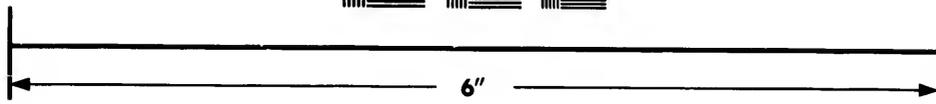
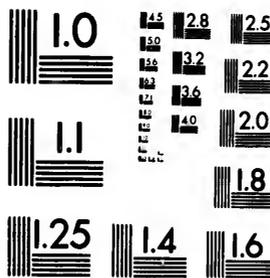


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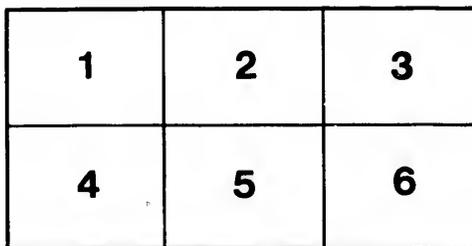
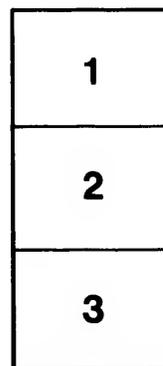
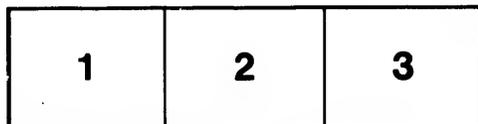
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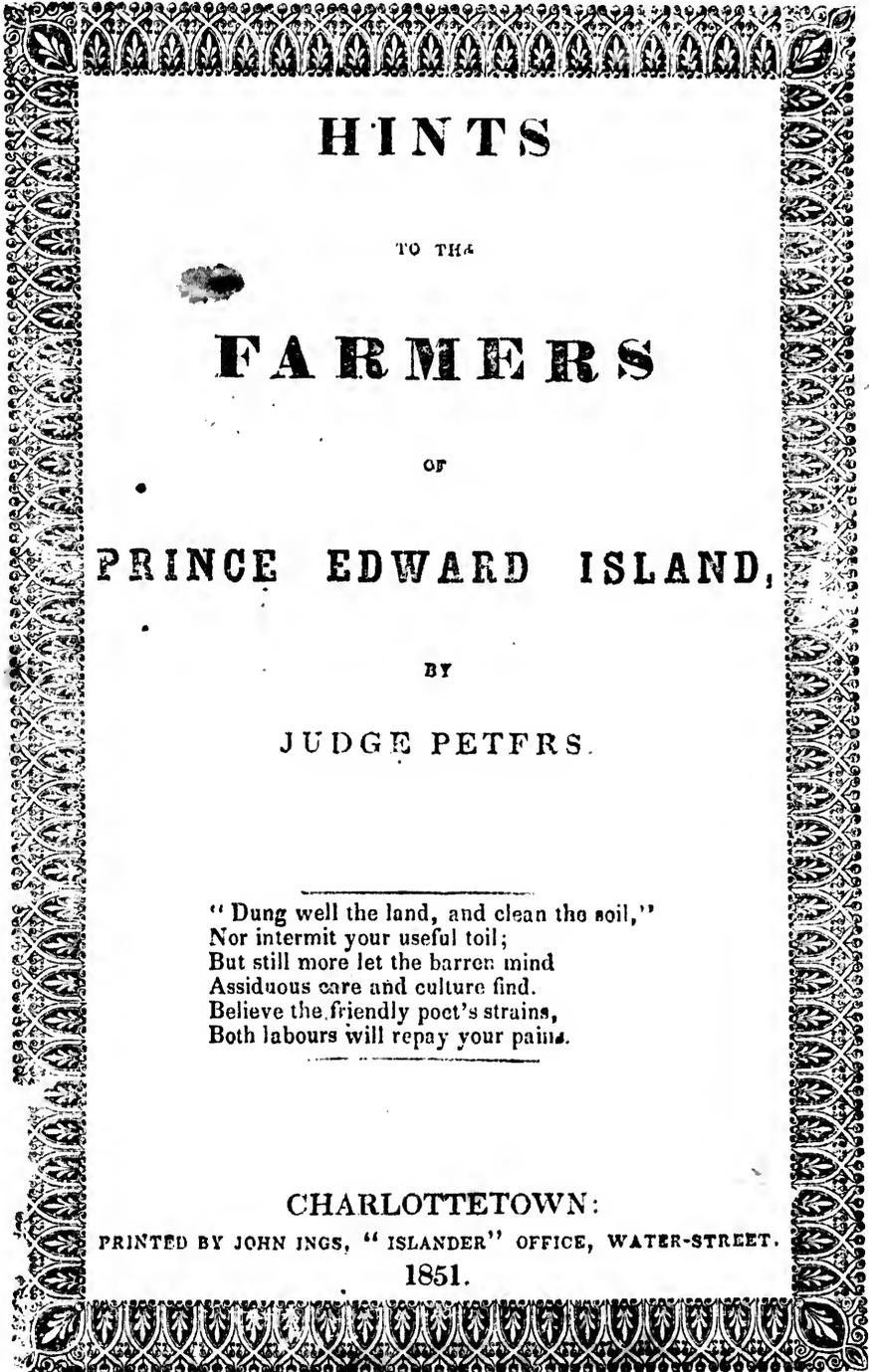
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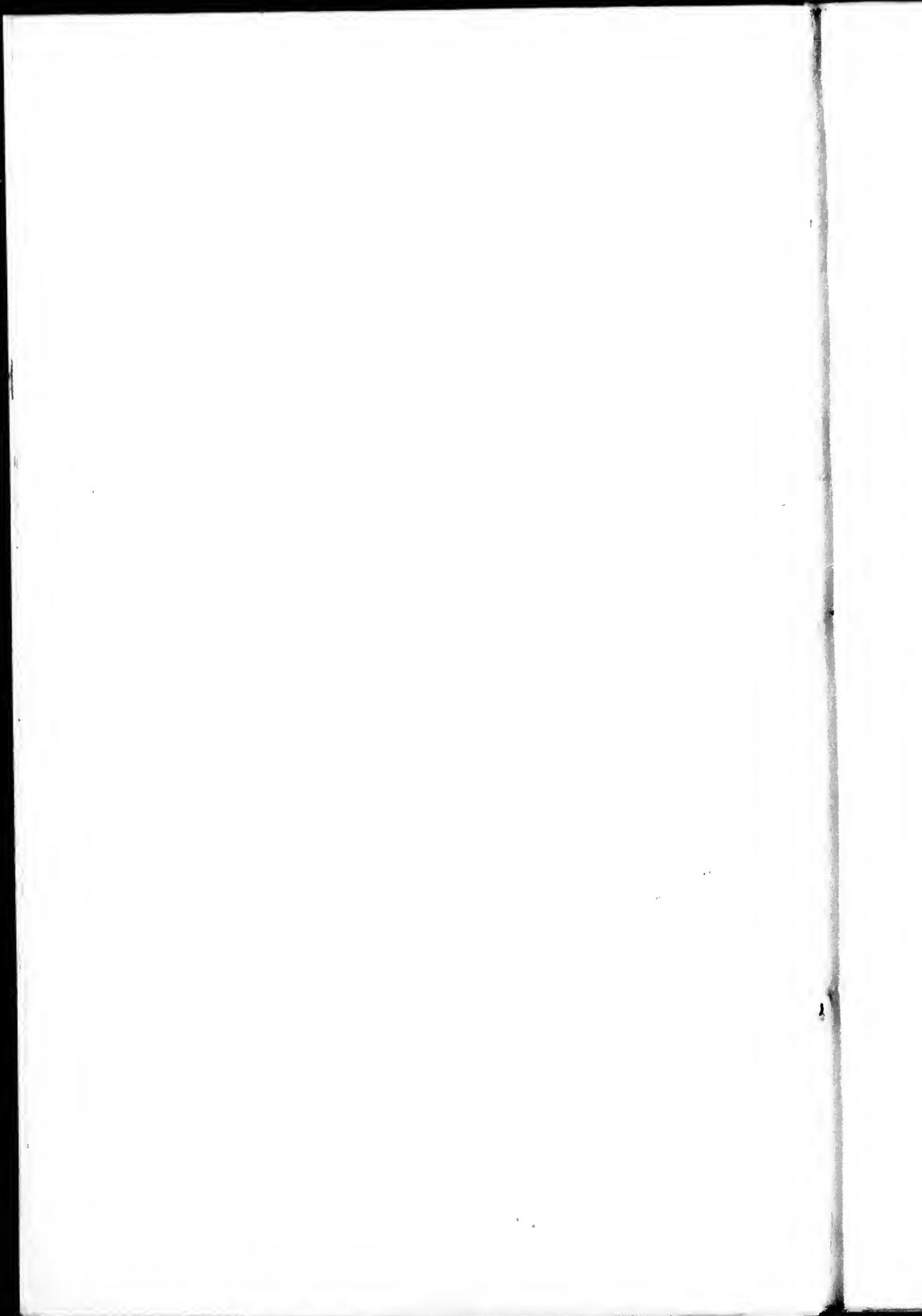


HINTS
TO THE
FARMERS
OF
PRINCE EDWARD ISLAND,

BY
JUDGE PETERS.

“Dung well the land, and clean the soil,”
Nor intermit your useful toil;
But still more let the barren mind
Assiduous care and culture find.
Believe the friendly poet's strains,
Both labours will repay your pains.

CHARLOTTETOWN:
PRINTED BY JOHN INGS, “ISLANDER” OFFICE, WATER-STREET.
1851.



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PREFACE.

A LARGE portion of this little Pamphlet is compiled from various Agricultural works. The arrangement is taken from Allen's Farm Book, from which much is extracted. Wherever a passage appeared plain, concise, and applicable, I have transcribed it; some are curtailed, and others added to, or altered, to render them more simple and intelligible. I have substituted my own ideas only when matter published by others, did not appear quite applicable to the Island, or was not sufficiently plain or practical in its directions. I have, at different times, distributed a good many agricultural works through the country, but, simple and practical as they are, scientific words sometimes occur, which, not being at once understood, discourage the reader, and lead him to lay by the book as something he cannot comprehend. This circumstance, and a belief that information on such topics, however limited, may be useful, has induced me (without any pretensions to the knowledge and experience necessary to write a treatise on farming) to attempt to point out some of the most common and pernicious errors in our agricultural system, and, avoiding all scientific terms, to place the substance of some useful things, which may be found in more costly works, or which my own limited experience enables me to recommend, in plain and easily understood language, and in a very cheap form, before the farmers of this Island; nor have I ventured to treat of any thing that I have not tested by practice, and found beneficial. Should its publication tend to correct some of these errors, and, what is more important, if it excite a desire to become acquainted with agricultural books containing more complete information, I

will be amply repaid for the little time and trouble expended in its production. "Fessenden's Complete Farmer," and "Jackson's Agriculture," (which can be obtained from the Royal Agricultural Society, or its Depots) I would strongly recommend for the study of the practical man.

In freely condemning general faults, I feel sure no offence will be given to the many skilful farmers scattered over the Island, whose practice forms an exception to the bad system I, in common with others, condemn. Although I cannot write for the benefit of such men, I may solicit their assistance. Their example has already done much; let their influence be used to encourage Agricultural Societies, farmers' clubs, and meetings for the discussion of agricultural topics; let them add precept to their example, and they will become their country's greatest benefactors.

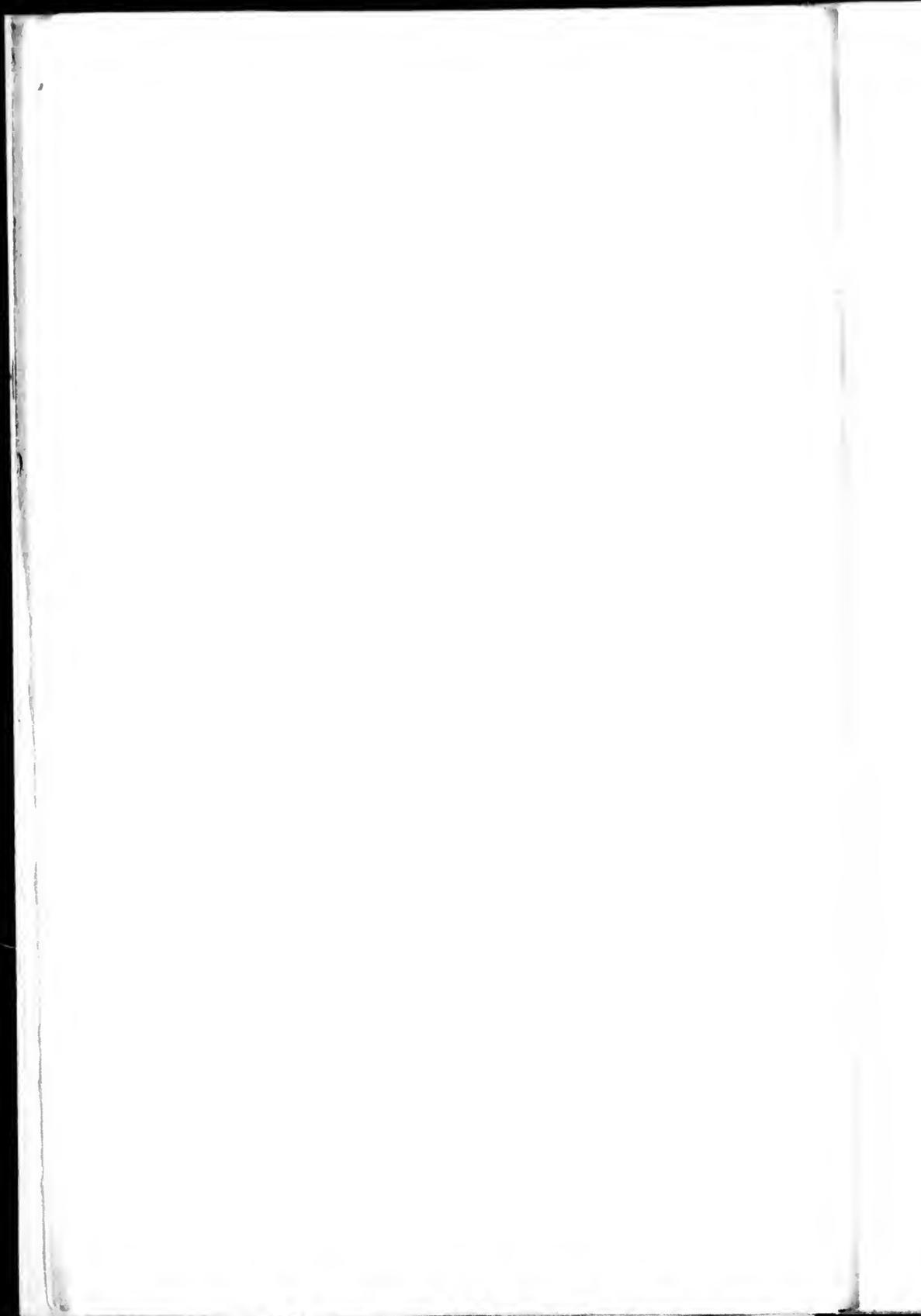
But, let none think they know enough. The art of Farming is progressive; it can exercise the most intelligent mind; one successful experiment leads to another; the most experienced may discover something new, and the most skilful may improve. The volume which tells what science has done for the farmer, will repay perusal; and by watching her present rapid march, he may avail himself of new discoveries, to lighten his toils, increase his profits, and improve his mind.

JAMES H. PETERS.

Sidmount, February, 1851.

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MANURES.

No soil will continue to produce good crops without manure; the farmer should therefore endeavour, first, to prevent waste of the dung and urine, both as regards quantity and quality; secondly, to increase the quantity by every means within his reach. Bous-singault, page 256, on this subject, says:—

“In agricultural establishments in which the importance of manure is duly appreciated, every precaution is taken both for its production and preservation. Any expense incurred in improving this vital department of the farm, is soon repaid beyond all proportion to the outlay. The industry and intelligence possessed by the farmer may indeed almost be judged of at a glance by the care he bestows on his dung-hill. It is truly a deplorable thing to witness the neglect which causes the vast loss and destruction of manure over a great part of these countries. The dung-hill is often arranged as if it were a matter of moment that it should be exposed to the water collected from every roof in the vicinity, as if the business were to take advantage of every shower of rain to wash and cleanse it from all it contains that is really valuable. The main secret of the admirable and successful husbandry of French Flanders may, perhaps, lie in the extreme care that is taken in that country to collect everything that can contribute to the fertility of the soil. Our agricultural societies, which are now so universally established, would confer one of the greatest services on the community, if they would encourage, by every means at their command, economy of manure; premiums awarded to those farmers who should preserve their dung-hills

in the most rational and advantageous manner, would prove of more real service than premiums in many other and more popular directions."

If a stranger should travel through Prince Edward Island, and form his opinion of our farmers by the state of their dung-hills, he would not go away with a very exalted opinion of our industry and intelligence. The waste of manure occasioned by the system followed here, is beyond calculation, and is deplorable indeed. The brevity aimed at in this pamphlet will not allow a discussion of the principles of Agricultural Chemistry. But it may be stated as an indisputable fact, *that the most enriching parts of manure may be washed from it by rain, or escape from it in the shape of an invisible gas, during the heating of the dung heap*. To assist the farmer in preventing this, is the object of the writer.

BARN-YARD MANURE.

The first consideration in the management of manures is to secure them, against all waste. On most of the farms in this Island the manure heaps are exposed to the rain, by which the most fertilizing parts are washed out, and frequently placed on the side of a hill, so that their dark rich juices, instead of being saved for the crop, run off to the nearest brook. This is a common error. To prevent it, the place where the manure is thrown out should be dug out so as to form a pit two, three, or four feet deep, according to its situation; if the bottom will not hold water, it should be puddled with clay; during the summer, or in the fall, as much of the mud, or one or two feet of bog mud, if it can be got, or earth from the road side, should be laid over the bottom of the pit, the manure, when thrown out, should rest on this mud or earth, which will absorb the juices as they escape, and become as good as the dung itself; and what the mud or earth cannot soak up will remain in the pit saturating the lower parts of the dung-heap. This will be found, on trial, an improvement on the present system. But there is a

further improvement, viz., the erection of a shed against the side of the stable or cattle house over the pit, so as to cover the manure when thrown out, this will prevent its being mixed with snow in winter, or washed by rain in spring. It is of great importance in the management of barn-yard manure, that a *gentle* fermentation or heating should be constantly going on in the heap, first, because a certain extent of decomposition is necessary to render the litter it contains fit food for plants; secondly, because by this heating, seeds of noxious weeds are destroyed. If the dung is mixed with snow, and frozen, no decomposition goes on in winter, and the seeds of every weed which grew on the farm are preserved and carried out with the manure, and are thus resown in the spring. By having the manure covered with a shed this evil will be avoided, as though ten or twelve inches of the top of the heap thus covered may be frozen, yet, even in mid-winter the interior of the heap will maintain sufficient heat to destroy the vitality of the seeds, and gradually to decompose the litter. If, on the other hand, manure which has not been covered, be left till late in the spring, the heat of the weather soon causes it to heat so rapidly that it becomes too hot; a strong smell will be found coming from it, this is a gas called ammonia, which, though invisible, is the very best part of the manure, and if preserved, would produce the farmer bushels of turnips, wheat and oats. On opening a heap which has undergone this excessive fermentation, a great part of it will often be found "fire fanged," that is, having a dry mouldy appearance. Manure reduced to this state is of little value; but where dung, by being under a shed, has undergone a gradual decomposition during the winter, this excessive heating, and consequent loss, will be avoided. Boussingault, page 250, on this subject, says:—

“The loss of ammonia from dung-heaps in the course of *regulated* fermentation must not be estimated too highly: when the decomposition is *carefully* conducted the loss is really very small, the gentle fermentation then raised, has characters which differ

essentially from those that accompany the rapid putrefaction, which never fails to take place when matters are not well managed. As an example of the rapid and injurious fermentation of which I speak, I may cite that which frequently takes place in piles of horse dung. Every one must have seen such dung hills left to themselves acquiring a very intense heat in the course of a few days, and even heard of their taking fire. I have seen piles of this kind reduced to their mere earthy constituents ; such are never the results of the moderate and gradual decomposition which farm-yard dung ought never to exceed. When the pit or stance is emptied, in which a slow and equal fermentation has taken place, the upper layer is seen to be very nearly in the same state in which it was when it was piled, the layer immediately beneath this one is changed in a greater degree, and sometimes exhales a slight ammoniacal odor ; in the lower strata the modification is yet greater ; the straw has lost its consistency, it is fibrous, and breaks into pieces with the greatest ease ; the mass is also proportionally darker in color as we go deeper, and on the ground is black. There is no doubt but that the state in which a properly managed dung-heap is found in the end, is due to the circumstances in which it has been placed and kept during the whole time of its preparation ; its constituent elements would have gone through a totally different course in the progress of their modification had they been left exposed to the open air."

LIQUID MANURE.

The urine of cattle, horses, pigs, &c., is a most powerful manure. "The urine saved from a single cow is considered worth ten dollars per annum in Flanders, where agricultural practice has reached a high state of advancement. The urine of a cow for a year will manure one and a quarter acres of land, and is more valuable than its dung in the ratio by bulk of seven to six, and in real value as two to one. How important, then, that every particle of it be care-

fully husbanded for the crops."—(*Allen's Farm Book*, p. 64) And yet, this most valuable manure is very generally wasted in this Island. There are several methods of saving it. One generally practised is to excavate the earth under or near the stables or stalls, and place in it a tank, either made of wood or built of brick, and grouted so as to hold water, and from which the liquid is pumped into a punchon placed in a cart or on wheels, and then allow it to run off as the cart is driven over the fields; various contrivances being used to sprinkle the liquid evenly over the ground. A simple and effective one is to place a board in the tail of the cart, with notches cut in the under edge, by letting the liquid run from the punchon into the cart it will be equally distributed the width of the cart body as it is driven along. But, as the construction of tanks requires an outlay of money, which many farmers cannot afford, a less expensive method seems better adapted to our circumstances. It has been already stated that a pit should be dug by the side of the stables, to receive mud or earth on which the dung should be thrown. The urine is generally wasted by running through the loose floors of the stables or stalls. Now, suppose the cattle stand with their tails toward the pit, all the farmer has to do is to shelve off the earth from under the stable three or four feet, as far as the group extends, so that any liquid falling through will run into the pit. If the cattle stand in a double row, or tail to tail, then, under the whole of the group a drain must be dug leading to the pit, as wide at the top as the group, and narrow at the bottom, and puddled with clay, so that the liquid falling through will gradually flow over the earth or mud placed in the pit; by this means the urine, instead of running under the barn and being lost, will be soaked up by the mud or earth in the pit. This method may be adopted even where the floors are formed of logs. Those who can afford to have tight plank floors, will find it more convenient to let it empty into the pit from spouts under or over the sill, because as the liquid should flow into it over the top of the mud or earth, the pit will then hold a

sufficient quantity without being made so deep, as it would require to be where the liquid first runs through the floor. By means similar to the above, the writer, last year, obtained 220 loads of manure from the urine of his stock, seven cows and three horses, independently of the manure made from their dung. The following extract from the *Farmer's Treasure*, page 175, both points out the mode of saving the urine, and strikingly illustrates its value as manure :—

“ A letter from Charles Alexander, near Peebles, in Scotland, addressed to Sir John Sinclair, in 1812, contains much valuable information on this subject. This intelligent farmer had long been impressed with the great importance of the urine of cattle as a manure, and he set about to discover, by a long and well-conducted series of experiments, the best method of collecting and applying it. He began by digging a pit contiguous to the feeding stall, but distinct altogether from that which was appropriated for the reception of the dung. The dimensions of this pit were thirty-six feet square, and four feet deep, surrounded on all sides by a wall, and the solid contents were one hundred and ninety-two yards. Having selected the nearest spot where he could find loamy earth—and this he always took from the surface of some field under cultivation—he proceeded to fill it, and found that with three men and two horses he could easily accomplish twenty-eight cubic yards per day. When the work was complete he levelled the surface of the heap in a line with the sewer which conducted the urine from the interior of the building, on purpose that it might be distributed with regularity, and might saturate the whole from top to bottom. The urine was supplied by fourteen cattle, kept there for five months on fodder and turnips. The contents of the pit produced two hundred and eighty-eight loads, allowing two cubic yards to be taken out in three carts, and he spread forty of these on each acre, so that this urine, in five months, produced a compost sufficient for the fertilization of seven acres of land.” He states, further, that he had *tried* this experiment

or *ten years*, and had indiscriminately used, on the same field, either the cow-dung or the saturated earth, and, in all stages of the crop, he had never been able to find any perceptible difference. But what is still more wonderful, he found his compost lasted in its effects as many years as his best manure.

It appears then, that in five months each cow discharges urine which, when absorbed by beam, furnishes manure of the richest quality and most durable effects, for half an acre of ground. The pit which contained all the dung of the fourteen cattle, as well as the litter employed in bedding them, and which was kept separate for the purpose of the experiment, only furnished, during the same period, two hundred and forty loads, and these, at the same rate could only manure six acres."

From these facts it is evident that the urine which the farmers in this island waste is actually worth more than the dung which they save, a conclusion which should certainly lead to an alteration in their present practice.

MANAGEMENT OF MANURE HEAPS IN THE FIELDS.

The dung is often drawn out to the fields in March and April, and formed into heaps, where it remains until it is wanted. This is necessary to forward the spring's work, but it is generally left uncovered, and heats before it is carted out for spreading, and thus a great portion of the ammonia—the best of the manure—is lost. Agricola observes:—

"A skillful agriculturist would no more think of allowing a violent fermentation to be going on in his dung-hill, unmixed with earth or matter to fix and secure the gas, than the distiller would suffer his apparatus to be set to work without surmounting his still with the worm to cool and condense the rarefied spirit which ascends in evaporation;" in both, the most precious matter is that which escapes in a gaseous state, and to behold it escaping with uncon-

cerned indifference, is a demonstration of the most profound ignorance."

The *Farmer's Treasure*, page 73, gives the following directions:—"When it is found necessary to cart the manure away in order to forward the business of the season, previous to the commencement of the work, a quantity of peat or soil should be collected on the spot intended to receive the dung. The foundation of the heap should be laid with such material, about six or nine inches thick, according to the nature of the dung to be laid upon it, and it should be rather inclined to the centre, so as to retain as much as possible of the sealage of the heap, the sides should be kept upright and the top level. At the conclusion of the hauling, the two ends should be brought up to the general level of the heap, and the whole surface, including the top, sides, and ends, should be well coated with the mould, or other material provided for the purpose.

In this Island, the ground being frozen in March and part of April, earth or mud cannot then be got, but the farmer should look ahead, he can make a heap of mud or earth during the summer or autumn to cover his manure with in the spring; the heap should be placed in the lee of a bush or fence, where the snow accumulates, or surrounded with a few bushes or hurdles to catch the snow. I generally prepare a heap of bog mud in this way to cover my manure heaps in the spring; I find it then easily got at, as the frost seldom penetrates the heap more than five or six inches. This mud being coated twelve or sixteen inches thick over the sides and top of the dung-heap, retains the ammonia, and becomes as good as the dung itself, and greatly increases the quantity of manure.

SPREADING THE MANURE.

Whether the manure be spread over the ground to be ploughed, or put in drills, it should be covered as soon as possible after it is spread, because, by exposure to the sun its moisture is evaporated, and

the dung is left parched and dry, and does not rot so quickly in the soil as when it is ploughed in damp, consequently, the crop remains a long time without receiving benefit from it. I frequently see dung spread two or three days before it is ploughed in. If it were old, well rotted dung, it might not matter so much, but with half-rotted dung, made only the winter before, it is a most wasteful practice: correctly speaking, the plough should follow the spreaders; but our practice must be adapted to our circumstances; and few of our farmers can command sufficient hands to do this, but all should remember, "*that every instant it lies exposed to the air, it is losing its value,*" and no one need spread more in the forenoon than he can cover before night.

BOG MUD,

Of which there is abundance in this Island, is a most valuable manure, but very generally neglected; one frequently sees a farm poor and worn out, its owner complaining he can't get manure, and yet in the midst of his worn out fields, lies an acre, or half an acre, of mud, from two to five feet deep, containing manure sufficient to make the whole farm as rich as a garden if he would but use it. An American Agriculturist, speaking of bogs and swamps, says:—"Such reservoirs of vegetable nutrition are mines of wealth to the farmer, if judiciously applied: nor can he justify meagre returns from his fields while this remedy is within his reach." This kind of mud frequently contains an acid quality, and then if spread and ploughed in fresh from the bog, it will be of little or no service to the first crop, and may prove injurious to it; yet, even then, in a year or two, its beneficial effects will be evident, and will be found durable.

But to make it produce prompt and immediate effect, it should be mixed with manure, or lime, or ashes, which may be done in various ways. In mixing it with manure, the plan I pursue—suggested to me by Fessenden's complete farmer—is this: I first form a bottom of mud fifteen feet wide, and eight or ten in-

ches deep, then lay on a layer of manure about six inches deep, then eight or ten inches of mud, then six inches of manure, and so on, alternate layers of mud and manure, till the heap is about four and a half feet high, the sides, ends and top are then coated with mud ten or twelve inches thick; the manure and mud should be thrown on from each side, and no one allowed to tramp on the heap, because, if it is packed too closely, it will not heat so well. The dryer the mud the less manure will be required to cause the whole to heat. I generally make the compost in August or September, and use about one load of manure to three of mud; if not made up till Oct., I use a larger proportion of manure, as more is then required to produce heat than when the weather is hotter. Early in the Spring the heap is turned, it then heats all day again, and is ready for turnips or other crops, and a cart-load of it will be found equal to a cart-load of manure.

In mixing it with lime, I have found twenty barrels of rough lime sufficient for one hundred cart-loads of mud. The lime should be stacked beside the mud, and mixed with it while it is hot; it should remain a year in compost, and be two or three times turned.

Ashes serve the same purpose, and in many parts of the Island are more easily obtained than lime. Dr. Dana, of Massachusetts, recommends eight bushels of unleached wood ashes to be mixed with one cord of mud, which, he says, is equivalent to pure cow dung in value. I have found the following method of preparing this mud cheap and effective:—I draw out the mud and dump the loads near the bog, making the heap about thirty feet wide, leaving it just as it falls from the cart, without levelling; then haul the roots thrown out in digging the mud, and pile them on the heap; then haul out the moss which has been pulled off the bog in getting at the mud, and pile it on the heap over the roots, in this way it soon dries; I then burn it, and the ashes cover the mud; I then throw in about five feet from each side of the heap, and put on a fresh layer of mud, then pile on more roots and moss, and burn again, and so on, till the pile is as high as I wish it; then turn the whole, and let it lay over the winter.

I have treated about five hundred loads of mud in this manner, which seems to me as good as that prepared with lime, while the cost of the lime is saved.

Spreading this mud in the barn yard, or cattle pen, where it receives the droppings, and is trodden by the cattle, is also a good mode of preparing it; but then it is advisable to make it up in a heap for a month or two before it is used, that it may heat.

SALT MARSH MUD

Is probably even more valuable than the preceding as a manure; it should be treated in the same manner before using. From a letter of the Rev. J. Vincent to the English Agricultural Society, quoted in Faulkner's Manual, page 63, mud, impregnated with salt, seems very effective when mixed with lime:—"On the coast of Carnarvonshire, in several places, there is a decayed vegetable deposit, of the thickness of four to five feet, strongly impregnated with sea salt; of this I have been for several years in the habit of making a compost, such as recommended by Lord Merdowbank, by mixing it with dung. In a few days a very strong heat is produced, and as soon as the fermentation begins to diminish, I have it carted on the turnip land, and it has proved invariably as effective as an equal quantity of rotten dung."

"Last year, having seen an account of the effect of lime and salt as a manure, I thought this saline deposit, if mixed with lime, might be equally beneficial. I accordingly got four seven cart-loads to be carried from the shore into a shed, and when well pulverized, it was thrown into a heap, and mixed with a cart-load of coal ashes; during the operation of mixing, about a barrel of soap suds was thrown over the heap. I then procured a cart-load of quick lime, and having reduced it to powder with water, it was thrown into another part of the shed, the two heaps having remained separate for a month, and each being quite cold, they were then both mixed together. In three or four days the compost became as hot as a dung hill, a strong fermentation having taken place; it was

allowed to remain in this state for a few days longer, when, the heat beginning to decrease, it was carried into the field preparing for turnips, and spread in drills in the same manner as *bone dust*. The crop proved a very good one, from 30 to 35 tons per acre, and was considerably better than those manured with bone dust the year before, in land of better quality." "The land on which the compost was used, was rather a light soil."

SEAWEED.

This manure is so generally used, and its value so well understood in this Island, that it requires little remark here; it should be well rotted before it is put in the ground, the cattle pen is an excellent place for preparing it. I have also found it an excellent compost with bog mud. I formed a bottom of mud six inches deep, then fifteen inches of *green* seaweed, then six inches of mud, then fifteen of seaweed, and so on, alternate layers of mud and seaweed, until the heap was about five feet high; and then covered the top, ends and sides about eight inches with mud, the mass contained about 100 loads; in three weeks it became quite hot, the heating of the sea weed dissipated the acid of the mud, and the seaweed was completely decomposed, and cut with a spade as easily as the mud, which acquired a strong marine smell. I used it for turnips, and found it most excellent manure.

ASHES.

When the great value of ashes as a manure is generally known, no person will waste, nor will any new settler—as they now often very foolishly do—sell a bushel of them, but they will be husbanded like gold for the crop; their value and the mode of using them are so well described by Allen, page 37, that no more need be done than to insert his remarks, he says :—"Ashes are also among the most economical manures, as from the free use of fuel in the United

States, they are produced by almost every household. Good husbandry dictates, that not a pound of ashes should be wasted, but all should be saved and applied to the land; and when they can be procured at a reasonable price, they should be purchased for manure. Leached ashes, though less valuable, contain all the elements of the unleached, having been deprived only of a part of their potash and soda. They may be drilled into the soil with roots and grain, or sown broadcast on meadows or pastures. They improve all soils not already saturated with the principles which they contain.

“The quantity of ashes that should be applied to the acre, must depend on the soil and the crops cultivated. Turnips and all roots, clover, peas, beans, grain, and the grasses, are great exhausters of the salts, and they are, consequently, much benefitted by ashes. They are used with decided advantage for the above crops, in connection with bone dust; and for clover, peas, and roots, their effects are much enhanced when mixed with gypsum. Light soils should have a smaller, and rich lands or clays, a heavier, dressing. From twenty to thirty bushels per acre for the former, and fifty for the latter, is a moderate application; or, if they are leached, the quantity may be doubled with decided benefit, as they act with less energy. Repeated dressings of ashes, like those of lime and gypsum, without a corresponding addition of vegetable manure, such as bog mud, sea weed or barn yard manure, &c., will eventually exhaust tillage lands of their carbonaceous and organic matters. PEAT ASHES.—Nearly all peat approaching to purity, when thrown out of its bed and thoroughly dried, will admit of being burned to an imperfect ash; and when it does not reach this point, it will become thoroughly charred and reduced to cinders. In both of these forms, it is a valuable dressing for the soil. It is always better, for dry uplands, to use the unburned peat, after it has been properly composted in a muck heap, as the organic matters which it contains, and which are expelled by burning, are of great benefit to the soil; but when

they are remote, the peat may be burned at a trifling cost, and the ashes applied with manifest advantage."

As the peat, or mud, dug from many of our bogs will burn when dry, the following plan, given by a German writer, may furnish a useful hint to those who desire to make ashes from them:—

"Kilns, or furnaces, constructed of stone or clay, are built near the bog or marsh, at the bottom of which, on the grating, a layer of dried peat is laid first, which is succeeded by a layer of peat in the state of moisture in which it is taken from the marsh; the undermost layer is then set on fire, and its heat speedily dries the one above it, and causes it also to ignite: so that after the fire is once fairly kindled, it can be kept up without the necessity of adding more dry peat. The fire is never suffered to proceed too rapidly, because the ashes lose much of their best properties when the peat has been too rapidly consumed. The ashes are withdrawn from beneath the grating, in the same manner as lime, without extinguishing the Kiln."

CHARCOAL

Surpasses all other substances in the power it possesses of condensing the gases, and is therefore a very powerful manure. Allen says, page 56, "when charcoal is scattered over the ground, it absorbs and condenses the various gases within its pores to the amount of from twenty to over eighty times its own bulk. The economy and benefit of such applications can be readily understood, as they are continually gleaning those floating materials from the air, and storing them up as food for plants. It checks rust in wheat, and mildew in other crops, and in all cases mitigates their ravages, when it does not altogether prevent them." By occasionally strewing a few bushels of it over the pig sties, the ammonia will be saved. Twenty to thirty bushels of fine charcoal sown on wheat or grass land forms an excellent top dressing. Whether sown broad-cast, or mixed with other manures, it should be made fine before using. It may be made fine enough for farm-

ing purposes, by passing a heavy roller over it, on a hard piece of ground; or by filling a tight puncheon, or cask, with water, and rolling it over it on the barn floor. Charcoal made from soft wood, is more easily rendered fine than when made from hard, and answers the same purpose, but does not, I believe, absorb quite so much gas: where Hemlock abounds, a large quantity could be easily made. One great advantage of this manure is, that it not only feeds the plants with just as much as is required, but it operates favourably for many years in succession.

NIGHT SOIL, OR THE CONTENTS OF PRIVIES.

I dare say many farmers have heard of the wonderful effect of Guano, but, from its cost, few have used it: I will tell you how you can have what is just as good, and a great deal better than much that is sold, without expense: *save the contents of your privies*. Two barrels of this night soil, mixed with fifteen or twenty bushels of fine charcoal, would give five hundred bushels of turnips per acre, on almost any land. When so mixed, it will have no smell, and may be sown with the hand along the tops of the drills, and the seed drilled in it. A small quantity of dung covered in the drills first, and this mixture sown along the tops of the drills, and the seed then drilled in it, will yield one-third more than the manure alone would produce.

LIME.

Lime furnishes us with the means of greatly improving our soils. It has a tendency to sink in the ground, and therefore in applying it care should be taken to keep it as near the surface as possible. It should be completely reduced to powder before it is used, as if spread unslacked it will form hard lumps in the field. The following are good modes of applying it:—

First, it may be spread on grass or pasture lands,

by which the moss will be destroyed, and the growth of the grass greatly increased; and when the land is broken up, it will be well mixed with the soil, and its beneficial effect felt in the succeeding oat and turnip crop.

Secondly, it may be spread on the ploughed ground, and harrowed in before the wheat is sown. It should not be ploughed in, because as it sinks quickly in loose soil, it will then be buried too deep.

Thirdly, it may be mixed with mud, earth, or other vegetable substances, and the compost spread on the land—which last (on the light soils of this Island) is, I think, much the safest mode of applying it,—for in using lime, it should be remembered that though heavy clay soils may be often and heavily limed with advantage, light soils, which most farmers here have to manage, may be entirely impoverished by its frequent application. Many old and apparently worn out farms will no doubt be much benefitted by a single application of newly slacked lime, and at once produce a good crop after receiving it; because such land contains a great deal of inert vegetable matter, which is decomposed by the lime, and then taken up by the plants; but you must not be deceived by this apparent fertility; if you go on cropping this land, depending on lime, without adding dung, mud, or other manures containing vegetable matter, the land will be left worse than ever; nor will a second liming then materially benefit you. For this reason it is far safer to mix the lime with mud, and apply the compost, there will then be no danger of its exhausting the land, and in this way its general use cannot be too strongly recommended.

I may illustrate this by the following extract from Jackson, page 47:—“A farm about three hundred acres in extent, kept almost wholly in an arable state, on which there is sometimes applied one thousand six hundred bolls of lime shells in a year, when taken by the tenant thirty years ago, the land, with the exception of a few perches, may be said to have been a waste of thin cohesive clay, reduced to poverty by liming and over cropping. Summer fallowing and

liming were had recourse to, without anticipating that the former liming had expended all its efficacy upon the soil; and the consequence was, that the lime failed in rendering the land better. But, seeing the fertilizing effects of lime in compost, he determined to try it *experimentally* on a park of sixteen acres, divided into equal proportions. The park was subjected to a well wrought summer fallow, one third was dressed with the compound, in the proportion of fifty bolls of shells per Scotch acre, incorporated with three times its bulk of earth; the next third of the park was dressed with quick lime by itself, at the rate of sixty bolls of shells per acre; the other was manured with thirty loads of farm-yard dung per acre; three ridges of it being left without dressing, and the whole park was sown with oats and grass seeds. The result of the experiment was as follows:—The part to which the compound was applied was most luxuriant, so much so that the strength of the oats pushed out the grass plants; the part manured was also good, yet by no means so luxuriant as the first; the limed part was very inferior to either, being a very poor crop; and the three ridges which got nothing were not worth shearing. This shows that the lime itself had some fertilizing effect; that the dung was superior to the lime alone; but neither of them would bear a comparison with the compost as a manure. When the field was again broken up, the part on which the compost was applied still yielded a superior crop. Many experiments of the same nature have been tried on this farm, with the same results.”

The quantity of lime to be used, depends on the soil; clays require a great deal, but on our light Island soil, twenty-five to thirty barrels of roach lime per acre for a first dressing, when applied by itself, without being mixed with mud, is sufficient. A larger quantity (even if it does no harm) is mere waste. Allen (page 42) says:—“ In the United States, the average for a *first* dressing, is from fifty to one hundred and twenty bushels per acre. This may be renewed every four or five years, at the rate of twenty to forty bushels. If an over dose has been applied,

time, or the addition of putrescent, or green manures, are the only correctives.

From the great effect said to be produced by lime, mixed with salt mud, it is likely that a small quantity of lime would be very beneficial to the Cape lands on the North side of the Island, which are impregnated with salt from the spray.

BONES

Ought always to be saved. In most countries they are crushed by machinery, for manure; but they may be broken by hammers into half-inch pieces. I have had some tons prepared in this way; a man can break three or four bushels in a day; most farmers could collect that quantity in a year. Children can break them, or they furnish employment in a stormy day—and five bushels would be sufficient to raise a quarter of an acre of turnips. After they are broken, mix them with an equal quantity of damp ashes, and form them into a heap; in forty-eight hours they will heat; after the heat subsides, apply them in the drills, covering them with very little earth, and drill the seed over them. They are better after having been boiled for soap, because they then break more easily, and decompose more quickly in the soil.

DEAD ANIMALS, BLOOD, &c.,

“When decomposed, afford all the materials of manure, in its most condensed form. They should be mixed with eight or ten times their weight of dry mud, turf, tan bark, or earth. A dead cow, or horse, thus buried in a bed of peat or mud, will yield twelve or fifteen loads of the richest manure.”—Allen, p. 70. What recklessness and waste is frequently exhibited by farmers here, in throwing dead horses, cattle, pigs and sheep into the sea and rivers, or allowing them to rot where they fall—thus poisoning the atmosphere, robbing their land of the richest manure, and depriving themselves of hundreds of bushels of turnips, &c. which it would produce.

FISH AND FISH OFFAL.

Fish are extensively used in many countries for manure. They are sometimes ploughed into the soil with a spring crop: Allen says, this is a wasteful practice, in light soils, as the gasses escape and are lost to the plants. The proper mode of using them is, by composting with dry peat, mud or earth, in alternate layers of about three inches in thickness of fish or offal, to nine of peat or mud, and over the whole a coating of two or three feet of peat, mud, or earth, is placed; a few weeks of warm weather suffice to decompose the fish, which unite with the mud or earth—no perceptible effluvia escaping from the heap, so effectual is its absorption. Two or three weeks before using, it should be turned and mixed, when it will heat again, and when this ceases, it may be applied to the land. When the mackerel and cod are on the coast, some of our farmers turn fishermen. I would suggest to them, when cleaning the fish, instead of throwing the offal on the shore (as they often do), that they should, when the fishing season comes, spread a few cart loads of mud or earth, and form a bottom for a compost heap; and place a few more loads beside it, ready to use when wanted; and when a boat load of fish is cleaned, that they should haul up the offal and spread it on the bottom thus prepared, covering it with some of the earth. This could be done with very little trouble. It may be said, that the quantity each could collect would be small; but “many mickles make a muckle,” and if they would carefully save all the bones, dead animals, fish offal, &c., they would find it worth having in the spring, and their cattle would have three or four extra hundred bushels of turnips to eat in the winter.

MANURING WITH GREEN CROPS.

This mode of manuring consists in sowing the soil with quick growing leafy plants, and when they begin to flower, ploughing them in, or having them eaten off by cattle. In this country, where the agriculturist's capital consists chiefly in sound health, strong limbs,

and (notwithstanding their dung hills) intelligent heads, there is perhaps no system so well adapted to our circumstances. On many farms, thirty or forty acres, completely exhausted by over-cropping, are thrown open as common; it would require a large quantity of manure to dress ten or fifteen acres of such land in a year; and even if the manure were ready prepared, the hauling it out and spreading would be more than many, by the labour of their own families, could accomplish. But by this system there is scarcely a farmer who could not ameliorate ten or fifteen acres of his worn out land a year, in addition to his other work. For instance, he could (in these long fields) plough at least ten acres in seven days; it might be done either in the fall, and the seed sown the following spring, and ploughed in during summer; or ploughed in July, and buckwheat at once harrowed in, and ploughed in in the fall, and the next spring sown with grass seeds; or if the crop ploughed in had been heavy, with oats, or rye, and grass seeds, a fair crop of grain would then be had, and the land left with a good plant of grass, which (instead of the scanty herbage now thrown up on these worn out lands) would yield excellent pasture for some years: thus increasing the profit of the dairy, and the condition of the stock, while the land would speedily regain its former fertility. If, however, the land be so exhausted as to give only a small crop to plough in, its owner must forego the grain, and be content with pasture only, for a time. Many persons suppose land improves by rest; but it is not the rest, but the grass and herbage which springs up and decays, or the droppings from animals feeding on it, which restores it. The time, therefore, required to restore worn out land by *rest* (as it is called) depends on the herbage it throws up. A comparison of the quantity of green crop ploughed in, when sown for that purpose, with the scanty herbage now yielded, will at once show that as much may be done towards renovating worn out land by the system of green manuring in one year, as is done by rest in eight or ten; and should, further, induce all to abandon the absurd practice of sowing

grain without grass seeds, when the land is intended to be left uncropped. This mode of manuring seems extensively practised in Italy, Germany, and the United States. Allen says:—"This system has, within a few years, been extensively adopted in some of the older settled portions of the United States. Its results have been entirely successful when steadily pursued, and with a due consideration of the objects sought, and the means by which they are to be accomplished. Lands in many parts of our Eastern States, which have been *worn out* by improvident cultivation, and unsaleable at ten dollars per acre, have, by *this means*, while steadily remunerating their proprietors by their returning crops for all the outlay of labour and expense, been brought up in value to fifty dollars per acre." Why should not the worn out lands of Prince Edward Island be restored by the same means?

PLANTS GENERALLY SOWN FOR THIS PURPOSE.—Allen says: "Buckwheat, oats, rye, and some of the grasses have been used for this purpose in the United States; and spurry, the white lupin, the vetch and rape in Europe; but for the Northern portion of the Union, nothing has been hitherto tried which is so well fitted for the object as *red clover*." Buckwheat, from its growing on the poorest soil, seems particularly adapted to be used on the worn out lands of this Island. One bushel of seed is enough for an acre.

This system may also be adopted on lands not so much exhausted, so as to improve the condition of the soil and give good crops, where, from lack of manure or want of hands, they could not otherwise be obtained. Suppose ley which is to be broken up be ploughed early in summer, sow it at once with buckwheat, and plough it in in the autumn; your crop of oats would be much better, and then less than an ordinary dressing of manure would suffice for the following green crop, and the land be again laid down in a much better state than it otherwise would have been. By ploughing in the after crop of clover in the fall, the same purpose may be served; indeed, the kind of crop ploughed in, and the frequency with which it is done, will "vary with almost every individual who

practices it, according to the quality of his land and the facility for procuring other manures." Only let it be recollected, that to farm successfully, the land should, at the end of each rotation, be better than at its commencement. No one should, therefore, grudge the occasional apparent loss of a crop of clover or buckwheat, as by thus ploughing it in, and judiciously alternating it with a very small quantity of other manure, the land may be kept constantly increasing in fertility.

SOAP SUDS AND HOUSE WASH.

If every farmer would dig a pit, say eight feet wide, and ten or twelve feet long, and three or four feet deep, near his kitchen, and have a small spout from the kitchen, or from a sink by the door, leading to it, into which all the wash and suds should be thrown, and cover the bottom of the pit with eight or ten inches of sand or earth, and when that was saturated, add a few inches more of fresh mud or earth, and continue doing so as often as required, to prevent unpleasant smell, he would in a summer not only accumulate a good many loads of the very best manure, but would avoid the slovenly practice of throwing the wash by the door, where (if it do not breed disease) it pollutes the air, and is lost as manure.

Many other manures might be mentioned, but my object being to direct attention to those which, though possessed by, or within the reach of most, are very generally mismanaged, wasted or neglected, I shall conclude this chapter in the words of Judge Buel:—
 "The farmer who wastes a load of manure, is as reckless and improvident as he who throws away a bushel of corn. Not only what is denominated *dung*, as the contents of the cattle and hog yards, and the clearings of the stable, (the amount of which may be greatly increased by stalks, weeds, and other vegetable matters) may be transformed into farm produce, but the rich earth of swamps, ditches and ponds, the leaves of the forest fern, urine, soap suds, bones, &c., are all convertible to a like use. He that will not feed his crops with manure, should not complain if his crops fail to feed him with bread."

CHAPTER II.

TURNIPS.

THEIR IMPORTANCE.

“The introduction of turnips into the husbandry of Britain,” says the *New Edinburgh Encyclopædia*, “occasioned one of those revolutions in rural art which are continually occurring among husbandmen, and though the revolution came on with slow and gradual steps, yet it may now be viewed as completely established. Before the introduction of this root, it was impossible to cultivate light soils successfully, or to devise suitable rotations for cropping them with advantage. It was also a difficult task to support live stock through the winter and spring months; and as for feeding and fattening cattle and sheep for market during these inclement seasons, the practice was hardly thought of, unless when a full stock of hay was provided, which only happened in a very few instances. The benefits derived from the turnip husbandry are therefore of great magnitude. Light soils are now cultivated with profit and facility; abundance of food is provided for man and beast, and by the soil being cleaned with this crop, a bed is prepared for grass seeds, wherein they flourish with greater vigor than after any other preparation.”

The difficulties felt by Agriculturists here, are similar to those formerly experienced in the mother country. The turnip crops competing for the Royal Agricultural Society's prize during the last two years, show our soil to be as well adapted to their growth as that of Britain, and there is no reason why their general cultivation should not prove equally beneficial to us. They furnish most cattle food, and most manure. Buel says:—“Assuming the average product of hay at a ton to a ton and a half, (which is much more than is generally obtained in this Island) and of

sweed turnips at six hundred bushels per acre, and allowing a bushel and a half of sweets (90 lbs.) to be equivalent for farm stock to 20 lbs. of hay, an acre of sweets will go as far in the economy of feeding as nearly three acres of meadow. The three acres of grass are found to give less than 9,000 lbs. to the dung yard, while the one acre of sweets gives 36,000 lbs., or four times as much as the three acres of grass land." Until our farmers are convinced of this, and shall cultivate turnips as the principal food for wintering their stock, and fattening their cattle, we shall find Agricultural improvement advance with tardy steps: we shall continue to see our markets glutted in autumn with beef, at two-pence a pound, because, for want of turnips, every one slaughters his beast then, instead of keeping it until it is in good condition; and we shall find the progeny of our fine imported breeds deteriorating in character, instead of maintaining the valuable properties of their ancestors.

THEIR CULTIVATION.

Turnips are generally sown in that part of the rotation which closes one course and commences another; and in this Island it will in general be found convenient to sow them after oats, sown on ley. On newly burnt lands there are few weeds, and excellent crops may be raised with little labour, by merely scattering the seed and hoeing it in; but with this exception, they should always be sown in drills, under which system three acres can be cultivated with less labour than one acre broad cast. The land intended for them should be well and deeply ploughed in autumn, and cross ploughed in the spring, then harrowed and rolled to break the lumps. If the land is foul with couch, have it well cleaned, or the turnip crop will be a failure, or cost more to keep clean than would have cleaned the land before they were sown. Next open the drills: thirty inches apart is the best distance for ordinary culture, as it gives room for the plough and horse hoe to work freely between the drills without injuring the plants. If a prize crop is wanted,

perhaps, twenty-seven inches will give a somewhat larger yield, but they will be more troublesome to clean, and I am convinced, that farmers, generally, will find thirty inches between the drills the most convenient distance. When the drills are opened, then cart in your manure, which should be short, and make it in small piles, so that it can be regularly spread in the drills: by making the piles so that they will spread into the three drills in which the horse walks and the cart wheels run, you will spread it more evenly, and with less labour, than from the larger piles, in which I often see it deposited. As soon as the manure is spread in the drills, and before the sun can dry it, split the drills with the plough, which will cover the manure and make a ridgelet over it, then run a light roller length ways along the drills, so as to flatten them on the top, and drill in the seed at once: it is very important that it should be done as soon as the drills are rolled, for the ground is then fresh and damp, which causes the seed to vegetate quickly: whereas, if you leave it, the tops of the drills get dry, and the seed is longer coming up, and the plants grow more slowly. I frequently see persons waiting for days, until the whole of the land is prepared, before they sow. This is a very bad practice, because, not only do the drills become dry, but the weeds begin to shoot before the seed is sown; and when the plant comes up, it finds the weeds up before it, and is consequently smothered, and is much more difficult to hoe and clean. The least you can do for the turnip is to give it fair play, and a fair start with its numerous weedy competitors; and, therefore, make it a rule to sow in the evening, or, at furthest, the next morning, every drill that has been dugged and covered during the day.

Some spread the manure broad cast, and plough it in with the second ploughing, and raise fair crops; but by putting it in the drills, the whole strength of the manure is given to the roots of the turnip, and, therefore, must promote its early growth more than when spread over a large space of ground. When the manure is ploughed in broad cast, I think it should

be done in the fall; a method which seems to produce excellent crops, and saves labour in the spring, when time is of most value to the farmer.

As to the best time for sowing Swedes, there is much difference of opinion; they may be sown from the 20th of May to the end of June; they continue to increase in weight until the frost compels us to pull them, and, therefore, the earlier they are sown, the heavier will be the crop. When sown in May, I have always found them escape the fly; but the best protection against this insect, is thick sowing—never sow less than three lbs. of seed to the acre, and you will seldom be without sufficient plants after the fly has done its work. Aberdeen Yellows may be sown from the first to the end of July.

HOING AND CLEANING.—This is the most important part of turnip culture, for manure as heavily as you please, if this is neglected, or carelessly or imperfectly done, you will not have a good crop: a few days' delay, carelessness, or inattention now, will make a difference of hundreds of bushels per acre. There is no crop on your farm which can so ill bear delay at this time as your turnips, and unless you can afford to throw away the labour you have expended, and to forego the benefit of a good supply of turnips for your stock, do this *when it should be done, and do it well.* If you are short handed, let every man, woman, and child, who can lift a hoe, or pull a weed, go to work in earnest, and the job will soon be accomplished; and, what is more, your children will become expert at turnip culture, on which all successful farming in this Island will, before long, depend: and remember that a good turnip hoer never takes his eye from the ground until called to dinner; recollect this yourselves, and impress it on the children, and there will be no stopping to talk, nor ceasing work to gaze at every passer by, by which so much time is often lost. The method I have found best in hoeing, is this: as soon as the leaves are between two and three inches long, run a plough between the drills, taking away the earth on each side to within about two inches of the plants, this will make a little ridgelet between each

drill, and cover up all the weeds; and if the horse hoe is run through about a week afterwards, they will be found quite rotten and form a good manure for the land; (some use the horse hoe only, but if there is much yar and weeds, the plough makes the best work.) Then set to work with the hand hoes, and thin the plants five inches apart: do not be afraid of stripping the roots of the plants, as the more they are exposed the better: when the plants are a good size, and the leaves begin to touch each other, a second hoeing must be given, cutting out every other plant; this will leave them ten inches asunder, taking away at the same time any weeds that are between them. This second hoeing is very quickly done. If the land is very weedy, the horse hoe should be run between the drills, once before the second hoeing, and once after, and this will complete the work.

Besides the manure covered in with the plough, small quantities of stimulating manures, placed close to the seed, are of great benefit to the crop; a small quantity of ashes run with the hand along the tops of the drills just before the seed is drilled in, will cause the young plant to grow more quickly, and get sooner beyond danger from the fly: twelve or fifteen bushels is sufficient for an acre, more than twenty is waste. When the manure is ploughed in in the autumn, if you have a compost of mud and lime, or mud and ashes, to apply to your turnip land, in addition, the best way of doing it is, after the ground is ploughed in the spring, cart on and spread twenty to twenty-five loads of the compost, then harrow and roll, and then throw the land into ridgelets, with the plough, thirty inches apart: this gathers the greater part of the compost which has been spread into the drills, and within reach of the suckers of the turnip: then roll the drills, and sow the seed. Night soil and bones are excellent helps to the crop—the mode of applying them has been already pointed out.

PULLING.—Few directions need be given about this part of the business. The tops and tails should be cut off close to the turnips, or they will not keep so well. Some persons advise the tops to be hauled off

and fed to the cattle on other fields. I have tried this, and am convinced it is a very bad practice. In the first place, as food they are scarcely worth the labour of hauling off; they will keep cattle alive, but if they happen to be fat, they will reduce their condition; and if the milch cows get them, the butter will be unfit for market. But the great objection to removing them is, that it robs the land of what ought to be left to feed the succeeding wheat crop. A heavy crop of turnips is exhausting. In Britain a portion of the turnips is consumed on the land, by sheep. Our climate will not permit this; therefore, as we have to remove the turnips, we should at least leave the tops. If you wish to feed them, and there is time to do so before ploughing, let them be eaten where they grew; or if not, plough them in, and, decaying in the soil, they will enrich the land; whereas removing them is not only a waste of labour, but your wheat crop will reproach you for having done so.

STORAGE.—Some complain of turnips being difficult to keep; those who find them so, keep them too close: with proper management, there is no difficulty in keeping any quantity. They should be put in piles in the field when first pulled, and covered with tops or straw, and a little earth. Here they will sweat a little. A dry day should be chosen to cart them to the root house. My root house is dug four feet deep, and then the roof pitched from the earth, and covered with sea weed and earth, well sodded over; the floor formed of slabs and bangers, raised six inches from the bottom, and divided into three divisions. It will contain about two thousand five hundred bushels of roots, and I generally fill it full, and have never lost any turnips. In the top there is a chimney, which is never shut night or day during the winter; the vacancy below, and the partitions, allow all the confined air to ascend, and as it is constantly escaping through the chimney, no frost comes down. Any one who will ventilate his root house in this way, will find the turnips as sound in June as when first put in. The situation of the root house is a matter of importance; it should be attached to the barn, and entered from the

barn; this will save a deal of labour in carrying them to the cattle during the winter. Some store them in their cellars, which is the worst place that can be selected, as they are generally too hot and close to preserve the turnips, too far from the barn for convenience, and the gas which escapes from them renders the air of the house unwholesome.

CARROTS.

The soil of this Island is well adapted to the growth of carrots. The preparation of the soil is similar to that for turnips; but the manure should be spread broad cast and ploughed in, as when it is put in the drills some varieties, particularly the Altringham, fork off as soon as they strike the dung, and do not attain half the length they should do—though the Long Orange and White Belgian do not seem to be affected by it. Carrots do not require the land to be so rich, but they want it very fine and deep. They seem to succeed best after potatoes; probably because the ground is then light and friable. After the land is cross ploughed, harrowed and rolled in the spring, it should be thrown into ridgelets, making them as high as you can, so as to give the plant as great a depth of soil to grow in as possible; eighteen inches is width enough between the drills, but unless the land is very clean, thirty inches will be found the most convenient distance. Roll the drills, and drill the seed, while the earth is fresh and moist, in the same way as turnips. If you sow English seed, you will require four or five lbs. to the acre, and then not be sure of a crop; but if American seed is used, one and a half lbs. per acre will be sufficient, as almost every seed grows, at least I have found it so. Eight or ten days before sowing, I mix the seed with fine sand, carefully sifted so that no stones or lumps are left to choke the drill, and keep it moistened with water in a warm room, stirring it up every day. When about to sow, I spread it in the sun for an hour or two, to

dry, taking care not to dry it too much, which would injure the seed. I then place a guage, large enough to let a large buck-shot through, in my turnip drill (one of Birnie's), and drill the seed in the same manner as turnips. Seed thus treated is generally up in three or four days, and the plants have a fair start with the weeds. They should be sown in May, or early in June. In cleaning, use the plough and horse hoe, the same as with turnips. They should be thinned about two and a half inches apart. In August, when the carrots are about the size of a man's thumb, they should be lightly moulded with earth, like potatoes. As to the yield per acre, the smallest I have had is three hundred and thirty-eight bushels; but then, the land being very foul, the drills were three feet apart, to admit of frequent ploughing between them. This last year I had an acre and one-fourth in carrots, on ground which had been in potatoes the year before; it was dressed in the spring with forty loads of dung per acre; the drills were thirty inches apart; the yield on the acre and a quarter was seven hundred and thirty-five bushels; they were thinned about one and a half to two inches apart, but the carrots split the drills and made room for themselves, and grew large. Work the soil well, and give it an ordinary dressing, and you will be sure of from four hundred to five hundred bushels per acre. The Long Orange and the White Belgian are the most productive. The haulm, or top, of the carrot, is excellent food: cows fed on it give very rich milk: all animals are very fond of it. As they do not appear to be so severe on the land as turnips, the tops may be hauled off and fed on the pasture fields; and an acre of White Belgians will, in this way, furnish a very large quantity of rich food in autumn. I have tried carrots on land manured with sea weed, and also with river mud; but they would not grow to any size, although turnips in the next drill, on the same manure, grew as well as those on dung. Old well-rotted dung, and ashes, seems the best manure for them. For fattening pigs I have found this root more valuable than turnips, and working horses while fed on them will not require oats.

CHAPTER III.

ROTATION OF CROPS.

Rotation of crops is to grow different kinds of crops in succession, on the same field—such as roots, grain, and grass. To lay down any particular course, to be followed by all, would be absurd; for, as observed by Allen, the proper system of rotation any farmer should adopt must depend on all the circumstances by which he is surrounded, and must vary according to those varying circumstances. Though the chief object in introducing the subject here is to point out one great and common error in our present system, yet, as the reasons which render it necessary, and the principles which should guide the farmer in selecting his rotation, should be understood by all, they may be here briefly adverted to. It has been discovered that every crop takes away from the soil certain quantities of nutritious matter, without which there would be no crop; and that no two different crops abstract these nutritious matters in the same proportions. For instance, the turnip takes away from the soil a large quantity of one kind of nutritious matter, wheat a large quantity of a different nutritious matter, and hay a large quantity of nutritious matter different from both turnips and wheat; therefore, though a field may give a sufficiency of that kind of nutriment which is principally required by one crop, yet if another of the same kind immediately follows, there will be a deficiency for it; but if a different crop succeeds, there will be found enough of all the materials it needs fully to mature it; and when a third crop of another description follows, which requires nourishment different from either which have preceded it, the soil may be in a condition to yield a good crop of the last also.

But as every crop takes away more or less of all the nutritious matters which the soil contains, "if a succession of crops (no matter how different the kinds which succeed each other may be) are gathered and carried off the land, without the occasional addition of manures, they will be found gradually to diminish in quantity till they reach a point (which, under the same system, many farms in this Island have long since reached) when they will scarcely pay the expense of cultivation." But the great error here, and to which I desire particularly to direct attention, is, the cutting hay for years in succession on the same land; it is this practice which has ruined half the lands of the Island, and will impoverish the farm of every man who perseveres in it. It seems generally laid down in those countries where great science and great experience have combined to ascertain what is best, that on light soils, such as this Island, two successive crops of hay should not be cut on the same field; or if a second crop is taken, the field should receive a top dressing the previous autumn or spring. I know the danger of saying this. Many will exclaim: It is impossible for us to do it; where can we get manure? and if we had it, how can we dress so much land? what would we do for hay to feed our cattle? what folly, to recommend a system which the circumstances of the country will not permit the people to follow! and under this impression will, perhaps, throw away the book, determined to persevere in the present ruinous system. But withhold your condemnation for a moment. I am aware that even a bad system cannot, without inconvenience—perhaps loss—be entirely changed at once; it would not be prudent to attempt it, and I do not advise you to do so. There is no harm, you must admit, in showing what other countries, with soils similar to our own, have found best: nor is the difficulty of at once adopting it any reason why we should not make gradual approaches towards it. And let us see whether the difficulties are really so insurmountable as they may at first appear. First: as to where you are to get manure, I would refer you to the first chapter, and ask you if you are guilty of

the neglect, or permit any of the waste there pointed out; if so, correct it before complaining on that head. Secondly: I would urge you to recollect, that one acre in good heart will yield as much hay as three in bad; the labour, therefore, of giving a light dressing (say twenty to twenty-five loads) of mud and ashes, or mud and lime, or mud and urine, or dung compost, would not be so great, when you have to go over only one acre, instead of three. Thirdly: consider whether you really require so large a quantity of hay. If you cultivate a large breadth of turnips, you will have a large quantity of straw from the succeeding grain crops; straw and turnips will keep cattle as well as hay, and much better than the red top and natural grass, which forms a large part of the hay cut on worn out lands. It will also suggest itself to you, that by turning the field to pasture before it is exhausted, the herbage will be greater in quantity and richer in quality, the cows give more milk, the dairy yield more and better butter and cheese, the young cattle grow more vigorously, attain their full size earlier, and make more beef; the wethers be fatter, and both draw more money from the butcher; and, though last, not least, your land will be improving, instead of getting worse. These advantages should be fully placed to the credit of the new system, before you resolve to continue the old.

The remarks of Professor Johnson, in his *History of the Agriculture of New Brunswick*, are so applicable to this subject, that I cannot do better than quote them here. He says:—"As regards his country, the New Brunswick farmer follows a system, which, where regular manuring is practised, would injure the land, and which is therefore condemned and avoided by all good farmers; but which, combined with the waste of manures and neglect of manuring, is certain to entail an early exhaustion." I mention particularly the *repeated successive crops of hay* which are taken year after year from the same fields.

"This custom, which is characteristic of these North American Provinces, and has been naturally fallen into in consequence of the necessity of provid-

ing a large supply of winter food for the stock, is very injurious to the land. This, I believe, is generally acknowledged; but the plea of necessity is urged as an excuse. It is not necessary, however, to cut hay off the same land year after year, without returning to it any manure; neither is it necessary to feed stock altogether upon hay. I infer that the land of this Province, when fairly treated, must be prone to produce abundantly, from the large returns which the farmers expect, and actually rob the soil of, after once manuring. I visited the farm of a most intelligent gentleman; one of the best farmers in his neighbourhood, and I believe most desirous to improve, who informed me that, after one dressing with mussel mud from the sea bank, not far from his farm, he had taken one crop of potatoes or turnips, one of wheat, and *eight successive crops of hay*—and he seemed to think the land had used him ill in not having given him more. For the first four crops from such an application, a British farmer would have been thankful and content; and in taking them, he would have been thought rather hard upon his land too.

“*The repeated succession of crops of grain* is open to similar reprobation. In remote districts of Scotland and England, the practice may be found still lingering; but it brings on ultimately a species of exhaustion, which is exceedingly difficult and expensive to repair.

“*The want of a rotation of crops* is evident wherever the above-mentioned practices, of taking successive hay or grain crops, prevail. But generally, throughout the Province, the neglect of a proper and profitable rotation must be reckoned among the defects of the prevailing husbandry; wherever the system of regular and copious manuring takes root, as an indispensable means of melioration, a well considered rotation of crops must accompany it, if the full benefits of good manuring are to reward the farmer's labours.”

The rotation in general best adapted to this Island—varied, of course, according to circumstances—would seem to be, after ley ground is broken up: first

year, oats; second year, turnips, carrots, parsnips, potatoes, or Indian corn, with manure; third year, wheat or barley, with grass seeds; fourth year, hay—if the land is top dressed the previous spring or autumn, but not otherwise; fifth year, hay also; sixth, seventh, and eighth years, if required, pasture; and then break up and commence again—with oats; when the ley is old and stiff, oats are often taken the second year also—and the second crop is often better than the first, owing, probably, to the cold in winter not allowing the sod to decay in time to give full nourishment to the first crop. This practice, though contrary to the general rules of good husbandry, may, under the peculiar circumstances, properly form an exception to the general rule; it should, however, be cautiously followed, and never adopted unless the sod be old and stiff, and then it would be better to follow the oats with rye—a crop which should be more generally cultivated, as it does not require strong land, and, if wheat fails, will furnish the farmer with excellent bread.

Grass seeds, particularly red and white clover, should be liberally sown with the grain, else both the subsequent hay crop and pasture will be deficient. No one should sow less than six lbs. of red clover, and two of white, in addition to Timothy, per acre—and double the quantity will do no harm. Red clover takes a great deal of its nourishment from the atmosphere, and its large roots, when they decay, tend greatly to improve the soil; and without white clover, pasture will not be what it ought. Formerly the high price of these seeds put their liberal use beyond the reach of many; but now that the Royal Agricultural Society and its Branches, supply their members with red clover at nine pence to ten pence per lb., and white at one shilling, there is no excuse for not using it.

CHAPTER IV.

REARING AND TREATMENT OF CATTLE.

Buel lays down two rules:—

1. "Not to work more land than can be well worked, and well fed."
2. "Not to keep more cattle than the crops of the farm will feed and fatten, and than may be profitable to the farmer."

Neither of these rules are much observed here, but to the last I at present wish to advert. That farmers generally keep more stock than the farm will feed, is proved by the condition of the stock in the spring.

If you desire to have good cattle, you should first procure a good breed. As the Agricultural Society supply bull calves to all who want them at half the price they pay for them, farmers can have no difficulty in improving the description of their stock; but no matter how good the breed, they will deteriorate, unless treated with proper care. The manner in which they are often stinted in their food, would ruin any breed. The first year's keep of a young animal is the most important; its constitution is then forming, and if badly fed, it will be stunted in size, and correspondingly deficient in all valuable properties. Calves should be well fed for three months, and put on good grass; and well fed during the next winter, using every day an allowance of turnips. It is by no means necessary to let them suck, or to give them new milk. The Complete Farmer gives the following directions:

"The method pursued by Mr. Crook, as mentioned in the letters and papers of the Bath and West of England Society, is as follows:—He purchased three sacks of linseed, value two pounds two shillings, which lasted him three years. One quart of seed was

boiled in six quarts of water, for ten minutes, to a jelly, which was given to the calves three times a day, mixed with a little hay tea. And he states that his calves thrive much better than those of his neighbors, which were fed with milk. Thus it seems that less than eighteen cents' worth of flax seed, with a trifle of hay, is sufficient for one calf."

"If skim milk is given to calves, it should be boiled, and suffered to stand till it cools to the temperature of that first given by the cow. It is better boiled than when warmed only. If the milk be given too cold, it will cause the calf to purge; if this is the case, put two or three spoon-fulls of rennet into the milk, and it will stop the looseness. If the calf is bound, pork broth is said to be a good and safe thing to put into the milk."

I have reared several calves with flax seed and jelly, and find it an excellent plan. To save the trouble of making hay tea, I cause a small quantity of boiled skim milk to be mixed with the jelly; and when the calf is about six weeks old, add a hand-full of oat or Indian meal. By this means, the dairy turns out as much butter as if no calves were rearing. I purchased one bushel of flax seed, and after rearing two calves, had more than a peck left.

The Complete Farmer, continues:—"The best calves for bringing up, are those calved early in the season, or before June. When calves are weaned, they should not be suffered to be with their dams any more till fall; neither should they be pastured within sight or hearing of them—it will cause them to neglect their feeding, and they will not forget their sucking.

"As the pinching cold of winter will be extremely detrimental to calves, they should be kept very warm in their house, well supplied with water, and let out only on the warmest days. A great deal of care is necessary to bring them through the first winter, which is the most dangerous period of their lives. They will acquire so much strength during the following summer, that they will have nothing to fear from the cold of a second winter."

TREATMENT OF STOCK IN WINTER.

The defects in the system pursued by the New Brunswick farmers, are so similar to those of the farmers of this Island, that the following extract from Professor Johnson's Report seems all that is necessary, to point them out. He says: "A proper degree of warmth, however, good housing, and good feeding, are necessary to the health and improvement of the cattle; and upon these points much alteration may be made for the better, in the ordinary practice of the Colony. It is acknowledged, at present, by chemical physiologists, that warmth is equivalent to a certain portion of food—that an animal which is exposed to more cold, will eat more—and that one which is better housed, and warmer kept, will eat less. To keep an animal comfortable, therefore, is to save food; and this alone ought to be a sufficient inducement, where a scarcity of winter food is complained of.

"In my tour through the Province, I have frequently observed how little attention appeared to be paid to the proper housing of the stock. Wide chinks between the boards, or logs, of which the cattle houses or barns are built, or large openings about their feet, too often admit currents of cold air in the winter season. The most of the prevailing winds, also, find their way through the walls, and the comfort of the cattle is thus continually liable to be disturbed, the chance of their thriving interfered with, and their consumption of food increased. Those who allow such a state of their cattle houses to continue, unjustly blame the winter for what arises from their own want of care.

"One of the opinions regarding the winter, which I have inserted above, makes it a matter of complaint that much care, attention, and experience are required, to keep cattle in condition while the winter lasts. This is, no doubt, true; but the same qualifications are necessary to success in any other branch of husbandry; and he who is unwilling to bestow all he possesses of them upon the business in which he is engaged, may happen to thrive, yet scarcely deserves to prosper.

Again, the winter feeding in the Colony is very much in the same condition in which it was over a large part of Scotland some sixty years ago. To keep his stock alive, was then the chief ambition of the Scottish farmer during the winter months, and he trusted to the nourishing grass of spring and summer to make up for the starving system of the colder part of the year. Such is very much the practice now in many parts of New Brunswick; but it stunts the cattle in their growth, and even in a money point of view is a false economy. The working ox, when spring arrives, has not sufficient strength to do all the work which the urgency of the season requires; while the animal which is sold for beef has so small a weight of muscle and fat, compared with that of its bones, and the quality of the meat is so inferior, that it is comparatively worthless in the market."

FATTENING.

Cattle are usually fattened on turnips and straw, or hay; but a small addition of flax seed and crushed grain will fatten them much quicker, and thereby materially diminish the quantity of food which would have been consumed, had the process been extended over a longer space of time, as it must have been without such additions.

On this head, Professor Johnson says, "The use of what is called prepared food, is also a means of improvement which deserves the serious consideration of the New Brunswick farmer. The oily seeds, such as linseed, are a most valuable food for animals, and an admixture of them, with the other fodder, is not only beneficial in itself, but enables the farmer also to use up easily and profitably the straw of his grain crops in sustaining his cattle, and to convert it at the same time into more profitable manure.

"In the present condition of agriculture in New Brunswick, I do not recommend the Provincial farmer to purchase linseed, as the British farmer does, for the purpose of feeding or fattening his stock, and for the production of a rich manure for his corn fields.

But the growth of a small proportion of flax upon his farm, besides yielding the fibre upon which in the winter season the members of his household may employ their leisure hours, will furnish him with a quantity of seed which will greatly benefit his stock, and which will enable him to adopt, with profit, the more artificial system of feeding to which I am now referring. To give an idea of this method, and of the practical results obtained from the adoption of it, I make the following extracts from my published Lectures on Agricultural Chemistry:—

“ ‘The method adopted is, to crush the linseed, to boil it by a steam heat for three hours, with two gallons of water to each pound of the seed, and then to mix the hot liquid with chopped straw and tail corn, in the following proportions:

Linseed,	2 lbs.
Cut Straw,	10 lbs.
Ground Corn,	5 lbs.

This quantity is given to each full grown beast per day, in two messes. The liquid is poured upon the mixed corn and straw on the floor of the boiling house, is turned over three times at intervals, and at the end of two hours is given to the cattle. They have two hot messes a day, and are fed punctually at the same hour.

“ ‘The times of feeding are, turnips at six in the morning, prepared food at ten, turnips at one, and prepared food again at four in the afternoon. The allowance of turnips is, sixty lbs. of Swedes per day, or seventy-five lbs. of Hybrids, or one hundred and twelve lbs. of Globes. Under this system, the cattle thrive remarkably, are still and quiet, lie down the greater part of the day, and though they cause a large outlay at first, in the purchase of linseed, they amply repay it in the value of the dung, and in the higher price they return for the turnips and for the tail corn than could be obtained in any other manner.’

“ ‘It is not necessary, in adopting this method, that the precise details above given should be followed out—that the same quantity, or proportions, of the several kinds of food should be employed—or that the

crushed linseed should be boiled by a steam heat. The principle of adding turnips to the hay usually given to the cattle and sheep, and to both a certain quantity of linseed, boiled long enough to form a jelly when it cools, mixed up with chopped straw, and brought to the stock either cold or hot—this is what the farmer may, in nearly all circumstances, profitably adopt.”

I have tried flax seed in fattening two or three cattle, but having no means of crushing it, I boiled it for two hours, and mixed the jelly and seeds with crushed barley, oats, or Indian corn. I gave one pint of seed and two quarts of meal, thus prepared, every day to each beast; its effects were soon visible in the silky appearance of the hair, and more thriving condition of the animal.

There is another point connected with cattle, which requires attention. There are generally no yards to your barns; there should be high close fences, or sheds, enclosing a space for a yard to shelter the cattle; all, however, cannot afford to make them, but all can fence in a small space adjoining their barn, to keep in their cattle, and prevent their wandering about the roads in winter, by which a part of their droppings are lost. Again, in the coldest weather you see the cattle out all day, exposed to the cutting winds, and half perished with the cold. In mild weather, it is well to let them out in the yard; but on severe days they had much better be in the stable, unless your yard affords very good shelter for them. The stables can easily be made warmer, by merely nailing up sided longers, or slabs, inside to the posts, and filling the space with sea weed, moss, straw, or tan bark, well stuffed down.

CHAPTER V.**ADVICE TO NEW SETTLERS.**

The man who commences a new farm in the woods has many difficulties to overcome, much hardship to endure, and many privations to suffer; exertion of muscle, rather than skill in husbandry, is at first chiefly demanded of him. The new land yields abundantly, and with his strength thus taxed to its utmost, and a long winter to encounter, the temptation to over-cropping is great, and he requires all his prudence to refrain from impoverishing what he has cleared, to supply his present wants. But beware how you do so. Nature has been bountiful in giving great fertility to the virgin soil, but you cannot abuse her gifts with impunity; if you exhaust the ground by the reckless system of taking crop after crop, without manuring, be assured you and your children will suffer for it in after years. Look at many of the old farms of the Island: how many farmers do you see, with forty and fifty acres of cleared land, selling their farms for a trifle, or struggling with poverty, and just obtaining a scanty subsistence, when they ought to have plenty? Yet these lands were once clothed with woods like yours, the soil as rich, the yield of the first crops as great: what has caused the change? The answer is, the foolish, barbarous system of cutting repeated grain and hay crops from the same land, without manuring. Be warned by their example, and do not follow a path which must bring you to the same condition.

The *first* year the land is burnt, you will put in some potatoes; but don't plant more than are absolutely necessary—since the disease, the fewer the better. New burnt land gives turnips with very little trouble; sow as many of them as you can; (Swede turnips,

mashed with a few potatoes, are not bad food); the seed is not expensive; sow it thick, that the lly may have his share, and leave a share for you also. The second year, sow the potato and turnip land with some wheat and some oats; try some rye also—it is a sure crop, and if the wheat fails, will make excellent bread; and if you sell it, the brewers will give you three shillings and six pence to four shillings per bushel for it. Unless the land is very good, you should not take another grain crop off the same piece of ground; but if it is very strong, you may sow oats or rye on it the third year also; sow grass seeds, red and white clover, and timothy as liberally as you can afford, with either the first or second grain crop, according as you intend it to be the last. The next year you will cut the hay. Now you should not cut hay on this ground another year, unless you top dress the land; if you can't do so, pasture it. You will say you have few stock to make manure, and no time to get, or way of hauling, mud to make composts. I am quite aware of these difficulties, and those best off may have to yield in some degree to circumstances. But go to work the right way from the first, and you will do much more than you think; if you are industrious in clearing, and raise turnips, you will be able to keep a cow and pig the second year: place a good lot of earth in the shed under the cow, it will catch the urine; keep adding fresh earth to the sty where the pig is kept in the autumn, and have a good quantity of it under him all winter. In many places fern grows plentifully, by the road side and through the woods; it is very valuable as manure. Make it a rule, that each child shall every day in summer gather an arm full, and throw in the pig sty or cow house; in autumn, when the leaves fall, gather as many as you can, and throw in the cow house; every spring, turn all out of the cow house and pig sty, and make it into a heap. Every little helps, and in a year or two, by the time you want manure, you will have a respectable pile. I often see new settlers selling ashes; don't do this—the trifle you get for them is not worth the time wasted in bringing them to market.

Keep every quart of your ashes, and mix it with mud if you can get it, if not, with earth and sods from the road side; if you don't want it the year you make it, it will improve by keeping. Some will say, we are obliged to sell ashes, and every thing else that will make a penny. I know that some new settlers are so destitute, that present subsistence can only be obtained by means injurious to their future operations. The poor emigrant, when he arrives, has more obstacles to overcome than the native settler; anxious to form a home for himself and the little family dependent on his exertions, but unacquainted with the climate, and unskilled in the use of the axe, he attacks the forest under disadvantages which a strong arm, a bold heart, and indomitable perseverance can alone overcome. Necessity may compel you, and many in like circumstances, to sell what should be kept as a valuable manure, to be harder on the land you first clear than you would wish, and to do many things good husbandry forbids. To such I would only say, do not persevere in taking repeated crops of grain or hay on the same land, or in selling ashes, or neglect collecting every thing which will make manure, one year longer than you can possibly help; and after you once get fairly under way, the stumps out of a few acres, and the plough to work, you will have no excuse for treating the land you clear each year badly. Then commence at once with the proper system; each acre of new burnt land will yield you turnips to feed your stock, will give you a crop of grain, and a crop of hay; then pasture it until it is fit to stump, and then, not having been exhausted, with very little manure will carry another rotation.

APPENDIX.

PROFESSOR JOHNSON, one of the first Agricultural Chemists of the present day, was recently employed by the Government of New Brunswick to make a Survey, and report on its Agricultural condition and capabilities, at a cost (as I am informed) to the Province, of from One thousand two hundred to One thousand five hundred pounds; after spending some months in executing the duty, he made a Report, which he concludes with some practical suggestions to the farmers generally, for the improvement of their system. What that Province thought worth paying so much for, and what so capable a man recommends, cannot fail to be both interesting and instructive to the farmers of this Island: his suggestions are therefore subjoined.

SUGGESTIONS AS TO IMPROVEMENTS IN THE PRACTICE OF INDIVIDUAL FARMERS.

After what has been said in the preceding Chapters on the subject of individual practice, it will be unnecessary for me now to touch upon many things which would otherwise have naturally found a place in the present Chapter.

By an improvement in practical agriculture, I understand a change in practice, which will enable the farmer to raise larger or more valuable crops from the same extent of land as before, or to produce equal crops at a cheaper rate, without permanent injury to the land. To the practical man, therefore, I wish to recommend nothing which, if rightly performed, will not, in my opinion, be the means of putting more money in his pocket.

What I have said in my suggestions to Agricultural Societies, in regard to draining—deep and subsoil ploughing—green manuring—the use of bones—the saving of waste materials for the manufacture of manure—the covering of manure from the action of the rains and snows in the fold yard, and from the washing of the rains when laid upon the field—of the use of lime—of an earlier cutting of the grain crops—of improving the breeds of stock—of a better housing of the cattle—of the growth and use of green crops, linseed, and prepared food during the winter months—of more diligent and more extended fall ploughing—of the value of agricultural journals and books—all this is intended as special advice also to the individual farmer. Each man can exercise a far more direct and beneficial influence—beneficial to himself and to the Province—over his own practice, than Societies, however zealous they may be, can be expected to do over that of the district in which they are placed. The improving farmer, indeed, does good in two ways. He not only puts more money immediately into his own pocket; but by the influence of his prudent and successful example, he induces others around him to follow in his steps, and to put more money in theirs also. Thus the agricultural improver—the judicious, not the hasty and imprudent one—is a most valuable member of society, and it is for the best interests of every country to support, encourage, and honour him.

There are only a very few additional topics on which I think it necessary to address a few observations to the practical farmers of New Brunswick.

1st. I would recommend the abandonment of the system of cropping with grain, or cutting for hay, till the land is exhausted—a system hitherto so much followed in the Province. If, while the stumps are still in the ground, the land cannot be ploughed, and must be left in pasture, the manure made by means of the hay and other produce of the farm, should be collected, husbanded, and applied as a top dressing in spring to the early grass. But when the stumps are already up, and grain and root crops have been raised upon the land, the barbarous custom of cutting for hay, year after year, without manure, ought to be for ever abandoned. Such land, when in grass, may be pastured, if thought desirable, for three or four years—it may even be allowed to be in permanent pasture, with an occasional top dressing—but not more than one year's hay ought to be cut, as a general rule, without the application of some fertilizing substance to its surface. When land has already been exhausted by such treatment, the use of bones is deserving of a careful trial.

2dly. The custom of leaving the land to cover itself with poor natural grass, after the grain crop has been taken off, should also be abandoned. It ought always to be laid down with grass seeds, where a naked fallow is not intended. I have, indeed, seen many cases where naked fields have shown the neglect of this most profitable practice of seeding; but it has generally been upon farms held by the poorest and most ignorant portion of the rural population of the Province.

3dly. The adoption of a system of experimenting, prudently, cautiously, and on such a scale as—if all his experiments should fail—would not seriously affect his pocket, is the next point I would urge upon the practical man. It is a line of activity upon which he cannot too soon enter. There is a broad intervening space between the actual condition of New Brunswick agriculture, and the condition to which it might be brought by the judicious application of existing knowledge. But that knowledge cannot be diffused among, cannot be acquired by, the farmers of the Province

all at once. What they do learn, also, they will naturally doubt, until they have seen it actually applied to, and actually causing more profitable crops to grow upon the land. It is, therefore, by a system of trials that general confidence will be obtained, in this or that method of improvement. The distinction between the man who desires to improve—to advance, which is a sort of condition affecting all material things in North America at the present time—and the man who is content to sit still, is, that the first endeavours to acquire information, and having obtained an inkling of new knowledge—perfect or imperfect—shews a disposition to make use of it, to make trials of the methods of advancement in his own walk, which the knowledge suggests. The maker of agricultural experiments, therefore, is the man who is acquiring knowledge—is thinking how he can apply it most usefully to himself, and is testing the opinions and recommendations he may have heard or read, by the practical means which his farm places in his hands. It is a favourable sign of the diffusion of knowledge, and of the awakening of thought and dormant intellect among the agricultural community of a country, when the habit of experimenting prudently and economically, is seen to diffuse itself among them.

The use of Lime is recommended by many in the Province of New Brunswick, and as I think, with reason. The advancing man will, therefore, try lime in a small piece of his land, if he doubts its efficacy, and his means are small; he will try it in various ways, applied, at different times, to different crops, and in different soils; and the results will determine him as to whether it would be more profitable to use it on a larger scale.

* * * *

With Bones, likewise, in various forms, small beginnings may be made by way of experiment. And so with all the improved practices. I have directly recommended, or indirectly alluded to, the really good and zealous farmer—the man who loves his art, and wishes to advance it, if only for his own benefit, and on his own farm—will, from time to time, try them, honestly, fairly, and prudently, yet fully, and will thus

keep constantly advancing in experience, and in the profitable culture of his land. There is, indeed, now scarcely any field so wide as that of the experimental farmer—none so full of endless novelties, which the active mind may investigate experimentally, and always with a view to profit. Unlike the old stagnant art of farming, of which the principles were not understood, the art of this present time is guided by clear principles—is full of ever new interest—is in a constant state of progression—and affords full employment for highly intellectual and active minds.

4thly. In the preceding Chapters, I have recommended the growth of flax, to a certain extent, for the purpose of procuring linseed as a food for the stock, and fibre for the winter's employment of the farmer's household.

5thly. To one other topic I advert, because of its great practical importance, though already frequently noticed in this Report. The improvement of the breed of stock is, in one point of view, the basis of the entire agricultural improvement of a district. Good stock necessitates good feeding. Much stock, and good feeding, produces much and rich manure. Ample manuring enriches the soil, and causes it to produce good crops; and these large crops, again, whether of corn, hay, or roots, afford the materials for abundant feeding, and for fold-yards full of manure.

But in some parts of the Province, there is a prejudice against improved breeds of stock. Thus, Mr. Hubbard, of Burton, writes me—"The stock of the country will do better on what we farmers call stock hay, and no shelter, than the English breed will on merchantable hay with shelter; and horses the same." I infer from these words of Mr. Hubbard, however, that he looks for the profit of his farming, not to the stock he can keep, but to the hay he can sell off his farm. If so, he may continue to rear the hardy animals—which, after all, are only old country stock, degenerated under the treatment they have received in the Provinces—and to make a profit by his good hay; but his land, like his stock, will degenerate in time, and it will cost his successors both skill and

capital to bring it back again to its original productive condition. I am informed that even the periodically flooded lands on the Saint John River, no longer yield the crops of hay they are known formerly to have produced. The profit of good stock consists, not only in the early maturity which they attain, and the larger produce of beef they yield from the same amount of vegetable food, but in their furnishing also the means by which the land can be maintained in good condition, and be compelled to produce abundant crops for an indefinite period of time.

As to the benefits of shelter, there is now no question among the most experienced breeders and fatteners of stock, as well as among theoretical writers, that an animal which is kept warm, thrives better on the same quantity of food, in fact can be kept in condition upon less food than one which is exposed to the inclemency of the weather. In regard to this point, there is not one law for New Brunswick, and another for the rest of the world. On this point, Mr. Goodfellow, of Miramichi, writes me as follows:—

“FREDERICTON, 29th Nov., 1849.

“Sir;

“Having been requested to give you my opinion on the treatment of Live stock in this country, during the winter months, I beg to submit the following remarks:—

“When I first engaged in farming operations, I kept my cattle in a building similar to those used throughout this Province at the present time; but about five years ago, I built a new barn on a side hill; I excavated an under-story for my cattle; one side, and part of the ends, are under the ordinary level of the ground; the side facing the hollow is where the cattle enter the building, which is of frame work, boarded and shingled. The building above is also boarded and shingled, on the roof and sides. There is a yard in front of the under story, of forty-five feet square. A shed is built on the North and West of the yard, to break off the wind, the South side being left open.

“Since I kept my cattle in this building, they appear much more comfortable (being entirely free from cold) than they were in the former building, while a saving of twenty per cent. is effected in the food. My cattle are always in better condition in the spring than those of my neighbours who keep their stock in the ordinary buildings of the country; and much less subject to the various distempers to which cattle are liable. No inconvenience is experienced from the building becoming too warm in mild weather, as there is sufficient means for ventilation.

“I have, &c.,

“(Signed) ALEX. GOODFELLOW.

“To Professor Johnson.”

I cannot but recommend practical men to put faith in Mr. Goodfellow, and follow his example.

The Professor concludes with the following summary of “Points to which individual farmers are recommended to direct their attention:”—

1st. Thorough drainage of clay soils, wet slopes and bottoms, and marsh or dyked lands, where the fall is sufficient to admit of a ready outlet, and a sufficient depth of drain.

2d. Better cleaning and deeper ploughing of the soil.

3d. More care in saving, collecting, and applying manures of all kinds, liquid and solid.

4th. An abandonment of the system of cutting repeated crops of hay off the same land till it is exhausted.

5th. An abandonment also of the custom of taking repeated successive crops of corn off the same land, without alternation with other crops, and without manure.

6th. Cutting down grain of all kinds before it is fully ripe, and grass before it runs to seed.

7th. Cutting down Indian corn with a knife, as is done in New York, and use of the stalks in feeding milch cows and other stock.

8th. Sowing buckwheat or rye to plough in green, and use of bone dust to renovate exhausted and worn out lands.

9th. Ploughing deeper, in all cases, than has hitherto been usual, but especially such land as has ceased to be productive as formerly.

10th. Taking advantage of every open day in the fall, to plough and prepare the land for the spring sowing.

11th. Selecting good stock of cattle, pigs, and sheep, for keeping through the winter.

12th. Providing warm but well ventilated housing for them.

13th. Feeding them plentifully, that they may be in good condition when the spring arrives.

14th. Growing turnips and linseed, with the view of adding to the quantity and enriching the quality of the food he has at his disposal.

15th. Collecting carefully, and preserving under cover, all the manure made by his stock during the winter; that he may have it abundantly and in good condition for his potato and green crops when the time of planting or sowing comes.

16th. Manuring annually, by top dressing, his worn out hay lands, when the land is not stunged, and therefore cannot be ploughed up.

17th. Collecting carefully all waste bones, breaking them, and applying them to the land; especially the use of bones is to be recommended upon land which has been worn out by over cropping with corn.

18th. Sowing down always with artificial grasses, when land, after a corn crop, is to be left with the view of its producing hay.

19th. To provide shelter, by fences or plantations, for his fields and stock.

“Wealth to the turnip, British farmers owe,
Though here too few its real value know;
Then, Countrymen, adopt what I advise,
And grow, like British farmers, rich and wise.”

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