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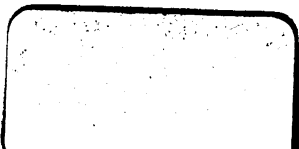
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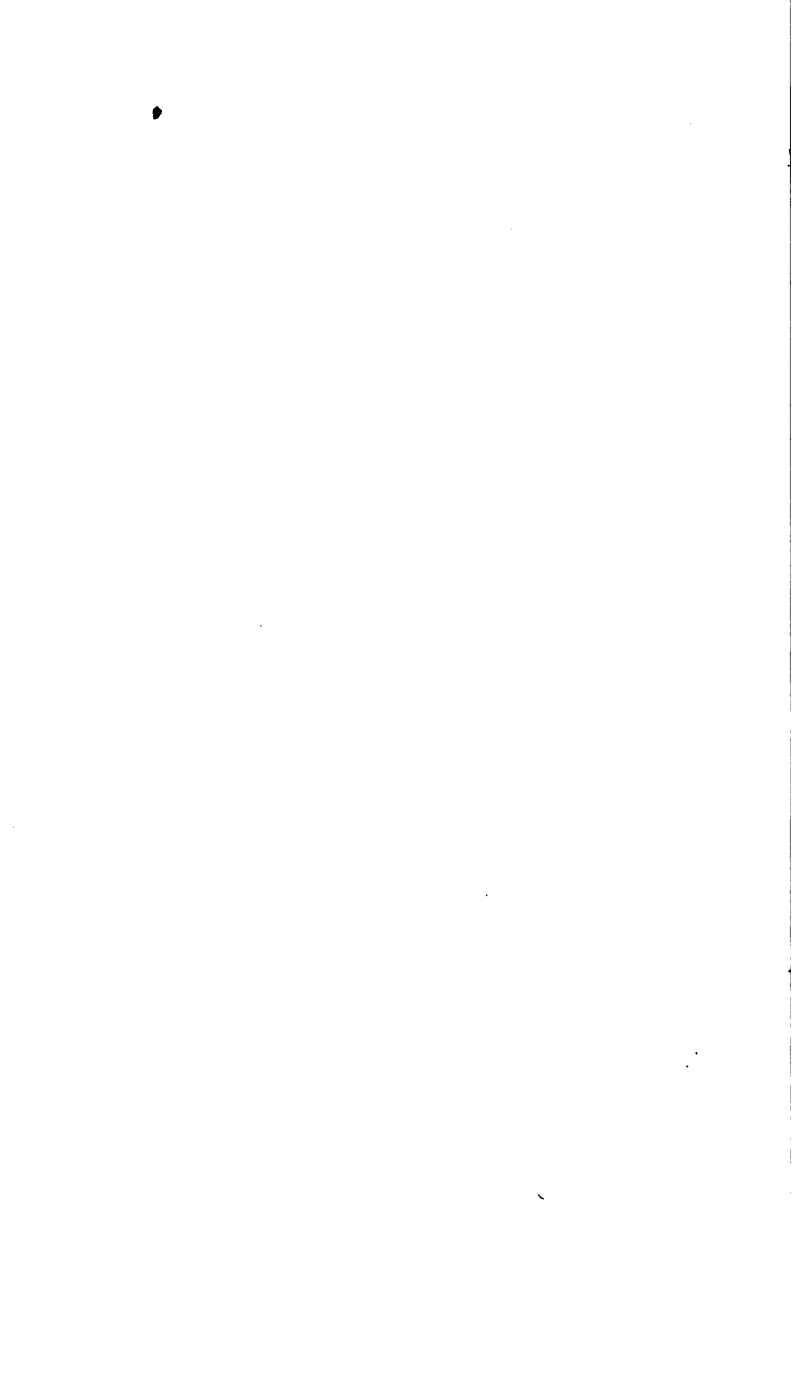
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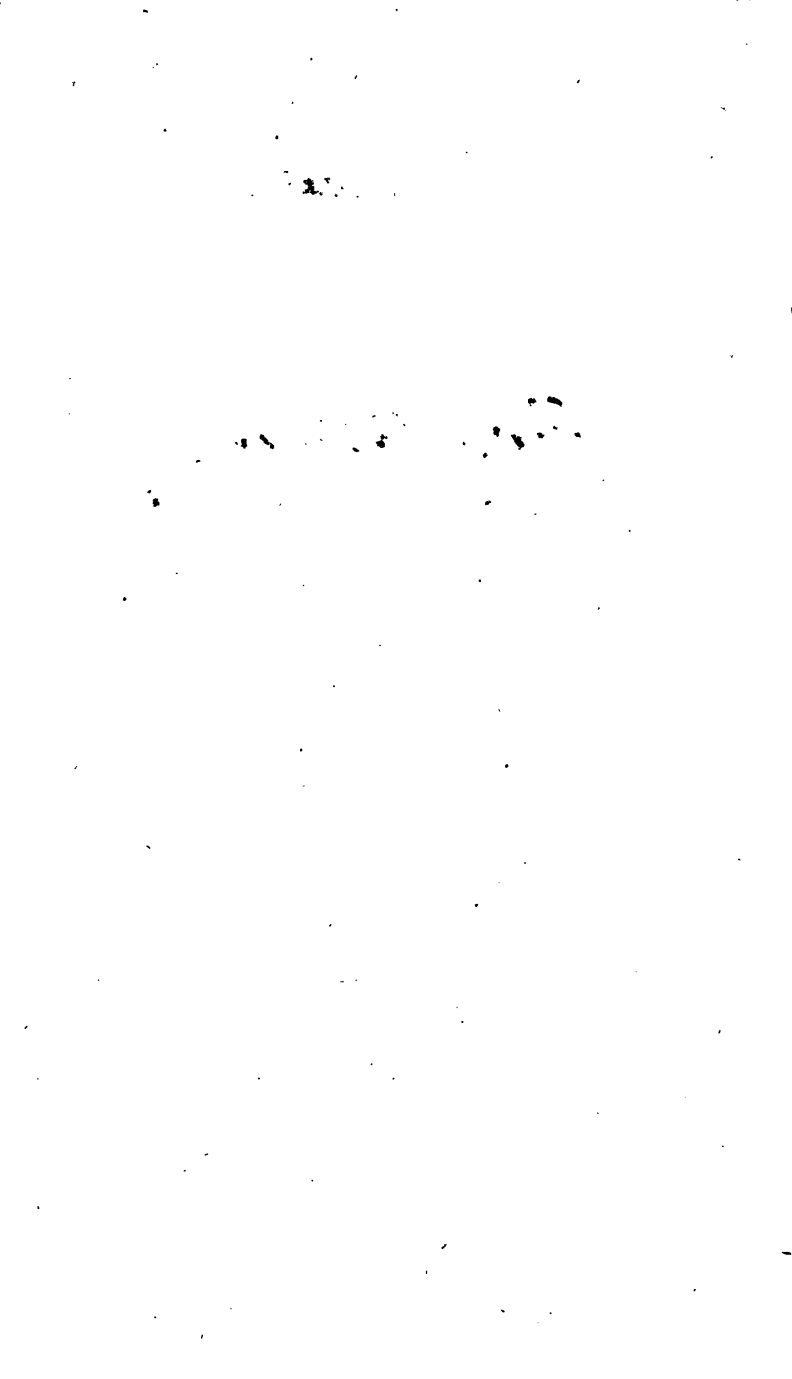






Howz. Palmer

1824







Horrebius Johnson -
1824

COMPENDIUM

OR

AGRICULTURE,

OR THE

FARMER'S GUIDE,

IN THE MOST ESSENTIAL PARTS OF

HUSBANDRY AND GARDENING;

COMPILED FROM THE BEST AMERICAN AND EUROPEAN PUBLICATIONS, AND THE UNWRITTEN OPINIONS OF EXPERIENCED CULTIVATORS.

Hate not laborious work, neither husbandry, which the Most High hath ordained. *Son of Sirach.*

Cultivators of the earth are the most virtuous and independent citizens. *Jefferson.*

.....
By WILLIAM DROWN,
WITH THE AID AND INSPECTION OF
SOLOMON DROWN, M. D.
.....

PROVIDENCE:
PRINTED BY FIELD & MAXCY.

.....
1824.

Agz 311.850



*Gift of W. H. Baldwin, Jr.
Rhode-Island District, &c.*



Be it remembered, That on this thirtieth day of December in the Year of our Lord One Thousand Eight Hundred and Twenty Three, and in the forty eighth year of the Independence of the United States of America, William Drown, of said District, deposited in this office the title of a Book, the right whereof he claims as proprietor, in the following words, to wit: "Compendium of Agriculture, or the Farmer's Guide, in the most essential parts of Husbandry and Gardening; compiled from the best American and European publications, and the unwritten opinions of experienced cultivators. 'Hate not laborious work, neither husbandry, which the Most High hath ordained.'—*Son of Sirach.*—'Cultivators of the earth are the most virtuous and independent citizens.'—*Jefferson.* By William Drown, with the aid and inspection of Solomon Drown, M. D."

In conformity to an act of Congress of the United State, entitled "an act for the encouragement of learning, by securing the copies of maps, charts and books to the authors and proprietors of such copies during the time therein mentioned;" and also to an act, entitled "an act for the encouragement of learning, by securing the copies of maps, charts and books to the authors and proprietors of such copies, during the time therein mentioned, and extending the benefit thereof to the art of designing, engraving and etching historical and other prints."

Witness,

BENJAMIN COWELL,
Clerk of the Rhode-Island District.

7224
H/11/17

RECOMMENDATION.

THE subscribers having been appointed by the Rhode-Island Society for the Encouragement of Domestic Industry, to examine DOCTOR and Mr. WILLIAM DROWN'S COMPENDIUM OF AGRICULTURE, feel great pleasure in stating that they are satisfied with the work, and do, therefore, in behalf of said Society recommend it to their fellow-citizens, as a production highly creditable to the Authors, and likely to be very useful to the Agricultural interest of the country.

TRISTAM BURGESS,
J. B. FRANCIS
SAMUEL KING,
M. B. IVES,
S. H. SMITH,
W. E. RICHMOND,

} Committee.



INTRODUCTION.

SOME Apology may seem necessary for publishing a new work on Agriculture ; a subject which has been so ably handled both in Europe and in this country.— Let the following suffice as all we have time to offer on this head.—That as knowledge is naturally advantageous and as every man ought to be in the way of information, even a superfluity of books is not without its use, since hereby they are brought to obtrude themselves on us, and engage us unawares. This advantage, an ancient father observes, we owe to the multiplicity of books on the same subject, that one falls in the way of one man, and another best suits the apprehension of another.—“ Every thing that is written,” says he, “ does not come into the hands of all persons : perhaps some may meet with my books, who may hear nothing of others which have treated better of the same subject. It is of service, therefore, that the same questions be handled by several persons, and after different methods, though all on the same principles, that the explications of difficulties, and arguments for the truth, may come to the knowledge of every one, by one way or other.” Add to this that our work professes little more than to abridge, compress,

and reduce to handy size, the voluminous productions on this important subject; so that it will require neither much expense to purchase, nor time to read.

The present is a peculiarly interesting era in the agricultural history of our country. The prejudices which have so much, and so long existed against the introduction of improvements are rapidly disappearing, and giving place to general inquiry and the adoption of the most approved modes of cultivation.

Agriculture has within a few years undergone a material change, not only by the progress made in the knowledge of the art itself, but also by the introduction of many new implements of husbandry, calculated to facilitate the operations necessary in the cultivation of the soil. This change is evidently owing to the spirited exertions and publications of individuals, as well as to the mass of useful and experimental knowledge, which Agricultural Societies have, with a laudable zeal and attention, given to the public. With the view of more generally diffusing this desirable knowledge, the editors have been encouraged to attempt the following publication, in which they will endeavour to be as concise as may be consistent with a proper elucidation of the important matters treated. From attentive observation we are satisfied there is a great deficiency of American publications on this subject. European works on Agriculture, are perhaps more common in this country; but they are not perfectly adapted to a region so differently circumstanced. "Though English writers may be perused by the judicious to great advantage, yet local circumstances so widely differ in the two countries, it would be unadvisable, and perhaps ruinous, for our farmers to adopt the methods of culture in gross, which they recommend to their countrymen." In compiling this Compendium, therefore, we shall have recourse not

only to American, but also to the best European publications, lest any useful suggestions, or modern improvements in the art, should escape notice; still keeping in view the difference of climate, seasons, &c.

Upon a careful perusal and comparison of the works in our possession, we have found much difference of opinion with respect to many important operations in farming. In these cases we shall aim to select the practices most consistent with common sense.

Who will venture to assert that we have arrived at absolute perfection in all the complicated operations of this noble art? If not, why are there so many obstinately wedded to their present practice, and so hostile or indifferent to all innovation? The farmer who is prejudiced in favour of the practices of his forefathers, may conclude he can do well enough without such aid as this work offers; yet let him reflect that a life-time is requisite to determine many things by mere experience in the business; and that by adopting the rules here laid down, much time may be saved and great waste prevented, because here will be summed up the experience of practical farmers for many ages.

The great Agriculturist, Arthur Young says, "No one of common sense can deny the vast advantage of *judicious collections*. I know not for instance of a more useful work than a collection of all the *truly valuable* in every book of husbandry; that the benefit of reading might be reduced to the labour of a few months, instead of twice as many years."

Agriculture has been justly termed the most essential of all arts. In every region of the habitable globe, where the least appearance of civilization exists, it necessarily occupies a great portion of the human race; and many learned men have made it their chief study and employment, justly deeming it the original and gen-

vine source of the strength, riches, and prosperity of a nation; because to it we are indebted for food, clothing, the most necessary accommodations, and the materials of all the arts and comforts of life.

Agriculture corresponds to that degree of exercise, says Lord Kames, which is the best preservative of health. It requires no hurtful fatigue, on the one hand, nor indulges, on the other, indolence, still more hurtful. But what I chiefly insist on is, that laying aside irregular appetites and ambitious views, agriculture is of all occupations the most consonant to our nature, and the most productive of contentment, the sweetest sort of happiness. It is of all employments the best calculated to raise our contemplations to the all-wise ruler of the universe, and to teach us our dependence on him, from day to day, from whose liberal munificence we derive all our enjoyments.

Agriculture is undoubtedly a healthy employment.— Among the pre-requisites to good health and longevity, may be numbered a suitable degree of exercise of body and mind, a steady and equal progress through life, never allowing our passions to triumph over our reason; temperance in eating and drinking, cleanliness, timely and regular sleep, and pure air. The farmer's dissolution is often occasioned by taking a severe cold, most commonly through great imprudence. In many instances from standing still or sitting down after violent exercise without putting on his clothes, or by an immoderate use of cold drink when very warm. If they would learn more prudence in these respects, and abstain from the use of spirituous liquors and other hurtful practices, the cultivators of the ground would seldom require the aid of physicians or apothecaries.

“ There may be some who, for want of due reflection or competent knowledge of the history of Agriculture,

may consider it as a heaven-taught art ; as one for which no talent is required ; and no knowledge beyond the meanest practical education requisite. To such persons we would remark, that although it has been the oldest of all the arts, and therefore it is more difficult to trace its history than that of any other, yet if we examine the implements of Agriculture, and the various modes of cultivation, we shall be convinced that it owes as much to genius and invention, and a spirit of improvement, as any other."

"In a philosophic view, Agriculture is great and extensive. In a political view, it is important, and perhaps the only firm and stable foundation of greatness.—As a profession; it strengthens the mind, without enervating the body. In morals, it tends to increase virtue, without introducing vice. In religion, it naturally inspires piety, devotion, and a dependence on providence, without a tincture of infidelity. It is a rational and agreeable amusement to the man of leisure, and an endless source of contemplation and activity to the industrious."

Should the present work, the result of considerable study and careful observation, contribute to the promotion of that art, which is the basis of all the others, the editors will be highly gratified. They feel unwilling to close this introductory part without briefly contrasting the happy state of American farmers, with the deplorable condition of very many cultivators in Europe.

France, the fairest portion of Europe ; renowned for its fertility of soil, and the mild temperature of its seasons : France, the country of La Fayette, was cultivated till lately by a wretched peasantry, who were but one remove from the oppressed Serfs (slaves) of the semi-barbarian nobles of the north.* Such was the state of that peasantry, that the amiable Saint Pierre querulous-

ly asked, What it availed them to have raised wheat, affording the finest flour, if they must live on bran.—Thrice and four times happy American cultivators ;—yes, too happy, did you but know your happiness !—Lords of the soil you cultivate, and sharing in all the luxuries of nature. Be assured, there is no occupation pursued on this globe, superior to yours. Venerate, then, the plough, the hoe, the sickle, and all the implements of husbandry : And, should the soil prove hard, yet you may say ;

*“ Tho’ rude, thou art still dear to me,
Land of my fathers ! Thou art free !
And bless the bard that strikes to thee
The ennobling harp of liberty !”*

* The condition of the boors is, in general deplorably wretched. The only property which their lords allow them to possess, is the food which they themselves cannot, or will not eat, the bark of trees, chaff and other refuse ; grass, water, and fish oil. If by any means they acquire any portion of wealth, it becomes a very dangerous possession, and when discovered, is invariably seized by their tyrannical lords.—“ It is thus,” says Dr. Clarke, “ we behold the subjects of a vast empire stripped of all they possess, existing in the most abject servitude ; victims of tyranny and torture, of sorrow and poverty, of sickness and famine.” Traversing the provinces of Muscovy,” he continues, “ the land appears as the garden of Eden, a fine soil, covered with corn, and apparently smiling in plenty. Enter the cottage of the poor labourer, surrounded by all these riches, and you find him dying of hunger, or pining from bad food, and in want of the common necessaries of life. Extensive pastures, covered with cattle, afford no milk to him.—In autumn, the harvest-field yields no bread for his children. The lord claims all the produce. Can there

be a more affecting sight than a Russian family, having got in an abundant harvest, in want of the common stores to supply and support them, through the rigours of their long and inclement winter !”



IMPORTANCE OF MAKING EXPERIMENTS IN

AGRICULTURE.

“The task of making improvement on the earth, is much more delightful to an undebauched mind, than all the vain glory which can be acquired from ravaging it by the most uninterrupted career of conquest.”—WASHINGTON.

AT this period, when the prejudices which have long existed unfavorable to the improvement of Agriculture, have been in a considerable degree scattered, by the beams of truth and science, little need be said perhaps upon the importance of instituting various experiments for the further advancement of the art. Men are not habitually thoughtful and reflecting; but find it much easier to receive the creeds of those who have gone before them as orthodox, than to examine for themselves and discover whether those doctrines are in consistency with the dictates of reason and sound policy. So it is in Agriculture—the mode adopted by the father is almost invariably pursued by the son; and the clearest dictates of reason are far less persuasive than the example of ancestors—like the man who in carrying his grain upon the horse, would ballance it on the one side with a stone, because his father and his grandfather had done so before him; whenever the glimmerings of reason, if once permitted to dawn upon

his mind, would have taught him the folly and inconvenience of the custom, So it is that our farmers have been inclined to pursue the same beaten track, not daring to vary from the established mode, which for a long time presented an effectual barrier to every species of improvement.

But happily this charm is now broken; and Agriculture is considered susceptible of improvement, like philosophy, from experiment. Much talent, learning and science are devoted to its cause; the happy effects of which begin to appear in many parts of our country; yet it is to be lamented that so few experiments have been made, calculated to establish useful and permanent systems of husbandry, suited to our peculiar climate and soil.

The true source of agricultural knowledge, is to be found in repeated experiments. These are to be made by ourselves or neighbors, and verbally communicated; or by persons at greater distances, and chiefly communicated by books.

By our own experiments we receive instruction from the hands of nature herself—by books we receive it from other men; the one is more certain and applicable to our own affairs, the other more varied, and copious and from the principles of science unfolded, enlightening. Neither of them ought to be neglected.—The examination of books; and a free interchange of ideas on agricultural improvements, will enable us to avail ourselves of the knowledge to be derived from our experiments. Information thus acquired is always applicable to our own business, it is engraven on our minds, and it can never mislead! its very acquisition is an amusement, and its communication a rational pleasure. For far superior to that mean jealousy which little minds are apt to entertain on their discoveries, the

public spirited individual nobly calls forth every assistant, and invites his countrymen to become his rivals in promoting the general welfare of mankind. But before experiments can be useful, they must be made with skill and reported with fidelity, stating the mode pursued, and the difficulties encountered.

It has been objected to those who advocate the cause of improved farming, that they are too much attached to theory, and too little acquainted with practice; and it has often been deemed sufficient to condemn any thing out of the common course to recommend it as described in a printed book. Some of our farmers believe, that in adopting new inventions, we insult the memory of those who have gone before us, who, according to their way of reasoning, have transmitted to us all that is necessary to be known in cultivating lands! Others agree that the late discoveries are useful to particular countries, but altogether repugnant to the nature of our soil! There are others, who allow all these improvements to have advantages in particular respects; but assert, that their superiority over the vulgar course of husbandry is so doubtful, they must, at least, be considered of small utility! Prejudices of this kind are however passing away. He who endeavours to add to the fund of useful knowledge deserves our thanks, however circumscribed his researches may be.

We admit that there are many theories, the result of experiments, the adoption of which cannot be recommended generally; yet the experiments of enthusiasts, or mere theorists, are often found valuable, or serve as friendly beacons to warn us of our danger. That which is certainly most desirable however, is an union of theory and practice.

It is the practical farmer that we would now invite more particularly to come forward; we are desirous of

seeing him engaged in those experiments on which important consequences depend. General reasoning and remarks may be of some use in many points, that experiments do not reach; but in general all the reasoning upon earth, without them, would be of no avail;—and they, in a certain variety, are sufficient to give the force of absolute fact to every point.

It is the business of the enlightened men who practice agriculture, and of authors who practice and write on it, to help forward the age; to try experiments on things newly introduced, and if they are found good, to spread the knowledge of them as much as possible; to endeavour to arouse the attention of the vast body of farmers. To omit this either in practice or in writing, is to reduce themselves to the level of those whom they ought to instruct; and to submit to that ignorance and backwardness, which cloud a country in an enlightened age, with the darkness of a preceding century. It is the business of superior minds, in every branch of philosophy, to start beyond the age, and shine forth to dissipate the night that involves them.

Let not those enterprising enquirers who aspire at excellence, be deterred by the ridicule that not unfrequently accompanies them in their attempts, or, intimidated by the apprehensions of ruin. Let them only be careful that their experiments be made after due consideration, and commensurate with their means, and there is little danger, but that pleasure, and in most instances, profit, will follow their undertakings. New practices in husbandry are often attempted by persons not bred to that occupation, and these for want of practical skill, may often fail in the execution; and when successful, the success is ascribed to a liberal expenditure of money, beyond the ability of the mere farmer. But what risk will attend experiments made by farmers

themselves, to test the value of these novelties ? Each one for himself can try them, on as small a scale as may suit his convenience, before he enters more largely into any article of cultivation, and at a very small expence of time and money. A small field, of a soil similar to that of his farm in general, appropriated to experiments would be the most proper. The introduction of improvements would be facilitated, if the money expended, and the quantity of labour bestowed upon them were always accurately stated, in all communications made to the public.

There is no way of making improvements in farming, but by experiments. If the farmer is informed of, or has conceived, a different and better method of culture, or management, in any branch of his farming, he is to test the goodness of that method by experiments ; and, if these prove successful, he may congratulate himself, on having performed an act which is serviceable to his country and honorable to himself.

Having urged the utility and even necessity of accurate experiments, we will enumerate a few of the more important objects, on which those experiments ought to be tried.

The proper selection of seeds is of vast importance. Experiments should be made to ascertain what kinds are the best of all the grains, grasses, &c. and how far they are susceptible of improvement. Next what quantities of these ought to be sown or planted on an acre, and, in what manner, whether in drills, in hills, or broad cast. Careful experiments should be made on the all important article of manure. We ought, without loss of time, to ascertain how far lime, plaister, and ashes may be used to advantage ; and in what manner the good manure may be best increased and applied ; how many crops will each sort benefit, &c. The best sea-

son for ploughing and sowing—what depths and what number of ploughings—what mode, whether level or ridge, the most advisable mode of tilling the ground, so as best to ensure the three great objects of tillage, which are the production of useful grains, roots, and grasses. Experiments should be made to ascertain what kind of soil is best adopted to each particular sort of grain &c; whether any, and what new grains, roots or grasses might be advantageously introduced; the most efficient mode of destroying or guarding against the ravages of noxious insects; the stocking farms with the most approved breeds of domestic animals; the cure and prevention of the diseases to which they are subject; the kind of food most proper for them, and the best mode of preparing it, &c.

These suggestions might be multiplied to almost any extent, but the few here mentioned are sufficient to show that experimental agriculture is yet on a wavering footing, and considerable time will be required to establish by experiment, some important points in the science.

The entertainment which may be received, from an enquiry into all the powers and operations of nature wherein husbandry is conceived, is one of the most noble that can be proposed to the mind of man. The subject is so vast it can never be exhausted; could he live, and spend ages in agriculture, he might still go on in his researches, and still make fresh discoveries that would excite afresh his admiration of the wonderful works of God.

NECESSITY OF CONSULTING BOOKS.

It is a saying sanctioned by the authority of Bacon, that "knowledge is power." Of all the various sorts of power enumerated by that great philosopher says Sinclair, this seems by far the most important. What gives one man any real superiority over another, but the knowledge he possesses? What enables some individuals to produce abundant harvests,—to carry on a prosperous commerce,—to establish successful manufactures,—to excel in mechanism; or any other useful art, but the acquisition, and judicious application of that knowledge in which others are deficient?

That the power and prosperity of a country, depend on the diffusion of useful knowledge, can hardly be questioned; and there is probably no art, in which a variety of knowledge is of more essential importance, than in that of agriculture. The extent of information necessary to bring it to any thing like perfection, is far greater than is generally supposed. To preserve the fertility of the soil—to free it from superfluous moisture—to cultivate it to the greatest advantage—to raise its productions at the least expence—to procure the best instruments of husbandry—to select the stock likely to be the most profitable—to feed them in the most judicious manner—to secure the harvest, even in the most unpropitious seasons—to separate the grain from the straw with economy and success—and to perform all the other operations of agriculture in the most judicious mode, require a greater extent, and variety of knowledge, than might at first view, be judged requisite.

It is not many years, since chemistry was brought to the aid of Agriculture, and this will eventually prove one of its principal pillars. Systematic rotations of crops

—improvements in breeding cattle—the use of plaister of Paris—soiling of cattle—the extensive field culture of roots, for the purpose of feeding stock—artificial grasses, &c. are of modern date, and have brought about great revolutions in the theory and practice of farming. The practical farmer, especially in the older and more populous parts of the country, must understand, and in some degree practice these improvements, or he will not only neglect to make the most of his means, but probably make so many backward and down-hill movements in the journey of life, that ten chances to one, old age will find him in the vale of poverty. The cultivator who does not keep pace with his neighbours, as regards agricultural improvement and information, will soon find himself the poorer, in consequence of the prosperity that surrounds him. He will be like a stunted oak in the forest, which is deprived of light and air by his more towering neighbours.

There are farmers who feel unwilling to consult agricultural books of any description for information, because disappointment has attended some attempt they have made to follow the directions contained in them. Let such men recollect that the editors of periodical and other publications, do not consider themselves responsible for the correctness of the statements, or the soundness of the theories of the various writers, whose essays they publish. Their rule is to admit every essay, which appears to contain any new hint. It is impossible for them to judge of the correctness in point of *fact*, of any statement, made by a correspondent. They believe that a free and unreserved communication of all experiments, whether the conclusion drawn from them are erroneous, or not, is of use. The cautious farmer, if he is struck with their novelty, may try them for himself. If they are found to fail, he will not re-

peat the experiment, but he will be very careful to inquire whether he has faithfully followed the instructions of the author. Whether his soil was the same as that in which the first experiment was made, and whether he has taken the same pains to produce the proposed result.

We believe that thirty years since, it would have been believed impossible to raise the great crops of corn and roots which within a few years, individuals in all parts of our country have succeeded in raising. How has this been effected but by circulating accounts of individual success ?

It is well known that there is scarcely any part of the country in which there may not be found persons engaged in agricultural pursuits, anxious of improvement, and capable of every rational inquiry. At the same time it must be admitted, that there are too many still labouring under the most obstinate prejudice against what they call *book-farming*, conceiving that they know as much of farming as is necessary, an opinion pregnant with much self-sufficiency, and exposing those who entertain it to the greatest possible disadvantage.

Our farmers have not advanced in any degree in proportion, either to their natural intelligence, or the progress of the arts in other countries. They pay but little attention to the rotation of crops ; their orchards are as neglected as their woodlands ; and after you get at a distance from considerable towns, horticulture is scarcely known. New-England probably can furnish bread stuff for the whole of the United States, and is dependent on the southern states for flour !

Every farmer, who has natural understanding, ought to be a well informed man, in reading and thinking, in theory and practice. But some farmers tell us that they never knew any good result from what they called

book-farming. That gentlemen farmers, who know nothing about farming but what they get out of the libraries, spend a great deal, but never make any profit by their agricultural projects, and schemes of domestic economy. It is, however, obvious to every person capable of reflection, that written documents must necessarily surpass in every respect those of the most retentive memory, the experience of no simple individual being capable of comprising all that is or ought to be known.

That knowledge, which gives man his supremacy over the beasts of the field, and the fowls of the air, and which bestows on individuals among mankind a pre-eminence much more substantial and less invidious than birth, wealth, title, or popular applause, can be acquired only by three modes, viz: *observation, conversation and reading.* Observation and conversation are very important inlets to ideas, and reading furnishes perhaps, as great a quantity of useful materials for the mind to operate upon as either of them. *Book-knowledge then is power,* and other things being equal, the farmer who obtains information from books, or other printed works, and has strength of mind, and good sense sufficient to make a proper use of it, has the advantage over his unlettered neighbour, who despises book-farming. Besides what is this book-knowledge, which some honest cultivators think is so much to be dreaded? It is nothing more than the result of observation, or experience, which after having passed through the channel of conversation, is at length reduced to writing, sent to the press, and the moment it is printed, becomes, according to the objectors to whom we allude, *book-farming*; and therefore is to be considered as something very ruinous to the practical husbandman! Thus, we will suppose that A has found out a safe and easy cure for the

botts in horses, or a method by which he can raise double the usual quantity of Indian corn on an acre; A communicates his discovery or improvement to B, his neighbour, who, although he has a great aversion to book-farming, makes use of and derives great advantages from it on the strength of A's oral testimony. But A sends an account of his discoveries and processes to the printer, and it is published in some periodical paper, and perhaps finds its way into some volume written on agricultural subjects. The whole thus becomes book-farming, and not worthy the attention of real, genuine, practical farmers.

But these absurdities are fast yielding to reason and the lights of science. The time has arrived in Europe, and is fast approaching in America, in which books and the information which they contain, will be considered as necessary to make a man a complete farmer, as a complete physician, lawyer, or divine.

SIZE OF FARMS.

The size of farms is a subject on which much has been written, and respecting which a great diversity of opinion prevails. It is impossible to lay down any precise or universal standard, as so much depends upon the nature and situation of the country; the character, skill, and capital of the farmer; and a variety of local circumstances.

It is well observed in the Massachusetts Agricultural Repository, that on this topic, perhaps the people of no country are so little practically instructed as ours. This arises from the condition in which the agricultural interest has been placed from the time of the first settle-

ment of our country. Our ancestors found a wilderness unoccupied except by savages. Those who fixed themselves in the country, when lands were cheap, naturally estimated their riches by the number, rather than by the productive power of their acres. Two, three, or four hundred acres were thought, at first, to be suitable for a farm. Afterwards, when population became increased and lands divided, the ideas of farmers settled down to the opinion, that from 80 to 150 acres, was sufficient for the independent support of a family. Upon less than 80 acres, though a man might find ways and means to live, yet it was thought he could not expect greatly to thrive. Accordingly the first effect of thriving among men of that size of farms, was generally evidenced by *the purchase of more land*. Often these purchases were made at the risk of embarrassment by debt and almost always to the real injury of such farmers, whose surplus capital, or even their borrowed capital, would have been generally much better employed, in improving the lands they possessed, rather than in the purchase of more acres.

With respect to men possessing only 30 or 40 acres, they scarcely ventured to call their possessions by the name of a *farm*, so little is such an extent of land in general estimation, entitled to the use of that term. If they attempted to live and bring up a family upon them, they for the most part looked to other employment for their support. Turning mechanics, or hiring themselves out at the most valuable season of the year, to their richer neighbours, or abandoning their own farm to tenants, and taking leases of farms, comprehending a greater extent of land, and so much better calculated to give that full employment to their activity, which to their mistaken apprehension, a farm of 30 or 40 acres did not afford. Until of late years, opinions and con-

duct of this kind were almost universal. Even at this day we know men, active, intelligent and industrious, possessed of this extent of land, who are labouring for others, or taking charge of their neighbour's concerns, upon the avowed reason, that they cannot support their families upon 30 or 40 acres! Yet their lands are good. The owners are industrious, intelligent, possessed of a strong desire of living independent. But they do not realize the actual efficiency of the soil, undoubtedly there are many honorable exceptions to the observation we are about to make; as a general truth, it may be asserted, that THE FARMERS OF NEW-ENGLAND ARE YET TO LEARN THE IMMENSE PRODUCTIVE POWER OF A PERFECTLY CULTIVATED ACRE. Instead of seeking riches in augmenting the number of their acres, let them be sought in better modes of husbandry. As a general truth, we believe it may be asserted that every farmer in New-England, possessed of 100 acres of land, might divide them fairly, by quantity and quality, into thirds, and by a suitable cultivation, make either third more productive than his whole 100 acres are at present. This is the operation, at which those interested in the agriculture of New-England, ought chiefly to aim—to make farmers realize what cultivation can effect, and to teach the modes, by which the productive power of the soil can best be elicited.

It has been said, that the man who makes two ears of corn, or two blades of grass grow where but one grew before, is one of the greatest benefactors to mankind; and that the man who, by good management, makes one acre produce as much as two did before, has added another and better acre to his estate. Mr. Madison illustrates this opinion by quoting one of the Roman writers on husbandry, who enforces the obligation to improving management, by the story of one Paridi-

ns, who had two daughters and a vineyard. When the eldest was married, he gave her a third part of the vineyard; notwithstanding which he obtained from two thirds the same crop as from the whole. When the other daughter was married, he portioned her with half of what remained; and still the produce of his vineyard was undiminished. This story, short as it is, contains a volume of instruction!

The farmer, in every article of his business, should consider the event before he fixes upon the means; and always have the end in his eye when he is about to make a beginning. Every consideration that can have influence on a man, calls on him to be cautious in not buying too much land. The pernicious practice of imperfectly cultivating a great deal of land, at much labour, toil and expense, without order, calculation, or method; and finally, without profit; instead of bestowing a proper degree of labour upon the tillage of a less quantity, is a very prevalent fault. What makes it the more to be regretted is, that our most industrious, enterprising, and meritorious farmers must frequently fall into it. Instead of confining their labours to a moderate extent of ground, applying to it all their manure and physical force, blindly bent upon realizing the greatest possible profit, they diffuse their culture over so large a space, as to render it in a great degree ineffectual, and thus defeat the very object they have in view. The mischiefs arising from this course are more numerous than we can now enumerate. Suffice it to say that the drudgery and perplexity of farming are thereby greatly increased; the time employed in carrying every thing to and from its distant parts is much greater; the crops are more liable to injury; the quality, and we believe we may add (in most cases) the quantity of the produce

is greatly inferior to what it otherwise would be, and the land is exhausted.

The great and general ambition of farmers is to occupy large farms; the more they possess, the greater consequence they think themselves of. Distracted with a confused multiplicity of labour, the augmentation of acres only serves to increase their perplexity, without increasing their wealth. The fertility of an estate is always in proportion to the culture bestowed, for if a man double his number of acres, and employ only the same number of hands, and the same quantity of manure, as when he had half the number, that estate will clear less than it did before the additional purchase. Thus it is evident a farmer may have too much ground as well as too much live stock.

For our conviction, nothing more is required, than to take a survey of an overgrown farm badly managed, where, on lands which have all advantages of situation, we shall see their crops of hay and corn that will not produce more than a third part of what lands of the same quality and quantity afford, divided into equal allotments, amongst the inhabitants of a populous village.

Were farmers to occupy no more ground than they could cultivate in a masterly manner, there would not be that general complaint of scanty crops, or of the land being worn out; for there is no land of any sort whatever; (which has a sufficient depth of mould for ploughing) but what may be rendered fertile by cultivation, and the application of proper manures; and in proportion to their different degrees of natural richness, be managed in such a manner as to produce luxuriant crops: for the resources of good husbandry are as infinite, as the fruitfulness of the earth is inexhaustible, when it is properly cultivated. By bad conduct good soils often produce but very scanty crops; when the blame is to

frequently imputed to their supposed natural poverty.

It may be said, that there are many farmers among us, who are poor men, with a farm of from 1 to 200 acres. It is common to hear husbandmen complaining of the burden of public taxes, and that these eat up their profits, but were the soil of New-England husbanded with the skill and care, which would entitle our cultivators to be called good farmers, we should hear no complaint of taxes in this favoured country.

In conclusion we will observe, that our objections to large farms are principally occasioned by observing the inferior management which they generally receive. But if farmers in all cases will retain a sufficient part of their capital to make improvements co-extensive with their landed estates, the objections are at once removed.

We acknowledge that the farmer should occupy sufficient land to engage his time, not irregularly and occasionally, but fully and completely, by which means his attention is not distracted from this important employment to others which would interfere with it, and necessarily prevent its correct and profitable management; and those idle habits, connected with public injury and individual ruin, are effectually precluded. But whatever this quantity of land may be thought to be, differing certainly in relation to different individuals, the importance of adequately stocking and preparing what is actually occupied is extreme. To unite the portion of land necessary to occupy the time of the experienced farmer, with the complete means of its fertility and improvement, affords the most auspicious foundation for the hope of success.

OF DIFFERENT KINDS OF SOILS, &c.

The whole surface of the earth is made up of a few simple ingredients. With regard to Agriculture our inquiries are bounded to the soil on which we tread, and to the substratum which supports it. These, in a judicious system of farming, are objects of great importance. The obstacles, which baffle the hopes of improvement, are just as likely to lie in the subsoil, which is beyond the reach of the ploughshare, as in the upper surface; because when the former is close or extremely retentive of moisture, the expense and hazard of cultivating the surface is considerably increased, whilst the growth of plants cultivated upon it is much abridged and impeded, particularly in adverse seasons; and for this reason, neither of them ought to be disregarded. A coat of stiff clay has been rendered productive, by the mere circumstance of resting on a bed of sand, or a rock of limestone; and, therefore, every cultivator, who wishes to pursue a course of good management, should go over all his fields, by digging pits in various places of at least eighteen inches down, that he may know the materials on which he is to operate. He can then lay his plan with greater certainty of success, and, what often happens, the subsoil may furnish him with the means by which to ameliorate the surface.

The earth which generally presents itself first to the eye, is no particular kind of soil, but, usually a mixture of the soil underneath, with every adventitious substance, either purposely brought to, or accidentally lodged upon it, causing it in many places to increase yearly in depth. It has pleased the creator of the earth, to leave it in some places more barren, in others naturally improved. We are to use our understanding in observing what is the kind of that natural improvement; and our industry in imitating the processes of nature.

A farmer, should be well acquainted with the soil he has to cultivate, previous to the application of manure, or a selection of crops: because what would be good

husbandry on one soil, would be inexcusably bad on a different one. By availing himself of the qualities it possesses, or by removing its defects, his profits are much increased. Indeed such is the importance of the soil, and the necessity of adapting his system to its peculiar properties, that no general system of cultivation can be laid down, unless, all the circumstances regarding it be well known.

Perhaps all the simple soils of importance that are found on or near the surface of the earth in this country may consist of, *clay, loam, gravel, and sand*. There is not one of these earths, in its unmixed state, that is so friendly to the growth of plants, as when mixed with some other sorts; and it is happy for us that nature in most places has blended them. Thus we have *sandy-loam, gravelly-loam, sandy-clay, gravelly-clay, &c.*

CLAYEY SOIL.

A clay soil, though distinguished by the colour which it bears, namely black, white, yellow, and red, differs from all other soils, being tough, wet, and cold, and consequently requiring a good deal of labour from the husbandman before it can be sufficiently pulverized, or placed in a fit state for bearing artificial crops of grain or grass. Clay soil is known by these properties; it holds water like a dish: it feels smooth and somewhat unctious; when once wetted it does not soon dry. In like manner, when thoroughly dry, it is not soon wetted—if we except the varieties which have a thin surface, and are the worst of all to manage. In a dry summer, clay cracks, and shows a surface full of small chinks. If ploughed in a wet state, it sticks to the plough like mortar, and in a dry summer the plough turns it up in great clods. Those which are soft, unctious, and easily improved are valuable; while those which have been deposited by the sea, or muddy streams, are still more so. The quality of a clay soil can generally be determined from its natural productions.

A clay soil must always be made rich; if poor, it is the most ungrateful of all soils. A stiff clay, if in tillage, demands opening by a mixture of sand and dung. Sand procured at the beach below high water mark (on account of its saltiness,) is best. This should be laid 2

or 3 inches thick, to break the cohesion of its particles. But marl, marl and dung, lime and ashes, are found to give such soils the highest degree of fertility. Dung will not be sufficient, unless in very great quantities. Dung and sand is better than dung alone. If these cannot be had in sufficient quantities, burnt clay, gravel or light loam, saw dust, chips, straw, stubble, swamp mud especially with ashes, bark of trees, rotten wood, or even pebbles will be useful. When once made rich they are extremely valuable; holding the manure remarkably. A small quantity of horse, sheep, or fowls dung every year, will prevent them from ever returning to their natural cold state.

A stiff clay, may be reduced to a loam, by dressing the surface frequently when under a sward, or covered with herbage, with plaster, sand, and rich manures, until a rich sward is obtained; then turn in the sward for tillage, and lay down as soon as possible, and dress again as before; in a few years, the stiffest clay may be reduced to a rich clay loam.

It is thought proper once in 6 or 8 years to summer fallow certain kinds of clay, even when in a clear state, to prevent the sourness and adhesion from wet ploughing, which exposure to the sun and winds in summer may remove. Clay soils should be ploughed in the fall. No soil requires more ploughings, which should be given it when neither too wet nor too dry. Frequent harrowings are also necessary to mix the sands and other materials well with the clay. In England it is customary to plough a clay soil four or five times.

If water stands on such land, it should be ploughed in ridges and water-furrowed. The width of the ridges should depend upon the degree of wetness. Sometimes drains are necessary. The value of clayey soils, depends upon having an open subsoil. A tough clay retains moisture so much as to rot the seeds and roots of plants.

Clayey soils, though they are supposed to contain more of the food of plants than any other, are apt to be barren in a natural state. When not too wet, and properly manured, they are well qualified for wheat, oats, barley, beans, peas, flax, clover, and other artificial grasses in large quantities. But they must not be fed with heavy

cattle, nor fed close by any creature in the spring. A clay soil receives but little benefit from the grass, and when once suffered to decline it is difficult to restore it.

Fruit trees in general do not flourish well in a clay soil. Roots of various kinds will not be so good. The soil does not suffer the roots to expand in quest of nourishment.

All clay soils are unpleasant to cultivate with the hoe, though such a crop will mix the sand sooner and cheaper than any other methods; and those which are cultivated solely with the plough, require more skill, and perhaps double the expense that are necessary on a light, sandy soil. But when their natural toughness is subdued they produce abundantly of such crops as are suited to them, and by their durability will repay the labour bestowed.

LOAMY SOIL.

Loam is a combination of clay and sand, some are denominated clayey, from the excess of that matter, others open and light, from the preponderance of sand. In fact, these two original ingredients seem capable of being compounded in such an infinite variety of ways, as to give occasion to that diversified texture of soils met with in all countries and situations; and are contrived to counteract each other's qualities, that by their union, they might furnish the basis of that beautiful and splendid creation of flowers and plants, of shrubs and trees, which decorate the face of nature, and charm us by a sweet assemblage of all that is gay and soft in colouring, with all that is elegant and attractive in design.

Loams being a medium between light and stiff soils, are the most desirable of all others to cultivate. They are ploughed with greater facility than clay; they are peculiarly well adapted for the convertible husbandry; for they can be altered, not only without injury, but generally with benefit, from grass to tillage, and from tillage to grass.

A mellow, rich, crumbling sandy loam, such as will admit tillage soon after rain; adhesive enough to fear no draught, and friable enough to strain off superfluous moisture, and to admit the fibrous roots of plants; if incumbent on a sand subsoil, is the most profitable of all

soils, being easily managed, and raising every species of crop the climate will admit of. Such loams as are of a dark red, bright chesnut, or hazely colour, if dry and mellow, are almost invariably excellent.

Gravelly loams, when warm, sound, and dry, or free from springs, are useful soils, more especially in wet seasons.

Stiff loam, is naturally a poor, cold land. On walking over it, it is found extremely adhesive in wet weather, and it requires a long time to dry, which retards ploughing till late in the spring. It may be considered as forming a medium between the clods of clay and the crumbings of loam. But if well manured, and perhaps drained, it will become very productive.

The poorer sorts are of a pale yellow, or whitish colour, and require abundance of manure to render them fruitful.

Loams of every kind, whether wet or dry, are natural to grass: Some, however, which lie flat become mossy, when they have been a few years in pasture or mowing, and require to be ploughed up; unless the moss is destroyed by scarifying or harrowing and top dressings. Gypsum will sometimes destroy moss, when strewed on a dry loam in the spring.

Loamy lands are generally too cold, and often too wet, for bearing good crops of Indian corn; unless well warmed and mellowed, by suitable manurings, &c. The dry, redish, dark coloured kinds, and those which have a mixture of gravel or sand are most suitable for tillage.

There are writers who speak of a soil which they call black or garden mould; but this being a species of artificial soil, into which the others are generally brought by the effects of manures, the decayed remains of animals and vegetables in the course of cultivation, it is not deemed necessary to speak of it particularly. All good mould becomes black by being exposed to the sun and air a year or two. Sir H. Davy says, a black soil containing much soft vegetable matter, is most heated by the sun and air; and the coloured soils exposed under equal circumstances to sun, acquire a much higher temperature than pale coloured soils.

GRAVELLY SOIL.

The gravelly soil is that in which gravel forms the largest part; and is distinguished according to the nature of the earthy matter mixed with it; as clayey gravels, loamy gravels, or sandy gravels. The goodness of such soils depends upon the properties of the gravelly ingredients, and the proportion of earthy matter mixed with them. Those are best which partake largely of slaty gravel. A coarse sand, and a fine gravel are nearly the same.

Generally speaking, gravelly soils are hard. They are more porous than sandy soils, and may properly be called *hungry soils*, especially when the parts of which they consist, are hard in substance and rounded in form. As a gravelly soil is more difficult to mellow than a sandy one, the former is the least valuable.

The open porous nature of gravelly soils, disposes them to admit moisture very readily, as well as to part with it with equal facility; which causes them to burn, as it is termed, in dry seasons, but have the property of quickly recovering with the least rain. They likewise have the property of being more early than the more heavy sorts of land.

Hard gravels must be improved by deep ploughings to enable crops to withstand drought; by the application of clay, marl, peat, or other earth; by the mud of ponds or rivers, the dung of cows and swine, sea-weed, straw partly rotted, or almost any substance which will retain moisture for some time; various animal manures in the form of composts, with loam and ashes; and by irrigation, if the water be full of sediment. The application of such things in abundance, will meliorate it for a long time. Such soil will answer for crops that require much heat, as Indian corn, beans, peas, potatoes, &c. With the aid of gypsum they will produce good crops of clover, which may be followed by rye.

Sometimes the gravel is so covered with stone, that hardly any mould can be seen. Land of this description is very troublesome to work, destructive to implements, &c. but with proper management can be rendered productive.

The wet, cold, springy gravel, is a very bad soil; it may be improved by draining; by frequent returns of

grass crops; and by repeated applications of manure. Some gravels and sands are of so burning a nature, that unless the season is wet they will produce but little.

But as the soils which may be denominated gravelly, are some more, and some less, so; some very hard and dry, some mellow, and not so much affected by drought: we will not pretend to designate particularly the most profitable uses of soils of this kind, as much must depend on their particular character, and as those of the better kind may often be found very good for most kinds of culture.

SANDY SOIL.

A sandy soil is that in which sand predominates, but which contains a sufficiency of other earthy matter, to make it more or less retentive of moisture, and thus becomes endued with various degrees of fertility. Wherever unmixed with other ingredients, it is of little or no value. Very light sandy soils neither afford sufficient stability to plants, nor retain moisture enough to convey to them their necessary food.

Where a sandy soil is underlaid, and at no great depth, with what is usually called a *hard pan*, it adds greatly to the retentiveness of the soil, and of course to its fertility.

Sandy soils are usually of a yellowish, or redish cast. Sometimes they are greyish; and frequently they are dark coloured. The latter are generally the most fertile; the yellowish and redish are commonly the least so; and the greyish commonly holds a middle station between the two extremes. There are writers however, who consider a red sand one of the most profitable.

The light, open, and porous texture of sandy soils render them easily cultivated, so that, if what is saved in tillage be expended in additional manurings, it is doubtful whether this soil, when skilfully managed, will not be found as profitable to the farmer as most other lands of middling quality.

The best mode of improving sandy soils, is, by a mixture of clay, marl, sea-shells, peat, vegetable earth, cow dung, swine's dung, or mud from swamps and ponds. A dressing of clay two or three inches thick, and well mixed, will make it fruitful for many years. As these sub-

stances are liable to sink into such soils pretty fast, it is necessary to plough deep to return them to the surface. It is worthy of remark, that the substratum of a sandy soil, is often a strong clay; thus nature furnishes the means of perfecting her works for the use of man, upon the same ground.

The crops best adapted to sandy soils are, common turnips, potatoes, carrots, barley, rye, buckwheat, clover, sainfoin, and other grasses. Wheat is not very natural to this soil; but when in good condition, it will produce tolerable crops of this grain; particularly when sown on a sward of clover turned under. The lighter kinds of it are too little retentive of moisture, during the heats of summer, for good crops of Indian corn; but those which are dark coloured are generally good for this crop. In some places the most valuable improvement upon this kind of land has been made by laying it into grass, and treating it with top-dressings of different kinds of soils, which, when liberally applied, have, often changed the appearance, and so much altered its nature, as to render it capable of bearing a succession of valuable crops of grain. Even a blowing sand may be reduced to a loam, by sowing plaister, with red top, or other fibrous rooted grasses, until a sward can be obtained, then dress with plaister, and such things as mentioned above, and mix them well with the sandy turf by harrowing. The frosts and rain of winter will also assist in this. When the sward has become strong and rich by the aid of manures, break up by deep ploughing; take one crop of potatoes, or grain, lay down, and proceed as before; in a few years it will be a rich sandy loam.

Sandy soils push forward crops much sooner than other soils, they are of all others the least productive of weeds. Turnips, &c. raised on them are of a better flavour, and less liable to be attacked by worms. Fruits or seeds ripened on such soils are better to keep, because they contain the fewest watery particles.

It is a rule, in regard to sandy soils, never to pick off any small stones that may be found in them, as they contribute to prevent evaporation, and to preserve moisture.

As the qualities of all soils vary considerably, every agriculturist ought to make himself acquainted with the nature of his land, and also the property of manures, a judicious application of which, with a proper course of crops and thorough tillage are the chief and grand secrets of agriculture.

DIVISION OF FARMS.

In the dividing of lands, by means of fences, regard should be had to a variety of circumstances, such as the size of the farms, and the nature of them, as well as to the uses to which they are to be converted; and the materials of which fences are to be formed. There is not a more expensive, perplexing circumstance about a farm; than the fields being in a stragling, disjointed situation. The judicious division of a farm, will save much labor, especially in travelling from one part to another. Crooked fences should be avoided, both on account of expense, and appearance. Although large farms should have large fields, yet small ones need not have proportionally small fields, for the same field may be appropriated to different crops, and the expence of division fences saved. But whatever the dimensions adopted, attention should be paid to the convenience of water, the purposes of draining, and the bringing together lands of a similar quality, or, such as can be cultivated and sown under the same circumstances.

All tillage lots, especially small ones, should be square, to save labour in ploughing. For, if a lot be long and narrow, cross ploughing will be either prevented, or the labour of it much increased. If possible, tillage lots should be near the barn, to save labour in carting manure. Mowing lots should be next to the tillage, if the soil permits; as these must be dunged, and their crops carted: The lots for pasturage should be next, and the wood lots the most distant from the house, that the view of the others may not be obstructed.

FENCES.

Poor fences are productive of incalculable mischief to the farmer. By these his crops are constantly liable

to be destroyed, and his cattle become habitually unruly. One unruly creature will learn others to be so; and thus the farmer with his poor fences, finds his cattle, instead of being profitable, to become productive of unceasing losses, and, what follows of course, of unceasing vexation. When the farmer is conscious that he cannot even sleep in peace, on account of the danger of his cattle destroying the fruits of his labours, he cannot be said to enjoy that tranquillity which ought to be the reward of the sweat of his brow. Rather, therefore, let him make his fences what might be generally deemed more than sufficiently high and strong, than too low and weak. This, if it be an error, is erring on the safe side; on the side which secures the fruits of his labors, promotes his tranquillity and happiness, and tends to the maintenance of peace and harmony among neighbours.

Log fences, are best when built of white pine, lasting perhaps 20 years. The next in durability are pitch pine, hemlock, ash, oak, and white maple. Bass wood, poplar, birch, beach, and rock maple soon rot. Logs that are peeled will last much longer.

Worm fences, are made with most ease, but require more timber than some others.

Post and rail fences, and board fences are very good when the soil is dry. In a wet soil the posts will be moved by frosts. The posts should be put two feet into the ground. Red cedar, locust, and chestnut are best. Butter-nut, black-walnut, and oak are pretty good, lasting about 15 years. Letting the bark remain on that part of the post put into the ground, is supposed to render it more durable. For the rails, cedar is best, lasting perhaps an age. If timber is scarce, and the ground is level and free from stones, post and rail fences, set in a bank made of the earth of two small ditches thrown up together, ought to be preferred. If the posts are too small to have holes made through them, the rails may be flatted at the ends, and fastened to the posts with spikes, or with wooden pins well secured.

Stone wall. Building walls is not only the way to clear ground of a bad incumbrance, but it is the best and cheapest of all fences in the end, for if properly made, it will last an age, with some trifling repairs. On a hard, sandy,

or gravelly bottom, if built with good stones, a wall will stand very well without digging a trench. On a clay or miry soil, the foundation should be laid in a trench, nearly as low as the earth freezes. The best way is to dig a trench to the depth of about eighteen inches; into this throw all the small and bad shaped stones, until the trench is filled; then on the top of these build the wall, in a mason-like manner, to the height of about five feet, and throw the earth dug out of the trench up against the wall on each side.

Hedges, are to be recommended where timber and stone are very scarce. Mr. Quincy of Massachusetts, has a hedge 255 rods long, made of American Hedge Thorn, planted five inches apart. The whole cost for six years, (when it was a sufficient fence,) including the plants procured from the district of Columbia, was \$167 (about 66 cents a rod.) He thinks, where the labour is performed by the farmer himself, a complete hedge may be formed in six or seven years, for less than fifty cents a rod. For his method of management, see Dean's *New England Farmer*, 3d edition. See also Cobbett's *American Gardener*.

It is supposed that the New-England Cockspur thorn is equally as good as that used by Mr. Quincy.

IMPLEMENTS.

The present period of low prices of products, and the necessity of economy, renders it expedient to enquire whether the labour of conducting our farms may not be abridged by the more general introduction of what are called labour-saving machines.

Mr. Burgess, a noted agriculturist of this state, observes, that our ploughs are far from the best; our harrows quite indifferent: rollers, scarifiers, drills, and threshing machines, scarcely used. He calculates that Wood's New-York cast-iron plough, can be moved with a power, one quarter less, and that it will then do one quarter more work than any other plough in use in the state. One hundred and twenty acres were ploughed by four of these ploughs in one season; and the whole

expense of keeping them sharp and fit for use did not exceed 56 cents each. The blacksmith's bill for ordinary wooden and wrought iron ploughs, for the same work, would, he supposes, have been \$5 each. It will be found therefore that not less than four shillings per acre will be saved by these ploughs; and the work done in every respect better. He calculates in the state there are 12,000 acres under the plough; so that to save four shillings per acre on this, will save \$8,000 to the farms of the state!

Scarifiers are calculated to do the work of a plough and a harrow. We believe that Mr. Burgess and Mr. Francis are the only persons who have made use of this implement in our part of the country.— Mr. Burgess says, that in all lands free of stone, or where the stones are loose, and not too large to pass between the shares and teeth, and on which a crop has been raised, a man and a pair of horses or good oxen, will prepare the ground and get in the grain on 30 acres in a week. In England a man with four horses and the broad scarifier has been known to do 60 acres of wheat in a week.

In the common method of doing this work, two men, or one man and a boy, with a pair of oxen and a horse are employed, and they hardly finish an acre per day.— It is then to be harrowed or bushed or both. What will it all amount to? Probably fifteen shillings an acre. If done with the scarifier, it will not cost two shillings an acre. The use of the scarifier would save to the agriculturists of the state \$10,000 per annum!

We could name a number of instances in which labour saving machines, for farming purposes, have been confined to a few large farms, although as well adapted for use on farms generally, and attended with much real saving. In such cases the only apparent cause has been the expense of the first cost of the machine; and yet the diminution of labour in the employment of such a machine, would have amounted in many instances to as much, in one year, as the machine cost. But if an individual does not feel able to buy a corn-sheller, drill machine &c. several farmers in a neighborhood could unite in the purchase and use them alternately. A manufacturer does not hold any price too high for an improve-

ment in machinery, whereby labour may be saved.— Shall it be said of the farmer alone, that he knows not how to appreciate the wonderful inventions and improvements, almost daily announced to us.

Imperfect labour is a necessary consequence of defective implements; but where attention is bestowed in constructing them, the different processes of labour, may, with justice, be considered as perfectly executed.

On a trial, in England, to ascertain the quantum of power required to draw different ploughs, it was found that some, although lighter than others, employed one third more power to move them in the furrow. In the formation and construction of all sorts of tools and machinery for the uses of the farmer, the principal aim should be that of rendering the work they are to perform more cheap, easy, expeditious, and complete, by having them perfectly suited to the operations for which they are intended, and at the same time not too weighty, while they possess sufficient degrees of strength for the different purposes to which they may be applied.

Every careful farmer, says Sinclair, will lay it down as a rule, frequently to inspect all his implements; and when any part of any of them is observed in the least damaged, or in danger of giving way, he will take care immediately to have it repaired. An implement, also, that is not longer wanted during the season, should be carefully laid up; but before it is put aside, it ought to be well cleaned, and rendered perfectly dry, oiled or painted, if made of iron, and kept so as to be ready for use when wanted. No circumstance marks more the character of an attentive husbandman. Upon every farm likewise, there ought to be one or more places properly constructed, for holding the larger implements; and some secure place allotted, for containing the smaller tools. Where machines are necessarily exposed in the field, a great part of the season, they require to be newly painted, at least every second year.

The importance of proper implements is such, that the melioration of those in use, would be an essential advantage to agriculture; and great as are the mechanical improvements which have been already made, many of them are capable of being brought to still greater perfection. Persons of genius and experience therefore,

ought to be encouraged to devote their time and attention to this most important object; and to exert themselves, either to improve the various sorts of implements now in use, or in the invention of superior ones, as circumstances may require. The invention of an useful implement, by which the labours of agriculture can be brought to a higher degree of perfection, and the expense of cultivation at the same time diminished, must prove of the most essential service to the farmer.

For the benefit of those who are anxious to avail themselves of the great improvements which have already been made in agricultural implements, it may be proper to state, that Repositories for Agricultural Implements and Machinery, have been established in the cities of New-York and Boston, and we sincerely hope, that the exertions of the proprietors, may, by a judicious public, be liberally rewarded.

TILLAGE.

There cannot, says Mr. Madison, be a more rational principle in the code of agriculture, than that every farm which is in good heart should be kept so; that every one not in good heart should be made so; and that what is right as to the farm, generally, is so as to every part of every farm. Any system therefore, or want of system, which tends to make a rich farm poor, or does not tend to make a poor farm rich, cannot be good for the owner; whatever it may be for the tenant or superintendant, who has transient interest only in it. The profit, where there is any, will not balance the loss of intrinsic value sustained by the land.

Experiments which have been made with the spade, shew how great is the yield when that instrument has been employed; and though it would be impossible to introduce it when labour is high, yet it affords a useful lesson, and shews that there is little danger of working our land too much.

Nothing is better calculated to ward off the effects of droughts, which are often so injurious in this country than good cultivation by ploughing sufficiently deep, and

manureing well; both of which increase moisture. Besides, ground well prepared, and manured, shoots forth its crops so rapidly, that the ground is soon covered and shaded from the heat of the sun; and, for this reason, retains its moisture longer. The same may be observed of mowing lands. Sometimes lands of good soil are found too closely underlaid with rock, to be sufficiently retentive of moisture, in times of drought; such may answer for orcharding, for the smaller fruit trees, or for pastures, by having considerable growths of locust at the same time, on the grounds, to prevent the effects of drought.

In tilling lands, it is essential that it be done *in the right season*; that it be done *effectually*, and, in order to this, it is of the first importance to have the implements of tillage *well constructed*, and kept in *good order*.

Lands should always be applied to that tillage for which they are best adapted; or, in other words, in which they will yield the greatest *clear profit*. If therefore, the farmer has lands which are only fitted for grass let him not waste his labour in trying to raise grain on them. If he has broken hills and declivities, they will generally but poorly repay the unpleasant labor of cultivating them with the plough and the hoe: Rather let such be kept for sheep-pastures, for orchards, or for raising timber. High lands are most generally selected for tillage. But low and moist lands, well drained, ridged, and water-furrowed, are often more productive; and there is less danger of exhausting them. If lands are rocky and stony, to plough and hoe them is a difficult and laborious employment; and generally cannot be productive of much profit, till the impediments are removed. If they are too light and sandy, they may, nevertheless, be made to yield good crops of tap-rooted plants, such as turnips, carrots, and clover; or of such as ripen early, as rye, for instance; or that bear the drought well, as saintfoin, lucerne, provided they are not hilly; or if hilly, such trees as flourish in sandy soils, as the locust, &c. If lands be boggy, when well drained, they will be found very profitable for hemp, which they will bear yearly, with the aid of small yearly additions of manure; but if they be moderately level, smooth, and of a good medium soil; that is, such as is

equally adapted for grain and for grasses ; there let the farmer pursue the culture of a rotation of crops, in such manner as he finds will afford him the greatest clear profit.

The expense of any kind of tillage never should be regarded, where clear profits proportionately great may be safely calculated on, as a general result. Neither should the expense of tillage be regarded where the clear profits will be great, though not to be realized in some years, if it may be calculated that such profits may certainly be expected.

OBSTRUCTIONS TO TILLAGE.

Stones lying above or below the surface are, in New-England, the most formidable obstruction to perfect tillage. On stony ground, the work is not only imperfectly executed, but in many cases the implement is broken to pieces, and much time lost. The removal of stones therefore, ought to be a primary object with every agriculturist ; because a neglect of this kind may afterwards occasion him considerable loss and inconvenience. The soil round a large stone is commonly the best in the field, by gaining the use of it, much benefit is derived, independent of the facility which is thus afforded to the ploughman's operations. When the clearing the land of such incumbrances, is attended with great difficulty, it is always advisable to calculate, whether the additional value of the land, when cleared, will warrant the expense ; an additional inducement, however, for incurring the expense, is, that these incumbrances are usually good materials for making the most substantial kind of fence. Where rocks and stones are numerous, walls may be made thicker and higher than is needful on other accounts ; and lots should be made smaller ; merely to dispose of the stones.

By experiments accurately made, it is found, that small stones on the surface of the ground are beneficial, in a small degree, in increasing its products ; but they are too troublesome, in good cultivation, to be desirable, on account of all the benefit to be derived from them. Unless they are calcareous, or partake of the nature of lime stone, they should be taken away, or at least so much thinned, that ploughing and hoeing may be com-

fortably performed, and without injury to the tools. Where ground is full of very small stones, they may be drove down so as to be out of the way of the scythe, by having a roller passed over the ground in the spring, when it is very soft, as the stones are then easily pressed into it.

To drain the ground also facilitates tillage exceedingly; for ploughing cannot be performed with advantage, where either the surface or subsoil is wet. In fact, every branch of good husbandry is intimately connected with another; and the practice of one branch is necessarily much affected by the way in which others are executed. To drain land well, therefore, materially promotes good tillage; and by good tillage the beneficial effects of manures are considerably increased. To discharge one of these fundamental duties of the husbandman, while the others are neglected, can only be regarded as performing a duty which will yield small benefit to those concerned; but to fulfil the whole duties incumbent on the husbandman, namely, to keep his land dry, clean, and rich; must be estimated the height of perfection in the rural art.

PLOUGHING.

The wise and judicious Romans considered ploughing the most essential of all the preparations which the earth undergoes. They laid it down as a maxim to sow but little, and plough much: Cato was thoroughly convinced of this truth, when he laid down as the first rule in husbandry to *plough well*; the second, to *plough*; and the third to *manure*; intimating by this, that ploughing alone is of greater consequence than all the other means of cultivating lands.

Number of ploughings necessary.—It is an important maxim in husbandry that *the earth should be thoroughly stirred by deep and frequent ploughings and harrowings.*—When this is done the consistence of the soil is improved, the small fibrous roots of plants have liberty to spread freely, and to acquire such nourishment, as could not possibly be obtained when confined between large impenetrable clods of earth. By its assistance, the manure, and the seed, are most advantageously inserted. It can be employed to destroy almost all kinds of weeds

and various tribes of insects. It is supposed that double tillage will preserve and continue the effects of manure nearly twice as long as with ordinary management.—Where manures cannot be had in due quantity, tillage will in a manner supply the deficiency; and where they are ever so plentiful, it will be a means of giving them greater effect. The finer the earth is made, the more it is enriched by dews, rain and air. For it has been found by experiment, that by taking some of the most barren earth, powdering it well, exposing it abroad for a year, and stirring it about frequently, it will become so fertile as to receive and nourish almost any plant in a high degree. Thorough ploughing therefore, is of such absolute necessity, that whoever is wanting in this work, must expect a deficiency of crop.

Agriculture, like other business, having profit for its object, is a subject of calculation; and its labors must be regulated by its end. The number of ploughings must depend upon the soil, weather, season, crop and culture. For wheat the ground should at least be thrice ploughed; but wheat requires more preparatory ploughing than rye, and rye more than oats. Clay ground demands more tillage than calcareous earth, and calcareous earth more than sand. Wet or dry weather makes frequent ploughings (according to circumstances) either useful, injurious, or impracticable.

Proper season to plough.—The prevailing opinion is strongly in favor of *fall* ploughing; because to the action of air and moisture, it adds that of *frost*, which may be considered as a plough, superior to any thing that can be made by the hand of man; it expands the moisture, which requiring more space removes every particle of earth, and separates them from each other. Almost all tillage land should, therefore, be ploughed in autumn, both in new and old ground. But all clay or loamy soils are more particularly benefited by fall ploughing; because on those the action of frost is greater, and because one ploughing of this kind may save two in the spring, when time is every thing; besides our teams at that season of the year, are much weaker than they are in the fall. But land ploughed in the fall must be again ploughed in the spring; and a weaker team can then be able to perform it. Fall ploughing is also con-

sidered the most effectual method to destroy worms.— The last of summer, or the beginning of autumn, is the right season for ploughing new ground. For it will be best to harrow, and cross plough it, before it is seeded, that the soil may be thoroughly mixed and pulverized. Therefore the first ploughing should be performed so long before hand, that before the second, the turf may ferment and become partly rotten. But this is not to be expected, if the ground be ploughed late in the fall; because the sun, at that late season, will not warm the ground enough to bring on any fermentation before the following spring, when the ground is to be sowed. For fall sowing, the ground should be broken up in the spring or early in the summer.

Soils of so retentive a nature, as to hold more water than is useful in vegetation, should be ploughed in a medium state, when neither too wet nor too dry. When very dry it is difficult to plough them, being so hard and tenacious, and if very wet, the ground is injured by the feet of the cattle. Green sward however, can be ploughed when pretty wet, if not miry; because the labour is more easy for man and beast. But it will not rot so well as when dry. The proper time for ploughing or harrowing in general, is when the soil upon stirring crumbles into small parts.

Spring ploughing will answer very well for a sandy soil, as such ground does not require the aid of frost.— Ploughing in such soils should be carried on in damp weather, particularly the last ploughing and the sowing of the seed. It is likewise recommended to plough such lands as much as possible, when the dew is on.

Depth of Ploughing necessary.—The depth to plough, must generally be regulated by the depth of the soil; and the sort of crops to be grown; tap rooted requiring deeper tillage than others. If the vegetable soil be deep, deep ploughing will be proper; especially where the upper stratum has become exhausted by severe cropping and that below is a strong earth, which can readily be fertilized by the frost and sun. But if the vegetable mould be shallow, deep ploughing, will bring up part of the subsoil, which will not be fertile, until some time exposed to the atmosphere. If the earth below is naturally very poor, requiring a long time to be made fer-

tile in this way, injury may result from ploughing deeper than usual.

Where, however, it becomes part of the farmer's object to increase the depth of the surface soil, deep ploughing is indispensable; and in this, as in many other cases, we must submit to present inconvenience for the advantage of future benefit. Farmers are sometimes led to plough too shallow, to save a little labour; and some are afraid to turn up what they call dead earth; but all the soil above the hard pan may be well employed in tillage; and if a red soil is turned up, it will in a year or two become dark, if properly tilled.

The depth may also in some measure depend on the means of improving the soil; for where the land is poor and the means of enriching it scanty, the depth must be in proportion to the quantity of manure to be obtained, and the number of ploughings to be given to it.

Soils are rarely found, that ought not to be ploughed in common 6 inches deep; many 8 and some 10, which will be about as low as the roots of any common crop will descend. One ploughing to the full depth every 12, 18, or 24 months, will answer—shallower tillage at other times will do.

A vegetable soil will seldom be deeper, than where the plough has penetrated. Where, however, shallow ploughing has always been practised, it may not be advisable to shift at once to the greatest depth that is to be ultimately fixed upon as proper, lest too great a proportion of barren earth should be turned up, and injure the crops immediately succeeding.

The advantages of frequent deep ploughings are many. Roots extend far where they meet no resistance; and the growth above the surface corresponds to that below. If more rain falls than the soil can retain, it descends to the bottom of the furrow, and seldom does damage. It keeps the ground moist, and should never be omitted in drought, or in lands liable to be injured by drought. Bringing up the new mould is peculiarly favorable to clover, turnips, and potatoes. By deep ploughing, animal and vegetable manures, which have a tendency to rise to the surface, are properly covered, &c.

Ridge Ploughing.—If the soil is naturally dry, plough flat, and as level as possible, this will give an equal dis-

fusion of moisture throughout the field; but if the soil is moist, plough into wide ridges of 18 to 24 feet, and if it is a wet, heavy soil, let the ridges not exceed 6 to 12 feet. The object of ridge ploughing, is to improve the furrow between the ridges, as drains for the water, therefore multiply your drains, by narrowing the lands, or ridges, according to the moisture of the soil; and so *vice versa*. This is the best, if not only method of equalizing moist and wet lands. Wet clays, and ground in which clay predominates, whatever be the culture, should generally be made to take this form; because, it powerfully tends to drain the soil and carry off from the roots of the growing plants, that superfluous water, which left to itself, would seriously affect both the quality, and the quantity of their products.

Ploughing hills.—Shallow ploughing, and ploughing up and down hilly land, have, by exposing the loosened soil to be carried off by rains, hastened more than any thing else, the waste of its fertility. When the mere surface is pulverised, moderate rains on land but little uneven, if ploughed up and down, gradually wear it away. And heavy rains on hilly lands, ploughed in that manner soon produce a like effect, notwithstanding the improved practice of deeper ploughing.

These evils may be remedied by a cultivation in horizontal drills with a plough adapted to it; or, as proposed by Mr. Butler, of Connecticut, author of the *Farmer's Manual*, by carrying a furrow down the hill only, and by inclining this furrow to the left hand, directly in proportion to the descent of the declivity—and suffering the team to re-ascend the hill without a furrow. This will lessen the day's work, not one half, but about one third, because the team will travel so much faster, both up and down the hill, when they carry but one furrow. In this way, the steepest hill may be ploughed without a single furrow left open to the wash, except the last one, and the saving in the strength of the team, and in the value of the crop, which will arise from the extra goodness of the ploughing, will doubly compensate for the loss of time.

Grounds upon the sides of hills are poorer than others, and require a great deal of manure, which with the finest mould will be soon washed away, unless some method like the above is adopted.

It is a bad practice to plough furrows constantly against the fence. It has a tendency to deprive certain parts of the field of the necessary quantity of earth.— They should be turned as often from the fence as against it. Indeed, it would be desirable, in every part of the field, to have the gathering-furrows always at the places where the last parting-furrows were made.

The ploughmen should never turn his furrow wider than the plough share will cut clear; but always as much narrower, as the stiffness of the soil shall render necessary, to lay his furrows smooth and light, and free from clods; in all such cases of narrow furrow, the extra expense of ploughing, will be saved in the expense of harrowing, with this advantage to the crop, that the harrow, pulverizes only the surface; but the plough, when properly directed, renders the earth mellow, to the whole depth of the furrow. One such ploughing will prove as beneficial as two partially performed.

HARROWING.

No instrument of husbandry requires the judgment of the farmer more than the harrow. The fertility of the soil, depending upon its being well pulverized, and intimately mixed with the manures applied, render harrowing very important. But many farmers expect too much from it, they neglect to give their land a due ploughing, trusting to the harrow to make it fine. After going over and treading down the ground several times, they find the clods still unbroken.

Wet ground should be harrowed in a dry time, and in the middle of the day. Dry soils, when the dew is on, and moderately dry. When land is muddy harrowing will be injurious, by making it more compact, very light land will be rendered more compact and improved by frequent harrowing.

Land newly ploughed is harrowed to the best advantage, the teeth go deeper, and raise more mould. If neglected at this time, it should be done after a gentle rain. On rough soils the faster the harrow moves, the more the clods are broken, the teeth kept cleaner, and the land mellowed. Harrows with wooden teeth, are of so little use, that it is the opinion of some, the feet

of the cattle will do as much injury in treading down the ground, as the harrow will do good.

New land should be harrowed as soon as possible after burning to mix the ashes effectually with the soil before it is blown away. A strong and heavy harrow should be passed several times in the same place to to raise a sufficient quantity of mould.

On newly ploughed sward a heavy harrow should pass the same way the plough did. Where seed is sown on ridges, the harrow ought also to be run lengthways.— Or it may be in such a case to plough in the seed.

When there are many ridges left after ploughing, it ought to be harrowed before the seeds are sown ; otherwise they will be buried at unequal depths and will come up in rows ; some will remain uncovered, but most of them will be thrown into the bottoms of the furrows. This will often be so deep as to injure the crop ; and in flax and hemp, often double the labour and expense in pulling. The growth of grass seeds will frequently be destroyed by being covered too deep.— Where lands are light, once over will answer ; but when they are stiff, twice may be necessary. It is always necessary to harrow sufficiently to break the furrow, and level the surface, otherwise the operation is imperfectly performed.

It would be a good plan, for farmers to employ two harrows in succession ; one of heavy frame, with few and long teeth ; the other of lighter frame, with more and shorter teeth. The common harrow often covers the seed too much ; small seed will not vegetate well at a depth greater than two or three inches.

ROLLING.

This operation is of nearly as much importance as harrowing, in reducing and pulverizing strong, heavy, and adhesive lands ; while by rendering loose soils more compact, the earth adheres more closely to the roots of the plants, and thus promotes their growth.

The rolling of land in tillage should be done only in dry weather ; never when the soil is so wet as to stick to the roller. But always as soon as possible after the seed is sown. No soil will admit of rolling, that is very pæven, or much rocky or stony. But small stones need

not prevent it; for when used upon such grounds laid down to mowing, it presses the stones into the earth even with the surface, at the same time that it breaks the clods, and thus prepares the way for the scythe in a cheap, and easy method. It is also usefully employed in reinstating the roots of meadow grasses, loosened and raised by the alternate freezing and thawing of the ground, and with similar view, may be passed over winter crops early in the spring. Without it, all crops of grain sown with artificial grasses, especially barley, cannot well be taken up clean with the rake. Some think a crop of barley in particular, will be larger for rolling, as it is a dry seed, that needs to be well enclosed with mould. Rolling after sowing and harrowing, will cause the mould to enclose the seeds, much of which otherwise lying in cavities that soon dry, is apt to fail of vegetating. It is useful in light dry soils, for preventing their moisture from evaporating too easily; and in depriving certain insects of their hiding-places in the cavities of the soil. Land on which turnips are to be cultivated will be much improved by rolling. Flax ought to be rolled immediately after sowing; it makes the seed vegetate equally, and prevents after-growth. It is necessary in rolling that every part of the ground receive an equal impression; once in a place is generally sufficient.

A wooden roller about 2 feet in diameter, and 6 feet in length, may answer the above purposes.

HOEING.

This is so important, that no crop can be expected without it. The deeper land is hoed, provided the roots are not disturbed, and too much cut to pieces, the greater advantage it will be to the plants. The oftener land is hoed, the more moisture it retains, the more the crops are nourished, and the better it stands droughts; drawing fresh earth up near the plants, increases their growth, makes them stand more firmly, and protects the roots from the heat of the sun. Hilling especially is hurtful; it prevents the roots from having so much benefit from rains, and deprives the lower roots of the influence of the sun. It should be done therefore by little and little, at several hoeings.

By hoeing, the land undergoes considerable preparation, for the reception of succeeding crops. In soils apt to bind after much wet, which causes plants to appear of a stunted growth, hoeing is of vast advantage in promoting their immediate growth and future progress. It serves to prevent the standing of water on the surface, so as to chill the ground, and check all fermentation in it, &c. But hoeing should cease, or be only superficial, when the roots are so far extended as to be much injured by it. Where land is tolerably free from obstacles, the frequent use of the horse plough to a considerable depth, renders the labour much less severe and expensive, and more advantageous to the crop, than to depend upon the hoe alone. The first time the plough is used, turn the furrow from the rows, as near to the roots as possible. At the next hoeing, and all after hoeings, the furrows are to be turned towards the rows, this prevents the plough from injuring the roots. The depth should be about the same as for any other ploughing, or the intention will be in some measure defeated. This may render it necessary sometimes to go twice in the same furrow. A plough, called a cultivator, has been constructed, with two moulboards, which turns the mould both ways at once.

The opinion entertained by some, that no hoeing at all should be done in a dry time, is irrational and ridiculous. They deprive their land of the benefit of the dew—suffer it to be overrun by weeds, and allow the ground to be so hard, that the rain when it comes will not penetrate it. There is no soil perhaps, except a thin sandy one, that will not be benefitted in hot, dry weather by frequent hoeings.

 FALLOWING.

Fallowing is a mode of preparing land for the reception of grass seeds, grain, or other crops, by repeated ploughings and harrowings. Tull, Beaton, and other writers on agriculture, have contended, that summer-fallowing should never constitute a part of a good system of husbandry; that the necessity of fallowing may be ob-

viated by the adoption of the drill husbandry, or, by a judicious rotation of crops. This remark will apply with peculiar force, to the soils and climate of New-England.

WEEDS.

The farmer views plants in a very different light from the botanist. All are weeds with the husbandman that give obstruction to the plants he propagates in his farm. It is in vain to expect good crops, and folly to go to the expense of seed and labour, unless they are kept free from weeds, and particularly, while they are young.

If weeds be neglected, or their destruction but partially performed, perhaps not more than one half of the crop, will be obtained, even from the very best soils.— To guard against bad kinds of grass and noxious weeds, plant such fields with potatoes as are infested with them. Be careful that seed grain, and grass seed are clean, and free from all foul seeds. Pull out the docks, &c. upon mowing grounds, before they go to seed. Remove the thistle, burdock, and every noxious weed from fences, &c. (For the saving of weeds see manures.) Suffer no old field to lie waste, as a nursery for weeds; the expense of ploughing will bear no proportion to the after expense of weeding. Weed crops with the plough and hoe; not after the weeds are grown, but as soon as they appear. It is supposed that the expense of weeding wheat, rye, barley, oats, flax and hemp, would be abundantly paid in increase of grain: for, generally speaking, any given quantity of weeds growing with a crop lessens its product, in proportion to the weight of the green weeds with that of the growing crop. After haying is over, all fern, or brakes ought to be cut, not only for the purpose of destroying them, but of increasing manure, by applying them as litter. If cut while the sap is in, and left to rot on the ground, they will greatly improve it. Sheep are much better than any other creature for destroying weeds, by pasturing.

DRAINING.

A point of importance in good farming, but in which our country is defective, is the draining of wet and marshy grounds. Much of our best land is not only rendered

useless by this neglect, but it often becomes the local cause of sickness and death.

Various methods of draining have been suggested by ingenious men, which are applicable to various soils. It is the opinion of Mr. Burgess, that if the system was thoroughly understood, and universally practised by the farmers of Rhode-Island, it would add one third to the value of the lands of the state; and by many intelligent men, it has been calculated, that should all the marshes, and meadow lands of New-England, be drained and embanked, where necessary, that she could sustain twice her present population.

If the drain is small, a moderate quantity of earth, grass, or other matter easily clogs it, and obstructs the passage of the water: whereas, if it be large, exactly the reverse takes place. If the drain is wide, and the earth taken from it removed to a distance, neither cattle nor frost can fill it up; but in spite of the trampling of the one, and the heaving of the other, a hollow must still remain.

The Farmer's Assistant gives the following method of draining bog-meadows effectually: First run a ditch through the middle, and draw off as much of its waters in this way as possible. Where the meadow is very wet and miry, commence at the *lowest* part of the ground where the outlet should be; and thence carry the ditch into the meadow, sinking it all the way, as low as will barely give the waters a current to run off; and the deeper this ditch can be sunk the better. Then turn a ditch proportionally deep all round the edge of the bog, for the purpose of cutting off all the springs. Then cross ditches are to be made, in number and size proportionate to the extent of the bog, and of the size of the middle and surrounding ditches. Generally speaking the deeper and larger the ditches, the fewer cross-ditches need be made. It should be remembered, that bog lands will settle down very much, after draining; for which due allowance ought to be made, in regard to the depth of the ditches.

To drain swamps, ditches ought to be of size and depth proportionate to the extent of the swamp; and the quantity of water to be carried off. Those round the edges of the swamp ought to be so placed as to receive all

the water from the springs which commonly run in on every side; or, if convenient, they should be so placed as to cut off the springs, by receiving them into the ditch. The months of August and September are best for this work. The proper proportions for these kind of ditches are, to be three times as wide at the top as they are at the bottom, and a little more than half as deep as they are wide. To prevent their falling in, it is advisable to sow some strong-rooted grass on the sides. The most expeditious, effectual, and economical mode, where the ground is not too miry, will be to use a plough and ox-shovel. It is supposed that two men, a boy, and two yoke of oxen, will accomplish more in a day, than six men with only spades and shovels. With the scraper, all the inequalities of the ground, upon the borders of the ditch, can be conveniently filled up.

Covered drains being considerably more expensive than open ones, we do not think it necessary to describe them here, but refer the reader to the *Complete Grazier or Plough Boy*, 2d Vol. No. 35-6, for a full account of them.

IRRIGATION,

The advantages of water to grass lands, are these: it preserves a favourable degree of temperature; improves the crop, by the nourishing substances it conveys; destroys weeds; and, as a mere element it is beneficial, more especially in dry seasons. It contributes so much to their fertilization, that it is rather surprising, the practice of irrigation has not been more generally adopted.

The common principles of irrigation are,

1st. Such command of water, as will cover the largest surface with the least labour and expense.

2d. Muddy water (the effect of loosened soil and heavy rains) is most favourable to vegetation, because, besides giving the necessary moisture, it furnishes a considerable portion of alluvial matter.

3d. Water charged with sand or gravel, or very hot or very cold, is unfavourable to vegetation, and ought not to be employed, until, by standing in reservoirs, it deposits these injurious matters, in the one case, and in the other, requires the temperature of the atmosphere.

4th. Clay and calcarious soils, require less watering than others.

5th. Irrigation is of less importance in northern than in southern latitudes : and,

6th. In cold climates, or in situations of much elevation, irrigation is most usefully employed in the spring and autumn ; and in hot climates and sandy soils in the summer.

Where a good head of water can be made without too great an expense ; or where a brook, or part of a river, can be so diverted from its course, as to be made to spread its waters over the neighbouring grass grounds, it should be attended to, as a matter of no small importance. The means of watering the ground, or of taking it off, should be completely under controul ; for, if too much be suffered to run on, it may do more hurt than good. The quantity should be proportioned to the nature of the soil ; as sandy grounds require more, and stiff soils less. The channels should be so made as to carry the water to every part, except where the ground is naturally wet. The main channel should just have descent enough to cause the water to run ; and the lateral branches should be run in such directions as that the descent be very moderate, and at the same time convey the water to every part of the ground. Sometimes it is necessary to carry off the surplus water by other channels, where the ground has little hollow through it. When the weather is hot, the water should be taken off the ground. The night, and days which are cool and cloudy, are the best times for applying it. In the spring, it should not be applied till the ground is somewhat dry ; and after the grass begins to start let the quantity be diminished, and let it also be stopped during rainy weather. When the grass is pretty well grown, no water should be applied, except in cases of drought. After taking off the second crop, the water may be thrown on more plentifully ; but it must be taken off some time before the winter frost commences. Mr. Van Rensselaer considers a month, a sufficient time to let it remain on in the fall.

It is the easiest and cheapest mode of fertilizing *poor land*. It promotes a perpetual fertility without the expense of manure. It may be made to yield the greatest

possible products, both in hay and pasturage. It will greatly increase the means of the farmer to multiply stock, and thus enrich the other lands with manure. It is within the power of almost every farmer to derive some advantage from irrigation.

FLOODING.

It differs from irrigation, in which the water ought constantly to be in a *flowing state*, whereas in the process of flooding, it is wholly, or nearly stagnant.

Where swamp-land is to be cleared, and it can be flooded, by making a dam at the outlet, at a small expense, it may be a matter of economy, as it will tend to destroy the growth of wood. This may also be performed on low meadows to kill the grass, if it be bad, in order to introduce better. If the water contains a rich sediment, it will enrich low meadows to flood them during winter. But by covering large tracts of country with water, in cold, and still more in the warm seasons of the year, it must render the climate moist and unwholesome.

MANURES.

In the theory, as well as in the practice, of agriculture, the subject of manures is exceedingly important. Every operation of husbandry, every preparation of land is calculated to render manure efficacious in its application. It is in vain that the soil is composed of the best substances, in the best proportions; that when so composed, it is kept in the best possible condition for vegetation, unless manure be added to it of such a kind, and in such a state, as is favourable to the growth of plants. In fine, it is that part both of the theory and practice of agriculture upon which every other may be said to depend. The ploughing and harrowing of land; the exposure of it to the frost of winter; irrigation and draining, are all regarded as important, only as far as they adapt it to the reception of manure, and are calculated to render its uses in vegetation more serviceable.

It may be noticed that the substances capable of being made use of as manure, are extremely numerous, and of different natures and properties. We will confine ourselves to those of most importance to the farmers of

entry, and commence with *dung of neat-cattle*. It is a cool, mild and oily substance; and is, therefore, most suitable for warm, sandy, and gravelly soils. It is used to prevent the soil's becoming too dry, and the soil from being parched for want of moisture. It is considered less valuable than the dung of swine and sheep, but more so than that of horses. Where animals eat the cud, the dung is so thoroughly putrified, that it is easily incorporated with the soil without any previous preparation in a dunghill, better than any other kind of manure; but on many accounts, a mixture of hot and cold, or dry and moist putrescent substances in the same is very advantageous. Cow dung alone, is more easily dissolved by rain than any other dung. The quality of the dung of animals, will in a great measure be proportioned to the richness or poverty of its food. It is also supposed that the dung of fat animals will be more serviceable than that of lean ones. The dung of lean hard-working cattle, and young creatures when poorly fed is quite inferior.

Horse dung, is the poorest animal manure, the hottest of any, and the most apt to excite a sudden fermentation. If suffered to lie in a heap till it becomes thoroughly heated, it assumes a whitish, or mouldy colour, and is then of but little value. It is difficult to give it value, without mixing it with other substances. If applied without mixture it should be done as soon as possible. It is most suitable for cold, wet, and stiff soils. For raising potatoes, from its heating quality, for some soils it may be used alone, nearly fresh from the stables, as it will ferment in the ground and be of benefit to the potatoe crop. The richest is that of stable kept horses, well fed with hay and grain, and this is greatly increased in richness and utility, if urine and straw mix with it. A mixture of horse and cow dung is very proper for land that is neither too light nor too stiff. Horse dung is a much stronger manure than it is supposed to be by those whose constant practice is to suffer it to be spoiled by over-heating in the heaps; by which it loses from 50 to 75 per cent. of its value. The diligent and attentive farmer should guard against such profligate waste of property. The remedy is easy, viz. by never allowing the dung to accumulate in any considerable

quantity at the stable doors. It should frequently be removed and thrown over that part of the yard where the dung from the neat cattle is thrown: or, used as an ingredient composts, by its quick and strong fermentation, it has an excellent effect, speedily dissolving other substances mixed with it.

Hog dung, is a very rich manure, and so cold as to ferment very slowly. A mixture of hog, cattle and horse dung is therefore very advantageous, as the one corrects the defects of the other, and prevents the fermenting process from going too rapidly forward. These substances to be managed to the best advantage, should be placed, layer above layer; almost every time the stables are cleaned out. If a little earth can be put between each layer, so much the better.

Hog dung resists the ill effects of drought remarkably. It is so strong a manure, that it answers well where mixed with a large proportion of earth, weeds, straw or other substances, and in this way it is better than any thing else for potatoes. Used alone it is excellent on meadow and pasture ground. It is the best kind of dung for trees. Hot sands and gravel are particularly benefited by it. No dung yields its virtue so readily as this; but none loses it so soon by bad management. The time of laying on should be carefully regarded; a rain will wash it into the ground very fast, and a dry wind will carry away much of its efficacy: it should therefore be covered as soon as possible.

It is almost incredible how great a quantity of good manure may be obtained, by supplying a hog sty with rubbish of all kinds to mix with the dung. The month of August is a good time to cart in turf and other good earths and cover the vegetables in hog pens; on account of the great heat and warm rains. In this business neither time nor expense ought to be spared.

Sheep dung, is next in value to hog dung. It is suitable for all soils, but being of a hot nature, it is most proper for cold, heavy lands, especially clays.

Folding sheep on fields, which are ploughed up, is a very good practice; as in this way the land receives all the manure that is made from their dung and urine, without the trouble of previous preparation, carting, &c. But folding sheep on small pieces of ground is

now generally supposed to do the sheep as much injury as it will benefit the land. When folded in a large field, they choose a fresh place to lie down every night, and receive no injury from the breath and smell of the excrements of each other. It is said, that in this way 100 sheep will, in one season, sufficiently manure a fallow of 8 acres for a good crop of wheat. The manure thus made should be frequently ploughed or harrowed under, to prevent much of its evaporation. It is reckoned by some that a sheep will manure one rod square in about a fortnight. Let a slight shed be made in a sheep pasture, and under this cart a layer of sand or other earth about 4 or 5 inches thick: The sheep will resort to this for shade if it be the only one in the field. As they saturate the earth thus carted in, bring in more and spread it over the other, and keep repeating this, until the mass is raised so high as to render it necessary to cart it off. A similar practice might be followed with horses and neat cattle. In winter, the building appropriated to sheep, should have the floor covered a foot and a half deep with sand, loam, or other earth; for the sheep to feed and lie on. Every week or two, if the weather will permit, a fresh quantity of earth to the depth of 3 or 4 inches should be added.

Poultry dung, tends much to facilitate vegetation, and is abundantly quicker in its operation than the dung of animals which feed on the leaves of plants. Liquid manure, made of this dung, may be applied as a top dressing with great advantage, to promote the early vegetation of the seeds of onions, carrots, cabbages, &c. It must not touch the leaves of the plants. Goose dung is of great service in the improvement of meadows. Sheep thrive best on pastures which have been manured with it. The false notion that the dung of geese occasions barrenness, has probably arisen from its laying too thick, for it is of a very hot and fiery nature: but if spread thin it will prove a valuable manure, especially if mixed with cooling earth, and left in a heap awhile. The same may be said of any other water-fowl. In general it is best to mix the dung of poultry with other substances before applied to the soil.

Urine, next to dung, is perhaps the most valuable and important of all manures. It should be used as

fresh as possible. If not mixed with solid matter, it should be diluted with water, as, when pure, it contains too much animal matter to form a proper fluid nourishment for absorption by the roots of plants. It can be employed with great benefit both on meadows and arable lands. When applied to meadows, it should be sprinkled during the winter and early in the spring, when the rains will wash it into the soil.

In some places, stable floors are made with clay, or paved with stone, with a little descent from the cattle's heads; or a tight descending floor of plank, and a water-tight gutter, that conveys the urine from all the stalls to a cistern, which is supplied with a pump. The fluid is conveyed and applied to the land by means of a cask, which is mounted on wheels, being filled at the pump. Or it can be collected in a pit and filled by pails with long handles. It may also be saved under the floors of the stalls, by a large quantity of earth laid there to absorb it; or by a sufficient quantity of litter laid under the cattle for the purpose; and by throwing earth in the puddles which form from dung heaps, &c. in the yard. It would be a most important improvement, to dig a pit contiguous to the feeding stall, of a size adapted to the number of creatures fed; this should be filled with good loam, and all the urine conducted into it. It is surprising how large a quantity can thus be enriched in one winter. The pit should be covered to exclude the rain and frost. A barn cellar would furnish the most convenient place. It is the opinion of Mr. Pickering, that for the want of such a reservoir for saving the urine of our cattle, more than half of our winter made manure, (and this is the farmer's chief dependance) is lost. Urine and the draining from the dunghill, are much better than dung for fruit trees, as penetrating better to their roots, and not harboring insects. This manure, forces newly planted cabbages in a most remarkable manner.

Straw, is very valuable, not only in consequence of its own substance, but from the quantity of liquid matter it absorbs. By carelessness in reaping, perhaps one fourth part is left upon the ground, which is generally wasted by rains and storms. When straw is used for litter, either for hogs, or cattle, or horses, it is generally allowed that one ton (the usual product of one acre of

wheat or rye) will produce four tons of manure; this will dress one acre of corn or potatoes in the hill, and thus give a profit on the crops of 10 or 15 dollars; whereas 5 dollars may be considered as a fair market price for feeding: leaving a balance in favor of littering of five to ten dollars, besides the warmth afforded the cattle; allowing the increased value of the land to pay for carting, &c. Straw fermented, is a more manageable substance and furnishes more manure for a single crop, than unfermented. In the latter state, it decomposes more slowly, and consequently, though its influence will be more lasting, yet it produces at first, less effect. To derive the full advantage from it, it ought to be hauled out before the substance has been wasted by rain; by the sun, and by the wind; and to be buried in the earth as soon after as possible.

Stubble. On a light soil the stubble should be ploughed in deep immediately after the crop is taken off. The stubble with the weeds will be equal to a moderate manuring. To pass a roller before the plough will facilitate the work. On a stiff soil it may be best to burn the stubble and plough in the ashes with a shallow furrow. The heat given to the ground is much better than a larger quantity of ashes. In burning it, the danger which is to be apprehended from the spreading of the flames may, perhaps, be obviated by tracing a furrow round the field, and setting fire to the stubble on the inner edge of the furrow. Or stubble and the undergrowth may be mown, carted into the hog pen, or barnyard, or even housed for litter for the winter. The difference between the value of it used in this way, and when left to waste on the ground, will not admit of comparison. If farmers feel no disposition to avail themselves of such resources to fertilize their lands, let them be cautious to cut their grain so close to the ground, as to leave no stubble that can be mown or employed to any particular use.

Paring and Burning.—This process is particularly adapted to the improvement of soils which are overrun by the roots of vegetables that cannot be destroyed by the common methods of cultivation; and on stiff clays, and such as contain too much vegetable matter. There is a great diversity of opinion respecting this method of

managing land. The prevailing opinion of writers however is in favour of the process. We think that many of our countrymen, possessing low damp meadows, free from stone, and abounding with moss, dwarf shrubby plants, tough grasses, &c. may resort to burning the surface with benefit, provided it be conducted with caution.

The late Mr. Nicholson of New-York in his prize essay has thus briefly described the operation.

When the ground is in a good sward of grass let it be carefully turned over with the plough; the irons of which should be well sharpened. Let the plough run about three inches deep. Then cross-plough with a sharp coulter, and the sward will all be cut into squares of ten or twelve inches. Set these square chunks up edgways, by leaning two together, and they will soon dry. When well dried, build a part of them up in the form of little ovens, at the distance of about eighteen feet each way. These are to have a little opening or door, at a common windward side, for the air to enter and another opening above, for the smoke to pass off. On some dry day, when the wind is fair for blowing into the holes below, place some straw or other dry rubbish into the holes, and set fire to it. As soon as the fires have got fully going in each of the heaps, let the holes in the tops be stopped up, for the purpose of retaining the smoke and keep gradually building up the heaps as the fire penetrates them, until all the chunks of earth are piled up round them; and when the heaps have fully burned, and sufficiently cooled, they are to be evenly spread over the ground, and ploughed in.

We subjoin Mr. Cobbett's method of *burning earth*.

Make a cricle or an oblong square; cut sods and build a wall all round three feet thick and four feet high, then light a fire in the middle with straw, dry sticks, &c extending it all over the bottom of the pit; keep adding light fuel at first, then rubbish wood, till there is a good bed of coals. Then put on the driest of the clods, taking care to *keep the smoke in*. Continue thus for a day or two, when you may dig out the earth any where about the kiln and fling on. Put your finger into the top of the heap here and there; if you find the fire very near, throw on more earth; not too much at a

time, for it deadens the fire. The ashes (or torried earth) will be cool enough to remove in a week, peat or bog earth may be burnt or bog earth may be burnt in the same way, or *dry*, as in the paring and burning method. Some only kindle a fire and lay on dry soils at first, and when the whole is under good way, throw on the earth, (subsoil, &c.) to be torried, till the heap is sufficiently large. This manure applied to cabbages, ruta-baga, Indian corn, and buckwheat produces great effect.

Ploughing in Green Crops, is considered beneficial on all light soils. By repeating this culture, poor or worn out land may be made rich. It is strongly recommended for all places where it is difficult to procure manure; where gypsum will not assist the soil, or where it cannot be had without too much expense. Buckwheat, rye, millet, pease, oats, and turnips are all considered suitable for this purpose. Perhaps buckwheat is the least suitable of any of them. Two crops of some of them can be ploughed in before sowing winter grain. They must always be ploughed in when in flower, or at the time the flower is beginning to appear. To prevent the plough from choaking, if the ground is free from rocks, a roller should be passed over the crop, in the direction the plough is to pass, where this instrument is wanting, the back of the harrow can be used, giving it additional weight if necessary. In about three weeks the ground will be ready for another crop, which can be sowed upon the furrow.

Mr. Pomeroy, of Massachusetts, considers rye, superior to any thing within our reach for this purpose. In order to ensure a sufficient growth, in season to plough in for Indian corn and most of our root crops, rye should be sown the beginning or by the middle of August, and much thicker than when intended for a crop of grain. If it gets too forward before winter, it should be fed down with light stock or mown. Winter rye, sown early in the spring, grows rapidly, and will generally arrive at sufficient stature in season to be turned in as manure for ruta-baga. Rye ploughed in when in full flower, and millet sown, which it will bring forward with great luxuriance, and that in its most succulent state turned in for wheat, may be one of the best fal-

low preparations for it that can be devised; and is probably the cheapest and most convenient process to restore an exhausted soil. At the same time it should be considered, that gypsum acts more powerfully on soils thus prepared.

Gypsum.—There is not any manure concerning which the reports of experimenters have been so contradictory as in the case of plaster of Paris. Its advantages are undoubtedly great. Plaster is more useful on dry than on wet soils, particularly on gravelly or sandy loams, and in some measure prevents the effects of drought. Its discovery has almost doubled the value of land in certain places. It is supposed to be useful on drained clayey soils, preventing their baking. It seems probable also, that it is best for land in a state of sward, though it is usefully employed on others.

The following are the conclusions of Chancellor Livingston and Mr. Logan after various trials. That there is no difference between European and American gypsum. It acts as an immediate manure to grass. One dressing will continue in force for several succeeding crops. It does not produce any remarkable effects used as a top dressing for grain. On stiff clays the increase of vegetation will not pay the expense of the manure. It is uniformly beneficial to Indian corn, unless in very rich or very wet lands. Beneficial to flax on dry, poor, sandy land. Particularly adapted to the growth of clover in all dry soils, or even in wet soils in a dry season. That it has no effect in the vicinity of the sea—but from the successful use of plaster near the sea coast in the state of Maine, on Long Island, and near the salt water in this state, by Mr. Moses Brown, the editors unite in opinion, with many others, that its operation depends more on the nature of the soil, or quality of the article, than on the state of the atmosphere, contiguous to the sea coast:

Gypsum generally benefits all broad leaved plants—such as corn, potatoes, peas, clover and most of the grasses. It is also good for young fruit trees. On grasses, the best time to sow it is when vegetation starts in the spring, at the rate of 1 bushel per acre, and the same quantity immediately after haying. On corn and potatoes, it is generally applied to the growing plant; oth-

ers recommend that for corn it be sowed broad cast, at the rate of one or one and a half bushel per acre, previous to the last ploughing. Plaster is commonly used upon different plans, varying according to its objects. If designed to last for a term of years, it is strewed, at the rate of three, four, five, and even six bushels to the acre; others think an annual application like the above better. In general its effects are not seen till the second year. Some recommend mixing one bushel of damp ashes to two bushels of plaster, when sowing it, to prevent its flying.

Plaster applied to seeds of Indian corn, &c. after being soaked in some fertilizing liquor, such as a mixture of old urine, lye of wood ashes, or strong soap-suds, with a solution of saltpetre, and sown or planted immediately, proves profitable.

That the effect of plaster will be continued indefinitely, under a constant removal of the whole crop from the soil, surpasses belief. It can scarcely fail to exhaust, at length, the productive powers of the earth.

A ton of plaster will make from twenty to twenty-five bushels. To know its quality, a quantity of the powder when heated in a dry pot over a fire, emits a sulphurous smell. If it briskly bubbles or seems to boil, it is good, if but little, it is indifferent; if it remains an inert mass, like sand, it is worthless. Before it is pounded, if good, the finger nail commonly makes an impression upon its surface, and it is not gritty.

Lime, is of extensive utility for manureing lands both in its native state, and after it has been burnt. It is most useful on stiff clays and cold loams. Light soils require a much less quantity. It will reduce peat and turf to a mere vegetable earth. It will produce a high degree of fermentation, in all soils which require it; and this is essential to their productiveness, in every country and climate. The best time for applying lime is, when land is newly broken up, after laying a long time in grass. But it is to little purpose to write on this article, as lime is so scarce and dear in most parts of our country, it cannot be often used for manure.

Trials of lime in this country have been quite limited, and confined mostly to the middle states, particularly Pennsylvania. It has usually been applied there at the

rate of about forty bushels to the acre. In Europe ten times this quantity is frequently used. It is found that the lands which have there been limed, are more powerfully stimulated by the application of gypsum, than those which have not. It is an easy matter for our farmers to ascertain how far it will be profitable for them to use lime, by making experiments with a single cask. But if too little is applied the application may prove useless, and the whole expense be lost; whereas, it rarely happens that injury is sustained from an excess, especially if more or less dung is soon after administered. Mr. *Anderson* was firmly convinced, from repeated observations, that lime and other calcareous manures, produce a much greater *proportional* improvement upon poor soils, than on such as are richer. And that lime alone, upon a poor soil, will in many cases, produce a much greater and more lasting degree of fertility, than dung alone. Generally where lime is applied, a less quantity of dung will answer.

The best way to apply it, according to Mr. *Pickering*, is to slake it with water, and as soon as it falls to a fine powder and is cool, to spread it evenly over the land, and with the harrow mix it with the soil immediately, and thoroughly.

Lime having a tendency to sink in the soil, cannot be kept too near the surface. The quality possessed by lime of producing a great degree of fermentation, renders it of singular use in making composts; operating upon a heap of earth, in some degree, as yeast does upon a quantity of flour or meal. If a handful of lime be thrown upon a spot of long rank grass, that has been rejected for years, cattle will afterwards eat it close to the ground.

Although lime is dearer in the first instance, than plaster, yet as the former continues its powerful effects for seven or eight years; in the end it may be cheaper in certain districts.

Sea-shells, when burnt, make a strong lime. The farmer can burn them with a trifling expense. For some soils they may be partially burnt; but for light soils they may be applied by merely breaking them. A thorough dressing of shells enriches land for many years.

Ashes.—The properties of ashes, from whatever derived, are nearly the same. They are a valuable ma-

nure, and should be carefully preserved from wet and air. One load of dry well preserved ashes, will go as far as two or three that have been carelessly kept. They are good for almost all crops, and are to be used as a top-dressing, because they soon find their way into the soil. By their tendency downwards, if put under the surface they will sink too low. They are considered rather more useful near the sea than in the interior. They are most beneficial to cold and damp lands, but of great service to all. A few bushels on an acre are a good dressing for grass lands that are low, and inclining to be mossy. Besides their fertilizing qualities, they check the ravages of worms and insects, and should therefore be applied to cabbages, turnips, cucumbers, melons, peas and other pulse. Ashes should be spread evenly, not in too great quantities, just before rain is the best time. They are an excellent nourishment for the roots of trees. Ashes do well in composts if kept under cover, making a fine mixture with cow, fowls, and short horse dung; and mixed with mud have been tho't by *Arthur Young*, superior to ashes alone, and four times better than mud alone.

Perhaps ashes may be most profitably applied to Indian corn, particularly where the soil is not suitable to the plant. On sward land about a gill of dry ashes, (the effect from a greater or less quantity about the same,) or half a shovel full of leached ashes, should be spread circularly round the top of the hill at the first hoeing, not touching the plants. A re-application at the time the ears are forming will be profitable.

Soot, as a top-dressing, is much more valuable than ashes, and is proper for almost all arable lands.

Marl, is a substance scarcely known in this part of the world, yet it is not improbable that it abounds in many places amongst us. It is therefore of importance that its distinguishing qualities should be briefly pointed out, that every parcel of earth, which bears any resemblance to it, should be examined with care, as the discovery would be invaluable. Marls are various in their qualities and colors, some hard, some earthy, and some shelly, &c. Beds of it are sometimes found under light sandy soils, sometimes in bog swamps, in clayey lands, and along the banks of rivers. Boring may discover

where it is. Marls have been known to fertilize all kinds of soil, but light sandy ones more than any other. It can be distinguished from clay, which is the only substance it is likely to be mistaken for, by its effervescing with acids; if any of the mineral acids, or even strong vinegar, be dropped upon the surface of the marl, it will produce an immediate effervescence, or in other words the drop will assume the appearance of boiling; this will not be the case with clay. A more simple mode may be adopted where no acid is at hand; take a lump the size of an ounce ball and when it is well dried, drop it into a tumbler of clear water; if it be marl it will immediately crumble into a fine soft paste in the bottom of the glass, giving off innumerable fine air bubbles which rise to the surface in rapid succession; if clay it will not be much changed by the water. Marl should be placed upon the land late in the fall, and left in small heaps to be pulverised by the frosts, &c. and late in the spring spread equally over the surface. If applied in sufficient quantity, its effects will be as perceptible as that produced by the most judicious application of gypsum.

Peat, is often found in low miry and boggy places, that lie between hills, and is sometimes found in cold hilly tracts. That which is the most solid, is the most valuable. It sometimes forms, and in other places is very near the surface; and sometimes 8 or 10 feet below it. It is known by cutting smooth like butter, being free from grit, and burning when dried. After long exposure to the air, it becomes hard, like a cinder. When put in composts, in which lime is an ingredient, it is converted into a substance, similar to the black dirt of bog-meadows. Until lately, it has been the practice to burn peat earth, and use the ashes for top-dressings; (which are supposed to be much stronger than wood ashes;) but we believe this practice in Europe has mostly given way to that of rotting peat in compost. One ton of dung will ferment three tons of peat or moss earth.—This, it is observed in the *Code of Agriculture*, is a most valuable discovery.

Mud, taken from swamps, ponds, ditches, rivers, and the sea, becomes excellent manure, consisting of putrified animal and vegetable bodies mixed with the rich

earth deposited by rains, &c. It is most suitable for sandy or gravelly soils. It should not be put upon ground, especially those in a state of grass, until it has been reduced into a considerable degree of fineness, by means of frequent turning over, and the mixing of portions of lime, rotten dung, or other materials of the same kind, in order to render the decay of its parts complete. As a top dressing for grass it should not be laid on very thick. Mr. *Deane* says he has known it to have as good an effect as barn dung, in the culture of Indian corn, upon dry soils; and that it meliorates the land for several years. The best method of managing all sorts of mud, were it not for increasing the labour, would be to lay it in farm yards, and let it be thoroughly mixed with the dung, and state of animals. When it is so managed, the compost is excellent, and fit for almost any soil, though best for light ones. Perhaps the advantage is sufficient to pay for the increased expense of twice carting. Mud taken from the docks, and sides of wharves in large towns is very valuable.

Salt. By numerous experiments, it is decided, that sea salt acts as a manure in some cases to a degree that proves its excellence when properly applied. In places where experiments have been made, salt has been called, *the most efficacious, the best, and the cheapest of all manures.* Its effects are said to have been visible in some places after 30 years! It is considered the most grateful to vegetation of all manures. Cattle fed on land manured with salt, are said to fatten in two thirds the usual time. Their flesh is also finer flavoured. Salt is considered most efficacious, when mixed in composts, in dunghills, or strewed over dung when carried to the field. If unmixed, undissolved, or used in too great quantities, it endangers the existence of tender plants. Pulverised, and applied as a top dressing, at the rate of from 2 to 4 bushels to the acre, it has had a powerful effect. Flax has been much assisted by two bushels per acre, and even five instead of being injurious has been of extraordinary advantage. It is supposed that flax and all oily seed should be sown with double their quantity of salt. It is recommended for turnips, onions, destroying weeds and noxious vermin. Sown thick over a asparagus (a maratime plant) in the fall, and lightly

sprinkled over in the spring, promotes its growth and destroys weeds. Barn dung is much improved by salting stock liberally. Quantity of salt, and qualities of the soil, make a difference. Too much burns; too little is ineffectual. The safest way is to begin by using it sparingly, always leaving a small portion of the same land without salt, that a just comparison of its effects may be made.

Sea-water, applied to manures in small quantities is found to possess powerful effects in promoting putrefaction, and would probably prove highly beneficial to all farmers near the sea side. A ton of water contains from one to one and an half bushel of salt. Mr. *Deane* makes mention of 100 hills of potatoes, which had two quarts of sea-water applied to each, immediately after planting; and he says that the product of these was one-half more than the same number of adjoining hills produced. Most probably, a quart to each hill would have been better. He mentions also a piece of flax, of which one side was short and yellow; but, on its being sprinkled with this water, it equalled the rest in about ten days, and eventually was the best. He found it equally good for stiff and sandy grounds.

Sea-weed, where used with judgment, never fails to enrich coast lands, especially those that are light and dry. It should be ploughed in while green; if there is much delay in this business, especially in hot weather, much of its goodness is lost. If that cannot be accomplished, a portion of quick lime should be blended with the heaps, and a quantity of earth placed beneath, mixed with, and covered over them; in this way the quantity of manure can be increased, and its effects rendered more lasting. It is best calculated for barley, enduring for two crops.

Fish-manure!—My corn should not grow at the expense of so much life. Swim on ye harmless tenants of the deep; and sport at freedom in your native wave. If I lived on the shores of ocean, your decomposing bodies should not contaminate the air of my fragrant fields, nor mar the happy rural scene. Nor would I manure my soil with such phosphate of lime as some of the British farmers use,—bones transported from the battle-field, and ground in their sweet mills.

Dead Animals. When animals die, it is usual to let them lie above ground; and some farmers hang dead lambs, cats, dogs, &c. in the forks of trees, or throw them on hovels or stumps at some elevation from the ground, to the annoyance of the public! By covering dead animals, says Mr. Davy, with five or six times their bulk of soil, mixed with one part of lime, and suffering them to remain for a few months, their decomposition would enrich the soil, so as to render it an excellent manure; and by mixing a little fresh quick lime with it, at the time of its removal, the disagreeable effluvia will be in a great measure destroyed; and it might be employed in the same way as any other manure to crops. Or without lime, if left a suitable time they can be removed without difficulty.

Scrapings of streets, a good manure for all soils, but particularly for stubborn clays.

Leaves. It is said that the mould and *fallen leaves* from the woods, are good for potatoes, as a substitute for other manure. This may be worth the attention of those who are deficient in other manure.

Brick and lime rubbish, is very good for cold plough lands.

Apple pumice, may be converted into a manure. Good earth with a little dung should be mixed with it before it is applied to the soil.

Tanners' bark, is sometimes mixed with lime, but will do best made into a compost with dung. It is a good manure for cold, stiff lands. On grass lands it should always be spread in the fall. It will revive orchards.

Saw-dust, when rotten, is useful for strong lands; a little wet decays it, and the effect is more speedy than tanner's bark, but not so lasting.

Composts, furnish a supply of manure when a sufficiency of animal dung cannot be obtained.

When manure is not made by hogs kept in the pen during the summer, the compost heap should be particularly attended to. The following, extracted from the *Plough Boy*, is a very easy and economical method of making a compost heap. Let every farmer mark out a spot, from six to thirty feet square, according to the size of his farm; this spot should be dug down two or three feet and the earth formed in a bank around it; a

few stout posts with crotches should be planted in a line along the middle of the pit, and shorter ones should be placed at the sides, to receive strong poles, on which to erect a shed of common boards. Having thus cheaply made a shelter, which secures the manure from the sun, from rain, and from water running into it, (while by removing a few of the boards, a little rain can be admitted in a dry time) the materials can be thrown together. A quantity of top earth or soils, and if the soil of the farm is stiff, a quantity of sand should be mixed and laid in the pit a foot thick. On this may be laid every ingredient that can be gathered together, that is calculated to manure the soil for which it is intended. Clay, sand, mud, lime, peat, &c. may therefore be parts. To these may be added the scrapings of the back yard, turfs on which cattle have long dunged, old rubbish of buildings, earth that has been long covered, banks of rich earth thrown up by the plough against fences, weeds, some animal manure, leached ashes, old fodder, feathers, refuse wool, woolen rags, hoofs of cattle, burnt bones, raw skins, bits of leather, curriers shavings, offall of fish, moss, old brine, soap suds, &c. These substances should be mixed as much as possible in forming the heap; which should be about five feet high, and when this settles by decomposition, more must be added. The heap should have such a degree of moisture as best promotes fermentation and corruption. This should proceed no farther than to destroy the seeds of weeds. Complete putrefaction seems of importance with regard to these; if they remain sound, they are carried out with the manure, and infest the ground. A cavity may be made at one side of the heap, to receive any liquid that runs from it, and this should be thrown from time to time, on the top of it with a scooping shovel. To prevent swine or fowls from disturbing the heap, it may be enclosed with wide boards, or walled two or three feet high. It should not be prepared too long before used.

Composts are well calculated for grass lands, and ought to supercede the offensive, and wasteful practice, of laying putrescent matter on the surface of the soil.

If our farmers in general would be persuaded to avail themselves of as many of these manures as fall in their

way, or can be easily obtained, we should no longer hear so many dismal complaints, of short crops, and worn out lands. The face of the country would soon be surprisingly improved.

Preservation of manures. It is well observed in the *American Farmer*, that the careful preservation, and suitable application, of manures, form one of the best criterians of a good farmer. Without attention to these, in old cultivated districts like ours, lands must become impoverished, and tillage an unprofitable branch of husbandry.

The prevalent errors, observes Mr. *Buel*, in the economy of manures, are a want of properly constructed farm yards; a neglect to stable or yard stock during some of our winter weather; and a waste of straw, stalks, and other vegetable litter. We seldom see among us yards so constructed as to retain the fluids which are produced in them. On the contrary, cattle yards are often located with the apparent intention of being drained into an adjoining field, a neighboring brook, or the highway; and we frequently see them destitute of any substantial and permanent enclosures. The practice of feeding cattle at stacks, remote from the farm yard, occasions a waste of fodder, a great loss of manure, and serious injury frequently to grass grounds, by the poaching of the cattles feet. The waste of green and dry litter, is a still more serious injury to good husbandry. Straw, and stalks and husks of Indian corn are often fed in open fields, or suffered to waste in heaps; while the practice is very general to permit weeds of all kinds, after the crop is harvested, to ripen and shed their seeds upon the fields, to the very serious injury of future crops.

Experience points out that a barn-yard should be a little hollowed. Its principal use, besides that of holding the dung, being to bring the rain water falling within the yard into the state of stagnation, and to let it pass off superficially, so as to prevent any thing of a current from carrying away the dung, either in a mass, or thick fluid condition; merely suffering the more watery particles to run off into a reservoir or receiver, constructed for the purpose, or into adjoining cultivated fields.

If a reservoir is formed for the superfluous wash of the yard, large quantities of earth and litter should be thrown into it; for a compost, so collected, is an admirable top-dressing for permanent grass land, or young clover. The yard should be free from rocks, and surrounded by a high close fence. If the soil is not compact enough to retain moisture, it should be bedded with clay six or eight inches deep, beat down compact, and covered with gravel or sand, to prevent its removal when manure is taken out. Before the commencement of the foddering season, the yard should be covered with some kind of earth, to the depth of eight or ten, or more inches, according to the number of cattle. The cattle should be strictly confined during winter, (except to exercise occasionally, and not turned out, as is frequently the case, into the pastures and meadows, by which the making of much manure is prevented, great injury in many situations done to grass-lands, and the stock, from being much exposed to cold and other causes, benefitted in a far less degree than is commonly imagined. A well should be made close to the yard to supply them with water; this will save much manure, prevent accidents, and in times of ice and snow prevent the stock from suffering for drink as they often do, when the owner is ignorant of it. Where the number of cattle confined in a yard is considerable, it may be necessary, occasionally, to remove the bottoms, and the matters littered upon them, to dung heaps, after they have become blended with rich materials. These must be immediately replaced by more earth, &c.

As great waste is occasioned by the evaporation of the more liquid parts of manure heaps, when exposed to the sun or winds, and the washing of rains and melting of snows; it is suggested that moveable coverings of some light kind of materials be placed over them. Manures kept in this way are far more efficacious. If this is not done, mixing dry earth, or other absorbed substances with the heaps will assist in preserving them. Or if the heaps are to remain some time exposed to the sun, &c. they should be covered with turf.

It is an excellent practice to cover the whole surface of the dung heap with a light coat of earth every time the stables are cleaned out, if there is no other cover-

ing. Troughs should conduct the water from the eves, and every reasonable precaution should be used to prevent the manure from being washed by rains. As soon as the manure is cleaned out of the yard for spring crops, if the cattle are to be kept in it at night, it should be covered with litter, and a coat of earth, or mud; and as often as once in two weeks, a new coat of earth should be introduced. In this way manure may be increased in a four fold degree. Or every morning after the cattle are turned out, the manure should be thrown in one corner of the yard, and on this a load of earth should occasionally be thrown. But if a yard is left naked until autumn, exposed to our burning summer suns, without litter or mud, or earth of any kind, to absorb the essence of the manure, much the largest part will be exhaled and given to the winds. Fresh manure should be kept as carefully from the sun and rain as grass which has been cut for hay.

By keeping hogs in a large open pen during summer, large quantities of manure may be made by a plan similar to that recommended for the barn yard. Mr. *Butler* recommends the sowing half an acre of clover on a rich soil near the barn, to be cut green and fed to hogs, as both cheap and profitable. Into the hog pen can be thrown coarse hay, pumpkin and potatoe vines, corn bottoms, husks, weeds of all kinds, &c.

Application of manures.—A few observations remain to be made under this head, in addition to what has been said on the various articles.

Animal manure should not be suffered to ferment, previous to its application, except in a very slight degree. Mr. *Davy* says, it loses 60 parts out of 100, when the process of fermentation is allowed to proceed uninterruptedly. A slight fermentation is undoubtedly of use in the dunghill, where there is a considerable collection of straw, hay, &c. for by means of it a disposition is brought on to decay when ploughed into the soil, and the work is more conveniently executed. Too great a degree of fermentation is however very prejudicial to compost manure in the dung hill; it is better that there should be no fermentation at all before the manure is used, than that it should be carried too far. There are many arguments and facts which shew it is prejudicial

to the interests of the farmer, to permit the violent fermentation which is necessary for reducing farm yard manure to the state in which it is called *short muck*.— We allow that when well rotted, it is more efficacious for a single crop, but its utility is of much shorter duration.

To prevent inconvenience from seeds in unfermented barn yard dung; it should be applied to no other than hoed crops. Compost manures, having fermented sufficiently to destroy the seeds of weeds, can be used for all crops, where the hoe is not used. To avoid any inconvenience by applying long, or unfermented manures to certain crops, such as flax, wheat, turnips, &c. we have only to apply the manure to the preceding crop.

It seems to be generally agreed, that using fresh, unfermented manure for drill crops; burying it at a good depth, and raising the plant over the dung thus buried, is the best possible way in which it can be used. The shortest dung should be used for these purposes, except for potatoes. Throw the more strawy parts of the dung in a heap four or five feet high under cover, stir it up from the bottom in five or six weeks, and it will do well for ruta бага.

Fibrous-rooted grasses should receive top-dressings of manure, and tap-rooted grasses, and all grain and root crops should have manure applied at a depth suited to the nature of the roots. All dressings must consist of materials adapted to the soil, and such manures as are likely to receive injury from being spread upon the surface, should be lightly ploughed, or harrowed in. The fall is supposed much the best time to spread manure on grass lands. But those manures which exert all their strength suddenly, such as ashes, soot, and warm composts, should be applied just before the time when the plants will need the greatest supply of vegetable nourishment, which is when their growth is most rapid, or near the time when the ears are shooting out.

All kinds of manure, should be mixed with the soil as soon after carting out as possible. To do this to advantage it should not be carted, spread, &c. faster than it can be covered with the plough or hoe. Rich fermenting manures should be applied as near the time of planting as possible.

As regards the depth at which manure ought to be placed, extremes must be avoided. Barn dung should be buried to a good depth; and in this state should remain till it has sufficiently rotted; for by lying too near the surface much of its efficacy is lost. Other manures which have a tendency to sink, must have a different management.

A sound discretion is essential, in determining how much manure may be expended, to advantage, on lands; generally speaking, much is lost in falling short of that point where, by the aid of plentiful manuring, the greatest profits are to be expected. Enough should be applied to fertilize the ground, and render it capable of producing good crops. Soils may, however, be overcharged with composts, or with raw barn-dung. But it has been too much practised in this country, to apply scanty portions of manure to lands in tillage, and hardly sufficient to have a perceptible effect. Mr. *Deane* recommends a plentiful dunging, once in two years, or in a course of crops; and the year the manure is laid on, take a crop that bears high manuring best, as Indian corn: Afterwards crops that need less manure, till the end of the course.

There is a system of management (says the celebrated *Arthur Young*) which has attracted a good deal of attention, and that is, to use dung fresh as made; thus requiring no dunghills at all, or nearly none. He mentions the late Mr. *Ducket*, who conceived that the more dunghills are stirred, and turned over, and rotted, the more of their virtue was lost. Long dung he esteemed much more than the same quantity of short dung. A very accurate farmer, of Hertfordshire, says the fresher dung is used, the better, even for grass. Near Meaux, in France, the farmers carry out their dung quite in a long strawy state, which they contend earnestly is much better than to leave it to be more rotten. He quotes many other authorities in favour of this management, which tends to reduce their labour and increase their crops. Warmth and nutriment will in this way be more gradually applied to the roots of plants. Vegetable and animal matters cannot serve as manures, says *Senebier*, till they begin to ferment; nor are they of any utility when the fermentation is finished. Fresh long dung

more particularly should be applied to hoeing crops, or to grass land. Upon this system the dung which is made in the depth of winter may be spread in May, for corn and potatoes; the next made, and what is not wanted for corn and potatoes, may be taken out, in June, for ruta-baga, cabbages, &c. The best time for manuring grass (in England) is immediately after hay is cleared from the field. To conclude—He who is within the sphere of the scent of a dunghill, smells that which his crop would have consumed, if he would have permitted it. Instead of manuring his land, he manures the atmosphere; and before his dunghill is finished turning, he has manured perhaps another town!

If every kind of putrid substance that could be collected in the spring of the year, was properly applied as manure, this dead matter would be springing into life; and those farmers who would do it would be doubly paid for their labour in enriching their lands, and causing them to produce abundance, and in being able to breathe a pure air, which is too often poisoned by the noxious effluvia which are rising from barn-yards and putrid substances around buildings, and which no doubt frequently produce fevers and other diseases during the summer and fall season.

Having thus briefly described some of the most important circumstances connected with the collecting, preserving, and application of manures, we shall conclude this branch of our subject with Mr. *Close's* very valuable table for manuring land, which will enable the farmer at one inspection to calculate, with accuracy, the number of loads which it will be necessary to employ in manuring a field per acre; at the distance therein specified.

<i>Number of heaps to a load,</i>	<i>Number of loads per acre.</i>							
	1	2	3	4	5	6	7	8
At 5 yards distance,	193	96	64	48	38	32	27	24
At 5 1-2 yards distance,	160	80	53	40	32	26	23	20
At 6 yards distance,	134	67	44	33	26	22	19	16
At 6 1-2 yards distance,	114	57	38	28	22	19	16	14
At 7 yards distance,	98	49	32	24	19	16	14	12
At 7 1-2 yards distance,	86	43	28	21	17	14	12	10
At 8 yards distance,	75	37	25	18	15	12	10	9

Explanation of the first two rows of figures in the preceding Table.

The number of heaps consisting of one load each, laid at five yards distant, is 193 to cover one acre; at *two* heaps to a load 96; at *three* heaps, 64; at *four*, 48; and so to the end:—each of the following rows is to be read in a similar manner.

CULMIFEROUS CROPS.

The varieties of corn ranked as culmiferous, or robbing ones, are, wheat, barley, oats, and rye; to which may be added Indian corn, and millet. These we are inclined to consider as bearing hard upon the soil. During the ripening of the seed, they draw probably their whole nourishment from the soil; as the leaves by this time, being dry and withered, must have lost their power of drawing nourishment from the air. But such plants, while young, are all leaves; and in that state draw much of their nourishment from the air. Hence it is, that when cut green for food to cattle, a culmiferous crop is far from being a robber. It is by fixing upon the most proper of each for the soil cultivated, that the judgment of the farmer is correctly ascertained. In other respects, such as the exhaustion of the ground, we view it as a matter of little importance which of them is preferred. The above are also called *white crops*.

LEGUMINOUS CROPS.

Though culmiferous crops have, in all ages, been regarded as most profitable, there is no doubt, but that rural management is most suitably exercised when due attention is paid to the preparative crops, or those which are naturally calculated to enrich or fertilize the soil, and to furnish an increased stock of manure. These preparative or enriching crops are usually called leguminous; under this head are ranked, beans, peas, clover, potatoes, ruta-baga, mangel-wurtzel, turnips, cabbages, carrots, parsnips, and buckwheat. The above are also called *green crops*.

ROTATION OF CROPS.

No branch of husbandry requires more skill and sagacity than a proper rotation of crops, so as to keep

the ground always in heart, and yet to draw out of it the greatest profit possible. In many parts of the United States, it is very little, if at all attended to. In new settled districts, the extreme fertility and abundance of the lands lessens the necessity of an attention to rotation of crops, but in any situation, the farmer will find, if he takes the trouble to make a comparative experiment, that some crops are much more abundant when they succeed certain grains and roots, than when put in at random. Some kinds of vegetables extend their roots near the surface, others penetrate deeper into the soil, some by overshadowing the earth with their broad leaves render it soft and mellow; others, whose naked stalks admit the free circulation of the air, consolidate the soil; some derive the greatest part of their nourishment from the juices lodged in the earth; others draw a considerable proportion from the atmosphere; some, having a longer period of existence, continue long to demand nourishment; others arrive more quickly at maturity, and must be easier supported. Besides, among the various tribes of insects so feeble in themselves, but so formidable and destructive by their numbers, each has some vegetables which it prefers to others for its food, and resorts to the places where such food is produced; and as they propagate their kinds where their food is found, they must become more numerous, and consequently more destructive, where the cultivation of the same plant is often repeated. *Rozier*, in his dictionary of agriculture remarks—Every tap-rooted plant succeeds very well after a crop of plants with fibrous roots, and thus alternately. That is the grand art of agriculture—when the nature of the soil is well understood. The cultivator never swerves from these data or positions, without paying dearly.

Whatever may be said to the contrary, all soils certainly suffer some degree of deterioration by long, unremitted tillage. When divested of that clothing with which nature always defends it if undisturbed, and when turned up naked to abide the force of the blast, the happy medium of consistence is deranged, its best particles carried away in torrents, and it is left a feeble skeleton, possessing only the faint semblance of departed fertility. Land also which lies perpetually in grass,

is deprived of the advantage of having the vegetable substance accumulating on the surface from time to time mixed into the soil. It is a maxim of Mr. Peters, President of the Philadelphia Agricultural Society, *To lay down land and break it up often.* Convertible husbandry, or regular alternations of tillage crops and pastures and meadows, seem therefore, to be the only system by which the fertility of the country can be preserved and improved. Whatever pains we take, whatever expenses we incur, in collecting instruments of husbandry, in accumulating and applying manures, and in tilling the earth; all is to little purpose, unless to these we superadd a *succession of crops, adapted to the nature of the soil—to the laws of the climate, and to the physical character and commercial value of the article raised.* The practice of applying manure and cropping, so as to draw out the strength of it, and that of the soil, as soon as it can be done, until the land is rendered quite barren and incapable of affording any more produce without some respite, is most miserable, and deserves the highest reprobation.

Crops are generally divided into two kinds, viz. those that exhaust and impoverish the soil on which they grow; and those that ameliorate and improve it. The first are fibrous-rooted plants, as Indian corn, wheat, barley, rye, oats, flax, &c. The second includes all the leguminous and tap-rooted tribes, as beans, peas, turnips, parsnips, carrots, clover, &c. Agricultural improvement depend in a great measure on the judicious interchange of their different crops; in soils which are well adapted to a variety of plants; for under proper management land may be constantly cropped, without the intervention of a fallow, as was formerly the practice. It is easier and cheaper to keep land in heart, than to restore it after it is worn out. Weeds will so increase, especially in old farms, as almost to spoil a crop, unless a hoed crop intervene to check them once in two or three years. And a green hoed crop helps to prepare land for producing other crops, by enriching it. Wheat land, for instance, may be recruited, and cleared of its weeds, by a crop of beans, or potatoes, as effectually as by fallowing.

It is difficult to determine what particular routine of crops is best. Green and white crops, alternately, are in general recommended. Soils differ so greatly even in fields which lie contiguous, that the course of crops which is suitable for one is unsuitable for another.

The following important rules, in regard to rotations, are particularly recommended.

1. When any farm begins to be improved, it is necessary to commence with such crops as are the most likely to produce manure; nor should two exhausting crops be attempted, in succession, until the soil has acquired a considerable degree of fertility.

2. The crops should be so arranged, that the labour of ploughing for each, and of sowing, weeding, reaping, &c. shall proceed in a regular succession.

3. All forcing crops, or frequent repetitions of the same articles or species, should be avoided; as a diminution both in the quantity and quality of the produce, is the usual consequence. In soils of moderate fertility, the greater the distance, at which the repetition of any sort of crop can be kept, the better.

4 Those crops should be mixed, which are known to be most productive of manure, and are best calculated for the extirpation of weeds. Hence it is better to cultivate a greater proportion of green crops than of grain.

It is supposed that hemp, carrots, onions and buckwheat, may be cultivated successively upon the same grounds for many years; but clover, potatoes, and Indian corn, oats and barley, wheat and rye, will not answer well for more than two years, without high manuring; and even then, they do best under a change of crops; flax will not succeed well upon the same ground oftener than once in seven years, therefore, a farm should be so arranged as to have a regular routine of crops, once in four, five, six or seven years, according to the nature or circumstances of the farm. Where circumstances render ploughing not so advantageous as pasturing, the land may remain in grass till these circumstances are obviated; care being always taken, when it is broken up, to follow alternate husbandry during the time it is under tillage. In this way the alternate system can be followed in every situation; nor do we consider the land being in grass for two, three or

four years, as a departure from that system, if called for by a scarcity of manure, poverty of soil, &c.

The following rotations may serve as an outline subject to be varied, as circumstances may require.

Light reddish sandy soil. First crop, turnips, well manured with compost. Second, peas, with some gypsum. Third, rye with red clover-seed harrowed in with a light harrow in the spring. Fourth and fifth, clover, with a light dressing of gypsum, after each mowing.

Dark sand, and a sandy loam. Indian-corn with potatoes, may be the first crop. It is recommended to plant the corn in rows north and south, six feet a part and in hills about two feet from each other. The rows of potatoes are planted between the rows of corn. Indian corn, in order to afford the greatest quantity of ears, requires to stand more widely separated, than it is when grown in the usual way; while, at the same time, other plants, of more humble growth, may be raised in the intervals; without essential injury to the growth of the corn. It would seem, that as much as one-fourth of additional aggregate product may, in this way be raised from any given quantity of ground. Second turnips; then wheat or rye, if the turnips can be removed from the ground in time; then clover; then another crop of wheat or rye; then the Indian-corn and potatoes again. Or barley with clover may come in after turnips.

Dry loam. Some of these soils are good for Indian corn, especially the mellow reddish-colored loams. The rotation may be similar to the last. Sometimes, the first crop should be potatoes, well dunged; then Indian corn manured with gypsum.

Wet loam. If very wet, few crops can be raised to advantage, except grasses. If not very wet, potatoes may be the first crop; let the ground be sufficiently mellowed with ploughing, and then very shallow furrows run for forming the beds for the dung; cover the seed with a furrow of a one horse plough, run on each side, so that in this way the roots will be more elevated than is necessary in drier soils. After the potatoes are taken off, throw up the ground in high narrow ridges—mellow the ground in the spring, and plant Indian corn on ridges to be raised by two furrows thrown up against each other. Ridge it again in the fall; and in the spring sow oats, barley, or summer wheat as most

suitable. Good crops of flax may also be raised in such soils; and they are suitable for winter-wheat, where they are sufficiently dry to enable that crop to withstand frosts. With the third crop grass-seeds should commonly be sown, which should be those of timothy or some other kind calculated to withstand frosts. Clover, will do if the ground is sufficiently dry for wheat. When the grasses begin to fail, break up the ground. Oats, on the sward, if properly turned over will do for the first crop.

Dark dry loams, are well calculated for an extensive rotation of crops, which may be similar to those mentioned for a dry-loam. They are not generally so good for wheat as stiffer soils; nor for turnips as sandy ones.

Gravelly soils, are generally best adapted to crops of rye and red-clover, alternately; and with gypsum and deep ploughing will bear tolerably good crops of each. In this way good crops of buckwheat may be had from such soils, which are naturally very poor; and this instead of rye, may be the intermediate crop between those of clover, from which the most profit is to be expected. Sainfoin will also answer for hard gravels. On fine gravels approaching to the nature of gravelly loam, crops of potatoes, Indian corn, and even wheat may be had, in rotation, beside clover, with suitable manures.

Gravelly loam, with the aid of gypsum and other suitable manures is properly calculated for a rotation, say, first of potatoes, then Indian corn, followed by wheat in the fall, after the corn has been cut up; or, barley in the spring, and then clover. Some of the mellow and richer sorts of this soil may answer well for turnips, carrots, and other roots, and for almost all kinds of crops suitable for dry upland soils.

Clayey soils, if sufficiently dry, with a proportion of calcareous or silicious earth mixed with them, may be well suited for rotations of such culmiferous and leguminous crops as may be found most advantageous; and also for some of the root crops. The rotation may be similar to that for dry loams, substituting the potatoe for the turnip crop. If the soil be a stiff dry clay, the first crop may be oats,* well harrowed in on the sward.

The tendency of the oat is to pulverise the soil by the expansion of its roots while growing, perhaps more than any other grain.

Turn the stubble under; and in the fall throw up the ground into high narrow ridges. In the spring, cleave these down and prepare the ground for barley, after manuring with suitable compost. Plough up immediately after harvest; put it in wheat in the fall; and in the spring harrow in clover and timothy-seed. When the grass begins to fail, begin the rotation, as before. When too wet for wheat, they admit of but little change; and should be kept mostly in timothy or other grass suitable to the soil. The changes may be oats, and then summer wheat, or perhaps barley, as before mentioned.

It has been said, that the foundation of all good agriculture was the raising roots, as winter food for cattle. What other cultivation can enable a farmer to raise on a specified quantity of ground, so great a quantity of excellent food? On lands like ours, of medium character, in point of fertility, manures in abundance are indispensable. These cannot be obtained in sufficient quantities, especially in interior situations, but by cattle. A rich agricultural country must be in general a cattle-raising country. New-England cannot become a great cattle raising country, unless it make provision for their support during our long cold winters, by raising roots upon an extensive scale. Instead of the farmer's understocking his pasture ground, as is the case in most parts of the country, through fear of not being able to maintain his summer stock on his winter food, this system enables him to stock his pastures up to their full power. We therefore recommend, that in addition to the introduction of ruta-baga, mangel-wurtzel, cabbages, and common turnips into the regular rotations, that the farmer appropriate every year more or less land of a suitable quality to carrots and parsnips, which requiring uncommon preparation, are not so suitable to enter the list of a general rotation of crops.

Mr. Nicholson's calculation of the value of crops, and the expense of raising each, may be some guide in making selections for rotations. He supposes the average crops of wheat, barley, and Indian corn, at the greatest extent, may be \$50 per acre when the grain is ready for market; crops of rye, oats, and peas, not more than two thirds of this amount; buckwheat, still less. From five to six hundred bushels of ruta-baga, or mangel-

wurtzel may be had from an acre, and worth, at 18 cents, \$100 per acre. And these roots are suitable for almost all the purposes of grain for live stock. As grain crops are nearly as expensive as roots, the clear profit will be from \$30 to \$50 per acre less than roots.

The following six years' rotation recommended by a writer in the Massachusetts Agricultural Repository, may be a good one for farmers in general in New-England.

1st year. After breaking up the sward is oats sown, thick, to be cut for fodder.

2d year. Potatoes or Indian corn, or both.

3d year. Ruta-baga.

4th year. Barley or wheat, sown with clover and herds'-grass, or red top.

5th year. Clover mowed.

6th year. Herds'-grass and clover.

In the autumn of the sixth year, the land to be broken up, and on the seventh year the same rotation recommenced,

It is difficult to designate particularly the most suitable changes of crops; as they are more exactly to be ascertained by the known product of lands, when properly cultivated. But such crops, in rotation, as are found to yield most clear profit, and are at the same time best suited to follow each other, should usually be cultivated, after making due allowance for the greater exhaustion of the soil, occasioned by the growing of some more than others.

INDIAN CORN.

This plant may justly be considered the most valuable in the whole circle of American husbandry. It is food for most animals, and yields a great increase of grain. It is not so liable to injury as other grains. As food to man it is remarkably wholesome and nourishing, and admits of the greatest variety in its preparations. In cultivating it the soil is cleaned and lightened, preparative to other crops: though it is inferior to preparations with ameliorating crops giving more shade and moisture.

The proper soils for this grain are the sandy, sandy loam, gravelly-loam, and rich red, or dark-coloured

earths, which have no clay in them. Cold or wet loams are as unsuitable as stiff clays, unless well managed.

It is not considered best to plant maize on green sward ground. It is apt to be backward in its growth, and not to ripen so well. (See Rotation of Crops.) But if this is to be made the first crop, the ground should be ploughed in the fall, or rather soon after mowing, re-ploughed in the spring and made mellow with the harrow; and if very wet, it should be formed into ridges. As a general rule no more land should be planted than can be made very rich, and kept perfectly clear of weeds.*

If 20 loads of good manure can be afforded to an acre, it should be spread on the surface and ploughed in; if but ten it should be put into the holes. Or spread a quantity of green manure over the ground as evenly as possible, and put the compost manure into the hill, or drills. In this way the rotted manure will supply nourishment to the plants the first part of the season, and the fresh manure, which was spread over the whole surface, will assist the plants most materially about the time the ears are filling.

The seed should be taken from the finest ears, and if possible from the largest and most perfect plants, particularly from those which have two or three ears. It is said that by selecting the earliest and ripest seed, the succeeding crop will be a number of days earlier. Shell the seed by hand, rejecting about an inch at each end, and all imperfect seeds. A change of seed will doubtless be found serviceable.

If planting a second time should become necessary, we would advise to soak the seed about twelve hours in a strong solution of saltpetre, or common salt, and then rolling in gypsum. This is said to have a very important effect in bringing the crop forward. To protect corn from animals, take equal parts of tar and train oil, simmer them together and turn them over the corn,

When it is planted on sward recently turned over, holes should be made quite through the furrow-slice, and dung put in the holes. If this caution is not observed the crop will be uneven, as the roots, where the furrow slice is thickest, will have but little benefit from the rotting of the sward.

after having soaked it well; then sift on ashes, lime, or plaster, stirring it till each kernel has taken up as much as will permit its being conveniently handled. Another method is, to soak the seed, then roll it in sulphur, and plant it immediately. Perhaps a little sulphur mixed with gypsum might render the seed sufficiently obnoxious to birds, &c.

The *time* of planting is that at which the earth first acquires the warmth necessary to vegetation, and which is sufficiently indicated by her spontaneous productions. If we plant earlier, the seed is apt to rot; if later, the ripening of the crop is hazarded. The old Indian rule, is to plant when the leaves of the white-oak are about the size of a mouse's ear; which generally takes place, between the 20th of May and the first of June. This will answer for all soils except dry ones, which should be planted a little earlier than this rule directs.

There is some difference of practice, without any great difference of result, *in the modes of planting*. If land is rough or strong, and the object is to *make the most of labour*, the better way is to plant in hills; but if the soil is rich and easy to till, and the object is to *make the most of land*, the drill method should be chosen. According to the first method, let the ground be cut into squares, by shoal furrows with a horse plough, (say half as deep as for common ploughing) from three to four feet apart, according to the kinds of corn to be planted. If nearly a shovel full of dung is to be put into each hill, the furrowing must consequently be pretty deep. If care is taken in planting to place the kernels four or five inches apart, four or five stalks can stand in each hill to advantage; but if thrown promiscuously in, they generally fall together, and three are sufficient for a hill. When planted in drills, the rows should be about four or five feet apart, and the corn about six inches apart in the rows, and covered about two inches deep. The rows must always run north and south, that the corn may receive equally the benefit of the sun. At other times two rows of potatoes, or mangel-wurtzel, are interposed between as many rows of corn, which is said to be a profitable practice.

Corn should not be annoyed with running beans, which by winding round the stalks and ears, cramp them

in their growth, and sometimes bend them to the ground. Pumpkins should not be planted with corn, except along the margin of the field; they rob the hills of much vegetable food, and by their shade shut out too much the influence of the sun.

No crop while growing, requires more attention than corn. To prevent it from being stunted at the outset, it is adviseable to apply some stimulants to the plants when very young; such as bog-dirt, ashes, or gypsum, and this should be repeated at the third hoeing. When the plants are three or four inches high, the plough must pass in the intervals, making two furrows in each, turned from the rows; the weeds killed and a little fresh earth drawn about the plants with a hoe. In about half a month after, plough again, turning the earth towards the rows, and draw up some more earth with the hoe. Just before the corn spindles give it the last ploughing and hoeing in a manner similar to the last, keeping the plough as far as possible from the hills. Avoid the harrow at weeding; it leaves the earth close and heavy, and injures the crop. Hoeing when the ground is soaked with water is also disadvantageous.

The practice of making very large hills is injurious, by diverting the water, and preventing the influence of the sun upon the lower roots, subjecting the plant to the exertion of sending out new sets of roots, at a suitable distance from the surface, and causing it to be more frequently broken by winds. (See Hoeing.)

The growth of suckers is injurious to the crop, and ought to be either pulled up, or bent down to the ground and covered with earth sufficient to kill them; this, by not wounding the principal stalk is no doubt the best way.

If this crop is harvested too early, it will lose much by shrinking. It should not be topped before the grains have somewhat hardened. It is probably the best plan to cut up the stalks by the roots, some days after the usual time for topping, and set it up in shocks to harden. In this way it is supposed, the ears derive the same nourishment from the stalk as when standing; much fodder is saved, and the ground is ready to be ploughed in preparation for another crop.

The husbandman with bad management, has been known to receive but five bushels of corn per acre for all his toil! and the skilful husbandman, upon the same quantity of ground, has been known to raise upwards of 172 bushels.*

On suitable soils, well tilled and manured, an average crop is supposed to be 40 bushels.

Mr. *Valentine*, of Massachusetts, raised last year 116 bushels on an acre. The whole expense, including \$25 for manure, was \$44.

Mr. *Lefferts*, of New-York, raised 125 bushels in 1821, on a heavy loam, by the following culture. With a heavy harrow, levelled old corn hills, ploughed 10th April, harrowed twice, furrowed 3 inches deep, 4 & 4 1-2 feet apart, put half a shovel full of compost manure in each hill. Planted 3d May, 6 kernels to hill; steeped, tarred, and rolled in ashes. Ploughed 3d June, turning the earth from the hill. Dressed with hoe 8th June, after which it was ploughed five times.

Corn is sometimes cultivated with a view only to the forage it may yield; and is sown broad cast, at the rate of 3 1-2 bushels to the acre. Sweet corn is supposed to be best, on a rich soil it will produce about 12 tons of green fodder in 4 months. This can be fed out to cattle, at the time when our pastures usually fail; or the whole can be mown when the blossom begins to appear, dried as quick as possible, and housed for fodder. The ground may be immediately ploughed, and sown with any winter grain. Thus it proves a fallow crop.

Indian corn contains a large proportion of farinaceous matter, and this substance experience has shown to be very nutritive. It is probable, says Dr. Gorham, that if Indian corn were submitted to the same processes as wheat before it should be used as food, it would be equally nutritious, because the proportion of soluble and nutritive matter would be increased by the removal of its cuticle and fibrous substance.

The most celebrated travellers assert that when the Europeans landed at St. Domingo, one of the first ali-

* Messrs. J. & M. Pratt of Easton, Madison county, N. York, in 1822, raised 172 1-4 bushels of corn on an acre.—See New-England Farmer, p. 234.

ments the natives offered them was maize; that during the course of their navigation they found it at the Antilles, in Mexico and Peru, forming every where the basis of the nourishment of the people of these countries;—that this plant, whose post is so imposing and so majestic constituted the ornament of the gardens of the palaces of the Incas;—that it was with its fruit the hand of chosen virgins prepared the bread of the sacrifices; and thus in fine, gratitude, this sentiment so delicious for worthy hearts, had determined even the rude people of the isles and continent of this new hemisphere, to institute annual festivals on occasion of the harvests of maize.

Maize, then, this most excellent cosmopolite plant, which seems adapted to so many climates, and created for a benefit to so many regions of the globe, may be justly considered as one of the best gifts of nature to mankind.

WHEAT.

Bountiful as nature has been to man in the abundance and diversity of her gifts, it is for this plant, observes Mr. *Russell*, he ought to be particularly grateful. It has in every age furnished the principal nourishment of civilized man; and while it is singularly qualified to sustain his health and life, and to administer to his comforts and even to his enjoyments, it appears to be specially privileged to dwell with him in every region of the earth, and every where to promote and to reward his industry.

Common wheat has many varieties; some of which are bearded, and others bald; some oval and others round or square; some yellow or red, and others white; some soft and others flinty.

It grows vigorously in clay, in loam, in calcareous earth, and even sand, when aided by manures, or in succession to peas, clover, &c. But after whatever kind of crop, this grain is cultivated, the soil should constantly undergo that degree of preparation that may be sufficient to bring it into a state of considerable pulverization and mellowness; for whoever has watched the progress of this crop in such lands as have been well broken down and reduced, and in such as have been

left in a lumpy crude state, at the time of sowing, must have remarked the difference to have been very considerable. Experience has shewn, that this crop should never, where it can be avoided, be grown after other kinds of grain-crops, as rye, barley, or oats; and that animal manure should not be applied for it, but for such crops as may precede it. Clover or other vegetable substances, or, where they can be obtained, mineral manures, should be alone employed as the means of enriching the soil. Gypsum may be strewed over the ground at the time of sowing at the rate of two or three bushels to the acre.

The wheat intended for seed should be some of the best grown of the crop; it should be well ripened before it is harvested, and if there be any smut in the crop, the part intended for seed should not be put in the mow with the rest. Changing the seed, or sowing it on a different soil, is supposed to prevent it from degenerating. Before sowing, pass it through a screen, to take out the seeds of weeds, &c. To prevent smut, steep or float the wheat in brine, urine, lye of wood ashes, &c. for a longer or shorter time, say from twelve to twenty-four hours; skim off the light kernels which float, take out and before sowing sprinkle the seed with lime, leached ashes, or plaster of Paris. The quantity of seed recommended for an acre varies from five pecks to two bushels; six pecks is the usual quantity. Lands weedy and of a deep rich soil require more, as well as lands newly broken up. The size of the grain and the time of sowing must determine in a great measure the quantity to be sown; for the later it is sown the more will be required.

With respect to the time of sowing winter wheat there is a diversity of opinion. About the middle of September, however, is the prevailing opinion, if the ground is in a suitable condition. (Respecting getting in the crop, see article Harrow.) If it is likely to grow too large before winter, the best way is to feed or mow it down; this will make it more strong and productive. Spring wheat should be sown as early as the ground can be made mellow. Some of the best crops raised in New England were sown in the month of March. The quality of this wheat is inferior, and the crop usually

smaller, but it is cultivated generally with more success.

It is believed, there is nothing gained by letting wheat stand till it is fully ripe; that is, till the heads turn down, before it is harvested. If it stand so long considerable will be shelled out before it is got into the barn; and even if the bulk in this case be greater, the weight may not be increased; and it is known that the best flour is made from the earliest harvested wheat. If it is affected with rust, cut it down as soon as the kernel becomes affected; it will be the only way to preserve the crop, and it is said to improve after being cut. The same may be said of rye. One acre is a large day's work for a reaper. It should be removed to the barn when there is a slight dew.

Some calculators have supposed, that the average produce of this grain over the whole face of the globe, will not exceed six bushels reaped, for one bushel sown. Mr. Livingston has calculated the average quantity of wheat per acre, upon unmanured lands, throughout the middle, northern, and eastern states, without taking in the new settlements where the yield is much greater, to be thirteen bushels. In the southern Atlantic states, it is much less. It appears that in the single district of Newbury—Newtown, Massachusetts, there were raised in 1817, by thirty-two persons, on fifty-eight acres of land, thirteen hundred and twenty-five bushels of wheat; making an average of twenty-two bushels to the acre, an average greater, it is believed, than that of some of the most favoured wheat countries. Mr. *Emery* raised thirty-three bushels on an acre; and Mr. *Newall* eighty-one bushels on two and a half acres. In New Hampshire, five persons, raised on eleven acres, three hundred and fifty-two bushels, equal to thirty-two bushels to the acre. If farmers will look over the accounts of late experiments on spring wheat, even on the sea-board in Massachusetts, where it is supposed to be the most subject to blight, they will find the average produce to exceed twenty bushels. Mr. *Taft* of Uxbridge, Mass. estimates the quantity of wheat raised in that town for three years preceding 1814, to have been one thousand bushels annually. We believe therefore that its produce is much more certain and profitable.

ble than is generally supposed. The expense of cultivating wheat, is thought to be only about half that of Indian corn. Is it not unaccountable then, when all these things are considered, that our farmers should neglect this valuable crop so much? We hope they will be induced to enter upon its culture with spirit.

For interesting particulars respecting its cultivation, see *Massachusetts Agricultural Repository*, vol. 4, 5, and 6.—*Plough Boy*, vol. 1, p. 122, 228, 229, 371.

RYE.

There is but one kind of rye, but this may be made either winter-rye, or spring-rye, by gradually habituating it to different times of sowing. Take winter-rye, for instance, and sow it later and later each fall, and it may at length, be sown in the spring; and then it becomes spring rye. On the contrary, sow spring-rye very late in the fall, at first, and you may gradually sow it earlier each succeeding year, until it may even be sown in May, and used the first season for pasture, or mowing, and then grown to perfection the second year.

Soils of a sandy or gravelly texture, are the most natural for rye. Weak land will produce it, and it does not exhaust the soil so much as other grain. These circumstances render it peculiarly precious to poor soils, and poor people—to mountains of great elevation and to high northern latitudes.

A small quantity of dung or mud, about half the quantity used for other grain lands, will, if laid upon rye ground, greatly increase the value of the crop.

Rye is subject to rust, but seldom to smut. If affected with rust, the same management must be used as for wheat. The seed should be carefully selected, and thoroughly washed in lime-water, as the means best calculated to prevent the *ergot*; a disease to which it is most liable, and which is supposed to be an effect of too great humidity.

The quantity of winter rye usually sown, is about a bushel, if sown early; of spring-rye, a bushel and a half or more. If the grain is small, less is required. The seed should undergo the same preparation as wheat.

From the middle of August to the middle of September, is the best time for sowing. A poor soil requires earlier sowing than a rich one. When early sown, it affords excellent pasture both in the fall and spring. If the growth is luxuriant feeding it is necessary. Spring-rye should be sown as soon as the ground will permit.

Rye, intended for family use, should be harvested as early as the grain can be prevented from shrinking, and let lie on the ground a day or two, to harden, and well dried before housed. The flour will be whiter, and perhaps nothing lost in weight. Nearly all kinds of grain suffer on absorption, if they stand on the stalk after being ripe or fit for gathering. Rye is thought to be more liable to this kind of diminution, than any other kind of grain, except wheat. When mildewed, Rye, by standing too long before it is cut, not only loses a part of its heaviness, but it generates a rank quality, which is neither agreeable nor wholesome.

Although we cannot by any means, approve of sowing rye for many years in succession on the same ground ; yet for the benefit of those who intend to persist in the practice, we will extract an excellent system of management from the *Farmers Assistant*.

The soil most suitable for rye, is usually that which is most benefitted by the use of gypsum, it quickly covers the ground with a sward of white clover. Sow plaster in the spring, on the growing crop of winter rye ; and in the latter part of the fall, turn in the clover. In the spring, sow spring-rye ; and immediately after this is taken off, turn in the stubble, &c. for a crop of winter-rye ; and in the spring repeat the process of manuring with gypsum, as before, for a crop of spring-rye ; and thus proceed with these crops alternately. In this way, by the addition of the spring crop, nearly double the amount of grain can be obtained.

BARLEY.

Barley is adapted to various soils and climates ; it is less subject to the attacks of insects, and more easily preserved than other grain. In times of scarcity, it is a good substitute for wheat, and at all times, yields a beverage, under the names of beer, ale or porter, equally wholesome and invigorating. It is besides, a food, on

which cattle do well, and horses arrive at their greatest possible perfection.

Though not so nice in relation to soil, as either wheat or rye, still barley prefers a loose, warm and moist (not wet) soil, and even grows remarkably well in a sandy one, in succession to suitable crops. It requires a soil in good condition, and, like many other crops, turns to poor account when sown on such as are poor.

Mr. *Deane* found it to answer well in a clayey soil, that was scarcely fit for any other grain. It is well calculated for New England, bearing drought well, and generally yielding a good crop.

About two and a half bushels, is a suitable quantity for an acre. It receives essential benefit from being soaked in lye, brine, the black water taken from a reservoir in the barn-yard, or some other fertilizing liquor. Adding some saltpetre to the liquor in which it is soaked, may prove of great service. All the oats and poor seed that rise to the top of the water, should be skimmed off. To prevent it from degenerating, the seed should be frequently changed. To change the kind, may also be advantageous.

The ground should have two ploughings at least. As the roots of barley extend deep, the ground should be mellowed at least six inches. It should be covered with a short toothed harrow, and then a roller passed over it, which, besides other advantages, makes it tiller into numerous stalks. Sea weed is an excellent manure for this grain.

It should be sown as early as the ground will permit, and immediately after ploughing, while the ground is moist.

If the blade grows rank, mowing is better than feeding with sheep; for the sheep, by biting low, injure its future growth.

Barley is ripe, when the red color on the ear is gone off, or when the ears fall down against the straw, and the stalks have lost their verdure. No grain perhaps requires more ripening; and it is not apt to shatter out when very ripe. By lying a night or two in the dew after it is cut, it is supposed the beards will come off easier. If it is full of weeds, it must lie in the swarth till they are dry. It should be threshed soon after har-

vesting. Forty bushels can generally be obtained from an acre.

Some farmers have not been successful with barley. It was probably owing to the want of *manure*, or sufficient *ploughing* and *harrowing*; to *degenerated* seed; to the *kind* not being adapted to the soil; or, to an insufficiency of seed, which caused the grain to be choaked with weeds. If the farmer has satisfied himself as to all these particulars, and still finds himself unsuccessful, he may conclude that the soil or the climate where he lives, is unfavourable to its culture.

BUCK WHEAT.

The principal excellence of this grain is for making an agreeable bread; for the cakes made of its flour, if eaten while warm, are generally much relished.—When ground, or steam boiled, it is very good for fattening swine, and other animals: The straw is useful for cattle and sheep, if salt is sprinkled amongst it, when staked: And the flowers afford food for bees at a season when the meadows and trees are nearly stripped of them.

A light mellow soil suits it best. It will grow with more indifferent culture than, perhaps, any other grain. It is much assisted by gypsum, where that manure is suitable to the soil.

It should be sown from half a bushel to 3 pecks to the acre, if the land is good; if poor land, one bushel is best. To wet the seed, and dry it with a sufficient sprinkling of plaster, will much assist the growth. Rolling immediately after harrowing has been found useful.

Buck-wheat should be sown just early enough for the crop to escape the frost. It is an old maxim not to sow it until the chesnut trees are in full bloom. Mr. Deane says it should not be sown till after the middle of May. About the first of July may be considered the proper time.

The crop when ripe, is cut with a cradle, left a few days to dry, raked in small bunches in the morning, carted in the heat of the day to the barn, or centre of the field, and threshed out immediately. It is said, the crop is easier raised, harvested and threshed, than any other.

OATS.

The oat is, among grain, what the ass is among animals—very little respected, but very extensively employed. In the poorest soil and with the smallest possible labour, oats give something; but because they do not give much, (in circumstances under which other grains would give nothing,) we infer, that the grain itself is a poor one. This is considered a better crop than barley to sow grass seeds with. Oats succeed well after almost every sort of green and root crop, but should not be cultivated after wheat, rye, or barley, where it can possibly be avoided. In a succession of crops, oats may sometimes be sown to advantage the first year after the breaking up, before the land can be made mellow and deep enough for other crops. (See rotation of crops.) Being hardy they may be cultivated upon almost any kind of soil; but are most productive on such as are strong, rich, and adhesive.

The quantity recommended to be sown, by different writers varies from one and a half to four bushels per acre; from two to three bushels, however, may be considered most proper. To change the seed occasionally is recommended.

Generally, it is best to sow oats as soon as the ground can be properly prepared in the spring; but where land is not liable to be much affected by drought, they may be sown at any time that will enable the crop to ripen before the close of the season. A late crop of oats is very effectual in destroying weeds. It would be a great improvement to have the seed steeped, and the land rolled, as for barley. In whatever way they are cultivated, they require the ground to be well stirred up and mellowed, and to be in good condition. It is a mistaken notion, though entertained by many, that slight culture will answer for this crop, or that this grain can be cultivated, to any advantage, in poor lands, without manure. Gypsum is a suitable manure for oats.

The crop should be harvested rather green, as this makes the straw much better for fodder, without any injury to the grain. Besides, as oats are extremely liable to shed on being cut down, cutting the crop a few days before it is perfectly ripe, will be a considerable saving in grain. The straw is so valuable a fodder, it is

better to cradle than to reap this crop. Though they should be well dried on the ground after cutting, they should not be raked or handled at all, when they are in the driest state. It should rather be done in mornings and evenings, when the straw is made limber and pliable by the moisture of the air. When housed, they will pack closer than other grain, and therefore a little more caution is required to prevent their heating. Oats make a good substitute for hay, if mowed while green; and this may be more profitable than suffering them to ripen when there is a prospect of scarcity of this article.

MILLET.

(*Panicum miliaceum.*)

The stalks and leaves of this plant resemble those of Indian corn, though much smaller. It grows to the height of three or four feet. A sandy soil suits it best. It bears drought admirably well. It is said to produce as large a quantity of grain as Indian corn; when cultivated in drills three feet apart and six inches in the rows; but owing to the difficulty in saving the crop on account of birds, of its ripening unequally, and its shelling out, it is generally thought best to sow it broad cast and cut it when in milk for fodder.

Mr. Reeder, of Pennsylvania, sowed one peck to the acre in May, and put in four acres; cut it middle of August, and dried it in the sun two or three days. He had 75 bushels of seed to the acre, and six tons of fodder on four acres. His cattle relished it very well.

It is stated in the *Plough Boy*, that millet sowed in June on good ground will give from two to four tons of fodder, and from twenty to thirty bushels of seed, equal to corn for fattening hogs. It is cultivated in Pennsylvania and Maryland as a fodder-crop, and cut in the milk. It is preferred in winter, by neat cattle, to clover.

The *American Farmer*, gives the following very flattering account of this grain. Millet sown from the first of May, to the 20th June, has invariably furnished more fodder than could have been obtained from grass under similar circumstances. On the 5th of May, five bushels were sown on four acres—on the 5th of July it was harvested, and estimated at four tons per acre. It requires

in all cases, fine tilth, and as much strength of soil as is necessary to produce heavy oats.

A crop of fodder can be produced if sowed as late as the last of July.

SEED.

The choice of seed intended to be sown, is an object of greater importance than many farmers seem to imagine. It is not sufficient that the finest grain be chosen for this purpose, unless it be likewise clear from weeds. In procuring seed, it should, therefore, be a rule with the farmer to purchase or reserve such as is the most full, plump, sound, clean, and healthy, whatever the sort may be; as it is perhaps only in this way that crops of really good grain can be ensured. It is the same in some measure with plants as with animals, that the produce is in a degree similar to that from which it originated. Where shrivelled-up and imperfectly ripened seed is sown, in general, but a little of it vegetates; and that which does, mostly sends forth plants of a weak and feeble kind.

Whenever we perceive that what we possess is deteriorating or inferior to that of others, no time should be lost to obtain by purchase, exchange, and by our own exertions those kinds that promise a better and more certain yield.

As it is not practicable for farmers generally to change their seeds either annually, or even every few years; they must select therefore with great care, the best part of their own seeds and roots for future cultivation.

• Make frequent selections of the most *perfect* plants of every kind, cultivate these by themselves, for the purpose of raising new and improved stocks of seed of every kind; and, when these are different *species*, be careful to set or plant them as much as 100 yards from each other, to prevent them from mixing, and producing spurious or degenerated seeds. Thus, in making selections in wheat, search for such heads as have the largest seeds, and the greatest number in each head. In flax, for the longest stalks, and such as have, at the same time, seeds of good size. In pumpkins, for such stalks as bear the greatest number, and these the largest, and sweetest, &c.

In many kinds of plants, such as Indian corn, pumpkins, &c. the selections may be yearly repeated, without much inconvenience. In others, such as wheat, barley, &c. yearly selections would be too expensive. In such, let selections be made, say, every eight years; and from the seeds of the plants thus selected raise a yearly stock, sufficient to serve for seed. The more constantly the selections are made, however, the more valuable the products will be.

The inferiority of our seed grain, is attributed in a great measure, by a writer in the *Plough Boy*, to the practice of stowing into the barns every sort of agricultural produce. On the hay, new wheat, rye, oats, barley, are all promiscuously piled, and are taken thence to be threshed, as occasion or convenience may dictate. It is known to be impossible to handle corn of any description, after it is ripe and dry, without shaking out and dropping some of the grain. If the wheat be uppermost, straggling seeds will fall among the barley or the rye beneath, and these latter, in their turn, will contaminate the oats, so that an unmixed sample, fit for seed, can scarcely be produced, under such treatment.

Grain that is designed for sowing should always be kept well aired; for, if deprived of air for a considerable time, it will not vegetate. Seed recently threshed from the straw, with a clear and thin skin is best.

In order to determine the goodness of seed, especially when old, take fifty grains at random from the parcel; sow them in good mould, at a proper depth, and carefully observe how great a proportion fail of coming up. They may be sown in a pot, and kept in a warm part of the house, when too early to plant in the open field. This method of determining the quality of seed, may save much labor and expense.

Previous to sowing, seeds should generally be soaked about twelve hours in some fertilizing liquor; a strong solution of saltpetre, or common salt with lye of wood ashes and old urine is believed to be best; sowing them immediately after being dried, with a sprinkling of gypsum; or lime, or ashes, when gypsum is not to be had. This is more particularly necessary when the right season for sowing has elapsed.

SOWING.

There are three methods of committing seeds to the ground, viz. *In hills*;—*in drills*;—or *continued rows*; and *in the broadcast method*, or *a cast of the hand*.

The first thing relating to *sowing*, is the preparation of the ground. It may be more or less *fine*, according to the sort of seed to be sown. Small seed require finer earth, than those which are larger. But, still, the finer the better for *every thing*; for it is best if the seed be actually pressed by the earth in every part; and many seeds are benefitted by the use of the roller. The ground should be good, either in itself, or made good by manure of some sort. In all cases, the ground should be fresh; that is to say, it should be ploughed, &c. just before the act of sowing, in order that the seeds may have the full benefit of the fermentation, that takes place upon every moving of the earth.

Sowing too early in the spring may be as injurious as sowing too late; for, if the ground be not well pulverized, and sufficiently warmed, before sowing, the seeds will come up slowly, and be stunted in their growth. A due temperature of the season, with respect to heat or cold, drought or wet, for all these greatly influence the state of the earth, is essentially necessary, and should be carefully attended to by the husbandman, when he sows; but the precise time most proper for this work, cannot, by any means, be invariably fixed, because it will always depend on the concurrence of a variety of circumstances. The seasons are more or less forward, and the ground is more or less dry, in some years, than in others. A proper series of well made observations, would furnish the best rules in this respect, but certainly would not fix the time of sowing to any particular day, or week, for years to come. *Linnaeus's* method, of observing the foliation of trees, &c. would determine the proper times for spring sowing. Why, says *Pliny*, does the husbandman look up to the stars, of which he is ignorant, whilst every hedge and tree point out the season by the fall of their leaves? This circumstance will indicate the temperature of the air in every climate, and show whether the season be early or late. This constitutes an universal rule for the whole world; because trees shed their leaves in every country, according to

the difference of the seasons. This gives a general signal for sowing; nature declaring that she has then covered the earth against the inclemency of the winter, and enriched it with this manure.

It can, therefore, only be observed in general, that it is better to sow early in autumn, than too late, provided the season will admit of it; because the plants are better able to resist the severity of the winter, after they have acquired a certain degree of strength; and their roots being then longer, and better fixed in the earth, will be less liable to be thrown out by frost.

A spot that has been newly cleared by burning, may be sown later in autumn than other land, to prevent the grain from attaining too large a growth before winter, which will render it liable to be killed by frost.

Where land is very rich, it ought generally to have more seed than if it be poor; and if the size of the grain be large, the quantity sown should be greater than when they are small. When seed is very large and full grown, two bushels may not be more than equal to one that is small and pinched.

The expense of English grain, as we call it, has brought the people of this country into the bad habit of sowing it too thin. Need the farmer be told, that, in all his operations, parsimony is never so ill judged, as when exercised in withholding the requisite quantity of seed? The greatest increase from the seed, is not to be accounted the most profitable crop. A yield of thirteen for one may be of more advantage than twenty for one. If one bushel of wheat sowed on an acre, produce twenty, and two bushels sowed on an acre, produce twenty-six, it is manifestly more profitable to sow the two bushels. The farmer may consider one of the two bushels as yielding twenty, and the other six. But as the labor in both cases is precisely the same, it is clearly more profitable in this case to have thirteen for one increase, than to have twenty for one. Besides, by sowing thin, there is room given for weeds to rise, and overrun the crop, without interruption.

M. Duhamel found, by experiments, that few seeds will come up, if buried more than nine inches; that some will rise very well at six inches; and that others will not rise if buried two inches. Those seeds which,

in vegetating, are thrown out of the ground, such as beans, &c. ought to be buried lightly; and, in general, it may be observed, that very few seeds require to be deeply buried. In light soils they should be buried deeper than in stiff and cold ones. When the ground is rolled, after sowing, seeds will come up with a lighter covering of earth, than where this is not done.

Much depends on having the seeds sowed as evenly as possible; and for this purpose they ought to be sowed when the weather is not windy, particularly those which are light, or easily wafted away. In sowing some seeds, it is advisable to go over the ground twice; sowing one half of the intended allowance of seed one way, and the other half crosswise.

For the proper time of committing each kind of seed to the ground, and the quantity to be sown of each, see the articles of which the seeds are to be sown.

DRILLING

Is a method of sowing seeds with a machine, by opening one or more furrows, at proper distances from each other, of a depth suitable to the seed to be sown, and at the same time dressing the seeds, and covering them all at one operation. It is drawn by one or more horses, according to its size; or it may be drawn by hand, or pushed forward, something similar to the manner of pushing a wheel barrow, where a machine for drilling a row at a time is to be used.

Of this latter description, may be those for drilling in the seeds of Indian corn, beans, turnips, onions, and generally all seeds which may be cultivated in rows, or drills, to advantage, and which have seeds of such shape as can be properly dropped at suitable distances with this implement of husbandry.

One man with a drill, to be drawn either by hand or by a horse, as the case may require, will perform as much as six, eight, or ten men, in the same length of time, without the use of this implement; besides, the work done with the drill, will be found much better executed, and with a great saving of seed.

Drills, however, are only proper for grounds which are clear of stones, and other impediments to the use of these machines.

Those who have used them in this part of New-England, consider them of *great utility*.

For the descriptions and drawings of the different kinds of drills, we refer the reader to the Encyclopedias lately published.

HARVESTING.

When crops are suffered to stand on the ground until they have fully ripened, they exhaust the soil considerably more, than if taken off in a green state. The same is the case in regard to weeds of every description. Perhaps the remark is not so fully applicable to crops of roots.

It may therefore be said that lands are negatively improved, in a saving of their usual exhaustion, by taking, such crops off the ground as soon as they have attained a sufficient degree of maturity. This is a matter that is worthy of consideration, especially when it is remembered that several kinds of crops may be severed from the ground, without injury, in some cases with a saving, before they have fully ripened.

Thus, Indian corn may be cut up while the stalks are still greenish, and set up in shocks for the ears to harden; and in this way much good fodder will be saved; the ground is less exhausted, and the grain is said to be as good. By harvesting oats while the stalks are somewhat green, they will be the better for fodder, and the grain will receive no injury thereby. The same may be observed, to a certain extent, in regard to crops of wheat and rye.

Flax pulled when just out of blossom is considered by some the best. The pea-crop is injured by standing too long; as in that case the hull becomes of little value. In short, no crops of grain derive any benefit from standing until the stalks are completely dead, except when the grain is to be used for seed.

The period at which wheat, and in short, all the other sorts of white crops should be cut, is when the straw begins to shrink, and becomes white about half an inch below the ear; the circulation is then cut off, and all

further benefit from its standing is at an end; the grain has, in fact taken every thing that is requisite to perfect it from the ground.

By cutting early it will yield more and whiter flour; will waste less by shelling; the harvesting will be expedited, so as to prevent the waste of shelling, by having the last cuttings become too ripe; and as far as the value of the straw, whether for fodder or other purposes, is concerned, an advantage is gained by cutting it while the circulation is going on, and by that means preserving a part of the natural juices; the value of straw, like that of hay, depending upon the proportion of natural juices it contains, and the pains which have been taken to preserve them.

Some farmers determine when grain is fit to cut, by the following signs: when the straw is all turned, excepting at the joints; when the kernel becomes so hard, that it cannot be mashed between the thumb and finger; or when the straw below the ear becomes so dry, that no juice can be forced out by twisting it. If the weather is fine, it can be bound, and put into the shock immediately after cutting; but if the stalk is stout, and the ear full and heavy, it should lay till the after part of the day; it can then be bound, shocked, stacked, or carted with safety, provided it is housed where it can have free air, or the mows do not become too large. Sheaves should generally not be larger than can be bound with a single length of the straw. Grain should be carted when the air has a small degree of dampness, to prevent scattering.

When a severe blight or rust has struck rye or wheat, it should be cut immediately, even if the grain be in the milky state; and it should lie on the ground, but not so close as to injure the heads, until such time as the stalks have become dry and the grain somewhat hardened.

It is mostly advised that such grain as is much infested with weeds, should be cut three or four days earlier than is usual, that the weeds may wither before the grain become too ripe. A single shower, or even a day's gentle rain, while it lies in swath, will not injure it. It is a most essential object, to cut the crop very low, to prevent both the waste of grain, and the loss of straw, the unavoidable consequences of high cutting.

When grain is stacked, a light floor of boards should be mounted on four blocks, set in the ground, and so high as to prevent the entering of vermin. In building a stack, care should be taken to keep the seed ends of the sheaves in the middle, and a little higher than the outer ends.

As soon as Indian corn is ripe, it should be harvested. If killed by a frost, it should be immediately cut up by the roots, before the leaves have had time to wither and set up in shock, having the tops tied together to keep out the rains. In this way the ears will ripen, in the same manner as when left to ripen in the stalk.

MILDEW OR RUST.

Mildew is that disease of wheat which causes the stalk to become covered, in a greater or less degree, with a redish or dark substance, something similar to the rust of iron. It is undoubtedly occasioned by parasitic plants of the *Fungi* order. The spots in the stalks consist of bunches of small *fungi*, of the mushroom tribe. What is called *blight*; is apt to affect wheat sown on intervale grounds, adjoining waters which occasioned a heavy fog in the morning. We know of no remedy for this.

Mildew or rust is the principle obstacle to the growth of wheat and rye in New-England. It is said generally to commence in warm rains, or a long season of warm, moist weather.

Mr. *Butler* attributes it to the application of rich manures; to the cultivation of wheat upon a strong, or rich soil; or their two frequent application, or too long continuance upon light or moderate soils.

The remedies against rust or mildew are :

1. Cultivating hardy sorts of wheat.
2. Early sowing.
3. Raising early varieties.
4. Thick sowing.
5. Changes of seed.
6. Consolidating the soil after sowing.
7. Using saline manures.
8. Improving the course of crops : and
9. Extirpating all plants that are receptacles of rust.

If a field of wheat or rye be evidently affected, and the progress of vegetation stopped, the only way to pre-

serve the straw and the grain, if any has been formed, from being entirely lost, is to cut it down immediately, even though the crop should be far from ripe. The straw is thus preserved either for food or litter; and it is maintained that any nourishment in the straw, will pass into and feed the grain, and make a greater return than could well be expected.

SMUT

Is a distemper in grain, which dissolves the substance of the kernel, turns it to a black dust, and bursts the coat of the kernel. The real cause of smut has escaped the researches of many philosophers. The methods of preventing it, recommended by different writers, are various.

It is said in the *Pennsylvania Farmer*, that smut in wheat may be removed by sinking a vessel that contains the seed beneath a running stream, or under a pump; stirring it briskly with a broom, whereby the balls, if any, of this pernicious substance, will float away or may be skimmed off, and if there be not any of them, but some of the powder adhereing to the seed-wheat, this active stirring and brushing will cleanse it.

From various experiments it has been found that steeping grain 24 hours in lye will prevent smut. Let the lye be made pretty strong, and if the wheat be steeped longer than this length of time it will not injure it, unless it be kept too warm. Lime water, and brine, applied in the same manner, will no doubt answer the same purpose.—(See the article wheat.)

Seed-wheat which has been well ripened before harvesting, is much less liable to smut than that which has been cut early. Wheat that is very smutty, should not be harvested, until fully ripe. Great care must be taken, not to thresh wheat on a floor where smutty grain has been threshed, to convey it in the same bags, or to mingle it with other wheat in the same mow; because smut is believed to be somewhat infectious. It is recommended therefore, that smutty wheat should be threshed in the field.

POTATOES.

The potatoe, the prince of roots, being of easy cultivation, generally abundant in its produce, and of quick

growth—ripening in three or four months, and being allowed by all to be the best substitute for bread, (though it is not many years that it has been in so general estimation,) has now attained its true point of estimation and usefulness in farming; being applied to numerous and important purposes.

There is almost an endless variety of potatoes. Valuable kinds are every year disappearing, and new sorts coming into notice. It would be easy to name many sorts, but quite useless. The best way to obtain new varieties, is from the seeds of the apples. Gather the ripe apples, wash them in water to clear them from the pulp; then dry the seeds, and next spring sow them in a bed which is to be kept clear from weeds. In the fall the small potatoes produced by these, can be assorted and planted the following spring, when they will produce potatoes of the usual size, and the varieties can be ascertained.

Potatoes will grow in almost any soil if suitably manured; but best in one that is light, cool and good, especially a fresh one.

Wet land produces too much top, and a watery fruit, unpleasant to the taste. Very dry land produces a small and nurly crop. Land that is apt to bake or shaded by trees should also be avoided.

The preparation of the ground for potatoes should be similar to that for Indian corn. It should be deep, because roots will commonly grow as low as the soil is stirred, and no deeper; and all land that is not green sward, ought to be well pulverized before planting. The quantity of manure necessary for a potatoe crop, must differ according to the nature of the soil and other circumstances. Twenty loads of barn-dung spread over an acre of land, may generally be considered a suitable quantity. If a sufficient quantity cannot be furnished to cover the whole surface, apply it to the drills, or hills only. Coarse crude manures, such as fresh barn-dung, moss, peat, turf, in short, any manure, that serves to keep the ground loose and mellow, will answer for this plant. If land is moist, manure should be of a light or strawy kind; if dry, finer and moister.

No field culture admits of greater variety than the potatoe; some farmers select the largest for seed, and plant one in a hill; others select the smallest, and plant

several in a hill; some divide the largest potatoes into two parts, and put one half in a hill; others both halves; some divide both the large and small potatoes into four parts, and place the four pieces in the hill at 4 to 8 inches asunder; others cut out the eyes, and plant them promiscuously, like Indian corn, 4, 5, or 6 in a hill; all these modes have answered well. We believe, however, it will be found the best economy to plant at least middle sized whole potatoes, of the best formed and soundest roots, or cut potatoes, equal in bulk to those. Each piece should have one or two good eyes. Cut them about a week before planting, to prevent them from imbibing too much moisture. If the land is dry, wet and roll them in plaster: or it may be better to sprinkle on gypsum before the cut parts have dried.

Early in May is perhaps the right season for planting potatoes in a dry soil. They will sometimes do well planted the last of June. On all soils they should be planted as soon as the ground is warm. An early crop will be dry and mealy, a late one unsolid and watery.—Planting in hills is no doubt best for rough ground. But in a rich, mellow soil, well prepared, the drill method is best. Furrow the ground about three and an half feet apart, after the manure is placed, drop the potatoe on it about 8 inches apart, and cover them thinly.

When they are about 5 or 6 inches high, the plough should go and return in an interval, turning the earth at the first ploughing from, and at the second (which should be before they blossom) towards the rows. After each ploughing a little earth must be drawn round them with the hoe, taking care not to hill them too much: For they will not grow well more than 4 or 5 inches under the surface. The ridges or hills should be rather broad than steep; and flat on the top, to retain the moisture. If any weeds should afterwards rise, they should be cut up with the hoe, that none may go to seed.

The blossom should be taken off as soon as they appear, as this has been found, by experiments accurately made, to increase the crop about one sixth part.

Potatoes should be dug and housed as soon as they are ripe, before the vines are entirely dead. Exposing them to the sun and air, is generally supposed to be injurious to them. In gathering a crop it is recommended to run

furrows on each side of the rows and then a deep one in the middle, which turns most of them to the surface. Passing a fine toothed harrow over the ground, will aid in the work—hogs can be turned in to take the few that are left. It is said that one man can throw out of the hill, with a four-pronged fork, as many as five or six hands can pick up and cart. (Suitable forks are for sale at the Repository in Boston.)

For fattening all kinds of cattle they are very good, when steam boiled; the juice of potatoes is injurious, the water in which they are boiled should always be thrown away. In a raw state they are considered less nourishing for hogs, than any other animal. The potatoe is a very important article. Some writer calls it a little loaf ready for cooking. This plant, and maize, are indigenous,—the most valuable vegetable productions of which this happy continent can boast,

RUTA BAGA.

The Ruta-Baga, or Swedish turnip, is considered superior to any other kind of turnip for stock; and is suitable for all kinds of creatures except milch-cows. It is the sweetest kind, especially when steam-boiled. Its flesh is harder and more consistent, which better enables it to withstand frosts, and to keep from one year to another. It is raised as cheap as Indian corn. The average product on land well prepared, is from five hundred to six hundred bushels. The tops, when cut before the roots are gathered, are valuable as green feed for stock; yielding, according to Mr. Cobbett about four waggon loads per acre. Sandy and sandy-loam soils, where they are sufficiently manured, are considered best for all kinds of turnips; but any rich, dry, mellow soil is good.

To prevent degenerating, Mr. Cobbett recommends the following management. Select the fairest and best formed roots for seed, rejecting those of a whitish color, or greenish towards the neck, preferring such as are of a *redish cast*. Preserve them carefully over the winter; and set, in March or April, in a rich soil, remote from the roots of the turnips, or cabbage-kind, to preserve the seed pure and unmixed. Two or three roots if they do well, will yield seed sufficient for an acre of land. Let the seed remain in the pods, until the time of sow-

ing; which is from the 20th of June to the first, or even 10th of July. It is recommended, if the soil is dry, to steep the seed and roll them in gypsum.

The ground should be twice deeply ploughed, and then harrowed. Furrows are then to be run at the distances of about thirty inches, the plough passing twice in the same place, and turning the furrows back to back. In the bottom of these furrows suitable manure is to be placed evenly along. If the soil is previously pretty rich, fifteen horse-cart loads will be sufficient; if otherwise, thirty ox-cart loads should be used. A furrow with a horse plough, is then to be run on each side to cover the dung. Level the top of the ridges, which should be but very little elevated, except in wettish land, and drill, or plant the seed by hand, about a foot apart, or less if the ground is not rich, and two or three seeds in each hole; pressing the earth upon them a little. When the plants are well up, plough and hoe them. In due season, thin them, leaving but one in a place, and fill up vacancies by transplanting. After this, they must be ploughed and hoed once or twice, and the weeds on the ridges taken out with the hoe or the hand.

Another method highly recommended is to transplant ruta бага. This may be done after the 15th of July, and after a crop has been taken from the ground; but the first of July is probably a better time. In transplanting it is recommended, that it be done immediately after a heavy shower, that the plants be of five or six weeks growth, and that in setting, particular care be taken to press the earth closely against the bottom of the roots.

To save labor, some prefer sowing the seed broadcast; and hoeing once among them, thinning out the plants to proper distances. A crop of six hundred bushels was raised upon one acre of a clover lay in New-York. The grass was cut about the 20th of June, about twelve loads of manure spread over the ground, which was immediately ploughed, one pound of seed sown, and harrowed in lengthwise of the furrows.

The time of harvesting is before the frosts set in, say not to exceed the 10th of November. The earth can be turned from the roots with the plough, in dry weather, and then gathered by hand. The crop may be se-

cured over the winter, in the usual manner of securing potatoes, either in the cellar, or in pits dug in some dry field, and covered close and secure. The tops should be put in small heaps to prevent them from heating, and fed to cattle.

Ruta Baga does not come to its sweetest taste till February. To fat cattle, they must not be given in so great a quantity as to occasion a continual looseness. Hogs will feed and fatten on them; cut small, they are remarkably fitted to fatten sheep; and the horse, when accustomed to them, is said to prefer them to grain. They should be put into a tub, and cut small with an instrument like a hoe, with the blade put perpendicular into the shaft. A man will with this instrument cut as much in one hour, as six horses will consume in twenty-four. For all animals, they are improved by steaming or boiling.

The French turnip nearly resembles the Swedish, and requires about the same culture, &c.

TURNIPS.

Turnips are cultivated in two ways, viz.—in the broadcast and drilled methods. They succeed best in a light, sandy loam. Upon new or fresh ground they are always sweeter, than on old cultivated fields. Though such is the kind of land best adapted to the raising of turnips, yet they are cultivated upon every sort of soil in use as arable land. Much of the sandy soil now lying waste in various places, might, with the assistance of culture, and a small portion of manure, be profitably employed in producing turnips; for such ground, if dressed with a light coat of clay or loam, would yield excellent crops of this vegetable.

The ground intended for the production of turnips in the ensuing season, ought to be deeply ploughed in October or November, and to be left in that rough state, to receive the benefits of the winter frosts, &c. In the April following, harrow it, about the middle of May give it a deep cross ploughing; and in June harrow it again. Just before sowing, spread a good coat of manure, plough it in lightly, and mix it well with the harrow; sow the seed and harrow it in with a light harrow, and roll the ground.

‘ Ah ! says the farmer, this will never do ; the crop will not be worth the expense. First make one fair experiment, and we are confident you will not give up the pursuit ; you ought to take into consideration, that after the turnips are off the ground, it will be in a high state of preparation for several successive crops, of various kinds, and that without this, or similar tillage, it may remain during your life in an unproductive state.

The time of sowing depends upon the application of the crop ; from the middle of July to the first of August, is the proper time, if intended for winter feeding. A damp time should be chosen.

The quantity of seed sown on an acre by the turnip farmers, is never less than one pound, more frequently a pound and a half. The crop may be greatly augmented in product, by going over the ground, once at least, with a hoe, for the purpose of extirpating the weeds, and thinning the plant, so as to stand from six to eight or ten inches apart, according to the size they are expected to grow. If the weeds rise again, as they commonly will in old ground, the hoe should be applied the second time. Here again will the farmer exclaim against the expense and trouble of hoeing ; but let him try one acre in this way, and leave another of the same quality to nature, as is too frequently done, and he will find, says *M. Mahon*, that the extra produce of the hoed acre, will more than six times compensate for the labor bestowed.

Among numerous precautions, recommended to prevent the destructive ravages of the fly, the following are considered the most effectual. To steep the seed in fish oil twelve or twenty-four hours, drain it off, and mix the seed with dust or plaister, to separate and enrich it. Or in a dry season, soon after the plants have come up, sow very thinly over them, some powdered soot or lime, in a dewy morning. But probably the most effectual method is, to use a heavy roller after sowing. The turnip fly is always found most numerous in rough worked ground, as there they can retreat and take shelter under the clods, from the weather, birds, &c.

Some strongly recommend cultivating the common turnip in drills, in a manner similar to ruta бага, except that they are allowed to grow nearer each other in the

rows. The seed should be liberally strewn, in order that if part of the plants be destroyed by the flies, enough may still remain.

Turnips are raised very successfully, by ploughing in the stubble on rich land, harrowing the ground lightly, and sowing two pounds of seed to the acre. When the plants are above ground, give them a light covering of ashes. When they are four inches high, run a furrow with a horse plough through the field, and return with another, at the distance of three feet from the former, in this way the whole can be ploughed into rows, thinned and hoed in a proper manner. The plants turned under, furnish considerable manure.

Another method is, to plough in the richest stubble fields immediately after harvest, dress the ground with plaster, live or leached ashes, or compost manure, and harrow in the seed.

When the ground is folded for raising turnips, instead of sowing this crop the first year, let it be frequently ploughed; in order to kill all the weeds, and sown early with flax the next spring, and then with turnips, after the flax is taken off. Great crops of flax may in this manner be raised.

As turnips are thought by some to be an exhausting crop, it is necessary to apply considerable manure, or to feed a part of the crop upon the ground, to prevent the soil from being injured. Where sheep are a part of the stock of fattening cattle, a quantity sufficient for them may be left in the ground. Thus, if they are to consume a fourth part of the whole crop, leave every fourth row, and by this means their manure will be more equally distributed.

Those that are not fed on the ground, must be harvested (in New England) about the end of October, or even earlier in some places. Those that are intended for early feeding, may be topped, and preserved from frost some time in the barn, covered with litter. Such as are intended to be kept till spring, should be covered with potatoes, or dry sand, to prevent them from being pithy.

Common white turnips require to be fed out before they grow spongy. The most excellent mutton is fattened on turnips, and they are a good food for horned cattle.

But if fed plentifully to milch cows, they are said to give the milk an ill taste. (For saving the seed, see seed.)

Mr. *Little*, of Massachusetts, in 1821, raised 615 bushels of common turnips on an acre. The entire expense of cultivating this acre, including thirteen dollars for manure, was twenty-eight dollars and seventy-five cents.

Mr. *Melville*, of Pittsfield, Massachusetts, in 1817, raised about 800 bushels of common turnips on an acre! We will briefly state his method of culture.

The ground was *old improved land*, half in sward, and half potatoe ground. Ploughed it 20th May, and harrowed it well twice. Ploughed and harrowed it again 20th of June, and formed it into drills, about twenty-eight inches apart,—next day, carried on fourteen loads hog manure, seven of sheep, and seven of barn manure, applied it to the drills, and planted it immediately. Next day sowed on thirty bushels slacked lime, and fifteen bushels ashes; to extend the experiment, divided the top dressing equally on the different kinds of manure, (so as to ascertain which manure, and which top dressing was most suitable for turnips) left about two square rods without either manure or top dressing, and marked off three drills not to be hoed at all. On 10th July harrowed; 15th hoed them, leaving one plant in four or five inches. That part with sheep manure and ashes was the most promising; and that with hog manure and ashes next. After hoeing, the drills with hog manure and ashes took the lead; those not hoed, were very diminutive. The 21st of July, harrowed again, and the 26th, hoed the second and last time. The 1st of August, began to thin out, to feed to cattle—in this manner, sixty-three bushels were used previous to harvesting. On the 5th November, began to take them in, and had *twenty-five oxen cart loads*. The expense of cultivation was seventeen dollars seventy-five cents. The average weight of the turnips was from four and a half to six pounds; several weighed ten, and one weighed thirteen and a quarter pounds; whilst those without manure, and those not hoed, did not average more than one and a half pound each.

MANGEL WURTZEL.

The Mangel Wurtzel, or Root of Scarcity, is a species of the beet. It grows like that, chiefly above ground,

into which it does not penetrate more than half its whole length. It would be apt to rot if the root was covered with soil. Its culture is easy—its advantages numerous. Both the leaves and the roots are good food for man and beast; nor are they liable to be destroyed by insects; they are also proof against the summer's drought, and the change of the season. It prepares the ground extremely well for other crops.

The more the land is manured and cultivated, the better the plants. In ordinary land, with common culture, they will weigh five or six pounds, and the leaves can be stripped four or five times in a season. In good land they often weigh nine or ten pounds, and are stripped eight or nine times. In a suitable soil, well manured, they frequently weigh fourteen or fifteen pounds.

Rich, deep, loamy soils are properly adapted to its culture; it is cultivated with success, on loamy land, with some mixture of sand in it; on such it is considered by some more profitable to cultivate than any other root, especially when the leaves are used for soiling.

The ground should be prepared to receive the seed, and cleared the same way as for *ruta-baga*. The manure should be of the finer kind. The roots will not get to a larger size in rows three feet apart than they do in rows two feet apart. The seed should be carefully selected from the most perfect plants, and that have been cultivated at a distance from other varieties. It is best when fresh, but will keep several years. It must be deposited in the earth about an inch deep, and from ten to fifteen inches apart, according to the quality of the soil. If vacancies occur, they can be supplied by transplanting.

The proper time for planting is the month of May. Every seed will have two or three roots growing together; as soon as they shew their fourth leaf, all, but the most vigorous plant, must be taken away. As soon as the head of the plant has spread, no weed can live underneath its shade, and the expense of hoeing afterwards is very trifling.

When the outward leaves are about a foot long, the first crop can be gathered, taking the under ones that bend towards the ground; breaking them off near the

root. In good land the leaves can be plucked off every two or three weeks.

Gather and store the roots away dry, before any frost, taking care that they are not bruised, which occasions their speedy decay. They may be kept in dry sand, to protect them from frost; or without sand, if in a place sufficiently guarded against frost. Those that are intended for the table, will be found much better, if covered with sand, or with other vegetables.

Mr. *Peters*, of Pennsylvania, gives a preference to this root, having tried all others, particularly for fattening neat-cattle, sheep, and store hogs; and says, that to some horses it is grateful and nutritive, though some refuse to eat it. The leaves, which are very abundant, he considers superior to any other green herbage, now in common use, for cattle that are not pastured.

In giving these roots to cattle, they are first washed and then chopped into small pieces. It is best to accompany them, when given to horned cattle, with some kind of hay, or chopped straw. Fed in moderate quantities to milch cows, they impart a delicate flavour to the cream and milk. Steam boiling improves them very much for fattening cattle. If they become frozen, they may be used for cattle, before they have thawed, by extracting the frost from them in water. In this way all kinds of roots can be managed.

In the year 1820, Mr. *Prince*, of Massachusetts, raised six hundred seventy and a half bushels of mangel wurtzel on one acre.

In 1822, Mr. *Little*, of the same state, raised nine hundred seventy and a half bushels on one acre, the whole cost, including manure, was \$23 96 cents.

Mr. *Powell*, of Philadelphia county, raised nine hundred eighty-two and a half bushels, on one hundred fifty-five and a quarter perches of land, which had not received more manure than is usually given to potatoe crops in that county. The whole expense was about equal to that of Indian corn.

CARROTS.

The field culture of carrots, for the purpose of providing a succulent food for winter's stock, begins to be, very deservedly, more and more an object of at-

tention. Among vegetables, the carrot is deemed by many writers, both in Europe and America, to combine more advantages than almost any other, considering the quantity and quality of its produce, and the effect of its cultivation, in deepening, clearing, and ameliorating the ground, for subsequent crops. They will yield, with the best cultivation, from six to eight hundred bushels to an acre. They require a mellow soil, into which they can easily penetrate deeply. They will grow very well on one which is moderately rich; provided it be well and deeply mellowed, to the depth of ten or twelve inches. If the plough do not go deep enough at once, it should be trench ploughed; that is, the plough should pass twice in the furrow. A fertile sand, a sandy loam, a dry warm loam, or a fertile gravelly loam, are each suitable for them, with proper manuring and cultivation.

The seed should be obtained from fine deep-red, or orange colored roots, carefully preserved, and collected only from the centre seed stalks. The pale colored roots, and yellow ones, are fast degenerating. About four and a half pounds of seed are sufficient for an acre, when sown broad cast.

Carrots should be planted as soon as the ground can be made light and loose, the last of April or first of May is late enough. They will do tolerably well later, especially if the seed are steeped. Before sowing or planting, rub the seed betwixt the hands, to take off the beards, to prevent them from sticking together; with the same intention it is sometimes mixed with sand, or fine saw dust. Put on a sufficient quantity of the most rotten compost, to make the ground rich. Fresh dung should not be applied to this crop.

The sowing is performed, either in the broad-cast way or the drill. In the former, the seed is covered with a rake instead of a harrow, to prevent its being covered too deep. The first hoeing being finished, after they have arrived to a suitable size, the ground can all be harrowed over, without any injury to one plant, perhaps, in fifty, if they are uncovered of the dirt thrown on by the harrow: This is a proper time to thin them, letting them stand about six inches assunder. A second hoeing should be given as soon as the weeds and the growth of the crop render it necessary. If the plants

grow luxuriantly, they can be thinned again and fed to the hogs. The crops are much larger, when the roots have sufficient room. (In England the usual distance is fifteen to eighteen inches each way.) Further hoeings will occasionally be requisite to keep the ground deeply stirred and perfectly clean. The hoeings are best performed with a sharp narrow hoe.

If the ground is not too dry, carrots should be sown on ridges, two feet apart; they may be made with a horse plough; and the top of each ridge should be levelled with a rake. Immediately after the ground is ridged and raked open a drill with a hoe, plant the seed pretty thick, cover about an inch deep, and press down a little with a hoe or shovel. About two pounds of seed will be found sufficient. Success in cultivating this vegetable, depends entirely on early attention, in weeding, thinning, hoeing, and ploughing—the plants should not be left for a crop nearer than three or four inches. It is not the number but the *size* of carrots that makes a large crop. If the plants are suffered to stand thick, they will necessarily be small, and of an inferior quality. They should at all times be kept free from weeds, and the earth loosened with a hoe. If they are planted on a side hill, be careful not to have the rows go *up and down*, as they are apt to wash. If heavy rains fall, the ground between the rows should be stirred as deep and as near to them, as can be done with safety to the roots.

Instead of one row on a ridge, some sow two rows, ten or twelve inches apart; and thin the plants to four or five inches distance in the rows, with intervals of three feet between the double rows, for tilling them with the plough.

Carrots grow considerably in October—the first of November is early enough to gather them. Run a plough close to the plants, so as to turn the earth from them, and they may then be easily pulled up. Where it is not convenient to do this, the spade and dung-fork will be found most convenient. Cut off the tops near, but not quite to the crown of the plant. All that are broken, or cut, being liable to decay must not be put with the heap. Carrots are easily kept in masses, in a cellar or place out of reach of frost, provided they be

dry when put into it. But if *wet*, they will be in great danger of heating and decaying. To prevent this they ought to be taken out of the ground in dry weather. If possible, after they are topped, they should be permitted to be in heaps, under cover, for eight or ten days.

Carrots will amply repay every expense of the finest culture; and from their extensive utility, it were much to be wished, they were more generally introduced. In the stable, they are a good substitute for grain to horses, not employed in any quick work, and partially to those that are: they are peculiarly well calculated for fattening oxen and sheep, as well as feeding cows, horses and hogs. One bushel per day is the usual allowance for working horses. The tops are valuable for cows, sheep and swine.

Mr. *Butler*, says that 500 bushels to the acre is a good crop, but that he has known 2,500 bushels to be raised upon an acre, or in that ratio; and that it is worth 2s. when given raw to hogs, cattle, and sheep, or 2s. 6d. when boiled, or steamed, and mixed with bran; such feed makes excellent pork, beef, mutton, butter and cheese.

PARSNIPS.

The cultivation proper for parsnips, is very similar to that for carrots, and the same kind of soil and manures are suitable for each. They, however, require the soil to be loosened eighteen inches deep; therefore they should be planted in a stronger soil than that appropriated to carrots; as they demand perhaps a better soil than any crop the farmer can put into the ground.

Trench ploughing may be suitably employed for this and the carrot crop. It is performed by first running a furrow the usual depth; then another plough follows, in the same furrow, and throws up the fresh earth over the old, sufficiently deep to bury that below the common depth of ploughing; then the next light furrow, with the first plough, throws the old earth into the bottom of the deep furrow and this again follows, with the second plough, and throws the new layer on the top of the old, &c.

Parsnips are considered as good for feeding and fattening of cattle as carrots, and are about equally pro-

ductive. They might be cultivated to advantage for feeding in the spring, when the stock of carrots has become exhausted; as the best way to keep them over winter is, to let them remain in the ground. If dug up in the fall, the best time is the last of November. Let none of the roots be wounded in digging up. The tops should not be cut off very close. It is better to keep them in a cellar that freezes than in a warm one. To prevent them from drying, cover them with dry sods or sand.

The greens of parsnips are as good for cow-feed as those of carrots; but if the crop is to stand out in the ground all the winter, the tops should not be cut off in the fall.

These have been long known among us as a garden vegetable, but are rarely met with in field culture; a fact the more extraordinary, as in England, they have been very extensively and profitably employed that way for more than half a century. They are easily raised, subject to few diseases, resist frost more than the common turnip, and are palatable to cattle.

Cabbages require a rich soil, rather moist than dry. A clay soil, well mixed with other matters, is very proper for them. They are said to grow well in drained swamps without manure. Hog dung, mixed with lime or ashes, or door dung and ashes are suitable manure for them.

The species most recommended, are the early Salisbury and York, the great Scotch, the Drumhead, and the green Savoy. The last is probably best both for man and cattle. The preparation of the soil for this crop, may be the same as that described for potatoes, which, therefore need not be repeated here.

It is a question, whether it is best to transplant cabbages, or to set the seeds in the spot, and at the proper distances where they are to grow. As the latter method is attended with the least trouble, it is to be recommended for field culture. New seed vegetates quicker, and is more to be depended upon.

About the last of May, plant the seed in rows three and a half or four feet apart, the hills one and a half or two feet from each other, and plough and hoe as for other hoed crops. In regard to the distance of

planting, it must depend in a great measure upon the goodness of the soil, and the natural size of the variety of the cabbage employed. In clayey soils, retentive of moisture, they should be planted on three feet ridges. Six or seven thousand cabbages will grow on an acre of ground. Strewing soot, ashes, or lime, round them, while young will assist considerably in keeping off insects which attack them.

Cabbages afford a most excellent forage for sheep, cattle or swine, till the month of February. When fed to milch cows, the decayed leaves must be taken off, or they will impart a bad taste to the milk and butter.

Cabbages for winter use should be pulled in dry weather, and hung up in a cool part of the cellar, with the heads downwards. But, to preserve them better for winter and spring use, let a trench be made in a dry soil, and line it with straw; set the heads closely together with the roots upwards; cover them with straw, and then with earth, piled up as steep as possible. In this manner, it is said, they will keep till May, and may occasionally be dug out as they are wanted.

Mr. *Winship*, of Brighton, Massachusetts, raised, in 1820, upwards of thirty-two tons on an acre. In England, twenty-five tons are considered an average crop.

BEANS.

The only species of beans much used in this country, is that which, in England, is called *Kidney-Bean*, and in France, *Haricot*; (*Phareolus vulgaris*.) The bean of English writers, is what is commonly called here the *Horse-Bean*, (*Vicia faba*.) Considerable confusion has arisen from the indiscriminate use of the term bean, applied as it is, by some good American writers on agriculture, to two very distinct genera or sorts of plants. The horse-bean (*vicia*) being tap-rooted, is much used in England as a fallow crop; and probably might be advantageously introduced here. White kidney-beans are almost the only kind used for field culture at present. They require dry land that has been tilled with care, so as to destroy the weeds; and of such fertility as would produce a moderate crop of Indian corn. Poor sandy soils, or gravelly loam, will produce them; provided the beans are wet and rolled in plaister before

planting. They can be planted in hills, or drills, the rows two and a half or three feet apart, according to the strength of the soil, and ploughed and hoed like other hoed crops. The time of planting is the same as Indian corn. Hog's dung mixed with ashes, is said to be the best manure for them. The hills should be from fourteen to twenty-four inches apart, according to the soil. They must not be so thick as to preclude the sun and air. Five beans will be sufficient to remain in a hill.

When about two thirds of the pods are ripe, and before the frosts, pull and spread them in rows; but they must be turned occasionally at midday, that the dampness of the ground may not mould those underneath. After thrashing, if there are any unripe ones which require more drying, spread them on a clear floor, under cover, till they are thoroughly dried.

White beans will yield from ten to forty bushels to the acre; twenty bushels is called a good crop. They are valuable for the table and for stock, particularly for sheep and hogs.

PEAS.

Peas, a leguminous crop, is proper to intervene between two calmerous crops, they are a good preparative crop for grain, as the ground is left mellow, and but little exhausted by them.

They are best adapted to smooth lands; as it is somewhat difficult to cut the crop on stony grounds. With the aid of gypsum they will grow very well on light sandy lands; and, generally speaking, they will grow to advantage on almost every soil that is sufficiently dry, and rich, for a good crop of wheat. If the ground be too rich, however, they will run too much to haulm, and yield the less. But the crop, to make it profitable, should be of a luxuriant growth; and as such will cover the ground more completely, it will, on that account, be in better condition for succeeding crops.

The allowance of seed when sown broad cast, is from one and a half to three bushels to the acre; thin soils requiring the greater quantity. When sown too thin, the plants will lie upon the ground, and perhaps rot: when they are thick, the plants will hold each other

up with their tendrils, forming a continued web ; and will have more benefit of the air.

Peas should be sown as early as the ground can be well mellowed. The harrow not covering them sufficiently, they can be ploughed in with a shoal furrow. If caution is used, there is not much danger of them being buried too deep in this way. Soaking the seed in some fertilizing liquor, and drying them with lime or plaster, will be of service to the crop. If they are infested with bugs, put them for a few seconds in this liquor, made hot ; dry them in the manner above mentioned, and sow them immediately. If this precaution is used, and new fields selected for their culture, it is said the crop will not be buggy. Those designed for cooking may also be cleared of these bugs, by the use of hot water ; as they will drop out of their holes, after they are dead, and may then be easily sifted out.

The length and feebleness of the stems of peas, and the little tendrils they throw out for support, indicate the advantage of mixing with them other plants of more erect growth, which may prevent the peas from falling and lodging. For this purpose, rye and oats have been selected, and with great advantage.

Peas, when sown early in April with oats, or in May with beans, (*vicia*, horse-beans) say one bushel of each to the acre, come forward early, and give a handsome profit, to bring forward young hogs in summer.

This crop must be mown before the peas begin to shell out, laid in small heaps until dry ; removed to the barn when the air is not dry ; and threshed in the common mode. Before putting them into casks, spread them on a floor for two or three weeks to dry. They yield from sixteen to forty bushels an acre. Their haulm affords a wholesome fodder to neat cattle.

Peas are superior to Indian corn, for fattening swine, or cattle. For this purpose they should be steam-boiled. When fed to horses, they should be mixed with oats. The marrowfat peas, when dried before fully ripe, are best for culinary purposes. Feeding stall cattle at the rate of two quarts twice a day, to each head, accompanied with plenty of long food, fatten them kindly.

Some recommend turning hogs in upon them, as soon as the pods fill ; the advantages are, the hogs feed and

fatten themselves ; no particle of their manure is lost ; that part of the crop refused by them, is given back to the soil ; and the rooting of these animals, in this case, is a benefit. The refuse part of the crop can be immediately ploughed under, after the hogs have left the field.

A farmer in North Carolina, who has been in the habit of planting on an extensive scale, as many as five different kinds of peas for the last seven or eight years ; says that when cut for hay, they will make more nutritious and heavier crops than any thing else.

PUMPKINS.

Pumkins will grow well on every kind of soil that is fit for hoed crops, and the richer the better. In raising them, it is usual to mix them with the crop of Indian corn. But it is doubtful whether any thing is ever gained by raising two growing crops together. If planted with Indian corn, they may be put between the hills of corn, of every fourth row, and every fourth hill, upon a shovel full of rich manure, two seeds in a hill ; in this way they do well.

It is recommended to plant this crop by itself, in hills eight or nine feet apart. Give the hills plenty of seeds, that if some of the plants should be destroyed, enough may be left. Two or three plants are sufficient for a hill. Though the crop will require as much ploughing as other hoed crops, yet the expense of hoeing will be trifling ; it will exhaust the soil but little ; and it will be a fine preparative for wheat, as the ground, if the pumkins are planted early, can be cleared sufficiently early for sowing that grain.

It is believed that an acre, properly cultivated, would yield ten tons ; and that these would be worth sixteen cents per hundred for feeding and fattening cattle. Mr. *Nicholson* estimates the expense of cultivating an acre, including manure and rent of the ground, at \$13 75 cents ; and the value of the pumkins as estimated above would be \$32, leaving \$18 25 cents of clear profit.

Pumkins, if steam-boiled, are a rich food for swine ; the seeds should be taken out, as they prove injurious to those animals. They are valuable, as affording an early supply of food for feeding horses and fattening all

sorts of cattle in the fall and fore part of the winter, before the ruta бага crop should be used

To save the seed pure, plant the several kinds at as great a distance from each other as possible. The summer and winter squashes, if they flower near together, will degenerate; and the neighborhood of a pumpkin will deteriorate the future progeny of both.

CROPS USED IN MANUFACTURES.

Three other green crops remain to be treated of; namely, hemp, flax, and hops. None of these, however can be viewed as improving crops; on the contrary, they may be characterized as robbers, that exhaust the soil, and return little, or rather no manure for restoring its fertility. They are, however, all necessary articles, and the culture of the two first, may be considered as materially connected with national prosperity.

HEMP.

This plant requires a mellow dry soil, and the richer the better. It turns to but little account, where the soil is not sufficiently fertile. It will grow year after year on the same ground, if properly manured; and it is not so exhausting, as some other crops. It succeeds well on drained swamps. If the soil be sufficiently rich, it is the surest of any crop; it is subject to no diseases; severe droughts but little affect it; and cattle will not touch it. It has been found to thrive well in New-England. From two to three bushels of seed are requisite for an acre; two where the soil is middling, and three where it is very rich. The goodness of the seed may in some measure be known by its feeling heavy in the hand, and by being of a bright shining color. It must be of the last year's growth.

Let the ground be well mellowed, by repeated ploughings in the spring, and let it be harrowed before the seed is sown, and then harrow the seed in. It should be sown pretty early in the spring; but not before the ground has sufficiently dried and can be put in ample order. The seed should be buried equally as possible, in order that it may all start equally; otherwise a part of the plants will out-grow and keep down the rest.

When sown as early as above directed, it will be fit for pulling or cutting about the first of August, the exact time being indicated by the falling of the flowers and withering of the leaves.

Hemp must be pulled, the earth shook from the roots, or it can be cut, tied into bundles, and without delay put into the water to rot. The water in which it is rotted, (or retted as some writers express it,) should not run rapidly, as such will wash away the coat. Let the sheaves be laid lengthwise across the stream, and sunk completely under. Standing water is good for rotting; but unless the hemp be once turned, that which lies uppermost will be rotted most, owing to the water near the surface being warmer than that below. When sufficiently rotted, which will generally be in about five days, a small handful may be pulled asunder with a little exertion; and then it must be taken out very carefully, so as not to injure the coat, spread and dried as soon as possible.

If there is not a sufficiency of water at this season of the year, the hemp can be spread on the ground as pulled, and left till dry; which in good weather will require about a week. When dried it can be gathered in bundles, bound with straw, and carefully stacked, or housed till there is a supply of water. Or hemp can be dew rotted.

When sufficiently dry, it is to be broken with a coarse break, (and if very long may be cut in two,) then again broken with the common flax-break, and then dressed in the manner of flax, but more gently, as it will waste with hard beating. An expert hand will swingle clean about 100 pounds per day.

The male plants of hemp bear the flowers, and the female plants the seed. A sufficiency of the latter are to be left for seed; and these will require about six weeks further time to ripen; the ripeness being known by the seed turning brown. The seeds may be gently beat off the stalks when dried; or they may be taken off by a coarse kind of comb made for the purpose. The female hemp, which has stood to ripen the seeds, requires a longer time to rot than the male, and when dressed is harsher. The better way is to sow some

hemp, thinly, by itself, for seed, and then the rest of the crop may be all pulled or cut together.

If hemp be suffered to stand after the right time for pulling, the stalks of the male wither and blacken, and then the coat is but of little value.

FLAX.

Such crops of flax as are usually raised do not pay for the labour bestowed on them. As this is a crop that the farmer must raise, if he has any regard to domestic economy, the means of raising it to advantage should be closely attended to.

Soils most suitable for flax are those of the deep loamy kinds, and such as contain a large proportion of vegetable mould. On strong loamy clays that have been well broken down and reduced by tillage, it has also been found to answer well. The sandy or very light gravelly lands are improper. But whatever the nature of the soil may be, it should neither contain too large a proportion of moisture, nor be too dry; but have the mould in a fine and well pulverized condition. Such lands as are situated rather low, as upon the banks of rivers, are found to be well adapted to flax. The best preparatory crops in this country, at present, appear to be potatoes, corn and roots, if they have been well manured; particularly if pains be taken to prevent any weeds going to seed in the fall.

In the preparation of the land, as it is necessary that it should be made perfectly fine, it must be repeatedly ploughed over, with a shallow furrow, and broken down by harrowing. Sometimes it is successfully raised on grass land when ploughed early in autumn, and properly prepared in the spring. No dung should be applied to the land when the flax is sown, but may be put on bountifully with the previous crop. The objection is, that dung forces the growth so rapidly that the plants are weak and liable to lodge. Lime, shells, leached ashes, &c. do not produce such effects. Top dressings soon after the plants appear, of plaister, ashes, soot, &c. are highly beneficial, as they increase the growth, and destroy worms. In addition to the above, it is requisite, that the ground shall not have borne flax for about seven years previous to sowing. Because when not pulled in

a green state, but allowed to stand for seed, it is as severe a scourge as can be inflicted.

A very essential point in raising great crops of flax, is to have frequent change of seed. That of the last year's growth should be obtained if possible. The usual marks of good seed are, that it be plump, oily, and heavy, of a bright brown colour, sinking readily in water, and when thrown into the fire to crackle and blaze quick. Experience must determine the quantity to be sown. It is probable that a bushel or six pecks is the least, and two bushels the extent that should be sown. The richest soil requires the most seed, as not more than one plant is wanted in a place. If sown *thinly*, the stem is shorter, the fibre coarser, and the seed more abundant—and vice versa. It should be sown as early in the spring as the ground can be prepared for it; and covered in by regular harrowing, once or twice in a place, with a light common or bush-harrow, not covering it too deep. Rolling land after the seed is sown brings on an evenness of vegetation. A top-dressing of four or five bushels of fine salt to the acre is found to be of great advantage. Some recommend to divide the seed, and sow half one way and half the other, that it may be sown as evenly as possible.

If flax is to be water-rotted (a process similar to that for hemp,) it should be pulled as soon as the blossoms have fallen off; and at this time the coat of the stalk is stronger than afterwards. If it is to be rotted on the ground, (dew rotted) it should stand until nearly ripe; or until the under leaves fall off; and then the seed (as they will continue to ripen afterwards) can be saved, which is a matter of some consequence. That which is designed for affording seed for sowing again, should have the seeds ripened most before pulling.

The method common in this country, of rotting on the ground, is so well known that it is not necessary to say more, than that the flax should be spread thin and evenly, and that it should be turned over, when about half rotted. That which is rotted too much may be restored to its strength, by keeping it a few years.

It is a very nice point to give flax the proper degree of rotting. If rotted too much, its strength is impaired for present use, and it wastes more in cleaning; and, if

rotted too little, a great addition of labour is requisite in fitting it for use. That which is coarse will not quicken that which is fine; these should, therefore, be kept separate while rotting. The short and the long should also be sorted, as it is inconvenient to have them mixed in dressing. The process of rotting should be finished during the month of October if possible.

It has been proposed to pull flax when dry,—free it from seed,—steam or boil it in water or white lye about twelve hours,—then spread and dry it,—break, &c. There is no difficulty, it is said, in pulling your flax one day and having a part of it spun into thread the next day.

To save the seed; as soon as the flax is dry enough to be put under cover, it should be rippled. A comb, resembling the head of a rake, but with teeth longer and nearer together, made of hickory or oak, is fastened upon a block, and the flax, taken in parcels no larger than the hands can firmly grasp, is drawn through, and the bolls ripped off; attention can be paid to sorting at the same time. The bolls are to be riddled and winnowed immediately; spread then on a clean floor, or on sheets, in the sun, and when sufficiently dry, and beginning to open, threshed. By this method the foul seeds are completely separated: A great improvement.

The farmer, perhaps, would do well to make more of a business of raising flax, when he becomes engaged in it, by raising enough in one season to last two or three years. By cultivating it in the most complete manner is the only way to make the business profitable.

It is the opinion of Mr. *Pomeroy* of Massachusetts, that four hundred pounds of good flax, and eight or ten bushels of seed, may fairly be assumed as a medium crop on favourable soils, where the culture becomes such an object as to make other farming operations subservient to it, and due attention is paid to change of seed. [*See his Essays on Flax Husbandry, Mass. Agr. Repos.*]

The expense of dew and water-rotting, and of breaking by hand, is saved in some parts of our country, by the operation of machinery, recently invented for the purpose; machinery, by which more is gained in quantity, to the dressed flax, than sufficient to pay the expense of the operation.

HOPS.

The following very good directions for cultivating hops, are taken from the *Farmer's Assistant* :

This plant requires a rich mellow soil, well prepared by digging or deep ploughing. Bog meadows are good for raising it, when properly drained.

The plants are raised in hills, six or seven feet apart, where the soil is not very rich, and at a greater distance, when richer. When the plants begin to shoot, take cuttings from branches which grow from the main root : If of the last year's growth, the better ; and these are known by their white appearance. Let each have three or four buds ; bury them lightly in the hills, with the buds uppermost ; allow two or three sets to a pole, and three poles to a hill. For making the hills, dig round holes three feet in diameter, a foot in depth, and deeper if the soil will admit it ; fill up these with the earth thrown out, well mixed with old compost, if the soil be not already very rich.

The first year, the hills are not to be polled ; but the ground in this, as in succeeding years, is to be kept mellow and free from weeds, by ploughings and hoeings. As the vines rise this year, let them be slightly twisted together, on each hill, and let the hills be raised a little by hoeing in some earth round the vines.

Early in the spring, the second year, and always after this, the hills are to be opened, and the sprouts or suckers cut off within an inch of the old root ; but that must be left entire, as well as those shoots which inclined downwards to form new roots. Some manures should occasionally be applied. Poles ten feet long are sufficient for the first year ; after that they are to be fifteen, eighteen, or twenty feet long, according to the strength of the ground. Each pole should have three vines ; and all the others should be broken off in the spring. As soon as their color is changed, and they emit a fragrant smell, they are to be gathered. When the poles are drawn, cut the vines three or four feet from the ground. The best way to dry them is on kilns, with a moderate heat ; for if it turn the hop brown it will be injured. Let them lie about six inches thick, and be frequently turned. When the seeds crackle a little they are sufficiently dried. Or they may be dried in the sun, or on floors

under cover. Before they are bagged, they should lie in a heap about four days, to sweat and grow tough. The bags are to be of coarse linen cloth, (the thicker the better,) about eleven feet long, and two and an half yards in circumference ; so as to hold about two hundred and fifty pounds. To bag them, a hole is made through an upper floor, to which the bag is suspended ; the hops thrown in, in small quantities; and trod down as hard as possible.

The long white hop is most esteemed, as yielding the greatest quantity and being the most beautiful. Care should be taken to have the hops all of one kind ; for, if there be different sorts, some will probably ripen before others.

An acre of hops well cultivated, will amount to two or three hundred dollars, and the expense will not be more than one hundred. If not wanted at home, they are a good article for exportation. If well harvested they will keep good a great many years.

GRASSES.

The advantages which have been derived from the introduction of cultivated grasses, cannot be too highly appreciated. Amidst the variety of natural produce, there must be many plants of an inferior quality, which are rejected by horses, cattle, and sheep. Old turf, on that account, is never eaten so bare, as a field where a few selected plants alone are cultivated, known to be grateful, salubrious, and nourishing to stock.

The mould of the ground, which is laid down to grass, should be made very fine, as the seeds, being very small, may otherwise be covered too deep, by falling below, or be scorched by lying above great clods. Like other seeds they require a due degree of moisture to cause them to vegetate, and therefore should not be left exposed to the rays of the sun without being covered ; for unless rainy weather follows immediately after sowing, many of the seeds will not vegetate. Sow them as soon as possible after the ground is ploughed, while the soil remains moist, and harrow with a light harrow, after which a gentle rolling would be useful. It is always good economy to lay down rich, and not poor ground to grass.

It has been disputed, whether grass seeds should be sown with or without grain. The result of much careful inquiry, however, has been, that where equal pains are taken, the future crop of grass will succeed equally well in either method; while the same tilth answers for both crops. Barley is considered preferable to other grain, to sow grass seeds with. In cases where the soil is so rich, that there might be some risk in sowing a full crop of grain, less seed is sown, even as low as one-third of the usual quantity; and in that case, the grain, nurses the young plants of grass, and protects them from the rays of too hot a sun.

Land intended to be converted from tillage to grass, must either be dry by nature, or be made so by art, before it is possible to get a valuable crop of grasses; all the best sorts abhor a wet bottom when they are young, and will not root deep enough in it, to bear the vicissitudes of the seasons.

It is a bad system to mix seeds of different plants before sowing them, in order to have fewer casts. It is better to sow each sort separately, as the expense of going several times over the ground is nothing compared to the benefit of having each sort equally distributed. The seeds of grasses, being so light, ought never to be sown in a windy day; wet weather ought likewise to be avoided, as the least degree of poaching is injurious.

The species of grass appropriated to any particular soil or application being determined upon, its seeds cannot be sown too plentifully, and no economy less deserving the name can possibly exist, than the being sparing of grass seeds. The seeds of grain may easily be sown too thickly; but with respect to those of grass, it is scarcely capable of occurring. The smaller the stem, the more acceptable it is to cattle; and when the seeds, particularly of some grasses, are thinly scattered, their stems tend, as it is called, to wood, and the crop is liable to be infested with weeds.

Some think that if ground is well manured, good grasses will come in of themselves. Perhaps so;—but how long will it be before that happens? Clean seed, and that which is known to be suitable to the soil, should always be sown. For though grasses will gradually come in, no great crop is to be expected the first

year, unless it be a crop of rank and useless weeds. And he that misses of the first year's crop, loses much, as the longer the land lies, the more compact, or bound, it will become, and produce the smaller crops.

It cannot be doubted, that if a third part of the land, now under tillage, were properly laid down in grass, for the purpose of feeding stock, it would be of the greatest benefit both to the farmer and the public, as the remainder would be better manured, more easily cultivated, and would produce as much for consumption, as the whole now does. The failure of new crops of grass, is in a great measure owing to a deficiency of seed, or to the land being sown, when out of condition, and without an adequate supply of manure; and many farmers have, in these circumstances, continued their fields under a course of planting, to their own impoverishment, and the loss of the public. Whereas improved rotations, and in particular, a greater number of green crops, would enrich any poor or exhausted arable land.

The advantages to be derived from the alternate, or convertible husbandry, cannot be too much dwelt on. Mr. *Robbins* of this state, in his address, very justly observes, that a farm best fitted for the convertible husbandry—convertible from grass to grain, and from grain to grass, is the most profitable farm; and hence the value of all those means by which the farm is brought into this desirable state. None but those who have tried it, can be fully aware of the vast improvement effected by laying down old ploughed land into grass, as well as converting pasture and meadow lands into arable. Under that system, when judiciously conducted, the crops are always abundant, and the soil is kept in a constant state of increasing fertility.

The chief food of cattle consisting of grasses, their importance is as obvious as it is great, and the distinguishing and selecting them cannot be too fully attended to. By this care the best grasses, and in the greatest abundance that the land admits of, are secured; while, for want of this attention, pastures and meadows are either filled with weeds, or bad and inappropriate grasses. It would require a large volume to describe all the kinds of grass which are and might be cultivated in the United States. It is said, that there are in all 215 grasses

properly so called, which are cultivated in Great Britain. The number of grasses fit, or at least necessary, for the purposes of culture, however, is but small. Some of these are best calculated for moist soils, some for dry, some for pastures, and some for mowing. By the careful separation and sowing of the seeds of these, the husbandman would soon be enabled to accommodate the varieties of his soil, each with the grass best adapted to it: the advantage of which would infinitely exceed the trouble necessary for its accomplishment.

Some of the most valuable kinds are here noted, together with their proper soils, &c.

Clover, is universally known as being an excellent grass; while it produces the best hay for horses, it, at the same time, enriches the ground. As it is tap-rooted, it draws a portion of its nourishment from a depth below the surface, to which the roots of most other plants do not extend; and after the sward is turned over by the plough, and the roots are dissolved, they make a fine manure, and in a measure prepare the ground for wheat, or almost any other crop. But to illustrate the many advantages of clover not only for soiling, (or stall-feeding) pasture and hay, but for the improvement of the soil, and its efficacy in withstanding the drought, would require a greater scope than our intended limits will permit.

Clover will thrive luxuriantly in any tolerably fertile soil, except a wet one. It prefers light sandy or loamy soils, and will, with the assistance of plaster, thrive well upon gravels. A light top dressing should be given early in the spring. On tenacious soils, a small quantity of lime, would be preferable, but on light land the effect of gypsum is astonishing.

In respect of preparation, it is less nice than many other herbaceous plants, yet the finer the state of the mould the land has been brought into, the more certainly and the better it succeeds.

It is now generally sown with barley, or other spring grain of the culmiferous kind, and rarely by itself. (If the land is poor, choose the crop that will afford it the best protection against the sun, as rye, &c. and if rich, the crop which will smother it least in its infancy as wheat, oats, &c.) The advantages proposed by this

practice, are these: the preparation given to the soil for the grain crop, which is exactly that best fitted for the clover; the protection given by the grain to the young clover, against the combined effects of heat and dryness; the improved condition in which it leaves the soil for subsequent culture. In this practice, however, a less quantity of grain must be sown than usual, because without ventilation, the clover plants will perish. It is frequently sown in the spring, on winter grain; but in this way it often happens that the seeds do not grow, owing to their not being covered. This difficulty may, however, be obviated, by giving the ground a brushing, where it is rough; or a light harrowing where it is smooth; either of which methods, but particularly the latter, will be a benefit to the growth of wheat or rye. It may also be sown with grain in the fall; but there is danger in that case of its being killed by the succeeding winter. Some recommend sowing half in the fall with the grain, and half on a light snow in March. It is indispensable to a good crop; that the seed be good; and regularly and equally sown. The tests of good seed are; its comparative size and weight, its plumpness, its yellow or purple colour, its glossy skin, and lastly its cleanness, or separation from other seeds and from dirt. About twelve or fourteen pounds is a suitable quantity for an acre.

Clover should never be cut the first season; nor fed close; but the second season, it should be cut when in full bloom, and before the heads begin to turn brown. It is thought best to exclude sheep and horses from clover, unless intended for pasturage only. The cutting and curing, if the crop is heavy, is very nice and critical farming. After being cut in dry weather it should remain in the swarth till it is dried, about two-thirds its thickness; it is then *not strewed*, but turned over; the hay should be as little shaken or scattered about as possible; and raked up before night. The next day it must be opened, turned once or twice, and cocked up again. If the weather permits, it will be improved by standing one or two days more before housing. If it is housed without using these precautions to prevent heating, the application of salt will be important; or interpose between two layers of clover, one of clean straw. By

the first method, the whole mass is made acceptable to cattle; by the second, the quantity of nutritive forage is increased—and by both methods the clover is effectually prevented from heating, which greatly injures it, and renders it hurtful to horses. If on twisting some of the largest stalks like a string, no moisture appears upon the surface, it may be housed with safety.

When a crop of clover seed is to be raised, let it be from the last crop of the second year; and sometimes instead of cutting the first, let it be pastured till the 10th of June: as suffering the crop to ripen, injures the roots for a succeeding crop. In the first crop, of either season, very little seed is to be found.

It is said by *Duhamel*, that one acre of this plant will feed as many cattle as four or five of common grass: but they must not be suffered to eat too plentifully of it at first. It should be given by degrees, till they are fully seasoned to it: nor should they ever be turned into this food in wet weather.

Green clover is good food for swine in summer; and when cut green, and salted, after being a little withered, with about half a peck of salt to a load, it makes good food for them in winter, after being steamed or boiled.

Half a bushel of plaister, well mixed with a suitable proportion of ashes and fine salt, strewed over an acre of clover ground, after each mowing, will make it much more productive.

Herd's-grass, or *Meadow-catstail* (*Botanical name Phleum Pratense*) called *Timothy* in the middle and southern states. It is improperly called *Fox-tail*, quite a different species. Herd's grass grows best in rich moist soil; but it will grow well, for a few years, in a rich wet, or a rich arable soil. In the rich wet soil, it gradually lessens in product; while at the same time it gives way to wild grasses. In a rich arable soil, it gradually fails, by reason of the ground becoming bound, and the sward thickened with other grasses. Probably if it were well torn with the harrow in the spring, and not too closely pastured in the fall, and not at all in the spring, it would grow well for many years in such soil. By close pasturing in the fall, it is apt to be torn out by the roots, and by cropping it again in the spring, it suffers

much. It will yield, according to Mr. *Nicholson*, one half more hay, when not pastured at all, than when pastured closely both fall and spring. In the richest soils, and when not pastured, upwards of four tons may be had from the acre, in a season, at two mowings. It requires about ten or twelve quarts of the seed for an acre.

The proper time for mowing it is, when in blossom, or a little later; but if left till the stalk, or even the under leaves begin to turn, the true value of the crop is lost. It is a common practice to sow Timothy and clover mixed; but this should not be done when clover is sown for the purpose of being ploughed in for manure; because if clover is cut when just arrived at perfection, Timothy is then so young as to be in a very imperfect state.

It is not so much a fertilizer of land as clover: on the contrary, it is said to bind, and somewhat exhaust the soil. It is perennial, and will last beyond the memory of man, if not destroyed by close pasturing.

Lucern, (*Medicago Sativa*) is undoubtedly the most productive, and that which comes into use sooner than any other of the artificial grasses. It endures drought well, and grows very late. Horses, cows, sheep, and swine, are very fond of it, when it is mown and given to them green, which is the most useful application of it. It does best upon rich, dryish loams, where, if the soil is clear, three to five tons of excellent hay can be cut to the acre. It is said to grow well in the coldest climates; but those which are mild are most suitable for it. It is supposed that our dry warm summers are more favorable to its growth, than the cool and moist ones of Great Britain. Mr. *Livingston* of New-York, has obtained greater products than those mentioned by British writers. With the best cultivation and plentiful manuring, nine tons per acre have been had in a season. It can be cut several times a year.

The ground should be prepared by deep and frequent ploughings. It can be sown in May, or as soon as the ground is sufficiently warm, either by itself or with a crop that will not lodge, thinly seeded. About twenty pounds of seed are required for an acre.

As soon as it begins to blossom, it should be mown.

In making it into hay, the same directions should be attended to as for clover. During the first season of its growth, the product will not be so large as afterwards : In this season it is most infested with weeds, which can easily be destroyed by frequent mowings, for the purpose of soiling. After the first season, it may be fed without much injury.

It is recommended by European writers, after the grass has stood two or three years, to harrow it early in the spring ; and it is said, if the roots are considerably torn by the operation, they will not be injured. This should be repeated every second spring, after applying a good top dressing of manure.

On dairy farms it is of great utility. Where the soils are suitable, a few acres under this grass, round the house, must, in all cases, be valuable for the purpose of early green food. Lucern is much superior to clover for soiling milch cows, giving no taste to the milk or butter, and one acre is sufficient for three or four cows during the soiling season. This grass lasts twelve years or more, and exhausts the soil but little. When it turns yellow it should be mowed, and the plants will come up free from the disorder.

Sanfoin, (*Hedysarum onobrychis*) will grow very well on dry stony soils, that are unfit for any good cultivation, and will produce on the worst lands a ton of hay, beside considerable after-math in the season. Nothing is better to soil horses and cows with. On good dry lands, the product will be much larger. This plant will make a much greater increase in poor ground than any of the natural grasses ; which is principally owing to its having a long perpendicular root, which sinks to a depth of several feet.

It requires a soil free of the seeds of weeds, and well mellowed by deep ploughing. The seed should be *fresh*, and three or four bushels to the acre, sown very early in the spring. Those which have a bright husk, a plump kernel, bluish or gray without, and greenish within, are best. It is the best method to sow from one to three bushels, with five pounds of clover, to the acre ; as the clover serves to keep down the weeds till the sainfoin has become well rooted. It may also be

sown with oats or barley. No cattle should feed on it the two first seasons.

When cured into hay, it should be cut before the blossoms turn much ; (it is at no time to be cut before it is in full bloom ;) and managed the same as for clover. It is a fine hay for sheep. If saved for seed it must be the first cutting. In collecting the seed, cut the grass when the early seeds are getting ripe, without waiting for the latter blossoms to shed. Thresh it in the field on a cloth, as much will be lost by sheding if carried to the barn.

It is the opinion of Mr. *Robbins*, that this plant is as hardy as the red clover, as little liable to be winter killed ; for the winter of 1822, which killed so much clover, did not affect at all the sanfoin plants, in his garden, and no way protected from the frost.

Redtop, (*Agrostis vulgaris*)—with spreading panicle, and the branches divergent and capillary, differs from spear grass (*Poa pratensis*, also excellent) with which it has been confounded, and which flowers much earlier. Red-top is cultivated considerably in this part of the country, and seems to succeed well on either moist or dryish land. Some say that on wet land no grass answers so well as red-top. It yields a good crop, and makes good hay.

Orchard Grass, (*Dactylis glomerata*) called Cock's foot by English writers. This grass is worthy of being cultivated on account of its uncommon luxuriance. Oxen, horses, cows, and sheep eat it readily, and it is valuable on account of its excellent after-feed. It affords an abundant crop, springs early, and grows fast, makes excellent hay, and yields abundance of seed, which is not easily shaken out. It is a hardy grass, found highly useful on moist loamy soils,—thriving under the shade of trees, which probably occasioned its name. In instances where Herds-grass (*Timothy*) is now used with clover, farmers would do well to make the experiment of substituting orchard grass. This comes early, is soon mature, and continues green until late in the season as clover does : Herds-grass is late in coming in the spring, and late in ripening. Orchard grass intended for fodder should be cut while young and tender.

Tall Out-grass (*Avena elatior*) flowers in June, and, though coarse, is very profitable when closely fed down. It is very luxuriant in its growth, and makes tolerable hay, to which a little salt applied when laid down in the mow would be an improvement. All animals that are commonly fed with hay, eat it with pleasure. It has two advantages over Herds-grass,—earliness, and great after crop; and would probably answer well for soiling, as it starts very early, and grows very late. It produces well both in good and bad soils,—but should be cut in flower while the stalk is fine and tender.

Fowl Meadow Grass (*Poa aviaria*.) It acquired this name by being supposed to be brought to a meadow in Dedham, Massachusetts, by water fowl. It is an excellent grass for wet meadows, affording very good hay for horses, and neat-cattle particularly. Mr. *Eliot* thinks drained swamps are a very proper soil for the cultivation of this grass; and observes that it keeps green for a long time, so that it may be mowed at any time from July to October; and that it is so fruitful as to produce three tons of hay on an acre.

Striped-leaved reed grass, (*Phalaris arundinacea*.) This like the last does well on wet soils. This grass (in the Appendix to *Davy's Elements of Agricultural Chemistry*) is said to succeed on almost any soil,—but is particularly luxuriant on strong moist lands. The strong nutritive powers which it possesses, recommend it to the notice of occupiers of such lands,—which cannot be drained. Its produce is great, and the foliage will not be denominated coarse, if compared with those which afford a produce equal in quantity. We have made trial of it; and find it will flourish on common loam, spreading freely by its roots. Some of it in a dried state, offered to oxen, was readily eaten.

Cichory: or *Succory*, (*Cichorium intybus*.) is a hardy plant, and may be found beneficial on poor sandy or gravelly soils. For feeding cattle, it is usually sown with oats, or other spring grain; but for soiling it is sown alone. Mr. *Young* thinks it best to be drilled alone on poor land, in rows about nine inches asunder. On large tracts of poor land, it is thought it would increase the produce ten fold. Cichory is very luxuriant, and will admit of being often cut for soiling. It may also

be made into hay, which, though coarse, affords considerable nourishment. Sir J. Sinclair says, it is strongly recommended, as hardy;—calculated for the poorest soils; and adapted even for bogs; excellent for pasture or soiling; producing a greater quantity of food for sheep, than any other grass now in cultivation. It bears close feeding well.

The following grasses are not generally cultivated here; but are well deserving of attention, and will, probably, be soon introduced:—some of them native plants.

Fiorin (Agrostis Stolonifera) requires a moist climate or a wet soil, and is perhaps the most useful plant that bogs can produce. It yields abundantly; and sheep, neat cattle, and horses, are very fond of it.

Fertile Meadow-grass (Poa fertilis) contains a large proportion of nutritive matter.

Meadow Foxtail (Alopecurus pratensis.) This is one of the earliest grasses; and is considered as holding a high place among good grasses, whether used in a fresh state as fodder, or made into hay.

Sweet-scented Vernal grass (Anthoxanthum odoratum;) and

Meadow soft-grass (Holcus lanatus) deserve some attention; the last well calculated for sheep.

Fall Fescue grass (Festuca elatior) stands high, as to nutriment afforded by the whole crop, when cut at the time of flowering.

Sheep's Fescue (Festuca ovina) grows well in dry, sandy soils. Sheep are fond of it, and soon become fat from its use.

Blue grass (Poa compressa) is worth cultivating. It flourishes in dry soils; and its dark green, succulent leaves, afford excellent pasture, particularly for sheep. To these may be added,

Guinea grass (Panicum maximum) which may be cut repeatedly, and is very productive. It is cultivated in the state of Mississippi, and no doubt, can be cultivated here to advantage.

Barn grass (Panicum crus galli) so common on rich cultivated grounds, should arrest our attention as an article suitable for soiling.

MEADOWS.

The lands which are most proper to remain in grass, and which, if in a state of tillage, ought to be converted into grass, are the following, viz.

1. Lands in the vicinity of large towns, where manure is plentiful, and where hay is always in demand, and consequently dear.

2. Lands situated near rivers or brooks, which are capable of being improved by irrigation.

3. Lands lying in the vallies of hilly countries; where old meadow land is scarce and valuable; and where the greater part of the tillage land is of such a nature, that it is almost impossible to convert it into good grass land.

4. All cold, strong grass-lands, which, if ploughed up, would be inapplicable to root crops, and to the purposes of modern husbandry.

The generality of farmers, in this country, mistake their interest, by having too large a proportion of their lands in grass, for mowing. Half the usual quantity with the best management, would produce as much hay as they need, a great deal more than they commonly get; besides saving them expense and much hard labor. Farmers should study their own ease, pleasure and profit, by fitting a small piece of meadow so as to yield them a sufficiency of hay. An acre, at two mowings, can be made to yield four tons of hay, and at this rate, ten acres would yield sufficient for a hundred acre farm. The greater ease, and saving of expense, in gathering forty tons of hay from ten acres of fine smooth meadow, instead of, perhaps, twenty-five of rough meadow, ought to induce a farmer to improve a part of his meadows, to answer in place of the whole.

Bog-meadows, if well drained, and manured with upland earth, will produce prodigious crops of herds-grass, &c. Where moss prevails in grass-ground, that is not very wet, apply a heavy sharp toothed harrow; strew some seeds of herds-grass, or other good grass, over it, and give it a good dressing of a mixture of sheep dung and sand, or other warm manure that is suitable to a cold soil. There is no danger of destroying the roots of grass by this operation.

Land should never be laid down to mowing, that has been exhausted by cropping. It is always advantageous

to manure it well. Rolling, immediately after the seed is sown, has many advantages. Upland meadows should have a dressing of good dung, or compost, every two or three years: Every year would be better. A bush harrow should be drawn over the surface, which will break the small lumps remaining in the manure, and bring it closer to the roots of the grass. When the sward binds too much, break it up and till the ground; or scarify and apply manures. The binding is generally occasioned by too close feeding.

Meadows may be pastured moderately in the fall, but not closely. A part of the after growth should be left to cover the roots during winter. They should never be fed in the spring; the feet of the cattle at that time do great injury. By this bad management, too, all the best grasses are eaten out, and destroyed by the feet of the cattle; and wild grasses usurp their places. Meadows which are entirely of wild grass, are much less liable to be injured, by close feeding than others.

Where a meadow is quite wild, it should be mowed rather before the grass has attained its full size, and in this way it may yield a tolerably good second crop. By early mowing, the grass may be out of the way before the heavy rains which often fall in July.

Grass lands, under the above management, would produce larger crops. The surface would be covered in the spring with a fine verdure. The crops would cover the ground so soon as to prevent most of the ill effects of drought; the thickness of its growth, causing it to retain most of the moisture that falls in dews and rains.

HAYMAKING.

In cutting grass crops, it is necessary that they be in the most suitable state of growth and maturity, for affording the best and most nutritious fodder. With this view, they should neither be cut at too early a period, nor suffered to stand too long; as in the former case there will be considerable loss in the drying from the produce being in so soft and green a condition, and in the latter from a large proportion of the nourishing properties being expended. It is probable, therefore, that grass, in general when mown before it is in full flower, while the rich saccharine juice is in part retained, is in

the most proper condition for being cut down, as at that period it must contain the largest proportion of nutritious materials, but which then begin to be absorbed, and taken up in proportion as the flowers expand, and the seeds ripen. But there are other circumstances, besides those of ripeness, to be attended to in determining the period of cutting crops of grass, as in some cases, when they are thick upon the ground, the bottom parts become of a yellow colour before the flowering fully takes place; or in moist meadows when very tall it is liable to fall down and lodge; under such circumstances it will always be the most advisable practice to mow as soon as the weather will possibly admit; for if this be neglected, it will rot, or acquire a disagreeable flavour, and become of little value. It should be remembered also, that the soil is much less exhausted if the grass is cut before the seed forms. If a meadow is to be mowed twice in a season, the first crop ought to be cut earlier than where mowed but once, in order that the roots may recover immediately and be ready for vegetation afresh.

Where mowing grounds have a smooth surface, care must be taken to cut the grass as close and evenly as possible. Grass will not thrive well that is not mown quite close; and the loss in the crop where this is not done is very considerable, *as one inch at the bottom weighs more than several at the top.* But in cutting rowen or second crops of grass, more attention in these different respects will be necessary, as the crops are more difficult to cut. They should always be cut as much as possible when the dew is upon them; and as soon as there is a tolerable growth, as by waiting the season is getting more unfavourable for making them into hay; and when not well made this hay is of little value. It requires a much longer time to dry than the first crop.

For haymaking, it is essential to have dry weather; and the prospect for this ought always to be an object of attention. It has been found by actual observations for a number of years, that on an average, more rain falls in summer after the 15th or 20th of July, than before. Farmers will do well, therefore, to improve as much as possible the forepart of the season in haymaking. It is a fact not generally known, though made

public some years ago by a French philosopher, that the web of the common spider is a sure index of the state of the air for twelve or fourteen days to come. If the weather is to be fair and calm, the principal thread will be spun to a great length; if on the contrary the weather is to be stormy and boisterous, the thread will be short and thick, for obvious reasons; and if the spider is seen to repair the damages its slender thread may happen to sustain, you may calculate with certainty upon pleasant weather for many days.

In converting cut grass into hay, the great art consists in rendering it sufficiently dry to prevent its heating too much in the stack or mow, and at the same time preserving as great a portion of the natural juices of the plants as the process is capable of admitting of without danger.

If the weather is so unfavourable, that hay cannot be thoroughly cured; the application of from four to eight quarts of salt to the ton is recommended. In this way it can be saved in a much greener state, and the benefit the hay derives from the salt is more than four fold its value. Ground mows are more liable to take damage by moisture, than those upon scaffolds. The larger the mow, the drier the hay should be. To prevent hay from damaging in a large mow, some recommend barrels or stuffed sacks to be placed near the centre, and gradually raised as the mow is raised: These form openings in the middle, through which the steam of the heated hay can pass off, and thereby prevent it from being mow burnt. Another method is, to put the driest hay in the centre, and the wettest nearest the outsides. Some choose that a barn should have large gaps between the boards that the hay, &c, may have air. This is a mistaken notion; for the hay that is nearest to the gaps will lose its sweetness.

Stacking hay in meadows, to be fed out there, is a poor plan; as the meadows are in this way often much injured by the treading of the cattle; and, when this is not the case, much hay is generally wasted, and the dung of the cattle turns to little or no account. If the farmer has not sufficient room to house all his hay, he ought to stack it adjoining his barn, and then it can be easily thrown in at once, when his barn is emptied.

As narrow wheels sink into the ground and destroy much grass, they should never be used on meadow grounds, but broad ones should be substituted in their stead.

Horse-rakes are very useful on all smooth meadows. It is said, a man, horse, and boy, will gather hay with this implement, as fast as six men in the ordinary way. The expense of the rake will not exceed two dollars. It is composed of a piece of scantling three by three inches, ten feet long, into which twenty-five teeth, one inch by one and an half in diameter, nearly two feet long, and three inches apart, are inserted horizontally. The teeth should be made to turn up a little at the end, to prevent their running into the earth. Eight pins twenty-four inches in length are driven perpendicular into the scantling, and into another light piece at top, and there are also attached two handles, similar to those of a plough. The horse is connected by a rope at each end. When in operation, the teeth run along the ground under the hay, and as they take it up the upright slats retain it till the rake is full, when the man who holds it turns it over, and thus empties it in a row; then lifts it over the hay thus emptied, and sets it in beyond it; and so on till it is again filled. When one strip across the piece is thus raked up, the horse is turned round, and another strip is raked in the same manner, emptying the hay at the ends of the last heaps raked up, so that in this way winrows are formed. The winrows can then be dragged up by the rake into bundles, large enough for making into cocks. This instrument is very useful in the grain field after the harvest is off. It not only combs the stubble, and gives the grass a better opportunity to grow, but it saves a large quantity of grain.

In summer harvesting and mowing it has been too customary to use ardent spirits. We are confident the effects of Pandora's fabled box never produced one half the ills among mankind (even in story) that have in reality been occasioned by the fell products of the accursed alembic,—“whose worm out-venoms all the worms of Nile.” Health and activity are to be looked for only among those who use not ardent spirits. In harvest time, or on any occasion of increased labour, farmers could not use perhaps a more refreshing drink than milk

and water, sometimes sweetened and a little cyder added, or vinegar and water sweetened; or good small beer. We know, from long experience, ardent spirits are by no means necessary; even when on long journey's, and suffering "the peltings of the pitiless storm." Even were we strong calvinists, or as firm fatalists as the Turks, and so should conclude that all the temperance we could possibly exercise, would not prolong life a single day; yet we might cherish the sublime satisfaction of *living* while we live; for we look on those as worse than half dead to all true enjoyment, who drag out a wretched life of intemperance. O beware of inceptive (often deceptive and seductive) ingurgitations. In our revolutionary war, Dr. *Rush* recommended that instead of rum, which could not be had, the labourers in harvest should mix a very small proportion of vinegar with the water used as drink. This succeeded so well that years afterwards, in many places vinegar continued to be used, though rum could easily be had. The preference of vinegar to rum is accounted for in this manner; severe labour or exercise excites a degree of fever, and that fever is increased by spirits or fermented liquor of any sort; but vinegar at the same time that it prevents mischief from drinking cold water during the heat and perspiration occasioned by exercise, allays the fever; and the labourers found themselves more refreshed and less exhausted at night, when vinegar was used instead of rum. The Romans used vinegar to mix with water for the drink of their soldiers. I cooled the heat of my blood with vinegar, which I mixed with water and sugar, and drank of it largely; said the celebrated *Denon*, who was with the French army in Upper Egypt. The labourers in some districts of England, it is said, during harvest make use of no other beverage than milk and water, which is found to allay the fever, and quench the thirst, much more than beer or ale: they confess that they are much sooner thirsty after drinking either of these, than they are after drinking milk and water.

LIVE STOCK.

According to the present improved system of farming, there is such a connection between the cultivation of the ground and the breeding, rearing, and fattening of

domestic animals, that the one cannot be neglected without injury to the other. If no more live stock were kept on the farm, than should be necessary for labour and food; and all the crops were sold off, the income for a *few years* might exceed what could be derived from a full stock of beasts kept on the farm and fattened. But how great the injustice to the soil! to what a heartless unproductive state it soon would be reduced! Experience clearly demonstrates that there are few countries so well adapted as New-England to the breeding and improvement of live stock. The extent and richness of her natural pastures are admirably calculated for this purpose. That with comparatively few exceptions, little attention is bestowed to the improvement of our breeds of cattle, is not to be denied; and yet if we consider the immense difference there is between the profits derivable from domestic animals of an inferior and superior quality; and at the same time bear in mind, that the degree of care and expense necessary to be bestowed upon each is not materially varient, we shall find abundant cause of wonder that the fact should be so. And as domestic animals are found to degenerate, unless pains be taken to prevent it; it becomes an essential point, therefore, for the farmer to be diligent in selecting those breeds which are found to be most valuable, as well from those raised in his own stock, as from those which may be obtained elsewhere.

The most desirable properties of live stock in general: are, suitable size; form; early maturity; a hardiness of constitution; prolifick quality; a tendency to grow; a disposition to fatten; and lightness of offal. The passion for the *largest kinds* of animals has been a great error with the improvers of live stock, in this country. The largest and smallest breeds are the very worst; and ought to be avoided in cattle, and generally in all animals. The form should be compact, so that no part of the animal should be disproportioned to the other; and the whole distinguished by a general fulness and rotundity of shape; the chest should be broad; for no animal whose chest is narrow, can easily be made fat; the carcass should be deep and straight; the belly should be of a moderate size; the head and bones and other parts of inferior value, should be as small as is consistent with strength, and with the other

properties which the animal ought to possess. The form must likewise be such, as to contain the greatest possible proportion of the finer, compared to the coarser and less valuable parts of the animal.

The art of improved breeding consists, in making a careful selection of males and females, for the purpose of producing a stock, with fewer defects, and with greater perfections than their parents; in which their mutual properties shall be combined, and their mutual faults corrected. It was upon this principle of selection, that *Bakewell* of England, has rendered himself famous by his breed of cattle and sheep. His principal aim was to gain the best, whether sheep or cow, which would weigh the most in the most valuable joints; and at the same time that he gained the shape which was of the greatest value in the smallest compass, he found by experience that he gained a breed much hardier and easier fed than others. In his breed of cattle, his maxim was, the smaller the bones the truer will be the make of the beast; the quicker it will fatten, and the weight will have a larger proportion of valuable meat. If there was deficiency in any point, he would cross his animal with one that was amply supplied in that part; and if any point of his animal was too heavy, by an opposite cross he would reduce the superfluity. By such management, diligently pursued, he, at length, gave to his stock the shape and qualities he desired. So far as we breed domestic animals in this country, we must extend our views beyond *beef* and *mutton*—and with the former combine *milk*, *butter* and *cheese*, and a fitness for *labor*, and together with *mutton*, aim at the greatest quantity of the *most useful wool*.

It is best to begin with a considerable variety of animals; that the farmer, by observing the profit he gets from each kind, may afterwards vary, as he finds to be best. Where farms contain a large proportion of high and dry pasture grounds, the greater quantity of sheep should be kept. Where low meadow abounds, the kind of stock should be increased, which will do best on coarse water-grasses; which is neat-cattle that are young and growing. But if a farm yield a plenty of good sweet grass, it is more suitable for a dairy farm. But let a farm be what it will, it should never be overstocked. The number of cattle should not be greater than the re-

sources of food will keep in good plight. If a poor farm be unprofitable, so are poor cattle. The half of any given number of animals, where they are well kept, will always be found to yield as much clear profit, as the whole when kept in poor condition.

It is an object of very great consequence to every husbandman, to expend, in the most economical and advantageous manner, the vegetable produce allotted for the maintenance of his stock. Foddering should not be commenced till it is really necessary; for when the cattle have been taught to expect it, they will neglect their other feeding. Fodder at first in the morning, when the frost is on the ground. Neat cattle should not yet be housed; but horses should. In cold rains they should, however, be sheltered, as these are more hurtful than cold dry weather. The meanest fodder should be reserved for the most severe weather. The early part of winter is the most improper time to pinch cattle. They ought not to be kept constantly on salted fodder. A change of food, sometimes salt, and sometimes fresh, is best. Too much fodder should never be laid before cattle at once: Rather let them have a little at a time, and be fed the oftener. By constantly breathing on their food, it becomes less palatable; and for this reason they will eat that which has been exposed to the open air and winds, after they have rejected it in the stable. Exactness in regard to time and quantity, is of the utmost importance. Cattle which run out during winter should have a shelter, and a rack under it to hold their fodder. This not only saves them from much suffering, but much dung is preserved by the shelter. If exposed to cold, attended with rain, snow or sleet, their wretchedness claims compassion: and the owner feeling for the beasts committed to his care, should resolutely practice giving them due shelter and attention. Much chaff and straw, that is often thrown away, may, with a little pains be made useful for stock, by mixing something green with it, and sprinkling a little salt throughout the whole. Straw ought to be laid away as soon as threshed, and brine sprinkled over each layer, so as to give a degree of saltiness to the whole mass, and occasionally fed out to all the neat-cattle. A great saving can be made by cutting straw, One of the most econo-

mical machines can be had for \$3 or \$4. It is considered an excellent practice to keep salt under cover, in such a situation that cattle or sheep may have recourse to it at pleasure. A liberal use of salt is proper at all times, except, perhaps, in the *coldest weather*, when it may cause them to drink too much cold water. From trials in England it has been found, that the following quantities may at all times be administered in that country with perfect safety. To neat-cattle, four ounces a day, mixed up with steamed chaff, or other moistened food; one half to be given in the morning and the other in the latter part of the day. To horses four ounces a day, as aforesaid. To young heifers two ounces per day, at twice as aforesaid. To calves one ounce per day, divided into two portions. To sheep, two ounces per head, per week. It is believed by many, that salt is a cure for botts in horses; and that the wool is materially improved of such sheep as have a suitable quantity. Mixing salt with water and fine clay in a mass for creatures to lick, is better than to give it to them alone.

Animals intended for the butcher, should be kept in a state of regular improvement. They ought never to be allowed to lose flesh, in the hopes of afterwards restoring it by better feeding. Great care should be taken, not to overstock pasture. The food, whatever it may be, should not be too suddenly changed. They require a progression from coarser to better food, as they grow more in flesh, otherwise, when half fat they will go back, and are with difficulty again raised.

Among the most useful improvements of modern husbandry may be numbered the practice of steaming or boiling food for domestic animals. A steam boiler is an implement that no farmer should be without, as potatoes particularly, are nearly doubled in value, when boiled turnips and other roots, and pumpkins, are also much improved, as food for cattle, by a similar process. Clover hay, corn tops, blades and husks, when steamed, have been found greatly to improve the quantity of milk and the condition of animals in the winter season.—Boiled clover-hay is found very good for keeping swine in the winter. We believe this to be well worthy attention, by having a box to hold the hay, &c. sufficiently large for the purpose. A steam-boiler is commonly

made by setting a kettle, holding twelve gallons or more, in a furnace, of brick or stone, and over this a hogshead, with one head taken out, and the other bored full of holes, is set so close that the steam of the kettle, when boiling, can only rise through the holes, and thence ascend among the articles to be boiled in the hogshead, and pass off at the top. In this way a hogshead full of potatoes will be nearly as soon boiled, as a small part of them only could have been, if placed in the kettle underneath. As the kettle must be so closed as to prevent any steam passing off, but through the bottom of the hogshead or vat, a pipe or tube must be set in one side, through which, with the aid of a funnel, the water is to be poured into the kettle, as often as occasion may require. When poured in the tube is to be stopped with a plug. Grain of all kinds may be steam-boiled to great advantage, for feeding and fattening cattle; but, in that case, it is requisite to have the bottom of the hogshead covered with a cloth, to prevent the grain running down through the holes. It was the opinion of a late excellent writer in this country, that steam-boiling food, for feeding or fattening all sorts of cattle, generally increases the value of the food, as much as forty or fifty per cent.

Mr. *Davy*, from analysis, has found, that the best wheat contains ninety-five parts in one hundred of nutritive matter; good barley, ninety-two; rye, seventy-nine; oats, seventy-four; peas, and beans, fifty-seven; potatoes, twenty-five; beets, and mangle wurtzel, fourteen; carrots and parsnips, ten; common turnips, four; ruta baga, six; cabbages, seven; clover, four; other grasses, from two to five. Thus it would seem, that as much nourishment is to be derived from one bushel of wheat, as from upwards of twenty bushels of turnips. This, however, is not the case. What is called the stimulus produced by distention must be taken into the account, in forming a proper estimate of the effects produced in supporting life, by any kind of food; and it is on this account that, perhaps, fourteen bushels of turnips, particularly when boiled, would sustain life as long, or fatten as much, as one bushel of wheat.

The method of littering all kinds of stock, cannot be too highly recommended; it not only renders the animals

so much more warm and comfortable, as to lessen the expense of food, but it greatly increases the quantity of manure. The author of the *Farmer's Manual*, supposes, that each creature properly stabled and littered, with coarse hay, straw, &c. furnishes the means of saving nearly the whole expense of wintering, in the next year's tillage.

Too little attention is paid in this country to the diseases of domestic animals. We are bound by interest and by motives of humanity to perform this reasonable service. In consequence of the dominion man holds over them, they acquire new and violent diseases, and are made subject to casualties, that do not take place in those beasts which roam the forest; they live only for our benefit; they cost us nothing in wages or clothing; for all their services they require only at our hands, food and shelter, and these of the cheapest and coarsest kind. Who can reflect upon the services of the noble horse, the labour of the ox, the utility of the cow, the cloathing of the sheep; and not acknowledge that we are vastly their debtors, and that gratitude as well as interest should move us to their relief, in all their maladies. By making ourselves acquainted with the diseases of our domestic animals, we prevent imposition, and rescue them from the hands of the ignorant pretender, who, by his improper and untimely remedies, disturbs the efforts of nature, and increases the difficulty he would wish to remove. Every grazier, therefore, ought to be in possession of some approved book on the diseases of *live stock*.

On the proper selection of cattle, horses, sheep and swine, and their management, the profits of a farm must at all times materially depend. If we have those of an unproductive kind; if too many or too few—if fed without judgment, or fattened at too great an expense, they will deprive us of that recompense which a farmer ought to obtain. To close our remarks we would recommend to farmers not to keep more of any species of animals, than they can keep well. It is much more agreeable to see a small stock in fine order, than to see a large stock of poor meagre looking animals, and it is far more profitable.

HORSES.

The marks of a good horse are, a high neck, full breast, a lively eye, a strong back, stiff dock, full buttocks, ribs reaching near to the hips, good hoofs, and a good gait. The size should be in proportion to the work in which he is chiefly to be employed.

Mares should not breed till after they are four years old. They should be free from distempers, and possess those qualities desirable in a horse. When with foal they should be housed pretty early in the fall, and be well kept till foaling, which should be about the last of May. (They go with young about eleven months.) They should not be ridden swiftly, nor put to drawing or carrying burdens, for one or two months before that time.

Colts should be weaned the beginning of foddering time; and then they ought to be put in a stable by themselves, kept on good hay, and fed regularly twice a day during winter, with oats, or some other nourishing food. The next summer they ought to have good pasture. If colts, as well as other young animals, are not well kept the first winter, they are very apt to get stunted; and of this they never wholly recover.

In breaking a horse gentle means are best. First let a young horse be tamed by leading with a bridle; then saddle him, and lead him about smartly so as to make him trot; then fasten a small weight on the saddle, adding more and more till he carry the full weight of a man. If he be very fractious, lead him with another horse. After he has been broke to leading well, and carrying burdens, let him be gently mounted, while some person hold him, and rode about in a ploughed field, with another horse before him, if necessary, until he learns to go by himself. In teaching a young horse to draw, the same gentleness should be used; first putting him with a gentle horse that is true to draw; then loading him lightly, and gradually heavier, till he has learned, like his fellow, to exert his utmost strength.

The best method of keeping working horses in the summer is to *soil* them. They should have a yard adjoining the stable, in which they may run at large at times. This practice is a great saving of pasture land; the horses will keep much better, and they are always at

hand for service. This management prevents them from watering, or slavering at the mouth, which is often very injurious.

The stable should be so well enclosed as to defend them from winds and storms in winter; and at the same time not so warm as to injure them when exposed to the weather. It should have a floor descending back for the stalls to run off; which ought to be kept clean and well littered. In the summer time, it is thought better for them to stand upon turf. There should be sufficient room in the stalls for horses to turn their heads to every part of their bodies, and to raise them as high as they please. The rack should be perpendicular and not too high. Some prefer putting the hay into a very large manger or trough; and what is left by horses, other cattle will eat readily. Crowding horses together in stables that are not sufficiently aired, is so injurious, that it has been observed in Boston that most horses from the country become diseased the first week, and frequently in twenty-four or forty-eight hours after they are placed in the stables of that city.

Clover and Herd's grass together are the best grasses for horses. When grain is given them, let it be either ground, or boiled. Raw potatoes or carrots, washed clean, though far inferior to boiled roots, will keep them in good order. Pumpkins will fatten them. Chopped straw (particularly oat straw) mixed with meal and water, with a moderate proportion of hay, will keep horses that are not at work in excellent order. This method is considered cheaper and better than feeding them on hay only. If no kind of fresh food can be furnished for the horse to eat with his dry hay, it is recommended to place a basket of snow near him to supply the waste of saliva which is absorbed by the hay while eating.

To avoid the catalogue of disorders to which this useful animal is exposed, regular treatment seems to be the surest course. The kind of treatment which deserves this character is, never to heat nor fatigue them more than is necessary; and if they are at any time overheated and fatigued, to cool them in a gradual manner, rub them well down, and covering them, so that perspiration may not be obstructed, and administering

some warm boiled food, so that the intestines may be kept open, and the consequent disorders avoided. They should at all times be kept clean, and their skin curried and brushed, but not too severely.

When a horse is on a long journey, he should be fed with hay and provender, and not turned out to grass at evening, for his joints to be stiffened by the dampness and cold of the night, after the warm and severe exercises of the day. To prepare him for a journey, he ought to be previously kept to hay, with provender, and have moderate daily exercise, in order that his fat may become more solid, and of course his body better inured to fatigue. He ought also to be shod some days before in order that the shoes may become easy to his feet. If the skin should be rubbed off his back, sprinkle over the raw flesh a little dry whitelead, which will soon heal the sore.

NEAT CATTLE.

The marks of a good Bull are, a quick countenance, forehead large and curled, eyes black and large, horns large, straight and black, neck fleshy, belly long and large, hair smooth like velvet, breast big, back straight and flat, buttocks square, thighs round, legs straight, and joints short.

The principle distinguishing marks of a good cow are said to be these: wide horns, a thin head and neck, dew lap large, full breast, broad back, large deep belly; the udder capacious but not too fleshy; the milch veins prominent, and the bag tending far behind; teats long and large; buttocks broad and fleshy; tail long, pliable, and small in proportion the size of the carcass, and the joints short. To these outward marks may be added a gentle disposition, a temper free from any vicious tricks, and perfectly manageable on every occasion; a voracious and indiscriminate eater of all foods, and industrious whilst on a thin pasture, seldom laying down.

Early calves are best for raising, as they will endure the first winter better; and, if heifers, will generally have calves a year sooner than those brought forth late. April may be as suitable a time as any if the calves are to be reared; if not perhaps May is better. The most promising calves should be selected for rearing, for the

uses intended, and the rest fattened and killed. Those intended to be killed should be taken from the cow the next day after they are calved; and let them have only two teats of the cow to suck the first week, three during the second, and all during the third and fourth; in this way they will be fatter in the end, than if they had all at first. Feeding calves three times a day is considered much better than only twice; but, whether fed twice or thrice a day, the times of feeding should be regular, and as nearly equidistant as possible. It is generally recommended to place a lump of chalk convenient for the calf to lick at. Fresh litter should be constantly provided for them to lie on, and particular attention paid to their cleanliness. The calves intended to be reared may go with the cows the first three or four days. They should have milk, more or less, for about twelve weeks. They may be fed with skimmed milk, or water porridge, after the first fortnight; or their milk may be mixed with meal and water. After a calf has sucked, or drunk milk, for a month, take some of the freshest and sweetest hay, and put little wisps of it into cleft sticks, and he will soon learn to eat. If skim milk is given to calves, it should be boiled, and then cooled to the temperature of that from the cow. It is better boiled than when warmed only. If given too cold it will cause the calf to purge. If this is the case, put two or three spoonfuls of runnit in the milk, and it will stop the looseness. If the calf is bound, pork broth is said to be a good thing to put into the milk. Mr. *Budd*, of Mass. directs to feed the calves when three days old with gruel, composed of one third barley and two thirds oats, each ground fine, and the mixture sifted. A quart of this gruel is to be given to each calf, morning and evening. The gruel is made by taking one quart of the flour, and twelve of water, and boiling them together for half an hour, and is to be given while milk-warm. If calves are put into pasture, it should be such as is dry and sweet. White and red clover is best. There should be no water in the pasture but sufficient shade. When the dews fail, a little nourishing drink should be given them in the middle of the day, if the weather is warm. During the first winter they should be kept in a comfortable place, and have plenty of good fodder and

a little Indian meal, or other nourishing food; and they should have shelter earlier than larger cattle. The best time for castrating calves is at fifteen or twenty days old.

Young steers intended for labor, should be early yoked, and worked moderately at first with old oxen. When oxen are worked in wet weather, let that part of the yoke which rubs against the breast and neck be rubbed with tallow, to prevent soreness.

The signs of a good ox, are, thick, soft, smooth, short hair; short thick head; glossy smooth horns; large shaggy ears; wide forehead; full black eyes; wide nostrils; black lips; thick fleshy neck; large shoulders; broad veins; large belly; thick rump and thighs; straight back; long tail, well covered with hair; and short broad hoofs. The best colors are brown, dark-red, and brindled. When an ox has completed his eighth year he should be fattened.

Cows should not be milked during two months previous to calving; and for some weeks before this event should receive particular attention. The day and night after a cow has calved, she should be kept housed, and her drink should be luke-warm. Let her not be exposed for some time after to the dampness of the night. Cows should at all times be kept in high health and good condition: for if they are suffered to fall in flesh during the winter, it will be impossible to expect an abundant supply of milk by bringing them into high condition in the summer. The happiest consequences will ensue, both in regard to milk and improvement of the cows by currying them well. Pure water also is a most essential article to them. It has been ascertained, that if water is at command, cattle will drink of it eight times a day: hence it is evident, that they cannot get enough, if only driven twice a day to an adjoining stream or pond.

The common cattle stalls of our country are so ill contrived, that the cattle lie down in their own dung. This dries and forms a thick coat on their hind quarters, from which they are not relieved till they shed their hair in the spring. They are thus rendered *uncomfortable*. To be uncomfortable is to suffer some degree of *pain*; and no one will suppose that animals in *pain* can *thrive* or *preserve* their plight, with the same food, equal-

ly with others perfectly at ease. Even hogs, though prone to wallow in the mire in warm weather, are always pleased with a dry bed, and thrive best when kept clean.

Oil-cakes, are of great use, for feeding cows before calving. Flax-seed broth, or jelly, is much recommended for fattening. It is made by putting about a quart of flaxseed to seven of water, and then let stand about forty-eight hours; after which it is to be boiled gently for two hours, stirring it frequently to prevent its burning. When cool, it is to be mixed with meal, bran, or cut-straw, and fed out at the rate of about two quarts a day to each beast, and it is said to make a great saving in the article of food. It is also useful for fattening calves.

The more cattle can be made to eat with an appetite, the sooner they grow fat. It is bad economy to spare food in this case: a certain quantity daily is requisite to preserve a beast from falling away; and an addition is necessary to put fat on him. Therefore the sooner he is fed, the greater proportion of what is necessary for bare maintenance, is saved.

Cattle ought not to be turned to pasture in the spring, until there is a *good bite* of grass. And if it consists of the artificial grasses, care must be used to prevent them from receiving injury. The milch-cows and fattening cattle should have the best or first feeding of each pasture lot.

The cow is generally in her prime at five years old, and will continue in a good milking state till ten years of age or upwards. The time of milking ought to be regular, and as nearly equi-distant as possible. Where the feeding is full, milking three times a day in summer, will increase the milk nearly one third. Omitting to milk regularly and clean, tends very much to dry them up. The milk last taken from a cow has been found to produce a much larger proportion of butter than the first.

It is considered best to select cows from the stock raised on the farm; if brought from other farms it is frequently two years before they will give the full quantity of milk. In the improvement of the breed of cattle, select those cows which yield the most of such

cream as makes the *best* butter: for there is a considerable difference in the quality of milk, from cows fed in the same manner.

SHEEP.

Among the various animals^t given by the benevolent hand of Providence for the benefit of mankind, sheep is one of the most useful. They multiply fast; they are subject to but few diseases in this country; and they not only supply us with food and clothing, but also afford employment to many persons, in the various branches of woollen manufacture.

It is highly desirable that our country should be stocked with sheep of various kinds, in order to supply itself with the various sorts of clothes which are necessary in different uses. Many questions which were once problematical, observes Mr. *Lowell*, are now settled in favour of the merino.—It was doubted whether it would stand our climate:—It does perfectly.—Whether its wool would not degenerate:—It rather improves.—Whether its meat would be good for the table? It is as fine at least as any mutton we have. Whether the wool could be exported to England and sell there at a fair price? It has been done, and met such a sale as would yield a much greater profit on merino sheep than on the common sheep.

The farmer should carefully examine the nature of his land; and having attentively weighed its relative degrees of fertility, and his various sources for supplying food, he may then proceed to purchase that breed, which, after mature consideration, he has reason to believe is best calculated for him. The difference of land, whence the sheep are to be purchased, ought to be attentively weighed; for with sheep, as with cattle stock, if any breed be brought from a rich to an inferior soil, it must necessarily decrease in value and condition. It may be found equally true, that different soils are best suited to different breeds of sheep; and that the soil often serves eventually to produce a difference in sheep.

That our sheep may be profitably managed, none should be kept for breeders that have not good fleeces. It is the opinion of Mr. *Deane* that lambs should not come till about the 20th of April, when the grass begins

to start. The ewes should therefore be kept from the ram till the 20th of November. For a few weeks before, and for a considerable time after yearning, they should have plenty of juicy food: For the want of milk is the principal cause of the loss of so many lambs. Sheep should have hay of the best quality during winter. Red clover that has been salted in the mow is esteemed the best. If sheep are fed daily upon potatoes, carrots, turnips, &c. no article of stock will repay with greater profit; the quantity of wool will be greater, and quality finer; they will be free from ticks, unless kept in too warm a covering, and too many in a fold; they will not shed their wool, and seldom lose their lambs. When sheep are badly kept they take colds, and discharge a mucus from the nose. Good feeding, together with some pine boughs given them occasionally, will cure this complaint. If pine boughs cannot be had, spread some tar over a board, and over this spread some salt, which will induce the sheep to lick up all the tar, and this will effect a cure. The yard and shelter should be spacious; the shelter close over-head, but open to the south, and it should have some small apartments for the ewes at yearning time. The different apartments must be kept well littered.

If lambs are weak, it is necessary to give them, the first day or two, a small quantity of cow's milk, warm, three or four times in the day; if it is cold weather, the cup containing the milk should stand in another vessel, that is partly filled with warm water. Should the lamb be chilled, rub his legs with tow, and let a warm cloth be wrapped round it. But if corn, barley, oats, or white beans, are given to sheep, during the winter, in small quantity, the ewes will have plenty of milk, the lambs will be strong, and the trouble of nursing saved.

Water is not necessary for sheep during the season of pasture; as they will feed while the dew is on; but in winter they should have free access to it, although they can do many days without it. They thrive better if changed frequently from one pasture to another, if of equal goodness.

The weaning of lambs, before the time when they naturally wean themselves, is believed to be by no means advisable, unless the ewes are to be turned off

for fattening. In this case, care must be taken to milk the ewes every day or two, for the first week, until the milk dries up.

In washing sheep, to prevent danger from exposure, sink a tub or barrel for the person to stand in. The water must be warm as can be had, and perfectly clean. It is necessary to keep sheep, some days previous to shearing, in a clean pasture, that their wool may imbibe some of the oil which is lost by washing, which will render the shearing more easy, and require less oil afterwards. If any are cut in shearing, the wounds should be smeared with a mixture of tar, fresh butter, and sulphur. At shearing but few should be brought together at a time, and they should be penned in the open air. After shearing, they require shade during the heat of the day, free access to their shelter during rains and cold nights, and plenty of salt. At shearing time, the lambs should be docked, castrated and marked; and all old and broken-mouthed sheep, and all that do not possess good qualities should be marked, in order to be put in good pasture and fattened. To destroy ticks on sheep, part the wool along the back, and down each side of the neck, and sprinkle snuff thin: it will kill the ticks in the course of three or four days. This operation ought to be repeated in ten or twelve days, to kill those newly hatched. This operation performed on the lambs after the old sheep are shorn, will expel the vermin from the flock.

The wool of yearling sheep should be kept by itself; as its difference of texture will cause cloth to shrink unequally if mixed with other wool. The other fleeces may be sorted, by making separate parcels of the thighs, belly, back, and sides. Mr. *Hayden* of Massachusetts, recommends the following management for wool that is to be sent to market. After separating from the fleece all tag locks and manure, wind up as tight as possible, with the skin side inward. After which, it would be well to put it into a clean dry apartment for a week or more, for the purpose of drying before packing. The most convenient bags may be made of tow cloth, from 7-8 to 4-4 wide, of three breadths each, from two to two and a quarter in length. As merino sheep cannot be washed to much advantage, the wool must be wash-

ed soon after shearing, to prevent it from fermenting and spoiling in hot weather.

Ewes should not have lambs until they are two years old, as it stunts them in their growth; and they have so little milk, that their lambs either die, or are always small and inferior. A yearling sheep has at its first shearing, two broad teeth before, besides its narrow teeth; when sheared the second time, it has four; the third time six; and the fourth, eight. They are then said to be *full-mouthed*. At seven and eight years they begin to lose their front teeth. Whenever this happens, they should be turned off to fat, as they are then upon the decline.

Mr. *Livingston* says, the size of the ewes, more than that of the ram, governs the size of their lambs; that the ewes of a small race cannot bear large lambs, though the ram be ever so large. For this reason, the lambs which are raised from a merino ram, on our common ewes, will be larger than those raised from one of our common rams on merino ewes. But as sheep are supposed to eat nearly in proportion to their size, those of a medium size are the most profitable. To improve our breed of sheep, take ewes that are at least three years old, as large as can be obtained of the sort, with the belly large and well covered with wool, chine and loin broad, breast deep, buttocks full, the eyes lively, the bag large, and the teats long. They must have fine short thick wool, with the least hair on the hinder parts. In the choice of a ram, which we will suppose to be three-fourths blooded, select one that is of good size, broad in the chine and loins, deep in the carcase, the back straight, the ribs well set out, so as to give room for a large belly, well covered with wool, the forehead broad, the eyes lively: Let him also be strong, close-knit, and active; and let his wool be of good quality, and as clear of hair on the hinder parts as possible. The product of such a ram, with common ewes, would be lambs nine twenty-fourth parts of merino blood; and twice repeating the process on the females of successive products, would give three-fourth blooded lambs. Two further repetitions from a full-blooded ram, would give lambs possessing fifteen-sixteenths of merino blood, which is probably sufficient. The ram, however, ought

to be changed at each time ; as it is believed that the rearing of succeeding stocks, between which there is the closest consanguinity, must eventually tend to degenerate the breed. About forty ewes may be allowed to one ram. See *Livingston's Essay on sheep*.

SWINE.

This species of live stock may be regarded as one of the most profitable, while the number kept on a farm is proportioned to the quantity of offal on the premises ; especially as the benefit arising from their dung, more than counterbalances the expense of attendance, and as they are the only kind of animals that can be fed upon those articles, that would otherwise go to waste about a farm.

The marks of a good hog are, a moderate length, in proportion to the size of the body ; the nose short, the cheek plump and full ; neck thick and short ; quarters full ; carcase thick and full ; hair fine and thin ; with a symmetry adapted to the breed to which it belongs. Above all, it is essential that it be of a kindly disposition to fatten early. The long nosed hogs should be avoided.

The sow will bring forth a stronger and better litter, if kept from the boar till a year old ; and he should be kept from sows till that age. He should be kept in good condition, and not go to more than ten sows in a year. The sows should also be kept in good condition, but not too fat. The period of gestation is about four months ; they usually bring two litters in a year ; the most proper times will be April and early in September. They should be kept clean and well littered ; but should not have too much litter at the time of piging, lest they overlay their young. In eight or ten days they should be let out of their sties into the yard, for several hours each day. Where several sows are farrowing, about the same time, they should be kept in separate apartments. To prevent sows from eating their pigs, let them have plenty of water. The pigs intended for market, should be killed in about three weeks. The finest ones should be saved, and castrated and spayed, at the age of six weeks. If pigs are to be weaned, it should be at the age of two months ; and they should have a sty by themselves, be kept clean, well littered,

and have plenty of good food. When three months old, they will do well by turning them with the hogs in the clover field. The pasture in which hogs are kept, should have a supply of water.

In preference to feeding swine on clover in the field, during summer, Mr. *Young* directs soiling them in a yard; in this case, sainfoin, lucern, clover, &c. can be cut and carried to them; also, all kinds of weeds from the borders of inclosures; the haulm of peas, beans and potatoes, fern or brakes, &c. and where situation will admit, eel grass and rock weed, towards increasing manure, with mud from the bottoms of ponds, and scraping from the yard, occasionally sprinkling upon the mass, a little quick lime, to favor the decomposition. Mr. *L'Homedien* thinks the manure made in this way will more than pay for their keeping.

Another good method, is to have two small enclosures; the one to be kept for feeding them, while the other is under tillage for a fresh supply of clover, or other good grass, when that in the first has failed. As sweet apples and peaches are valuable food for them, let a few trees of these be planted, in the enclosures, of the best yearly bearers; some being early ripe and some later; but not so near each other as to injure the ground for cultivation.

Boiled or steamed clover hay cut a little sooner than usual, and salted in the mow, will keep hogs during winter, but to this it is best to add steamed potatoes, carrots, &c. The cleaner they are kept, the better they will grow and fatten. They never should be without a good shelter, summer and winter. But how many leave this poor degraded creature, exposed to the inclemency of the season. The hog appeals to all our senses; he shivers, his thin hairs are clotted and dripping, he utters loudly his complaints! But he is not a favourite! he is rude and dirty; neither amuses nor renders any daily services; he is destined to slaughter, and suffers unpitied any natural evils that befall all the few days allotted to him by the will of his master.

The sows may be allowed to breed till they are six years old, and the boar until five. After this, the former is to be spayed and fattened, and the latter castrated and fattened for bacon.

Hogs for fattening should be in a healthy state ; and, to increase their appetite, let a dose or two of sulphur be given them in their food. Change of food is also good to increase their appetite. Probably changes of boiled roots, and of meal and water, at intervals, would be found best. All kinds of grain, ground to meal, and mixed with water, in the proportion of five bushels of meal to one hundred gallons of water, well stirred several times each day, until it has fermented and become acid, is said by Mr. Young, to be the best food for hogs. It should be made in large quantities, as it will require two or three weeks to ferment. Mr. Deane says, that while hogs are fattening, little or none of the wash of the kitchen should be given them ; but that their drink should be clean water, of which they will drink considerable. Mr. Bordley, recommends not to force hogs to eat salt by mixing it with their food, but place it where they can have access to it at their pleasure.

Swine kept in too warm, and more so in filthy pens, are ever subject to diseases and unprofitable feeding. There is no greater mistake than that of *gorging* swine, when first penned for fattening. They should, on the contrary, be moderately and frequently fed ; so that they be kept full, but do not loath, or reject their food ; and in the end contract fevers and dangerous maladies, originating in a hot and corrupted mass of blood ; against some of which, *dry rotten wood* is a preventive. Their meals should be regular, and as nearly equi-distant in point of time as possible. Posts ought to be set up in the sty for them to rub against.

To keep hogs in health, and prevent them from having the measles ; about once a week mix two spoonfuls of madder in their food ; and on some other day in the week, give a spoonful or two of an equal quantity of flour of sulphur, and saltpetre, well pounded and mixed, and added to their food.

The business of fattening hogs should be begun so early in the fall, (say first of October) as to be completed early in December ; as after cold weather sets in, they will fatten very slowly.

PASTURES.

The grounds that are the most perfectly adapted to this use, are all those which have a considerable depth

of good mould, and at the same time that they afford a good herbage, are so dry in their nature as to admit the animals to feed upon them at almost all seasons without injury by poaching.

The subdivisions of land, that is kept for the sole purpose of pasturing, should depend as well upon its fertility, as upon the number of different kinds of cattle that are to be fed on it. Fifty acres of land, that would only feed three cows during the season, would not pay the expense of subdividing. On the contrary, if the farmer has but three cows, and has three acres of the best pasture land, he ought to divide this into at least two parts; so that the one can be growing while the other is feeding. Or, if he keep twenty cows, and has twenty acres of the best pasture, it will be profitable to divide it into four parts, pasturing each enclosure three or four days, alternately. In this way, pasture lands will keep at least one fourth more cattle, than if the whole were in one field.

Not only a change of pasture is beneficial, but a change of different kinds of cattle in the same pastures should be attended to. Thus, let the milch cows take the first cropping of each field, in rotation; then the horses and oxen, and the sheep next. In this way, the last feeder will eat much grass that has been neglected by the former.

It is hurtful to pastures to turn in cattle too early in the spring; particularly to those which are wet. Poaching such land destroys the sward, so that it will produce the less quantity of grass. They should not be turned in till there is a *good bite*. The latter part of May is early enough.

By draining wet miry spots in pasture, the grass will probably be doubled in quantity, and much improved in quality. Bushes should be cut out and destroyed; thistles and other noxious weeds should be mowed down before they go to seed, and every mean taken to eradicate them. It is never advisable to pasture lands too closely, particularly in the fall, as this only tends to diminish the quantity the next year. The dung that is left, should be beat to pieces, and scattered over the field. Plaster, or lime ashes, sown upon pasture grounds, will repay a handsome profit, by increasing the quantity and

value of feed, by bringing in the finer grasses, such as white clover, &c.

Sheep require no water in their pastures; it is also said that calves should have none: and, horses require but little, except when they are worked. The effect of this treatment is, that they become habituated to lie by in the heat of the day, and feed at night, when the dew is on the grass, which renders it more nourishing. Cows, however, must have water: and where it is scarce, the farmer may select some small stream, spring, or pond, or large trough, supplied from some neighbouring spring, and divide the pasture so as to have four or more inclosures centre in, or upon the brook, pond, or reservoir; in this way fifty or sixty acres may be supplied with water. But if there is no water, the best way is to sink a well at that spot where the pasture lots corner together; and then by a little cheap wind-machinery, the trough may be filled as often as necessary. In pastures which are on the sides of hills, water may be easily obtained, by digging horizontally into the hill till you come to it, and then carrying it out in a pipe. Another method is, to dig a well on a steep part of the hill, and place a syphon in it, with so small a pipe that it will not let off the water fast enough to exhaust it in the well.

Lastly, as a matter of ornament, profit, and shade for cattle, let your pastures be planted with a few useful trees; and probably, for this purpose, the locust will be most suitable for dry, and the sugar-maple for moist lands.

SOILING OF CATTLE.

By this is meant, the feeding of stock in a house, shed, or fold, during the growing season, with grass, &c. cut and carried in to them. It is particularly recommended for milch cows, working horses, and oxen, and for fattening cattle; and it has been found to answer well for swine.

It is observed by Mr. Quincy, of Massachusetts, that there are six distinct advantages, which those, who advocate soiling, propose to themselves by the practice, and on which they establish the preference of this mode to the common one of pasturing cattle during the summer.

1st. *The saving of land.* For it is said by those who have practised soiling, that a spot of ground which, when pastured, will yield only sufficient food for *one* head, will abundantly maintain *four*, when kept in the stable.

2d. *The saving of fencing.* The general effect of soiling cattle is, to render all interior fences absolutely useless.

3d. *The economising of food.* There are six ways by which beasts destroy the article destined for their food; viz. By eating; walking; dunging; staling; lying down; and breathing on it: Of these, the first only is useful. By cutting the same, and feeding it to them in the stall, sparingly, in point of time, but sufficiently in point of quantity, every particle will be consumed; and beasts will eat many products of the earth, in the stall, which they will refuse in the pasture.

4th. *The better condition and greater comfort of the cattle.* They are less subject to accidents and diseases; they are protected from the flies; and they do not suffer from the heat of summer. Stall feeding, does not imply keeping cattle in stalls, or in the house *the whole* time. It only intends, always feeding them there, and keeping them there the chief of the time. On the contrary, it is an essential part of the system, to let them loose in yards well shaded, at least two hours in the forenoon, and two in the afternoon.

5th. *The greater product of milk.* Although the quantity of milk may not be greater in the early part of the season, when pastures abound with a flush of feed, yet Mr. Quincy has found from experience, that by providing a regular succession of succulent crops, the milk product will be undiminished; and therefore greatly exceed that obtained by pasturing.

6th. *The attainment of manure.* Soiling is supposed to afford more than double the quantity of manure from the same number of cattle; for the best summer manure is produced in the stable, and carried to the field when in the most suitable condition; whereas, when scattered about fields, and exhausted by the air and sun, it is much wasted.

There are other advantages attending this method of husbandry. The trouble of driving the milch cows to

and from the pastures, is saved; the working horses and oxen are always at hand; and, what is of no small importance, when the cattle are housed the growing crops are in more safety.

The only offset to all these advantages is the labour of raising and cutting the food, and feeding and taking care of the stock.

The crops necessary for soiling, may be rye (sown the preceding year) oats, barley, millet, (this has been cultivated to advantage in this State the present year) Indian corn, sown broadcast, clover and various grasses; besides cabbages and roots, so arranged as to have a succession of succulent food through the season. Any sorts of grain sown to produce fodder for soiling, after being harrowed in, should be rolled, to make the ground smooth for mowing. If the soil be rich and the surface smooth, the grass may be cut when only three or four inches high, and will then yield a good swarth. Such ground well set with the grasses usually cultivated and inclined to moisture, may in this manner be mown three or four times in a season. The cutting of the rye, oats, barley and millet should commence as soon as they will yield a good swarth, and be finished before they have passed the flowering state. If mown before they flower, they will shoot again; and if the growth be rich, yield second crops.

Indian corn will be well grown for soiling by the 10th or 15th of July: and will continue green, and in full sap until the last of August. And in order to continue a supply of the rich, green food—to which probably no other vegetable of our country is equal, especially for milch cows—pieces of land may be planted or sown in succession, so that some may be in full sap to the last of September.

Rich mowing land will furnish a second and third crop of green fodder that will answer to the middle or last of October. Perhaps late sown oats, hardier plants than Indian corn, may supply the place of grass. Pumpkins, also, during this month and the next, will furnish a most valuable food. To these may be added the tops of winter vegetables, such as carrots, turnips, &c. which will be useful till the middle of November. Mr. Quincy has been able to support 20 head of cattle, from the 5th of October to the middle or latter end of Novem-

ber with the tops of vegetables raised on eight to twelve acres of land, with the addition of only a single foddering of salt hay, per day. If, however, the farmer is not in the practice of raising a sufficient quantity of roots, to yield a support for his stock, for five or six weeks, cabbages are, in this climate, the farmer's best dependance, after the second cutting of the grass and corn, and oat fodder fail.

After November, potatoes, mangel wurtzel and carrots, added plentifully to their dry fodder, even if this be only barley, or oat straw, or wet or low meadow hay, will doubtless keep cows in milch till within a suitable time of their calving. Cows, during the time of their going dry, and other stock at all times, fully supplied with ruta бага, or common turnips, with the same poor dry fodder, may be kept in high condition. In England, cattle intended for beef are often fattened on wheat straw and turnips, giving of the latter as many as they will eat. They commence feeding in this manner in Autumn, and by the spring the cattle are fat for the market.

Rye, oats, barley and millet when destined for soiling, should be sown twice as thick as when intended to ripen their seeds. In like manner Indian corn may be planted in continued rows only so far apart as to admit a small plough in its culture, and with the plants only four or five inches a part in the rows. The surface of the ground should be smooth in the rows, so as to admit of mowing the corn: Or it may be sown broadcast, ploughed or harrowed in, by harrowing both ways, and afterwards rolled.

The essential point in soiling, is to make and save the greatest possible quantity of barn-dung. Some of the most intelligent farmers, therefore have barns with cellars under them, for the purpose of receiving the dung of the cattle, and into these the dung and litter are constantly thrown. Suitable earths are also laid behind the cattle to absorb the stale as it runs backward, and these, when saturated, are also thrown down and mixed with the dung. The cellar should not be very deep, and should be open for the admission of air during the summer. The bottom ought to be made water tight with clay. Others prefer sheds adjoining the barn, to keep the dung under cover to protect it from the rains,

The proportion of valuable manure that the careful husbandman may provide by this system of management is scarcely to be conceived.

The whole supply of food for the day, can be cut and carried to the barn in the morning. A light hand-cart, or wheelbarrow, will be found convenient for bringing in the grass from the parts of the field nearest the barn; and a horse-cart, from those most distant. Double sheds, in which a sufficient space is left before the cattle, for the feeder to go with a large wheelbarrow to distribute their food, are, perhaps, the best constructions for feeding houses; being not only most commodious, but less building will be required for the same number of cattle, than by having them all to face one way. The food is distributed, under cover, about six times a day, in due proportions, which the usual practical knowledge of a farmer will easily regulate.

Mr. Quincy has kept for several years the same amount of stock, by soiling, on seventeen acres of land, though not in high tilth, which had always previously required fifty acres. But he advises the farmer to keep on hand, a month or six weeks stock of hay or other food; so as to have assurance that his cattle should not suffer by drought, or any other untoward accident of season. A mixture of dry food with the succulent, is very conducive to the health of the animals soiled, and enables the feeder to check the too great looseness of the bowels; often the effect of high feeding upon juicy vegetables.

It has been observed, that those cows which have been always used to be kept by soiling, during the growing season, are usually more profitable than those which have been newly put to this method of keeping.

The practice of soiling cannot, of course, be advisable to that class of agriculturalists, whose farms contain tracts of land suitable for nothing else than pasturage, but to that class, whose farms are small, and who are stimulated by that correct ambition of possessing a little land highly cultivated, rather than a great deal miserably managed; to that class, also, whose entire farms are capable of being tilled or mown—where fencing stuff is dear—where grass is of great value—where cultivation is carried to great perfection—where population is dense

—and particularly where their situation does not place them within any easy access to manures ;—in such situations, the practice above proposed presents advantages of the most decided and unequivocal character.

Mr. *Robbins* thinks that a system, combined of soiling and pasturage, might be a great improvement upon our present system—soiling of our working cattle, in the season of work, and soiling of our cows, combined with pasturage. Under this system, almost any farm, even a very rough one, might be greatly improved

There can scarcely be any doubt of the advantage of soiling, where that close sort of attention which is requisite in most of the operations of farming, is bestowed : but in order to the success of the practice, it is necessary that the cattle be kept clean ; that there be plenty of pure water for them to drink ; that the food be given them frequently and in due portions, without its becoming injured by keeping ; and that they be turned out for a few hours in the cool of the morning and evening, in the summer season, and in the middle of the day, when the weather becomes more cold. It might also be of additional advantage where different kinds of green food can be easily provided, to vary them occasionally.

There is no proposition in nature more true, observes Mr. *Quincy*, than that any farmer may maintain by this system, upon *thirty acres of good arable land, twenty head of cattle*, in better condition, with more profit, with more comfort to the animals, with less labor, less trouble, and less cash advance to himself, than he at present usually expends upon one hundred acres. In addition to which he will have the great satisfaction of seeing, in time, every square inch of his land productive, instead of seeing, as he does now, not more than one part in four of his farm producing any thing ; or at least, any that will pay the expense of harvesting.

BUTTER.

Pans, or trays, for holding milk, to raise the most cream ought to be broad and shallow, and the milk put in them, should not be more than three or four inches in depth. Tin or wood are the best materials for making these. Some line wooden trays with lead ; but this is a bad practice, as lead may sometimes be dissolved by the

acid of the milk, and then it is poisonous. Wooden trays ought to be well scalded, and dried in a cool place, as often as new milk is put into them.

If new milk be kept as warm as it comes from the cow, no cream will rise on it; but, when sufficiently cooled, it separates from the rest and rises to the top. In order then to effect this, to the best advantage, the new milk should be made as cool as possible, and the cooler it is thus made, the more suddenly and effectually the cream will rise. The cooler the cellars, therefore, in which milk is kept, the better. To set milk pans, made of tin, in beds of salt, would, no doubt, be useful when the cellar is too warm; and to set all milk vessels on a floor which is constantly covered with cold spring water, is also an excellent plan; and, where it can be done, ought never to be omitted. Wetting the floor will answer.

Most of the cream comes last from the cow in milking. The last half pint, contains as much cream as the first quart, or perhaps three pints; and, for this reason, they ought to be milked as clean as possible. The quantity of cream will be greater, if the milk of each cow be strained into a pan by itself. In cold weather the milk should be strained immediately after milking, but in very warm weather it can be left till nearly cool.

In hot weather the cream should be skimmed from the milk at or before sunrise, and in about twenty-four hours after it is taken from the cow. In winter, milk may remain unskimmed thirty-six or forty-eight hours. The cream should be deposited in a deep pan, kept during summer in a cool place, where a free air is admitted. Unless churning is performed every other day, the cream should be shifted daily into clean pans. If a pump churn is used, it may be plunged a foot deep in cold water, and remain in that situation during the whole time of churning, which will much harden the butter. A strong rancid flavour will be given to butter if the churn is placed so near the fire as to heat the wood in the winter season. In churning it is necessary to keep a regular stroke. After the butter is churned, it should be perfectly cleansed from the milk before salting.

For curing butter, take two parts of the best common salt, one of brown-sugar, and one of salpêtre ; beat them together so as to blend them completely, apply one ounce of this to every pound of butter ; and work it well into the mass. It should be put into firkins, and so closely packed and crowded, that no air can be in contact with the butter ; which should be carefully covered with a piece of fine cloth, after dipping it in melted sweet butter. When more is to be put into the tub, take up the cloth ; and after that is well crowded in and levelled, put on the cloth again so nicely as to shut out, if possible, every particle of air. Butter salted in this manner and put down in close tubs, with a little melted butter poured over the surface, to fill up every vacuity, before the top is put on, will keep much longer, and be worth at least twenty-five per cent. more than that which has been cured with salt alone. It must not, however, be used sooner than three or four weeks after it has been laid down, as it does not fully acquire its rich marrowy taste, until about that length of time. The tubs, during summer and fall, should stand on the coldest part of the cellar.

For keeping butter sweet that is salted in the usual way, it should be salted with an ounce and a half, or more, of the strongest and best salt, finely powdered, to each pound, and so thoroughly mixed that every part may be equally salt ; made into rolls, and then put into a cask of pure strong brine, and, for keeping the rolls completely immersed in this liquid, there should be a cover, suitable to the dimension of the inside of the cask, to be laid on the rolls, and sunk beneath the surface of the brine by a weight, which may be a block of wood, fastened to the cover, that will sink only a given depth. The brine does not penetrate the butter so as to give out any additional saltness. For clarifying the brine it should occasionally be scalded, the scum taken off, and more salt added if necessary. Butter made in May is observed to be best for keeping.

Milk or butter should not be put in stone jars, as they communicate a poisonous quality extremely injurious to the human constitution. Wooden vessels are the most proper for containing salted butter, and oak the best kind of wood. Iron hoops should not be used, as the

rust of them will in time sink through the wood and injure the butter. As it is very difficult to season new firkins, it will always be preferable to employ those which have been already used. The most speedy method of seasoning firkins is, by the use of unslacked lime, or a large quantity of salt and water well boiled; with which they should be repeatedly scrubbed, and afterwards thrown into cold water, to remain there three or four days till wanted. They should then be scrubbed as before, and well rinsed with cold water; and, before the butter is put in, every part of the inside must be well rubbed with salt.

If any ill flavour is apprehended from the cows having eaten turnips, &c. the addition of one eighth part of boiling water to the milk before it is poured into the dishes will effectually remove it. Or a small bit of saltpetre, powdered and put into the milk pan with the new milk, prevents the cream and butter from being tainted, although the cows be fed on the refuse leaves of cabbages and turnips.

An improvement in the dasher of the common churn has been made, by which that kind of churn is considered by many to be, for common purposes, equal, if not superior, to any in use. The dasher turns on the handle, by being fixed to it by a pivot. The dasher is merely two cross-pieces, say, three inches square, put together, by being let into each other, which then form four wings. These are cut leveling on each side, at an angle of forty-five degrees, so that they stand diagonally; the whole being very similar to the wings of the little windmills (so called) which are set up, on poles, to be turned by the wind. As this dasher goes down in the milk, it turns one way, on its pivot in the lower end of the handle, and as it comes up, it turns the other way; and this produces an agitation of the milk, better calculated for producing the butter, than any method ever yet known. It is so efficacious in its operation, that the churning must be performed moderately, or the butter will come too soon, and be *swelted*, as it is technically called by some.

CHEESE.

Cheese is mentioned by the most ancient writers.

“ Around the grot we gaze ; and all we view,
In order ranged, our admiration drew :
The bending shelves, with loads of cheeses prest, &c.”

HOMER.

But let us attend to the best mode of loading our shelves with first rate cheeses.

Make your milk blood-warm, and put in your runnet ; but no more than will just make the curd come. Add an ounce of fine salt to so much curd as will make a cheese of fifteen pounds, and in proportion for a greater or less. Stir the curd till it is gathered ; put it in a strainer, and with your hands work out all the whey ; then lay it in a clean linnen cloth, put it in the hoop, and, covering it with the cloth, put it in the press, and let it stand there two hours ; then take it out, rub it over with fine salt, put it in another dry cloth, and put it in the press eight hours ; then take it out again, put in another dry cloth, and put it in the press again, where it is to remain till the next cheese is ready. When taken out of the press, put it in brine twenty-four hours, and add to the brine about a tea spoon full of saltpetre. Some little additions of salt and saltpetre must be occasionally made to the brine ; and let it be cleansed as soon as necessary, by heating it and taking off the scum. When you take the cheese out, dry it with a cloth ; bind it round with a long string to make it keep its shape, which must be kept round it for some days, and let it be daily turned on the shelf, for two months.

Let the evening milk be put with that of the morning ; and, to make the best cheeses, let none of the cream be taken away. If the evening milk, however, be skimmed, and added to that of the morning, it will make tolerable cheese. Skim-milk cheeses are also made ; but they are not worth much.

Wooden vessels are considered most wholesome for holding the milk ; but if tin be used, they should be washed every time they are emptied, with warm water, in which a little salt has been dissolved, and should be kept clean by scouring ; and to prevent acidity in wooden vessels, they should in like manner be scoured and cleaned with warm water.

eight hours it is taken out of the press and salted, the cheese is placed on a board, and an handfull of salt is rubbed all over it, and the edges are pared off if necessary; another handfull of salt is strewed on the upper side, and as much left as will stick to it; afterwards it is turned into the bare vat without a cloth, and an equal quantity of salt is added to it, and the cheese is returned into the press; where it continues one night, and the next morning it is turned in the vat and continues till the succeeding morning, and is taken out and placed on the dairy shelf; where they are turned every day or every other day, as the weather may be. If it is hot and dry, the windows and door are kept shut, but if wet or moist, the door and windows are kept open night and day.

FRUIT TREES

There is probably no part of rural economy, observes Mr. Coxe, which combines in so great a degree the agreeable occupation of the mind with active employment, as the cultivation of fruit trees, with the other branches of an extensive orchard establishment: to the man of wealth and leisure, it offers the means of improving and adorning his estate; the scientific cultivator will find in it inexhaustible sources of intellectual occupation; while the practical farmer, whose views are limited to objects of certain profit, will be amply remunerated for every expenditure of labour or money, by the immediate comfort, and eventual emolument, which will be derived from such an establishment.

As nothing, says Mr. Robbins, is more delicious, so nothing is more wholesome, than well ripened fruit. It is its deliciousness that makes its danger. It tempts to excess in eating, and to eating it, unripe. But taken in moderation, it is as wholesome to the constitution, as it is delicious to the palate. Fruit seems to be the favourite food of nature. All animals devour it with eagerness. There is no luxury of the unadulterated palate so much coveted; and in places where nature has denied the production, no cost in forcing it is considered too great. Besides the unfailing market, that may be expected for the fruit, there is the farm, where so much is wanted for family consumption, where it contributes so much to

the pleasure of the family table, and where it is manufactured into so many liquors; the cider, the perry, the wines, &c. both for family consumption, and the market; so that a few acres of fruit become a source of more revenue, than the whole farm besides. Nothing, in agriculture, gives so much value to the land it occupies, as a good fruit tree. In many instances, it adds many hundred per cent. to its value. The original cost is a mere nothing, even if the young tree be purchased. But if it be raised, and formed, as it may be, a little labour procures it. The time, it requires to come to a state of bearing, ought to be no objection; for in the mean time the land may be cropped, and the tree will be the better for the tillage. Its growth and maturity will be perceptibly hastened. The new value begins with its plantation, and grows with its growth. Notwithstanding, these advantages, and the immense value of fruit trees, it is truly said by Dr. Thacher, of Massachusetts, in his *Orchardist* that their cultivation has received but inadequate attention from the farmers of our country. It must be confessed, as a notorious truth, that an orchard, planted and cultivated in the most advantageous manner in point of beauty, profit, and convenience, is scarcely to be found. The most palpable neglect prevails in respect of proper pruning, cleaning, and manuring round the roots of trees, and of perpetuating choice fruit, by engrafting. Old orchards are, in general, in a state of rapid decay; and it is not uncommon to see valuable and thrifty trees exposed to the depredations of cattle and sheep, and their foliage annoyed by catterpillars and other destructive insects. In fact, we know of no branch of agriculture so unaccountably and so culpably disregarded.

Every thing depends upon care, enlightened care in securing, training, and forming the tree in the first place; and then on its subsequent management. It is this which is to ensure its vigor and constant fertility. Men often object to planting fruit trees and nurseries, on the plea that they may never live to enjoy the fruits of them. Such an objection is mercenary and selfish, and betrays an ignorance, or disregard, of the obligations we all owe to posterity and to patriotism. For the well-being and comfort of future generations, all good minds have

feelings of sympathy; and the planting and protection of orchards has been considered, by every age, as a kind of indispensable duty. That one may plant the tree, and that another, to come after him, may enjoy the fruit, ought to occasion no hesitation. Every one hopes to leave value to his children or relations. The shape is of no material consequence, whether it be in a growing tree, or in one grown. If at the verge of life he plant—he adds so much to the value of the land, for the benefit of his heir. But these objections, can be felt only, as to the apple and the pear, which come late, but last long. As to all other fruits, he that plants at almost any age, may hope to enjoy, their maturity is so early.

When we consider the various manners in which fruits are beneficial; when we recollect the pleasure they afford to the senses, and the chaste and innocent occupation which they give in their cultivation; when we consider the reputation which they communicate to a country in the eye of strangers, especially as affording a test of its climate and industry; when we remember the importance of improving the beverage which they are intended to supply; when it is calculated under how many solid forms they may be exported (as dried, and preserved, as well as in their natural state;) and lastly, when we reflect upon the utility of giving to our rural labours a thoughtful turn, which is the best substitute now left, after having quitted our primeval state; I say, when we consider these things, it will appear that the subject of fruits, which were the first earthly gift of Providence to man in his more favoured state, may well continue to merit both the public and individual attention.

APPLE TREE.

Among the numerous varieties of fruit-bearing trees, cultivated in our country, the apple is, confessedly, of superior importance and utility. It is among the excellencies of a fruit orchard, that it affords a salubrious beverage, an adequate supply of which would have a tendency to diminish, if not supercede, the consumption of ardent spirits, so destructive to the health and moral character of our citizens.

Nursery. Every planter ought to raise his own trees, that the removal may be easily effected without the roots becoming dry, that the tree may be continued in nearly the same kind of soil and atmosphere in which it originated; and that there may be no hazard respecting the kind of fruit intended to be planted. The first step therefore, towards obtaining a good orchard, is to create a good *nursery*. Respecting the soil suitable for a nursery, there is among writers, a considerable diversity of opinion. Some think it the better plan, to make a nursery on such ground as is but illy suited to the growth of the trees to be raised; for, by afterwards placing them in a soil that is natural to them, they will grow more thriftily than trees raised in a nursery where the soil is suitable to their growth. Others are of opinion that the soil should be rich, for the vigor of a young tree, say they, is one of its most valuable properties; no cultivation or soil will effectually overcome the want of it; trees will seldom fail even when removed to a soil of different character from the nursery wherein they were raised, if they have the benefit of good cultivation and good soil; these will produce a correspondent effect on the growth of the tree wherever raised. This is a subject, on which, as Sir *Roger de Coverly* says, much may be said on both sides; the decision of which, with that of several such cases occurring before, we submit to the umpirage of experiment.

We agree with a late writer in opinion, that the soil ought to be naturally good, for at least one full spade deep, or if more, the better; that a loamy soil, of a moderately light temperament is best, and that it cannot *naturally* be too good. It is very wrong to enrich nurseries with *dung*, particularly until it is very old, and almost turned into earth. It is not absolutely necessary that the soil should be exceedingly rich, nor over carefully manured: a medium between the two extremes is best; such as any good substantial garden-ground; or good mellow pasture land. The situation most favourable, is a piece of level ground, neither wet nor dry, free from stones, in an open situation, where fruit trees have not lately grown, or indeed any other deep-rooted plants. Let the ground be ploughed very deeply early in the fall, and be well mellowed: and plant the seeds

about the month of October. Make the rows three and a half, or four feet apart, and plant the seeds plentifully with or without the pomace, one or two inches deep. If the pomace is not used soon after taking it from the press, it must be spread and dried, as it is liable to heat and destroy the seeds. Those seeds that are saved early, or are to be kept through the winter for spring sowing, (which some prefer,) should be preserved from air in dry sand: Let them be put in a box layer upon layer, covering them several inches with sand. Soon after coming up they are to be thinned, so as to stand at proper distances, (say four or five inches apart) and the ground is to be kept hoed, but not deep near the plants, and clear of weeds and grass. After they have had two summer's growth, they may be taken up, grafted near the root, and set again in the nursery, at the distance of about a foot and a half or two feet apart in the rows; where they may remain until sufficiently large to transplant into the orchard—or they may be engrafted in the ground.

The cultivation of a nursery is effected by ploughing and harrowing, each operation twice or thrice in the season, with ploughs and harrows of a small size, in using which, great care should be taken to avoid galling and injuring the trees. The plough is not to go so near the rows as not to leave some ground to be dug with the hoe. The earth is first thrown from the trees, and then towards them, and the ground is also worked with a hoe between the trees to destroy the weeds; the more the earth is stirred, and the cleaner the ground is kept, the faster will trees grow in every stage of their progress, from the seedling to the full grown tree.

In pruning trees in the nursery, care should be used not to run them up too high; this weakens the stems, and throws the growth too much into the branches.—They must be pruned gradually, and a little each year. No suckers that spring up from the roots should be suffered to remain; and all buds should be speedily rubbed off, which would make branches too low on the stems. This attention is not required for those that are intended as stocks to engraft on.

Deep snows are apt to bend down young trees, and make them crooked. The best remedy for this, is to

Drive down stakes, proportioned to the height of the young trees, and tie them to these in such a manner, that the bark will not be injured by the string, nor by rubbing against the stakes. This is to be done after grafting them.

Engrafting. Miraturque novas frondes, et non sua poma.—VIRG.

This quotation may serve at least, to show something of the antiquity of the art of grafting: in which Virgil represents the stock or tree thus altered, as *astonished at the new leaves, and apples not its own*. What pity that the name of the inventor of this useful art should have been lost, who had deserved to rank high among the benefactors of mankind. Grafting was known long before the time of Virgil, having been mentioned by Hesoid, &c.

Fruit trees bear several years sooner for being grafted or inoculated. In the choice of scions for grafting, the first essential requisite is, that they are of the same genus and natural family with the stock which is to become their foster parent. Scions from a winter apple tree should not be grafted on a summer apple stock, because the sap in the summer stock is liable to decline and diminish before the winter fruit has become fully ripe. It is next important, that scions be taken from trees that have attained to the maturity of full bearing. They are directed to be cut in March, just before the buds begin to swell; and in order to preserve them in good condition, they must be placed, with their lower ends in the ground, in some dry part of the cellar till wanted. But some experienced operators prefer cutting them as near the time they are to be employed as convenient. Scions should always be taken from the extremities of the most thrifty and best bearing trees, and of the last year's growth, except only just enough of the growth of the year before to fix in the earth to preserve them moist until they are to be used; and they must be kept at full length. It is generally supposed that grafting may most successfully be performed, by allowing the stock to have some advantage over the graft in forwardness of vegetation. If grafts are to be brought from any considerable distance, they ought to be packed in light earth, and enclosed in moss or damp straw.

The most proper season for grafting, in our climate, is from about the 20th of March, to the 20th of May, though the operation has succeeded well, as late as the 10th of June, provided the scions have been properly preserved. It is always most successful, however, when done at the period that the buds of the stocks are swelled, so as to be nearly ready to burst into leaf: this should be very particularly attended to. It should be observed, as a rule, never to employ suckers from old trees as stocks for grafts, or buds, as they have a constant tendency to generate suckers, and thereby injure the growth of the trees.

Grafting can be performed in various ways. In every method it should be a general rule to adjust the inner bark of the stock and of the scion in close contact, and to confine them precisely in that situation. As *cleft-grafting* is the most simple and certain of success, and that most practised in New-England, we think it unnecessary to describe any other. Cleft-grafting is done on the stocks in the nursery, or on the small limbs of trees. The head of the stock or branch being carefully cut off in a sloping direction, a perpendicular cleft or slit is to be made, about two inches deep, with a knife or chisel, towards the back of the slope, into which a wedge is to be driven, in order to keep it open for the admission of the scion. The latter must now be cut in a perpendicular direction, and in the form of a wedge, leaving the side of the graft, which is to be outside, the thickest, so as to fit the incision in the stock. As soon as it is prepared, it should be placed in the cleft in such a manner that the inner bark of both the stock and scion may meet exactly together. In making the cleft, care should be taken not to injure the pith, or to start the bark from the stock, the scion being inserted in the sap wood of the stock or branch. When not grafted within the surface of the ground, the whole must be daubed with a quantity of stiff loam worked fine and mixed with chopped hay or coarse horse-dung. This must be applied closely round the parts, tapering at both ends; particular care being taken not to move the graft. This mortar must be surrounded with a winding of tow or old cloths. The middle part of the scion is best. The grafts should be four or five inches long, with two or

three buds to each. A good substitute for the above application is a composition of equal parts of tallow, bees-wax and rosin, softened by heat, and spread on strips of linen or paper, six inches long, and about two inches wide ; one of these strips must be wrapped round each stock, so as completely to cover the fissure at the sides and in the end. Instead of taking the young trees up to engraft them, it is recommended by many to remove the earth about an inch from the stocks, which can then be sawed off, so as to leave the top of the stump rather below the level of the ground—ingraft them, and then draw up the earth so as to cover the tops of the stocks one or two inches ; leaving one or two buds of each scion exposed—no composition is necessary in this operation, the covering of earth sufficiently protects the scions from the air and sun. But as it is necessary that the trees should stand at a greater distance from each other after being engrafted, and as it is considered advantageous to remove young trees in the nursery, previous to their final removal to the orchard, that the tap root and lateral roots, may be shortened, so as to induce them to form a regular globular root, sufficiently small to be removed with their plants ; we believe it will be best to take up the young trees, engraft them, cut off the extremities of the longer roots, and all the small fibrous roots, if out of the ground any length of time, set them out at proper distances in the rows, and draw the earth around the grafts as before mentioned.

Young trees properly pruned in the nursery, will, it is said, come to bearing sooner, and continue in vigour for nearly double the common time. All superfluous or rambling branches should be taken off annually, and only three or four leading shoots be left to every head.

That new varieties of valuable fruit may be obtained, it is best to reserve some of the most promising trees in the nursery, which can sometimes be determined by the large, thick and woolly appearance of their leaves ; these should be transplanted into the orchard in their natural state, and if they prove poor can be immediately engrafted. When trees of six or eight years old are grafted, their growth will not be retarded more than two or three years, frequently not one. When a tree of

considerable size is grafted, only a part of the branches must be cut away at a time, to prevent it from being injured. When grafts have acquired some inches in length, it may be well to rub off all the buds which have pushed out below them on the stem, and perhaps a few of those which have appeared above them, and if the grafts themselves put out any lateral shoots, spare them till the succeeding year, when you are called to re-graft such as have failed. In pastures where apple trees are scattered about, it is best to graft them with sweet apples, which will injure the cows less than such as are sour; and large sweetings will not be so likely to choke them as smaller apples.

Engrafted apple trees sometimes bear fruit when two or three years old; but if this premature produce be permitted, the prolific powers will be greatly impaired. If, therefore, the blossoms appear abundant, the fruit should be taken off as soon as formed, leaving only four or five to ascertain the kind. By permitting trees to bear too plentifully when young, they are more apt, it is said, to be alternate bearers.

The choicest kinds of fruit must be selected for making the best cider. Trees may be found which will bear excellent fruit for this purpose, and which, when grown to good size, will each yield, yearly, from twenty to thirty bushels, or more; which is perhaps five times the quantity that the common sort of such trees usually bear. This is surely a sufficient inducement to search for the most valuable fruit-trees, when about to collect scions to engraft trees for an orchard, instead of planting in the common way.

Soil, Situation and Aspect. With respect to soil, it should be of a deep loamy nature, neither too wet or heavy, nor too light or dry. The sub-soil has a powerful influence on the health and prosperity of trees. If this be rock, or what is called hard pan, (whatever be the surface,) the tree and its fruits are much deteriorated—nor will the remedy sometimes resorted to of cutting off the tap-root, and leaving the tree to subsist by those which are merely lateral, be sufficient.

Good cultivation, and a system of high manuring, will always remunerate the proprietor of an orchard, except it be planted on a quick-sand, or a cold-clay; in such soils, no management can prevent an early decay.

As to situation and aspect, that is not of much importance, especially for apple, pear and other hardy fruit trees; for you will find these growing and bearing fruit in the greatest perfection, in every aspect where the soil is suitable, and proper care taken of the trees.— But a moderately low situation, free from wet, may be more eligible than an elevated ground, as being less exposed to tempestuous winds; a gentle declivity is the most desirable. It will be most advisable for the farmer to make use of uneven grounds, and let those which are level be reserved for the plough.

Transplanting. The proper season for planting, will be found to depend on a variety of circumstances—in light soils, the winter settles the earth round the roots, and best secures them against the drought of the following season—and it is a time of leisure to the farmer. In stiff or wet soils, spring planting is considered best. If transplanted in the fall, it should be done in October, or as soon as the foilage falls off; if in the spring, as soon as the buds *begin* to swell, or rather a little before.

The distance between trees should be such as to prevent the extreme branches from locking into each other when attained to full maturity of growth. We are not to expect that the quantity of fruit will be in proportion to the number of trees in an orchard; for a few trees of large size will produce more and better fruit, than six or eight times the number of those which grow near and crowd one another. The most generally approved distance is forty feet.

To remove a tree, though young, is a severe test; and, therefore, every thing should be done to render the shock as little injurious as possible. It is recommended to prepare the ground with diligence before the trees are planted; by deep ploughing, and the cultivation of such hoed crops as will not exhaust the soil. The holes should be dug a considerable time before the trees are planted; if the trees are to be planted in the spring the holes should be dug in the fall. They should be five or six feet in diameter, and the spade must be carried to the full depth of the soil; and if it be gravelly, a considerable portion of this should be removed, and its place supplied by a due quantity of rich mould. In digging the holes, throw the top of the earth into a

heap by itself, and the earth from beneath in another. The trees to be planted should be as young as circumstances will allow. In taking them up, the roots should be preserved of the full length, if possible; the surface earth should be removed, and the running roots carefully traced and raised. If they must be cut, let it be done with a sharp instrument. The tap root, may be shortened to the length of about one foot, and all broken or bruised parts should be removed. The small matted fibres should be cut off, as they are apt to mould and decay, and prevent new ones from shooting. This need not be done, however, unless the tree has been out of ground some time. Lay some of the fine mould six inches deep at the bottom of the hole, place the roots upon this, in their natural order, and hold the tree perfectly upright, and the same side to the sun as it stood before, while more fine rich earth is put round the roots. Sway the tree backward and forward a little, and give it a gentle lift and shake, so that the fine earth may find its way amongst the roots and leave not the smallest cavity. Every root should be closely touched by the earth in every part. When all the roots are covered with this fine earth, and the tree stands about as high with regard to the level of the ground as it did in the place where it before stood, allowing about three inches for sinking, fill up the rest of the hole with common earth, and when you have about filled it, tread the earth that you put in, but not very hard. Put on the rest of the earth, and leave the surface perfectly smooth. Trees must not be watered, it sinks rapidly down, makes cavities amongst the roots, and is very injurious. But it is useful to place a small quantity of old hay or straw around them, to prevent the sun from taking up too much of the moisture, and to keep the ground from becoming dry and hard. This should be removed before snow falls, lest it harbor mice. Or small stones may be laid on the ground three feet around the tree. During the time of transplanting, the roots should be out of ground as short a time as possible; and should by no means be permitted to get dry, if it can be avoided; for, though some trees will live after having been a long while out of ground, the shorter the time out of ground, the sooner the roots

strike; and, if the roots should get dry, they ought to be soaked in rain or pond water, for half a day before the tree be planted. If the head of the tree is large in proportion to the root, it must be thinned a little to prevent it from being swayed about by the wind. (But the tops of the young trees must not be shortened, lest they produce a growth of suckers.) Even when pruned, it will be exposed to be loosened by this cause, and must be kept steady by a stake; but it must not be fastened to a stake, until rain has come to settle the ground; for, such fastening would prevent it from sinking with the earth; the earth would sink from it, and leave cavities about the roots. Care must be taken to prevent the tree from being rubbed by the stake. It is very useful to lay round the trees, a compost made of river-mud, wood ashes, and a small portion of lime, at the rate of about a common wagon load for every ten trees.

Should the earth be rather shallow, so that the roots cannot be sufficiently covered with good soil, a quantity must be brought from a distance to bank the roots around with; for there is no alternative, between planting them in the good soil, where their roots can take a wide extended horizontal direction, and lie within the reach of the genial influence of heat, rain, dew and air, and that of an untimely end, if planted too deep. One or two loads of mud from meadows or ditch banks, laid round each tree, on a light soil, and ploughed the next spring, where the mud has become pulverized, has been found highly useful.

If a farmer has not an eligible situation for a regular orchard, he can plant trees in various parts of the farm, not otherwise occupied, as on the borders and corners of fields contiguous to roads, lanes, &c. In some instances it is deemed a preferable method to set trees on the sides of a square field, the centre of which is left open for pasture or tillage.

Mr. Coxe, who is considered the most experienced orchardist in the United States, from experiment, is satisfied with the soundness of the prevailing opinion, against the sites of old orchards for new plantations. This remark however, he says, ought not to be applied to the spots where young trees, or those even of mid-

ling age, have grown—in filling up vacancies in growing orchards, the deterioration of soil produced by the growth of a tree for fifteen or twenty years, cannot be sufficient to injure one replanted in the same spot—on the contrary, the digging deep, and manuring the earth for the first tree, often renders the spot more eligible for a second, or third.

Ploughing. The looser the ground is kept for the first, and indeed for the several succeeding years, provided the plough does not go so deep as to hurt the roots, the more certain and the more vigorous will be the growth of the orchard. All fallow crops are preferable to oats or barley; and these are more favourable than winter grain: buckwheat is one of the best crops. Clover or any other deeply rooted grass, is considered injurious, unless dressed with plaster, or fed off when young. In cultivating an orchard, regard should be had to such a rotation of crops, and manuring, as will prevent the ground from being impoverished. Where grass or grain are cultivated, says Mr. Coxe, the ground should be kept open by digging the earth about three feet round each tree: A man will dig round a hundred trees in a day; or four or five furrows can be ploughed on each side of a row. When the shade of the trees, and the extension of their roots, impede the growth of crops; and the roots and bark are liable to be injured by ploughing, it had better be discontinued. The grass, however, must be kept away by digging round the trees, and suitable manures applied. Let them be kept as pastures for calves and swine. Neat cattle must not be admitted, unless they are guarded in such a way as to prevent their eating the lower branches, or rubbing against them.

Manuring. It has been found by experience, that apples, pears, peaches, &c. attain to their highest perfection only when the soil about the roots is kept open, and frequently manured. Among various substances which have been found suitable manures for trees, the following may be enumerated:—horns, hoofs, bones, where reduced to fragments or powder, leather, shells, hair, wool, woollen rags, tanner's bark, refuse flax, sea weed, swamp or pond mud, and ashes, chip or compost manure, soap-suds, the liquid substance which

is left at the bottom of stercoraries and barn yards ; and in short almost all manures which do not harbor insects. (Fresh stable manure is therefore improper.) These substances applied annually, or once in two years, will produce surprising effects, and the farmer will be amply compensated. Manuring, however must not be carried to excess, as too great a stimulus applied to trees, facilitates the luxuriant growth of wood, and renders the branches less productive of fruit.

Pruning. There is no branch of the management of orchards less understood, or more unskillfully performed, than the operation of pruning. When it is judiciously done, fruit trees, it is said, will come into bearing sooner, produce more abundantly, and continue in vigour for nearly double the common age. When trees are properly pruned in the nursery, there will be less employment for the pruning knife at all future periods ; it will nevertheless be indispensably necessary to retrench superfluous shoots and branches in every successive year of their existence. The most proper season for pruning, is when the sap is in active motion. If large limbs are lopped off, several inches from the trunk, before this time, the fresh bark round the wood becomes dry, large cavities are formed, which rapidly extend towards the trunk and heart, and the tree is soon deprived of its vigor. In New-England the sap commences its circulation about the 10th of April. From this period to about the first of May the pruning should be accomplished. If the work is done much later than this, the bark is apt to peel, which is very injurious. For performing the work, a saw, chisel, and pruning knife, are necessary. Various substances are recommended to apply to the wounded parts, to defend against wet, cold air, or the scorching sun. Fresh cow dung tied on with a cloth ; the composition used for grafting ; tar or thick paint ; or an ointment composed of rosin, bees-wax, and turpentine : have all been found good. Large limbs should not be cut close to the main trunk of a full grown tree, nor indeed a branch, which is too large at the place of excision to close over again, as it may destroy the tree, by opening an avenue to the air and water, which induce rottenness, and, in course of

time, the limb or trunk becomes hollow, frequently to the roots. Always prune at a fork, and remove the lower branch, that the wound may be on the lower side. Care must be taken not to cut away too many large limbs at a time. All large limbs should be cut first at some distance from the place where they are to be pruned, to prevent the weight from peeling the bark: the bark on the lower side should be cut through to prevent the same accident. In every instance, after sawing off the branch, let the bark and edges of the stump be pared close and smooth with a sharp knife, (a drawing knife will be found convenient,) and immediately apply the composition so as to cover the whole surface of the wound. All dead limbs should be cut off close to the trunk. Such branches as intersect or cross each other, ought to be removed, and all others cleared of suckers to their extremities. Such branches as have received any material injury ought to be removed. Never suffer a sucker to remain near the root; nor by any means upon the body, which is not intended to be permanent. Those vigorous young shoots, which often spring from old arms, near the trunk, and incline to grow up into the head, must be annually extirpated, lest they fill the tree with too much wood. The outer surface only is able to mature fruit properly. Every inward and every underling branch ought therefore to be removed. Young trees if hide bound, should be relieved by cutting the bark with the point of a knife, from the top to the bottom of the stem.

Canker. This disease occasions the bark of apple trees to grow rough and scabby, and turns the wood affected to a rusty brown colour; and if no remedy be applied, will in time kill the tree. Mr. Forsyth directs all the diseased parts to be cut out with a sharp instrument. The same kind of compositions used for pruning and engrafting must then be applied.

Moss and Sealy bark. Fruit trees suffer much injury from these. They can be readily removed, by rubbing the trees in damp weather with a hoe, or the back of a knife. Good cultivation generally prevents the growth of moss. Whitewashing the stem, not only cleanses the tree of moss, but destroys many kinds of insects very injurious to fruit trees.

Mr. Forsyth, recommends washing trees annually with the following mixture, which he says will destroy the eggs of insects, prevent moss from growing, and have the same effect upon trees as a top dressing has upon grass land.

Mix fresh cow-dung with urine and soap-suds, and with this mixture wash over the stems and branches of the trees, as a white-washer would wash the walls of a room; taking care to cut off all the cankered parts, and to scrape off all the moss, before it is laid on. In the course of the season, he says, you will see a fine new bark coming on.

Canker worm. The female of this insect comes out of the ground very early in the spring, and ascends the tree to deposit her eggs, which she does in suitable places in the bark, where they are brought forth, and the young brood live on the leaves of the tree. Several methods for subduing them have been tried with some degree of success. 1. Tarring. This must be commenced as soon as the ground is bare of snow; (which is, in some years, as early as February;) that the first thawing of the ground may not happen before the trees are prepared. A strip of canvass, or linen, three inches wide, should be put round the tree, having first filled crevices of the bark with clay mortar; draw it close and fasten the ends strong. A thumb-rope of tow should be tied round the lower edge of the strip to prevent the tar from running down on the bark and injuring the tree. Let the strips be plentifully smeared with cold tar, of a proper consistence, to be put on with a brush. It must be renewed once a day without fail. The insects are so amazingly prolific, that if ever so few of them get up, a tree is ruined, at least for the ensuing season. The best time is soon after sun-set, because the insects pass up in the evening, and the tar will not harden so much in the night. This work must be continued with care, generally, till the last of May. 2. Mr. Nicholson recommends to scrape off the shagg bark to the width of 2 or 3 inches; then make a mixture of oil, or blubber, with suitable proportions of sulphur and Scotch snuff; and lay this on with a brush, forming a ring an inch or two wide; and no insect will ever attempt to pass this bar-

rier as long as the composition has any considerable moisture left in it. Let it be repeated when it inclines to harden; though perhaps this is not necessary. 3. The pasturing of swine in an orchard in the fall and spring has been found very servicable. These animals appear to possess a natural instinct directing to search for vermin and insects, which conceal themselves in the earth. 4. The late *Mr. Peck*, of Massachusetts, recommends as an effectual remedy, turning up the ground carefully in October, as far as the branches of a tree extend, to half a spade's depth, or five inches, so as completely to invest the surface. Break the clods, smooth the surface with a rake, and pass a heavy roller over it, so as to make it very hard, and without cracks. If the frost should heave and crack the smooth surface in the winter, it must be smoothed and hardened again in March. This will be found less expensive than the long course of tarring. 5. *Dr. Thacher* thinks it highly probable, that a quantity of sea-weed pressed round the trunks of fruit trees, extending 3 or 4 feet, would prove a remedy, by forming a compact substance, through which the canker moth and worm would not penetrate. 6. *Mr. Kenrick*, of Massachusetts, proposes to destroy canker worms by the following method: From any time in June, after the worms have entirely disappeared, until the 20th of October, let the whole of the soil surrounding the trees, to the extent of 4 feet, be dug up and carted away to a considerable distance; and let there be returned an equal quantity of compost, or rich earth, intermixed with manure. By this operation, the farmer, besides exterminating the worms, promotes the growth and fruitfulness of his trees, and defends them against the moles. The author of the *Farmer's Assistant* observes, that, by taking the earth away from the roots of the trees, very early in the spring, and destroying whatever may appear to be the abode of any insects; and then returning the earth back, mixed with a small quantity of sulphur, sprinkling some of this upon the surface, is, he believes, the most effectual method to keep every kind of insect from ascending. 7. *Mr. Knapp*, of Boston, has been very successful in the application of lime, as follows: Dig the turf, lay the ground smooth, and ap-

ply the lime in the fall. Take air-slacked lime, strew it about an inch thick, to the extent of 2 or 3 feet from the roots of the trees. The digging round the trees is highly useful, while tarring is injurious. The expense is not great; a man can dig round 50 large trees in a day. The lime is a most salutary manure to the trees. After the spot has been once opened and limed, the labor of keeping it open will not be great. Three hogsheads of air-slacked lime, or sweepings of a lime store, will suffice for 50 trees, and will cost \$3. As it is done but once a year, he thinks it cannot be half so expensive as tarring.

Caterpillars. The foregoing directions, for keeping cankerworms from trees, are equally applicable to these destructive insects. When a nest is formed early in the spring, run a pole into it, twist it round till the nest and its contents are wrapped round the pole, and bring the whole down and kill the worms. Let this be done early in the morning, when the dew is on, or in bad weather. If any escape this operation, repeat it when they have rebuilt the nest. It is asserted that spirits of turpentine, or common fish oil, applied to the nest with a mop of rags, will penetrate through, and kill every caterpillar within it; and it is also said, that soap-suds will answer the same purpose. This attention, continued for a short time every spring, will destroy those in existence, and will prevent their increase in future years—if left till grown strong, they wander from their nests, and cannot be effectually overcome without great trouble and expense.

Gathering, and Preserving Apples. The first requisite is, to ascertain precisely when the fruit is fully ripe, as it is said, that the longer winter apples are suffered to remain on the trees, provided they are not overtaken by frost, the longer they may be preserved. It may be considered a correct rule, that apples are ripe when those that are sound and fair fall naturally from the trees, or separate very readily on being lifted by the hand—They should be gathered during a clear dry air, after the dew has evaporated. In gathering apples and pears, it is necessary carefully to avoid injuring the blossom buds, which are already formed for the next year's

fruit. These buds are placed at the side of the foot stalk of the fruit, and, if the spurs are broken, there will be no fruit on that part the next season. The pressing against the trees, therefore, with heavy ladders, and the rash practice of thrashing the limbs with poles, ought to be entirely abandoned; for by such means, the bark and limbs are bruised, and the blossom buds for the succeeding year are destroyed. Instead of ladders, stepping frames should be employed, and a pole, furnished with a hook at the end, and covered with coarse cloth, may be used to shake the small limbs, without injuring the bark. When perfectly ripe, apples for cider may be shaken off without injury to the buds, but still they will be bruised, unless the ground be covered with blankets or straw. Particular care is requisite in gathering winter fruit for keeping: they should be gathered by the hand, and without injury, removing them from the gathering basket to the casks prepared for them, with great care: if bruised, they soon decay; and the less those that are sound are moved, the better. When in barrels, they should be placed in a dry, cool, shaded situation, above ground, and remain until danger by frost, and then put into the cellar. If apples are packed in layers with clean and perfectly dry sand, late in October, they will keep much longer, and be in a much better condition to ship to a distant market. Some persons construct shelves in a cellar secure against frost, and place their apples separately upon them, and find an advantage in saving their fruit over to the spring, which fully repays the expense. This is considered in the end as cheap as barrels. If put together in large parcels, in very warm cellars, they heat, and then they rot; and the e of them that happen not to rot, lose their flavor.

PEAR TREE.

This tree will grow better on a stiff clay, than most other fruit trees; but the soils which best suit the apple tree are also most suitable for it. Most of the directions already detailed, relative to the cultivation of the apple tree, may be applied to that of the pear tree.

Pear trees require but little pruning, comparatively with the apple tree, and if carried to excess, proves

very injurious. All dead branches, however, and even thrifty ones, which interfere and chafe each other, and every sucker proceeding from the trunk or roots, should be carefully removed. Pear trees, and other fruit trees, are frequently affected, and sometimes suddenly, without discovering the causes of their decline. A gentleman of Maryland has been very successful in preserving his trees by washing their trunks with *soft soap*.

From the pear is prepared a pleasant liquor, known under the name of perry, which is made in the same manner as cider. In England, particular kinds of pears are cultivated for this purpose, and the liquor is held in high estimation.

PEACH TREE.

Peach trees require a warm, dry, fertile soil : A sandy loam is best. If the spot where they are planted be sheltered from the northerly winds, it will be the better. It is exceedingly to be regretted, that these trees of late years have become liable to premature decay, and the period of their duration is greatly diminished, insomuch, that their continuance in a healthy bearing state seldom exceeds 3 or 4 years. This misfortune is increased by the circumstance, that a peach orchard cannot be reared a second time on the same spot, unless the soil be renovated by several years intermediate culture of other crops.

To raise the young trees, take stones that are fully ripe, and plant them in October, about 2 inches deep.— They will come up and grow to a good size in the course of the summer. They are to be kept clear of weeds, while in the nursery. At a year's growth, they may be inoculated, and, after two summer's growth, they may be transplanted. This may be done when the leaves have fallen in autumn, or in the spring. If the stones are not planted in the fall, they must be preserved in sand, and planted in March : in this case they must be broken open without injuring the kernel. Some think it best to plant stone fruit, on a small spot, and afterwards plant the seedlings out in the nursery. This may be done the next fall or spring after they are planted.

Budding or Inoculating is commonly practised upon all sorts of stone fruit ; such as peaches, nectarines, cherries, plums, &c. When the stocks are from about an half an inch, or a little less, to an inch or more in diameter, in the places where the buds are to be inserted, they are then of a proper size for working. In making a selection of trees, from which to inoculate, care should be had to obtain the buds from the trees bearing the finest fruit ; that this fruit ripen at different times, from the earliest to the latest for peaches ; and that they be taken from trees which are good bearers, and in a healthy condition. The proper season for budding, is from the beginning of July to the end of August. The method of performing it, as described in the *Orchardist*, is as follows : The buds preferred, are the shortest observed on the middle of a young shoot, on the outside of a tree.— For gathering the shoots containing the buds, a cloudy day, or an early or late hour is chosen. The buds should be used as soon after being gathered, as possible, and the whole operation should be quickly performed. In taking off the bud from the twig, the knife is inserted about half an inch above it, and a thin slice of the bark, and wood along with it, taken off, bringing out the knife about an inch and a half below the bud. Or the knife may be inserted three quarters of an inch below the bud, and cut upwards. This lower part is afterwards shortened and dressed, and the leaf is cut off, the stalk being left about half an inch long. The portion of wood is then taken out by raising it from the bark, and pulling it downwards or upwards, according as the cut has been made from above or below. If the extraction of the wood occasion a hole at the bud, that bud is spoilt, and another must be prepared in its stead. For the performance of this operation, provide a sharp budding-knife, with a flat thin haft, of ivory, suitable to open the bark of the stock for the admission of the bud, and also with a quantity of bass strings, or woollen yarn, to bind round it when inserted. On a smooth part of the bark of the stock a transverse section, (that is across the stock) is now made through the bark down to the wood ; from this is made a long

tudinal cut downward, about an inch and a half long, so that the incision may somewhat resemble the letter T; by means of the flat ivory haft of the budding-knife, the bark is raised a little on each side of the longitudinal incision, so as to receive the bud. The prepared bud is placed in the upper part of the incision so made, and drawn downwards; the upper part is then cut off transversely, and the bud pushed upwards till the bark of the bud and of the stock join together. It is retained in this situation by means of tying with strands of bass, or woolen yarn, applied in such manner, as to defend the whole from the air and sun, but leaving the leaf stalk, and the projecting part of the bark, uncovered. In about a month after the operation, the tying is slackened; buds, that have taken appear swelled, and the foot stalk of the old leaf falls off on being slightly touched. All shoots that spring below the budded part are carefully cut off. The head of the stock is not removed till the following March; after this, the bud grows vigorously, and, in the course of this summer, makes a considerable shoot. Against the next spring, the shoot is headed down in the manner of young grafted trees.

In taking up the young trees, care must be taken to preserve the roots as much as possible. Such parts as are bruised should be removed, and the small roots may be a little shortened. Be careful not to plant them too deep. They should be planted 12 or 15 feet apart.—It is important to transplant these trees, as young as possible, where you mean them to stand; if in the kernel so much the better; because in that case there will be no check of growth, which always injures peach trees.

Pruning must be omitted until they have taken root; and then but very little is necessary, except cutting away the decayed branches. In gummy trees, as the peach or cherry, all wounds should be carefully covered from the weather. When young trees are overloaded with fruit, it is absolutely necessary to thin them out while small according to the strength of the tree.

The premature decay of peach trees has been ascribed to various causes. But the true causes, as detailed by Dr. Mease, seem to be the following.

1. The fly that deposits eggs near the root, and there forms a worm.

2. The bursting of the bark by severe frosts in wet winters.

3. The splitting off the limbs at the fork of the tree.

The worms are said to be produced by a blue fly, which attacks the trees from about the middle of July to the middle of September, and generally deposits its eggs in the bark at or near the surface of the ground. To take out this worm the roots must be uncovered as soon as the tree begins to bud in the spring, and the spot looked for where the gum oozes out. Follow the cavity round with the point of a knife or a chisel, until you come to the solid wood, lay the whole open, and you will find the worm, with a white body and black head, which must be destroyed and the hole filled with cow dung, rendered adhesive by lime, sand and ashes. Soap suds, heated, and poured on the roots of trees, about the middle of August, have been used with success in destroying the eggs, &c. Or as soon as the buds begin to put forth, remove from the bottom of the tree entirely all the dirt or turf till you come to the base roots, from which scrape all the loose old bark: then take three quarts of fresh slacked lime for a full grown tree, and so in proportion for a smaller and younger one, and lay it carefully on and about the roots, covering it from the weather, and it is said to destroy the destructive maggots, entirely. Ashes used in the same way has been recommended.

It is stated in the *American Farmer*, that boxes made round trees, about one foot in height, and in capacity, exclusive of the tree, to hold a peck, filled with bark from tan vats, and pressed a little together, will secure the trees from worms a long time. It is also useful for plum trees, and in restoring all kinds of decayed fruit trees. It is considered best to renew the tan once in about two years. To wash the trunks as recommended for apple trees will be useful.

To guard against frost, plant the trees where the water will run off, and procure the sweetest and richest fruit as the inferior qualities are more injured by cold.

The splitting of the trees at the forks is guarded against by preserving as many upright branches as pos-

sible, by breaking off, in bearing years more than half the fruit while small, and by careful pruning.

Let no kinds of beasts into peach orchards, *hogs excepted*, for fear of wounding the trees; as the least wound renders the tree less productive, and the quality of the fruit inferior.

Mr *Coxe* says, the fine peaches which are raised for the Philadelphia market, are cultivated in the following manner. The trees are procured from nurseries established on fresh ground; they are planted on land not previously occupied by peach trees; the land is cultivated with manured crops of corn, potatoes, vines, or pulse, without intermission; the trees are carefully searched for the worm, in the spring, summer and autumn. Fresh cow dung is an excellent application for wounds made by the worms; ashes and lime, are offensive to the worm; marle has been successfully used as a manure round peach trees—several shovel fulls to each tree—with this management, a peach orchard near a market, or on navigable waters, will be a profitable application of land, but no precaution will ensure its duration beyond three or four years. In some soils and situations it may succeed much longer.

We may have great abundance of this delicious fruit, in every variety, if every farmer and horticulturalist, would plant the number, to which he could attend, without interference with his other concerns. He might keep up a constant succession, by setting out a few every year, our grain and garden plants in general, require renewal annually; and peach trees require no more trouble. A tree with very little attention, will produce three or four crops. Its growth is quick; and it may be propagated easily, and come to perfection, in any soil of tolerable staple. As the older trees decay, and grow sickly, young and vigorous trees will begin to bear.

PLUM TREE.

The management proper for raising this tree is the same as that for peaches.

A good sandy loam, well manured, is the best for this tree. Stiff clays are very unfit for it. It is increased by grafting or budding on its own stock.

Curculio. This is a bug, about the size of that which eats into the pea, and has proved very troublesome to most of the smooth skinned stone fruits, and even to peaches, apples, and pears, in some parts of the United States. It ascends the trees in the spring, and as the fruit advances it makes a wound in the skin, and there deposits the embryo; from which a maggot is produced. This preys upon the fruit until it dies and falls off; when the maggot makes its way into the earth, and is there changed into a bug, which is ready to ascend the tree the next spring, and make its deposit, as before.

It is recommended to put a ring round the tree, of a mixture of greese, or blubber, mixed with salt. Perhaps some of the other ingredients for destroying worms, would answer a better purpose.

Mr. *Philips*, of Pennsylvania, finds hogs of great use in an orchard of plum trees. They cause his trees to bear plentifully; while, without those animals, the trees bear very little. The reason of this is, that the swine, by eating up all the fruit which falls from the trees, destroy the young brood of *curculiones* deposited in the fruit, which is the cause of its early falling off.

CHERRY TREE.

It is to be regretted, says Dr. *Thacher*, that the cultivation of the valuable kinds of cherries is so generally neglected. Many advantages would accrue to the farmer from the cultivation of the cherry tree; it would serve the useful purposes of ornament and shade to his orchard and buildings, and the fruit would afford his family not merely an innocent, but salutary luxury; and if near a market, the profit would remunerate him for all his labor and expense. *

Cherries are propagated by budding them upon stocks, raised from the stones of the common black or red cherry, or upon stocks raised from the stones of any other kind of the same fruit; but the two first are most esteemed for that purpose, because they generally shoot much freer than any other. The stocks are obtained by planting the seeds in a nursery, and the seedlings are afterwards transplanted. The whole method of management pertaining to cherry trees is so precisely simi-

lar to that already detailed, when treating of peach trees, that it is thought unnecessary to say any thing more.

QUINCE TREE.

The quince may be propagated by layers and cuttings. (See layers and cuttings.) It may also be propagated by budding or grafting. Quince trees flourish best, and are more productive in a moist soil, though the fruit from those set in dry situations, is said to possess a finer flavor. It requires but very little pruning; the most important part of their management consists in clearing their stems from suckers, and in cutting off such branches as interfere with each other. All luxuriant shoots that strike up from the middle of the tree, must be lopped off, to prevent the head from being too much crowded with wood, which might impede the growth of the fruit. If the tree becomes diseased or rotten, the dead parts should be cut away, and the composition applied, as in apple trees. We are advised to plant them at a good distance from apple and pear trees, lest the farina become mixed, and the fruits degenerate.

Method of forcing Fruit Trees to blossom and bear Fruit.

With a sharp knife, cut a ring round the limb or small branch which you wish should bear, near the stem or large bough where it is joined; let this ring or cut penetrate to the wood. A quarter of an inch from this cut, make a second like the first, encircling the branch like a ring a quarter of an inch broad between the two cuts. The bark, between these two cuts, must be removed, clean down to the wood; even the fine inner bark, which lies immediately upon the wood, must be scraped away, until the bare naked wood appears, white and smooth, so that no connexion whatever remains between the two parts of the bark. This barking, or girdling, must be made at the precise time when, in all nature, the buds are strongly swelling, or about breaking out into blossoms. In the same year a callus is formed at the edges of the ring, on both sides, and the connexion of the bark is again restored, without any detriment to

the tree or the branch operated upon. By this simple operation, the following advantages will be obtained:

1. Every young tree, of which you do not know the sort, is compelled to show its fruit, and decide sooner whether it may remain in its present state, or require to be grafted.

2. You may thereby, with certainty, get fruit of a good sort, and reject the more ordinary. The branches so operated upon, are hung full of fruit, while others that are not ringed, often have none or very little on them.

CIDER.

When of a proper age and well refined, pure cider may be considered as a pleasant and salutary beverage, if used with moderation, and calculated to obviate a putrid tendency in the humors.

We have heard the opinion expressed, says Mr. Pickering, that orchards of ungrafted fruit make the best cider. This surely is an error. For although in a large orchard some good natural fruits may be found, yet many of the trees produce apples so small as to cost too much labor to collect them, and others have juices so meagre as when collected to be of little worth. A few sorts which in England have been celebrated for yielding the finest ciders, were always grafted with as much attention as apples designed for the table are with us. In some parts of New-Jersey, in which ciders of superior excellence are made, the farmers produce them wholly by grafting: nor can we expect fully to rival them, until we adopt the same practice. Perhaps there are few extensive natural orchards in New-England in which valuable cider fruits may not be found, with rich yellow flesh, capable of yielding liquors strong and of excellent flavor. From such trees, if still young, or in vigorous life, whole orchards might soon be formed. And probably different kinds might be selected which ripen their fruits at the times most proper for making them into cider. Apples until mellow do not attain their highest flavor; and till then cannot give the highest flavor to cider. Many reach that mellow and ripe state in October and November, which may be called the cider-

making months in New-England. It would require but little attention to select and propagate the best apples thus ripening in succession. Such ciders, made of ripe and unmixed fruits, would be more easily managed in the most difficult and important part of the process of cider making—its first fermentation.

To make the best cider, there are several requisites. The apples should be of one sort, and of the best kind. They should be perfectly sound, ripe, clean, and dry. Those which are shook from the trees by a gentle shaking, late in the season, are best; and all knotty, wormy, and rotten ones should be rejected. Such as are not of this prime rate may be made into common cider.

The apples thus selected should be spread on a floor, covered from the dews and rain; but exposed to a current of air. Here they are to lie about fourteen days for the purpose of sweating. After this they must be dried by exposure to the sun, the rotten ones thrown away, and ground immediately. A clean, convenient and covered mill and press, is the first pre-requisite for making good cider; and the straw should be clear from mustiness, as cider readily imbibes offensive tastes. The apples should be reduced to a fine pulp. The colour of the liquor and its smoothness are both improved by laying from six to twenty four hours, according to the weather, in the trough after grinding; turning it frequently to prevent fermentation. Lay up the pomace on the press without using a drop of water in any part of the process. Press the cheese gently at first, and advance slowly to the utmost power of the screw. It is in all cases necessary to return the first running on to the cheese, until it runs free from pulp. To clean casks which have been used for cider, as soon as one is empty, put in two or three quarts of fine gravel, and three or four gallons of cold water, and shake and roll it well. After this is emptied out, pour in a pail full of boiling water; roll and shake the water to every part of the cask, so as to heat it on all sides. Then pour out the water, and lay the cask exactly bung hole downwards, the water running clear and entirely off; the heat in the cask will dry it perfectly. In this state, bung it up carefully, and it will keep sweet. When casks have a

sour smell, put in about a pint of unslacked lime for a barrel of common size, and pour in three or four gallons of hot water; shake it well, giving it vent occasionally; let it stand till cool, and then rinse with cold water. Repeat this operation till the cask smells perfectly sweet. Wood ashes might perhaps answer as a substitute for lime.

In pouring the cider into the cask, let there be a strainer of coarse cloth in the bottom of the funnel, or let it pass through sand, to keep out the pomace. After it has been filled, the next process is the fermentation. In warm weather, or in cider made from weak or immature fruit, the fermentation commences in a few hours—but if the fruit is ripe, and the weather cold, it will be delayed for a week, and sometimes for a month. The casks should stand in a cool place near the press under cover, and where there is a free current of air.

There are three fermentations; the vinous, the acid, and the putrid. When the first ceases, the second begins, and when that ceases, the third begins. The first is only necessary for cider, and care must be taken to stop all further fermentation, as soon as this is over. This is known by the liquor ceasing to throw up little bubbles to the top. Then too all the pomace is raised up, and if suffered to remain there, will again sink to the bottom and render the liquor turbid. Let this time then be carefully observed, and let the liquor then be drawn off, not too closely, and put into clean casks, and set away in a cool clean cellar. If the cider remain bright and quiet, nothing more need be done to it till the succeeding spring; but if a scum collect on the surface, it must be again racked; as this, if suffered to sink, would be injurious: if a disposition to ferment continue, it will be necessary to rack off again, whenever a hissing noise is heard. The casks into which liquor is put, whenever racked off, should be made perfectly clean with lime and water as before mentioned. If intended to be bottled it should be fined with isinglass and drawn off in ten or twelve days.

After the first racking of cider, a quantity of lees remain, which when filtered through coarse linen bags, yields a bright liquid; if this be added to the cider

racked off, it will contribute to prevent fermentation, an excess of which is injurious. To prevent fermentation, it is also recommended, to let the cask be first strongly fumigated with burnt sulphur; then put in some of the cider, burn more sulphur in the cask, stop it tight, and shake the whole up together; fill the cask, and bung it perfectly tight.

To improve cider, draw it off from the first casks, put it into fresh ones, filling each about three quarters full, and set them away till winter; at which time let them be exposed to the frosts, until one half or even two thirds of the contents of each are frozen; give the liquor some vent while freezing; draw off the unfrozen part, bottle it, or put it in clean new casks, and in 2 or 3 years, it will nearly equal the best wines. It is also a good method to boil cider immediately from the press. It should be boiled down till all the scum has risen and been skimmed off. It ferments but little, and makes a pleasant drink for the next summer, diluted with water, if bottled, or otherwise kept well. Cider may be kept for years in casks, without fermenting, by burying them deeply under ground, or immersing them in Spring water; and when taken up the cider will be very fine.

Where the farmer is rich and forehanded, it is advisable to have a vat made near the press, which will contain from 8 to 20 barrels. This may be made square or round. Into this vat the cider, as it is made, should be turned, and suffered to work off in the open air. This will save much future trouble. There should be a tap and faucet, near the bottom, to draw off the cider, when the scum or crust is perfectly formed. For want of this, large open hogsheads will answer; or, leave the barrels not full by a gallon or two, and as they work off fill them up, and after they have done working, rack them into other casks.

GARDENING.

GARDENING is the most productive and advantageous mode of occupying the surface of the soil. It also produces the most refined and luxurious articles of human food, and in some respects the most wholesome.

It is truly astonishing in this enlightened age, an age characterized by so many useful establishments, that Horticulture should have been so remarkably neglected, and by that class of citizens too who are most interested in its advancement, we mean the agriculturalists; while so productive a source of comfort, profit, and economy lies so completely within the compass of their operations. The garden has, or ought to have, many attractions.— It is the household farm. It is always under the eye— it may be made the companion and the friend of many a leisure hour, it furnishes a spot, where, at chance intervals of severer labour, every man, even the humblest in the community, who has a garden patch, may benefit himself, and take a pleasure in his labour. The cultivation of a garden furnishes a pleasant and rational amusement. At a small expense, and a little labour, it presents to you a great variety of the beauties of nature, and it may be made to supply most families with a moiety of their sustenance. To be sure there is no great profit in cash arising to the farmer from gardening beyond the limits of 20 miles from a great town—but when men have arrived to the degree of comfort which our farmers generally enjoy, they ought to seek innocent luxuries.

A kitchen-garden, well stored with vegetables, is highly important to the Farmer, as the use of these supercede the necessity of consuming much meat; a practice equally inconsistent with economy and with good health. But the great mass of citizens do certainly deprive themselves of much convenience, saving, and perhaps

health, by not possessing a liberal supply of vegetables from their own gardens.

We do not invite the husbandman from the utility of his farm to the *pleasures* of a garden; we do not wish him to sacrifice his grain fields to the culture of a tulip bed; but we wish to call his attention to the utility, convenience, and economy that can be found in the cultivation of a substantial kitchen garden, from which his healthful family can draw many of those really innocent luxuries, which a bountiful Providence has spread around him.

Many persons, sensible of the utility, are often dissuaded from constant attempts in cultivating a kitchen garden, because they have experienced some failures in particular plants. But there will never be a failure of vegetables enough for a family's use, if the following requisites be well regarded: *Richness of soil; due care in the selection of seeds; proper cultivation, and a sufficient variety of vegetables, that if one kind fails, another may be a substitute.*

Soil, and Situation. It is found that a sandy loam which is several feet deep is best for a garden; but any loose mellow soil is suitable. It is fortunate, however, when a garden contains a variety of soils; as some vegetables require a strong and heavy soil, and do not thrive in a light one. But, we must take what we find, or rather what we happen to have. If we have a choice, we ought to take that which comes nearest to perfection, and, if we possibly can, we ought to reject *clay* and *gravel*, not only as a top-soil, but as a bottom soil.

A garden, if possible, should have a southerly exposure. It should be near the house, not only for the purpose of having it under the eye of the owner, but to save time in its cultivation and the daily gathering of its products. If it be practicable, to make a garden near to running water, and especially to water that may be turned into the garden, the advantage ought to be profited of. From a kitchen-garden all *large trees* ought to be kept at a distance of 30 or 40 yards.

Size. The size of the garden should be proportioned to the wants of the family. It ought to be sufficiently

large to raise many of the useful and various kinds of vegetables and fruits, which contribute to the sustenance, comfort, and pleasure of life. Such fruit trees, which make but little shade, as grapes, currents, quinces, &c. may be very agreeably intermixed with the growths of the kitchen-garden. It will be found that a garden of this kind should not contain in general less than a quarter of an acre. But if the family is large, half, or three quarters of an acre ought to be cultivated as a garden. It is probable, that matters may be so arranged, that a farmer may, with the assistance of his family, cultivate such a portion of ground, without improperly interfering with regular labour. It should be enclosed with a high close fence, which besides rendering every thing secure; serves to keep off the strong cold winds of Spring, which are very injurious to the young plants, and also to the fruit, which is then about putting forth.

Tools. The most important instrument in the farmer's garden, is the plough. The spade is the next instrument. This may be thin and sharp, and if used only in the garden, will last many years. The hoe is an indispensable tool, and of this you must have three varieties: the large, the small, and narrow hoe, all of which should be sharp, and kept exclusively for the garden. Two iron rakes, a coarse and fine one, will often be wanted; and a strong line of at least 40 feet in length. A rake can be made in about 30 minutes, which will mark out more ground for the gardener to seed than four men could perform in the common way in equal length of time. The head of the rake is to be about 6 feet long; into this, bore holes with an inch auger, at such distances as you wish to have the seed sown; put in teeth, sharpened at their lower ends; and attach a handle 5 or 6 feet long. The head of the rake should be sufficiently heavy, and the handle and teeth should be at right angles. Begin at the left hand end of the bed and draw the rake across it; then proceed, taking care to keep the left hand tooth in the right hand drill that has just been made (for a guide.) In this way a pretty long bed is formed into straight drills in a very few minutes. With these few and simple tools, all the work of a garden may be done, and well done; and if to these

you add the wheelbarrow, you have every thing necessary.

Preparation of the ground. This may be done by ploughing and harrowing, until the ground, at top, be perfectly clean; and, then, by double ploughing; that is to say, by going, with a strong plough that turns a large furrow and turns it cleanly, twice in the same place, and thus moving the ground to the depth of 14 to 16 inches. When this has been done in one direction, it ought to be done across, and then the ground will have been well and truly moved. The ploughing ought to be done with 4 oxen, and the plough ought to be held by a strong and careful ploughman. All those parts where the plough cannot go must be deeply turned with the spade.

If the garden be of a wetish or stiff soil, it will be greatly benefited by being thrown up into high ridges in the fall: at the same time, this will assist in destroying the seeds of weeds; but particularly in destroying insects.

Manure. The species of manure must depend upon the soil. It is generally thought, that dung, of any sort, is not what ought to be used in the raising of garden vegetables. It is very certain that they are coarse and gross when produced with aid of that sort of manure, compared to what they are when raised with the aid of ashes, sea-weeds, rags, lime and composts. And, besides, dung, in hot soils and hot climates, adds to the heat; while those articles just mentioned do not. If dung is used, it should be old and destitute of seeds.—Hog dung is supposed to be best. All the ground in a garden ought always to be good; and it will be kept in this state if it be *well manured* once every year.

Change of Crops. Skilful gardeners recommend attention to a rotation of crops that is fibrous rooted and tap rooted alternately; and occasionally lay down portions of their gardens with clover, which seldom fails to restore them to their former fertility.

Seeds. It is quite useless to prepare land, and to incur trouble and expense, without duly, and even *very carefully*, attending to the *seed* that we are going to sow. The *sort*, the *genuineness*, the *soundness*, are all matters to be attended to if we mean to avoid mortification and loss.

If the farmer does not save his own seed, which cannot always be done with convenience, all he can do, is, to take every precaution in his power when he purchases, and of whom he purchases. Some kinds of seed will keep a good many years; therefore, when any that is *very true* can be procured, it is best to get as much as will last for the number of years that such seed will keep. All seeds which are sound, and really good, will sink in luke-warm water in a short time, if divested of every thing which adheres to them.

Commonly speaking, new seed is to be preferred to old, as growing the more luxuriently, and coming up the surer and quicker. If old seed is knowingly sown, some allowance in point of time must be made.

As to the saving of seed, such plants should be selected as are of the most perfect shape and quality. In the Cabbage, we seek small stem, well formed loaf, few spare or loose leaves; in the Turnip, large bulb, small neck, slender-stalked leaves, solid flesh or pulp; in the Radish, high color, (if red or scarlet,) small neck, few and short leaves, and long root. Of plants, the early coming of which is a circumstance of importance, the very earliest should be chosen for seed. They should be carefully cultivated during the time they are carrying on their seed to perfection. But, effectual means must be taken to prevent a *mixing* of the sorts, especially among cabbages, turnips, &c. Mr. Cobbett found that Indian Corn would mix when the plants were *three hundred yards* from each other. What, he asks, must be the consequence, then, of saving seed from cucumbers, melons, pumpkins, and squashes, all growing in the same garden at the same time. It is not unfrequent to hear persons complaining that their melons are bad. On an inquiry into this circumstance, it will often be found that they have been raised and have flowered with cucumbers; and that instead of that flavor which is natural, and which constitutes the excellence of the fruit, they are rapid and unpalatable. To save the seed of two sorts of any tribe, in the same garden, in the same year, ought not to be attempted; and this it is that makes it difficult for any one man to raise all sorts of seeds good and true. However, some may be saved by

every one who has a garden; and when raised, they ought to be carefully preserved. They should stand till *perfectly ripe*; and be gathered in a dry time. If any moisture remains about them, they should be placed in the sun; and when quite dry, put into bags and hung up against a dry wall. Thus preserved, seeds will keep good for the number of years stated in the following list.

	YEARS.		YEARS.
Asparagus	4	Marjoram	4
Balm	2	Melon	8 or 10
Basil (sweet)	2 or 3	Mustard	3 or 4
Beans	1 or 2	Nasturtium	2 or 3
Beets	8 or 10	Onion	3
Borage	3	Parsley	5 or 6
Cabbage	6 or 8	Parsnip	1
Carrot	1 or 2	Pea	2 or 3
Celery	6 or 8	Pumpkin	8 or 10
Corn (Maize)	2 or 3	Peppers	5 or 6
Cress	2	Radish	6 or 8
Cucumber	8 or 10	Rue	3
Carraway	4	Ruta Baga	4
Fennel	5	Salsafy	2
Garlick	3	Savory	3 or 4
Leek	3 or 4	Spinage	3 or 4
Lettuce	3 or 4	Squash,	8 or 10
Mangel Wurtzel	8 or 10	Turnip	3 or 4

Seeds of all soft fruits, &c. should be taken out, cleaned and dried; their preservation will be more certain by putting them in dry sand, which sucks in the moisture from the seed, and prevents mustiness. It withal retains so much moisture as to prevent the seed from withering. This method is chiefly useful in preserving, during winter, seeds that require spring-sowing, and in the conveyance of seeds to a distance.

Planting. Two essential rules to be observed in the management of a kitchen garden are, never to crowd the ground with more plants than it is able to nourish properly; and never to let any part of it remain unoccupied, for want of a due succession of crops. In laying out a bed the earth should not be raised above the al-

wells, should never be applied to them. The water should be exposed to the sun for such time as will render it as warm as rain-water; and the quantity applied at once should never be very great; but rather like the application of a gentle rain. Water should generally be given, late in the afternoon, or very early in the morning, but the former is preferable; that the plant may have as much benefit from it as possible, before any part is exhaled by the heat of the ensuing day.

PEAS.

The best peas for garden-culture are the small early or early frame-pea, and the marrowfat; the former for early use, and the latter for an after and more abundant supply. Plant peas as soon as the ground is in good working condition; and from this time forward once a fortnight or three weeks, to keep up a regular supply for the table. Or it will be a good rule, when the first plants are up, to put in another crop of the same sort for succession. In this way green peas may be had from early in June, till the sharp frosts set in. For the early crop, select the driest and warmest soil in the garden, particularly such as is secured from the north winds, by a tight fence, or a wall. Those that are planted late in season ought to be under the south fence, so as to get as much coolness as possible. After the ground has been well dug, raked and levelled, mark it out in double rows, about 10 inches apart, and leave intervals of three feet for the early small kind; four feet for the larger; and five feet for the largest, so that when they are brushed in proportion to their respective growths, there may be a free passage through the intervals. Open the trenches 3 inches deep; and scatter in the peas at the rate of about one to an inch, and then cover them with a rake. The ground should be hoed, and kept clear of weeds; and when the young plants are 6 inches high, the stems should be earthed up a little, and each double row filled with brush wood, so that each plant may climb, and none of them trail upon the ground. The brush should be set strongly in the earth, or they will not bear the weight of the plants in windy weather.— Early peas are found to be most productive when plant-

ed in separate double rows in different parts of the garden, or with very wide intervals between, which can be cultivated with crops of low plants. In this way they are furnished with a sufficiency of sun and air. (*See Peas 126th page.*)

BEANS.

The variety of kidney beans is almost endless. The mode of propagating and cultivating is nearly the same in all, except that the dwarfs require smaller distances than the climbers, and that the latter are grown with poles, which the former are not. Select for cultivation those which experience shows best suited to our climate and soil, and which best supply the wants of your family. Every sort of kidney-bean must have rich ground to produce a large crop.

Bush Beans. It is a great object to have beans early, and they should be planted as soon as the ground is warm; but it is useless to plant them when the ground is cold. A principal crop should be planted early in May, and successional crops, about the middle, and also towards the end thereof. For the early kinds, select a piece of light rich ground; let the drills be made about two feet and a half asunder, and an inch and a half deep; drop the beans therein, at the distance of 2 or 3 inches from one another, and draw the earth evenly over them. As soon as they are in full bloom, and the lower pods are beginning to set, the tops or runners should be cut off; this will greatly promote the swelling of the pods, as well as their early maturity. But with respect to the small early beans, if you would have them come in as soon as possible, top them when the blossoms at the bottom of the stalks begin to open.

Pole Beans. For beans whose vines need support, let poles of a proper height be fixed in the ground about 2 feet apart, in rows 3 or 4 feet distant from each other—around each pole let 4 or 5 beans be planted; the poles should have small knots left on them, or pins put through to support the vines. This way of planting gives an opportunity of keeping the soil loose around the roots and prevents the injuries arising from driving poles into the hills. Of the various sorts of pole-beans one

planting is enough; for, if you gather as the beans become fit for use, they continue bearing all through the summer, especially the *Lima bean*, which delights in heat, and which should not be planted till the ground is quite warm. The *scarlet bean*, (*multiflorus*) is well worth cultivating, both for use and ornament.

CABBAGES.

Sow cabbages in an open situation, distant from fences, &c. early in May, in rows 6 inches apart, and put the seeds thin in the rows. As soon as up, thin the plants to 3 or 4 inches in the rows. Hoe deep between the plants, and keep them free from weeds while they stand in the seed bed. To prevent a sudden check by breaking all the roots at once, in hot weather, dig every other interval, leave the rest, and dig them a week later. If they are transplanted into other beds, when 3 or 4 inches high, it will greatly strengthen them, and render them in a much better condition for final transplanting.

The ground for cabbages must be well manured, deeply spaded, made fine, and intimately mixed. They require a deep, very rich, and moist loam, and agree exceedingly well, with large quantities of manure.—Where manure is scarce, a spade or two of earth is taken out at a proper distance for the plants, and the rotten dung laid at the bottom of the hole. When about 6 inches high, they will be fit to transplant. (See Transplanting.) Set the larger kinds in rows about two and a half feet each way. You can set some between rows of forward bush-beans, and other low growing crops, which will occupy the ground when those are off. If a hot sun cause them to droop, a shingle stuck into the ground will be sufficient shelter. Or plant 2 shingles, one on the southeast side, and one on the southwest, meeting at the south corner. Covering them with leaves, &c. is a bad practice. In bringing plants from a distance, be careful to preserve the lateral roots, lay them in a basket upon some moist grass, and cover them lightly with green leaves, and immediately before setting, dip their roots into water, and afterwards, unless the ground is quite wet, give them a sprinkling from the water pot. There is scarcely any crop that derives

more advantage from having the soil frequently stirred and applied to the roots of the plants, than the cabbage. It is only by a due repetition of those operations that the plants attain their most perfect growth and size. The later the plants are, the more necessary it is to earth them up, and the higher should the earth be drawn.— After they have been earthed up, hoe deep the rest of the ground. When the underleaves begin to decay, they may be taken off and fed to cattle. The plants will not be injured by it. (See Cabbages 124th page.)

CAULIFLOWER AND BROCCOLI.

These are a species of cabbage, but of a superior quality. They are cultivated in the same way as the common cabbage.

ONIONS.

This root requires a mellow, dry soil, and the richer, the better. The soil may be a rich sand, sandy-loam, dry-loam, or a gravelly-loam; or either of these earths, of common quality, when strongly manured, will answer. It is supposed that well rotted and fermented composts, formed of such materials as are most suitable to the soil, will always be found the best manure for this root. In April, or as soon as the ground is sufficiently dry to pulverize well, make it very fine, but not deep; make the rows a foot apart, and scatter the seed thinly an inch or more deep. Then fill in the drills, and harden the surface with the back of a shovel. When the plants are 2 or 3 inches high, thin them to 4 or 5 inches. Or make the drills about 10 inches apart, each way, and drop 6 or 8 seed, where the drills intersect each other. Though the largest onions are those that grow singly, some inches apart, those that are more crowded produce large crops. A small quantity of ashes and sand spread over the ground after planting, is useful. Keep the ground clear of weeds by hoeing and weeding, but, do not hoe deep, nor raise earth about the plants.— They should be hoed 3 or 4 times before the tops have arrived at their full height. After the bulbs begin to swell, hoeing must be discontinued. It is said to be very useful, to apply soot and ashes when the bulb be-

gin to form. Some are in the practice of beating down the tops, after the roots have attained considerable size, for the purpose of making the latter grow the faster; but the practice is no doubt injurious. When the stalks shrivel and fall spontaneously, they have ceased to grow and should then be pulled up and laid on the ground some days to dry and harden. If the weather should prove moist, they must be turned or they will strike new roots and grow. When sufficiently dry, cut off the tops, carry them in and spread them thin over the floor; here let them remain until the commencement of cold weather, then put them into a box or cask with alternate layers of dry chaff or fine straw, and set them in a place where they will not freeze. A little frost, however, will not essentially injure them, unless they are moved while frozen; but it is better to keep them in a temperature a little above the freezing point. Those which are shipped from New-England, are usually tied up in wisps of straw, and if they be hung up in this way they will perhaps keep longer than any other. If they incline to sprout, sear the roots with a hot iron, which will stop their growth. Those which have thick necks and the bulbous part small, may be left in the ground during winter: Many of them will stand the frost, and in the spring may be taken up and set in a bed where they will grow to be good onions. At all events, they are good for nothing, without a second year's growth; and must not be mixed with good onions lest they cause them to rot.

To obtain seed from onions, plant them very early in the spring in beds, about 9 inches apart. Take the largest and soundest for this purpose, and keep them clear of weeds while growing. When they have come to head, tie them loosely to stakes drove down for that purpose; otherwise they will fall to the ground, and then the seeds will not come to perfection. In a garden there always ought to be a crop to succeed seed onions. Onions are not an exhausting crop; and they may be constantly raised on the same ground.

Field Culture of Onions. Having omitted to speak of the field culture of this valuable root in the foregoing part of this work, we proceed to make some selections,

from the *Farmer's Assistant*, which may prove useful to those who wish to cultivate them on an extensive scale.

The ground should be perfectly clear of stones; and if it contain the seed of weeds, these should be first eradicated by a hoed crop. The ploughings, for preparing the land, in the first instance, need not be deeper than 3 or 4 inches. If the ground be suitably mellow, any further ploughings, for succeeding crops, will be unnecessary; all that will be found requisite, will be, to re-mellow the ground as deeply and effectually, as it can be done by a heavy iron-toothed harrow, having the teeth well pointed, and turning forward, so as to run about 2 inches deep. But, where the ground is not of the mellow kind, it should be prepared as at first. Whatever manure is applied, should be very finely rotted, clear of the seeds of weeds, and well mixed with the soil, by the harrow. After the surface is finely pulverized, it should be rolled, and then it is fit for the reception of the seed. The sowing should be as early as the ground can be completely prepared. The seeds should be drilled in, in rows about 10 or 12 inches apart, by a small hand-drill plough. This machine may be made to drill in 2 rows at once. The seeds should be drilled in pretty thickly, for fear they may not all vegetate. If the plants are too thick, they must be thinned by hand, when the first weeding commences. This is the most laborious operation in the whole process of raising this root, as well as some others; but here we propose another labor-saving implement, in the shape of a small hand-weeding plough. (See Hand-Plough.) Every part of the interval between the rows should be cut with this plough; after which it would probably be found requisite to use a small narrow iron-toothed rake, for the purpose of completely separating the roots of the weeds from the soil. After this, the cleansing of the rows of the weeds, which the plough could not touch, must be performed by hand. When the weeds begin to rise again, this operation must be repeated, and again, if it be necessary, as no weeds should be suffered to grow among the crop.

By the use of the drill, and weeding-plough, it is believed that one half of the labor usually bestowed would be saved.

Onions have been successfully cultivated in light, black, swampy grounds, when laid sufficiently dry by small open ditches, about 3 rods apart.

Mr. *Knight*, of Newbury, Mass. raised last year, 651 bushels of onions, on one acre. The soil is a rich gravelly loam, with a gravel bottom; in 1821, it was cultivated with onions, and cabbages; and was manured with about 5 cords of barn manure, and produced a good crop; after the crop was off the ground, there were 5 cords of barn manure, and 2 and a half cords of leached ashes ploughed in; in April, 1822, it was once ploughed, and sowed in rows 14 inches apart, which took between 3 and 4 pounds of seed; in the course of the season it was hoed between the rows and weeded four times; in September they were harvested. The entire expense, including \$ 21 and 37 cents, the cost of manure, was \$ 57 and 38 cents.

BEETS.

There are varieties of beets; but the best are the red, and the redder the sweeter. A full and abundant supply of this very excellent vegetable, ought to be cultivated in every garden. Sow them early, if the soil be not very rich; but they may be sown later, where it is strong. The soil should be well mellowed to a good depth. A soil naturally mellow is best for them. Make the rows a foot apart; sow the seed pretty thick all along the drill; and when the plants come up, thin them to 8 inches apart, or 12, if the ground is very rich. Mr. *Cobbett* advises to soak the seed 4 days in rain water before it is sowed. It should be put in about 2 inches deep, and the earth pressed upon it. The seeds generally come up double, but should be separated while young, otherwise both roots will be small. Those which are taken out may be transplanted; but they are not apt to make good roots. Beets should be kept clear of weeds, till the leaves covering the ground prevent their further growth. The under leaves may be broken off towards fall, and thrown to swine, which are very fond of them.

The roots should be dug up before any severe frosts; none of the fibrous roots should be taken away; nor

should the tops be cut close. In this situation they should be boiled, to prevent any loss of their juice. In winter, they are best kept in sand; and they should not be suffered to freeze, as this makes them tough and unfit for use. Beets, carrots, parsnips, &c. designed for the table, will pay well in their relish and flavor, if packed in sand, in dry casks.

The Mangel Wurtzel Beet may be cultivated much in the same manner, excepting the seeds may be further apart. The leaves of both make excellent greens.—
(See *Mangel Wurtzel*, page 118.)

CARROTS.

Carrots require nearly the same cultivation as beets. They do not, however, require so much room. They are considered best for culinary purposes, when planted as late as the last of May; as they do not attain their full growth, and are more delicate than those planted early. (See *Carrots*, page 120.)

PARSNIPS.

The cultivation is the same as for carrots, except that they require the soil to be dug deeper. The beet, carrot, and parsnip, all call for a generous, rich mould, and bountiful supply of manure to be well mixed in with the soil by deep digging.

From time immemorial our fathers in the country have raised the parsnip only as a *rarity*, to be sought for a few days in the spring. And few farmers think of digging this vegetable in the fall, to provide their tables with a very pleasant and useful variety in winter. By taking it up in the fall, we not only gain a long use of the plant, but we have it in greater perfection; for rarely can it be taken up in the spring before it has sprouted, and the inside of it become ligneous. Indeed, all roots should be dug in the fall, and it is said, if packed in a box with earth from the beds from which they were taken, that the same moisture may be preserved; they can be kept until quite the beginning of summer, possessing all their richness of juice and nutritious qualities. (See *Parsnips*, page 123.)

TURNIPS.

It is useless to attempt to raise them by sowing in the spring; they are never good till fall. Round Turnips should be sown about the end of July, in rows (in a garden) two feet apart, and thinned out to a foot distance in the rows. Good and deep hoeing and one digging should take place during their growth; for, a large turnip of the same age is better, weight for weight, than a small one. The Swedish Turnip, or *Ruta Baga*, preferred by many for the table, ought to be sown early in June, in rows at a foot apart, and thinned to 3 inches in the rows. About the middle of July they ought to be transplanted 3 feet apart, and, during their growth, kept clean, and dug between twice, at least, as deep as a spade can go. The Swedish Turnip produces excellent greens in the spring, and at a very early season.—Leave a row or two in the ground, and, when the winter is about to set in, cover them all over with straw or ceder boughs. Take these off when the winter breaks up, and you will have the greens. (*See Ruta Baga, page 113—Turnips, page 115.*)

RADISHES

Require a sandy, rich soil. Doubtless there might be a bed prepared for them. They should be sown thin in little drills, 6 inches asunder, as early as possible, in the spring, and a little bed, every three weeks, during the summer. As soon as the central rough leaf is half an inch broad, thin them to 2 or 3 inches apart. As they are uncertain in their growth, some put in the seeds between rows of other plants; and they are so soon pulled up, that they will not incommode the plants among which they grow. This root being liable to be eaten by worms, the following method is recommended for raising them: Take equal quantities of buck-wheat bran, and fresh horse-dung, mix them well and plentifully in the ground, by digging. Suddenly after this, a great fermentation will be produced, and numbers of toadstools will start up in 48 hours. Dig the ground over again, and sow the seed, and the radishes will grow with great rapidity, and be free from insects. Do not let the seeds of different species be mixed; and when you wish

to raise seed of any particular root, take care that it does not flower in the vicinity of any other kind. The early scarlet is the best.

CUCUMBERS.

Light sandy soils produce the best. It cannot be too rich, nor too well cultivated, to raise a great crop—hogs' dung and ashes are considered best for them.—(See *Radishes for a good manure for them.*)

It is generally observed, that cucumbers, squashes, and melons of every kind, may be planted as early as Indian corn; but in order to have them as early as possible, a few may be planted 8 or 10 days before the usual time of planting that grain. The seeds are considered best when 3 or 4 years old, and they are said to be benefited by soaking them in a solution of nitre, and covering them with soot. Three or four plants are enough to stand in a hole together; as their roots are said to extend to the distance of 10 feet in fine earth; therefore, when they get into rough leaf, they should be thinned to this number. After two rough indented leaves are produced, a *pimple* that portends a future sprout, on the *second* stalk is to be pinched off, to prevent its growth; this will make the other branches grow more strong, and be more prolific. The vines should be so conducted as to interfere as little as possible with each other. If you save a cucumber for seed, let it be the first fine fruit that appears. The plant will cease to bear much after this fruit becomes yellowish.

Cucumbers are rendered more wholesome by slicing them into cold water. See *Insects* for the method of keeping them off the young plants.

MELONS

Require all the season and great care to bring them to any degree of perfection. About the middle of May, prepare a piece of rich sandy ground, well exposed to the sun; manure it highly with compost, prepared a year at least before it is used; and give it a good digging, then mark it out into squares of 6 or 8 feet every way; at the angle of every square, dig a hole 12 inches deep and 18 over, into which put 7 or 8 inches deep, of

old dung; throw thereon about 4 inches of earth, and mix the dung and earth with the spade, draw the remainder of the earth over the mixture so as to form a round hill about a foot broad at top. Plant in each near the centre, 8 or 9 good seeds, distant 2 inches from one another, and cover them about half an inch deep. When the plants are in their rough leaves, thin them to 2 or 3 in each hill, the extra number in some, may serve to fill vacancies in others; draw earth, from time to time, round the hills, and as high about the roots of the plants as the seed leaves; when fit, stop them as directed for cucumbers; after which, keep the ground, by frequent hoeings, perfectly free from weeds.

The ends of the runners, and the fruit last formed, should be taken off, in order that the fruit first formed may have more nourishment. The same method can be taken to keep away *insects* as for cucumbers.

Seeds brought from the southward are said to be best. For saving the seeds, see *garden seeds*.

SQUASHES.

These, in all their varieties, are cultivated like *Cucumbers*. (See *Pumpkins* 128th page.)

ASPARAGUS.

This useful plant is best propagated from the seeds, and its successful culture almost entirely depends on the the proper quality of such seed. Hence, some of the most promising buds should be marked with a stick, and the seeds gathered when they are *dead ripe*.

To make a bed, open a trench early in the spring 4 feet wide, and one foot deep, in the warmest part of the garden. Fill the trench half full of good barn dung, mud, or a mixture of rich earth and dung; level it, and fill up the trench with good soil. Draw the drills 10 or 12 inches apart each way, and in the angles plant 2 or 3 seed about an inch deep. When the plants have been up some time, they must be thinned, leaving only one of the strongest in each place, and carefully cleared of weeds. The first year or two a thin crop of onions may be sowed in the intervals. When the haulm is yellow, in the fall, and before the frost sets in, cut it off close to

the ground. Lay some litter on the bed till spring, to prevent the frost from being too long coming out of the ground in the spring. When the frost breaks up, throw some ashes, or some other manure about an inch deep over the bed, having first loosened the top of the bed with a fork about 3 inches deep, and raked it. Upon this manure, throw a layer of earth over the bed, out of the paths, and break it fine at the time. Continue this management every succeeding year. When the bed becomes too high by the constant addition of dung, &c. part of the earth may be pared off in the spring, before the plants shoot, and the bed covered again with a thin compost of rotten dung. The third year some shoots or buds will be large enough for cutting. When these are about 3 or 4 inches high, they should be cut; slipping the knife down almost perpendicularly, close to each shoot, and cutting off slantingly a few inches within the ground, taking care not to wound the successional buds advancing from the same root. Terminate the general cutting, as soon as the shoots begin to appear small, or weaker than usual. In New-England, it is supposed they may be cut till about the middle of June. Asparagus being of maritime origin, a little brine or salt, may now and then be sprinkled on the beds with advantage. The beds will continue to bear well to 10 or 12 years, and with proper management 20 or 30 years.

It is advisable to have two beds, the one so situated as to come on as early as possible, the other late. The warmest situation is necessary for the former; for the latter the coolest, or that which is shaded.

OYSTER PLANT.

The salsafy, or oyster plant, is a vegetable of easy production, and universally eaten, when introduced to the table. It resembles a small parsnip in its appearance. It is raised annually from seeds, requiring no more care than the carrot. It bears a tolerable crop. In Europe it is eaten both boiled and fried. In this country it is par-boiled, and then fried either in butter or without. In its taste, it so strongly resembles the oyster, that when sliced, and fried in butter, it can scarcely be distinguished

from it. It is in eating from November to May. Like the parsnip it will stand out the whole winter.

LETTUCE.

As early in the spring as possible, (March,) prepare a spot in a warm situation, and sow early kinds of lettuce. Continue to sow of the best kind every two weeks, in rich ground, and in open situations, that you may have a regular supply. The different sorts should generally be sown separate, and in digging the ground, let the earth be well pulverised. Sow the seed on the surface, even, and not too thick, and rake them in lightly, taking care not to draw the earth in heaps. Scatter a few seeds among other general crops, and they will grow large and fine. If the early sown lettuce stands thick, draw it out; and when the ground is fully moistened with rain, manure it, dig it a spade deep, and transplant some of the best. There is nothing that bears transplanting better, and the heads will grow larger, and will not so soon run to seed. They should stand a foot from each other, that the weeds may be destroyed with a hoe, and the soil kept loose around them. Water them occasionally, till they have taken good root. Such as are left for heading, where sown, should in May be thinned to 10 or 12 inches distance every way, and those among other crops, to 3 feet. It is of much importance to have good sorts, and such as will not run to seed before they attain full growth; these are not commonly to be met with, and are worth procuring.

CRESS.

Cress, or Pepper Grass, is very good in salads along with lettuce and white mustard. It should be sown in drills, pretty thick (as should the white mustard) and cut young. A small quantity, in the salad-season, should be sown every ten days, and slightly covered.

NASTURTIUM, OR INDIAN CRESS.

This, for the sake of ornament, and that no small one in a kitchen garden, should be where thin stalks may find support. The seeds, when green, form a favorite pickle; they are often called eapers and substituted for

them. The young leaves are used in salads. The seeds should be sown early, and the plants require pretty long bushy sticks.

MUSTARD.

This plant requires a soil sufficiently strong for turnips. Let the ground be well prepared early in the spring, and sow the seed broadcast. When the plants are a few inches high, thin them to 8 or 10 inches apart, and destroy the weeds with the hoe. When the lower seeds are ripe, the middle seeds green, and the tops in blossom, cut them, bind them in small bundles, and lay them in piles for a few days. In this situation the green seed will soon ripen. The best mustard for culture is the common or black.

(*Sinapis nigra*.) Every farmer ought to raise this useful plant, as imported mustard is often adulterated. The culture of mustard is profitable.

PEPPERS.

The seeds of peppers germinate tardily, and should therefore be put into the ground as early in May, as possible. They will not flourish unless the land is good, and highly manured. For this use, manure from the hog-stye or hen-roost is the best, make it fine, and nicely incorporate it with the soil—level the surface with the rake and plant the seed in drills 18 inches apart, sow it thick, cover it half an inch with fine earth, and press it down. When grown an inch or two, thin them to 6 or 8 inches, and keep the ground free from weeds. The large heart shaped kind is generally used for pickling.

SAGE

Is raised from seed, or from slips. To have it at hand for winter it is necessary to dry it; and it ought to be cut, for this purpose, when beginning to bloom, as indeed, is the case with all other herbs.

PARSLEY.

Sow it in very clean ground. A bed 6 feet long, the seed sown in drills at 8 inches apart, will probably be enough for a family. To preserve it green through the

winter, put straw, or leaves of trees, 6 inches thick on the bed, and lay on something to prevent the covering from being blown off. This will preserve its leaves from being destroyed; and, when you go to get it, you must lift up the covering, of a part of the bed.

BROOM CORN.

This requires the best of land and tillage. The place assigned for it should, early in May, be laid up in small ridges, that it may dry and become warm. About the 20th of that month, level down the ridges, pulverise the soil, and intimately mix the manure—then stretch the line, and with the small hoe make a furrow 2 inches deep, scatter the seed, and cover it with light earth—Then move back your line 3 feet, and in this way plant whatever quantity you please. When up, thin plants, reserving those only which appear stout and healthful.—That seed only which is heavy, and of a bright, shining colour, is worth planting. The best seed will lose its vitality in 4 or 5 years. The grain is good for poultry.

FRUITS CULTIVATED IN GARDENS.

The useful and the agreeable concur to recommend the cultivation of fruit in gardens; as the plants, being perennials, require only occasional care, little trouble, and hardly any expense.

Propagation by cuttings, suckers, and layers, may be practised in the early part of April; or as soon as the frost is out of the ground.

Cuttings must be taken from shoots of the last year, and it is, in most cases, best if they have a joint or two of the last year's wood, at the bottom of them. The cutting should have altogether, about 6 joints, or buds; and 3 of these should be under ground when planted. The cuts should be performed with a sharp knife, so that there may be nothing ragged or bruised about either wood or bark. Make a hole sufficiently deep and large to admit the cutting without ruffling the bark; let those which are most difficult to grow be set as deep as 12 inches; those less difficult, 6, 8, or 10; any vacancy left in the hole must be filled up with fresh earth, and pressed down close to the cutting. Let them be fre-

requently watered when the ground is dry, until they have got shoots several inches long. If the weather is hot cover the ground with leaves, or muck, (mulch,) or something to keep the ground cool. Where cuttings are to be kept some time before setting, let the cut ends be kept in moist earth, and soaked in water before they are set. Plant them in rows 2 feet asunder, at 6 or 8 inches distance in the row.

Suckers. Many kinds of shrubby plants, furnish abundance of suckers from the roots for propagation. They may be separated from the parent plants, each with some roots, and planted either in nursery rows for a year or two, or the largest, at once, where they are to remain. They are considered inferior to cuttings.

Layers. Trees and shrubs, which cannot be easily propagated by seeds, cuttings, &c. may nevertheless be propagated by layers. Take shoots of the last year's growth, bend them to the earth, and bury them half a foot deep in a good mellow soil; fasten them with hooked pegs to prevent their rising, and bend the tops so as to bring them above the surface. A slit upwards should be made in that part of the twig which lies deepest, or a wire drawn tightly round it there, to prevent the sap from mounting too fast. Let the ground be covered with stones, &c. to keep it moist, and let it be watered if necessary. When the twigs have struck root, they may be cut off in the spring and transplanted.

Transplanting, &c. In planting shrubs of every kind, let all convenient expedition be made in doing it, so that they may be planted as soon as possible after they are taken up; that their roots may not be dried by the sun and wind; but when brought from any distance, and cannot be immediately planted, untie the bundles, lay the roots in a trench, and cover them with earth, to lie, till the places allotted are ready to receive them.

Dig a round hole for each shrub, from half a yard to 2 feet or more wide, according to the size of the roots, and a spade deep, capacious enough to receive them freely; and loosen the bottom well. Prune off broken or bruised roots, and irregular productions of the heads; and place them in the holes upright, break the earth well, and throw it in equally about the roots, which

cover a proper depth, shaking the plants gently as the earth is filled in, tread it moderately, and place some long litter on the surface, to preserve moisture. Support the tallest with stakes.

The ground must always be kept clear of weeds; for, whatever they take is just so much taken from the fruit, either in quantity, or in quality, or in both. Taking off the earth round the roots of fruit bearing shrubs and vines, throwing in soap-suds, that has been used in washing, and then replacing the earth, has a most beneficial effect.

As the time of planting varies in different seasons, the only sure guide is, to plant all kinds of shrubs, &c. as soon as their buds *begin* to swell, or a little before.

CURRANTS.

Currants are easily propagated from cuttings. (*See Cuttings.*) They will furnish themselves with roots, and bear fruit the second year. They will do very well even on light and sandy soils; but, perhaps, the best soil for them is a good mellow sandy loam. With proper culture, however, they will grow pretty well on almost any soil that is not too hard and poor. When the bush has stood 2 years in the nursery, plant it where it is to stand; and take care that it has only one stem.—Let no limbs grow nearer than 6 inches of the ground. Prune the shrub every year; and keep it thin of wood, keep the middle open; the limbs extended; and when these get to about 3 feet in length, cut off, every spring, all the last year's shoots. Cultivate and manure the ground. It will be most convenient in a garden to set them next the fence. By planting some on the south, and some on the north side of a wall, you can have the fruit from June to October.

To cultivate them upon an extensive scale for the purpose of making wine; set the bushes in rows, 6 or 8 feet between each, and about 3 feet between each bush, with intervals of proper width and at regular distances for passing across the rows. It is estimated that an acre, well cultivated, would probably yield, on an average, a quantity of fruit sufficient to make 1000 gallons of wine yearly. The expense of making this wine is about 50 cents a gallon.

Currant Wine. To make this wine, gather the currants when fully ripe, let them be picked in fair weather and with as much expedition as possible; break them well in a tub or vat, (some have a mill constructed for the purpose, consisting of a hopper, fixed upon two lignum vitæ rollers,) press and measure the juice, having first strained it through a woollen cloth; to every gallon of pure currant juice, add two gallons of cold water, then to every gallon of this mixture, immediately put three pounds of good brown sugar, (some think it better with three and one fourth pounds,) stir it well, till the sugar is quite dissolved, and then fill up the cask. If you can possibly prevent it, let not your juice stand over night, as it should not ferment before mixture. Observe, that the casks be sweet and clean, and such as never have had either beer or cider in them, and, if new, let them be first well seasoned. The cask must not be so full as to work over. Lay the bung lightly on the hole, to keep out flies, &c. In three weeks or a month, the bung-hole may be stopped up, leaving only the vent-hole open till it has fully done working; then stop it up tight, and in six months it will be fit for bottling or for use. Like other wines, however, it improves much by age.

If you intend to make 30 gallons agreeably to this receipt, you will require 8 gallons of juice, 16 of water, and 72 lbs. of sugar.

GOOSBERRIES.

Goosberries require a deep and rich loam: the ground must be well manured and kept free from weeds; and be careful to plant none but those that are of a good kind. The best mode of propagating them, is by cuttings or layers. (*See Layers, Cuttings, and Transplanting.*) Early in the spring, spade carefully around the roots, turn over the soil, and pull out all grass that may grow near them. Prune them by cutting out every worn-out, decayed, or irregular branch—let none be permitted to grow across each other; but let all be pruned to some regular order—cut out all the super-abundant, lateral shoots of the last summer, close to the ground, or old wood, only retaining here and there a good one, to sup-

ply the place of casual, worn-out bearers. Never permit the extremities of the branches to stand nearer than 6 or 8 inches of each other. The best form for a well trained goosberry or currant bush, is that of a wine glass.

Goosberry Wine is made in the same manner as currant wine, except that one third less sugar is required. In picking the berries, take none that have fallen upon the ground, or that have been shaded and grown sour.

RASPBERRIES

Are raised from suckers, though they may be raised from cuttings. The suckers of this year are planted out in rows, 6 feet apart, and the plants 2 feet apart, in the rows. This is done in the fall, or early in the spring. At the time of planting, they should be cut down to within a foot of the ground. They will bear a little, and they will send out several suckers, which will bear the next year. About four is enough to leave, and those of the strongest. These should be cut off in the fall, or early in the spring, to within four feet of the ground, and should be tied to a small stake. The next year more suckers come up, which are treated in the same way. Fifty clumps are enough, if well managed.—There are white and red: some like one best, and some the other. To have them fine, you must dig in manure in autumn, and keep the ground clean during summer, by hoeing.

GRAPE VINES.

Wherever any kinds of grapes grow wild, they may be there cultivated to advantage.

The spots most favorable for them, are the sides of hills, sloping to the south, with a loose and mellow soil, but not liable to be washed by heavy rains. Stiff soils are not good; though by carting on sand, and other loosening manures, they will answer tolerably well. The ground must be well mellowed by ploughing, and mixed with sand, if not naturally sandy, and such manures as will keep it rich and mellow.

The best mode of raising the plants, is by cuttings, taken from the vines at the fall pruning, and preserved

in earth, with litter over their upper parts, to protect them from frost, till spring. These may be made either of one eye or bud, or of four or five, attached to a small portion of the two years' old wood, forming a cutting in the shape of a small mallet. In May, take them out and wash them from dirt, and if they are very dry, let them stand with the lower parts in water six or eight hours. Open the holes fifteen or sixteen feet from each other, which will allow about eight feet for the vines to run each way on the trellis or wall, and put 3 cuttings into each spot, a few inches apart, to insure the setting of one. When this is ascertained, the two weakest must be withdrawn. Lay the cuttings a little sloping, that their tops may incline to the wall or stakes to which they are to be tied: they must be put in so deep that the uppermost eyes may be level with the surface of the ground. They should be kept moist, but not wet. (*See Cuttings.*) One bud only should be allowed to grow the first year; the plant should be kept free from weeds; the earth kept light; and as soon as the shoot produces laterals, they should be pinched off, but not so close as to injure the vine, and the shoot tied to the sunny side of a stake. By the first of November, this shoot may be cut down to two eyes, not reckoning the lowermost one next the old wood. In our climate, it is probably best to take down the vines, for the first three years, about the middle of November, if the weather is dry, and cover them slightly with earth, forming a slope to prevent the rains from penetrating. The head must not be covered with earth, but with chaff, or some such dry stuff. The plants should not be uncovered till the middle of April. The second years growth should only exhibit 2 branches trained. The good eyes will all shoot forth in the spring; and let them all grow to the length of about eight inches before you select the two most proper. Those that are selected must be fastened to the wall or trellis, as they extend in length. The trellis is to be 5 feet high, and is to consist of a row of little locust posts, about 3 inches square, put 2 feet into the ground, and placed about 3 feet from each other. Check the branches of the second year's growth at about 5 feet, pinching off the laterals, &c. at about 4 inches. In the fall, trim the vines

again. Now you have two main branches to trim, and these should be cut down to within 4 or 5 good eyes of last year's wood. The third year presents two main branches, each furnished with 4 or 5 eyes. Proceed as before in the choice of shoots, training only two from each branch. Thus you will have four main branches this year. If the vines begin to bear this year, pluck off nearly all the clusters while young, to prevent the vine from being injured. With respect to cropping and pruning the vine, be always careful to check its aspiring nature, and keep it of humble size, by which means it is always easy to be managed, and less subject to be injured by violent winds. In the fourth year, training again two branches from each trained branch of the previous year, you will have 8 branches to each vine. You therefore proceed as before in humbling the vine; and proportioning its quantity of fruit to its ability to bear; and remember not to let the vines bear all the fruit they put forth, until they are fully able to do it without injury to them afterwards. No more shoots should be permitted to grow than can be laid in clear and handsome, and without confusion on the trellis, and so as to admit the sun and air freely among the branches. All this time the ground is constantly to be kept light and mellow, and perfectly clear of weeds and grass. For this purpose, straw, chaff, flax-shives, &c. spread over the ground, will keep it mellow and moist, and prevent its washing. It is said that a vine properly managed will not decline under 50 years.

By packing grapes in dry saw-dust or bran, they can be preserved a long time.

WINE.

To make good wine, the grapes of the same kind should be gathered at different times. The first should be of the ripest clusters. Those which are not sufficiently ripe, must be gathered at another time; the green and rotten ones must be rejected. Wines of different colors are made from the same grape. To make white wine, grapes sufficient for a pressing are gathered early in a damp, misty morning, while the dew is on. When the sun comes out warm the gathering is discontinued.

They must be immediately carried to the press or vat, stripped from the stems, and pressed out without delay. The first pressing should be gentle. After the first pressing, the press is raised, the cake cut up and pressed again. The cutting and pressing is to be repeated, as often as you find the liquor to run.

In making red wines of the same grapes, they are to be gathered when the sun shines the hottest. They are washed in a vat, and are then to lie in the liquor for a length of time, which must depend on the heat of the weather, the flavor of the *musk*, and the height of color intended to be given. They are to be stirred frequently, the better to raise a fermentation and redden the liquor. After laying as long as is thought proper, it is poured off, strained, and put into casks. Afterwards the remainder of the grapes in the vat, is put into the press, and undergoes the pressings and cuttings before mentioned.

The finest wines will work the soonest, and the fermentation will take 10 or 12 days, according to the kind of wine, and the season of the year. Those that are backward in fermenting may be quickened, by putting into them a little of the froth or yeast that works from others. During fermentation, the bung-holes of the casks are to be left open, and should be closed when it abates, which is known by the froth ceasing to rise so fast as before. The cask is also then to be filled to within 2 inches of the top, and a vent-hole left open to carry off all that is thrown up afterwards. The filling of the cask should be regularly done every two days, for about twelve days, in order that the foulness thrown up by the continued fermentation may be thrown out at the vent-hole, or it will fall back and prevent its becoming clear. After this the cask should be filled to within an inch of the bung, every 5th or 6th day, for a month; and then once a fortnight, for three months longer. Where the fermentation is entirely over, the casks are to be filled up, and this is to be repeated once a month as long as they remain in the cellar. They should be filled with wine of the same kind which they contain, which may be kept in bottles for the purpose; and the vent-hole should be stopped when the fermentation is over.

The first drawing off from the lees is done about the middle of December, and the casks containing the liquor drawn off, should stand without the least disturbance, by shaking, until the middle of February, when the liquor should be again drawn off to other casks. If there be then still so much lees as to endanger their contracting a putrid taint, draw off again in due season. Sometimes it may be necessary to repeat the racking several times; but let the casks be kept full, and let no wines of dissimilar qualities be mixed.

Turbid wines are fined by isinglass, or by putting a pound or two of fresh bloody meat into them.

Where wine has become sour, let some salt of tartar be mixed with it, just before it is used, which will neutralize the acid.

In summer, cool, clear days, with northerly winds, are the best times for drawing off wines.

For white wines, the casks must be new, to prevent their coloring the liquor, but red wines may be put into any casks, provided they are sweet and clean. Wine should not be bottled, till it is clear and fine and all fermentation subsided.

Good wine may be made with our *native grapes*; those which ripen in September. For a barrel (30 gallons) take two bushels, a little heaped; mash them well in a suitable vessel, adding a considerable quantity of water, and press, or squeeze through a cloth. In this mixture, dissolve 48 pounds of good brown sugar: then put it into the barrel, and fill up with water. The after management, time of bunging, &c. the same as for currant wine.

INSECTS.

OF all the enemies which agricultural pursuits have to encounter, none are equal to the *insect tribe*. The injuries sustained from these hostile myriads are of an extent, amount and nature, beyond what a superficial observer is aware of. Immense numbers of these prey upon the labors of the farmer, against the ravages of which it is, in many instances, difficult to provide adequate remedies. But it is a fortunate circumstance, observes the *New-England Farmer*, that the remedies prescribed against the ravages of one kind of insect, will frequently be found effectual against every other sort.

Among the substances, which are either offensive or fatal to all kinds of insects, may be numbered sulphur, elder, tobacco, quicklime, lime water, soot, unleached wood-ashes, strong lie, tar or turpentine, or water impregnated with those substances, common salt finely pulverized, brine, old urine, boiling water applied immediately before planting, &c. &c.

Quick lime and even strong ashes may injure tender vegetables; the safest way, therefore, is to apply such caustic and corroding substances to the soil, some time before the seed is put into the ground.

Yellow striped Bug. Set an onion in the centre of a hill of cucumbers, squashes, melons, &c. and it will effectually keep off this insect: or sprinkle the plants with a little sulphur, Scotch snuff, or gypsum.

Grubs. Very injurious to Indian corn. Most of the articles before mentioned, either boiled in, or diluted with water, and applied just before a rain, will drive them away.

Top, or Spindle-worms. White worms, that eat off the stem, which forms the top of Indian corn. Sprinkle the corn with weak lie.

Timber-worms. Felling timber about the middle of winter, is said to prevent the smaller kind from doing injury.

The large boring-worm takes its residence chiefly in pine timber. Scorch the trees in a light flame, or soak them in salt water.

Hessian Fly. Immerse the seed wheat 10 or 15 seconds in boiling-hot water; cool it suddenly; dry it, with lime or gypsum, and sow it immediately. The nits, by a good glass, can be discerned near the sprouts of the grains.

Maggots. Troublesome to the roots of cabbages, turnips, and radishes. Manure the ground with salt, or apply weak brine to the roots of the plants. (See *Radishes*.)

Turnip Fly. (See *Turnips*, page 115.)

Garden Flea. Very destructive to young cabbages. Sow some onion or tobacco seeds with the seeds of the plant, or sprinkle sulphur or snuff on the plants. Soap-suds is good.

Lice. These infest cabbages, but are destroyed by the frost. They can be extirpated by the smoke of tobacco.

Weavel. A little black bug, very destructive to wheat in graneries. On thrusting the hand into wheat infested with them, considerable warmth will be felt; but, as they are usually collected together, every part of the heap or bin should be examined. Sulphur or snuff, put up in little papers or bags, and properly distributed among the wheat, will drive them away. A bin made of boards of Lombardy poplar will never have a weavel in it. To keep them from wheat, before threshing, mix little pieces of this wood every where through the mow, or sprinkle salt among the sheaves.

Grasshoppers. The only known remedy, and it is sometimes very inadequate, is to raise large flocks of turkies and other poultry, which feed on them.

Lice on Cattle, and Ticks on Sheep. Where colts and young neat cattle become lousy, by poor keeping, or otherwise, oil the creature, or wash it with decoction of tobacco; and they should have better keeping, to prevent a return of the lice. To destroy ticks, see sheep.

For *Canker-worms*, *Caterpillars*, and *Curculis*, see those articles.

See *Peach-tree*, for the methods of preventing the injuries done by a worm to that tree.

For destroying the *Black Bug*, that eats into the *pea*, see this article.

BIRDS.

As insects have increased greatly since the birds have been thinned by the increased number of sportsmen, and as we know that insects are the favorite food of most kinds of birds, particularly of the smaller kind: it would be advantageous, therefore, to encourage the increase of the feathered tribe, by all the means in our power.

What immense numbers of these, our benefactors, are annually destroyed through mere wantonness and cruelty, while we are constantly hearing of the ravages of worms and bugs, in the various departments of vegetation. It is from small birds we are to look for assistance; their habits, wants and capacity qualify them to check and restrain the multiplication of insects. The parents of one nest of young birds have been calculated by some ingenious observer to destroy many thousands of insects in one day, and thus at the commencement of the warm season, one day's havoc prevents the existence of many millions.

The destruction of vast fields of grain, by flies, in some parts of our country, has been reasonably attributed to the extermination of the birds. It has indeed been found necessary to protect several species by law, but policy and humanity require, that the protection should be much farther extended. Some birds are pursued with unsparing hostility, from erroneous notions of their pernicious habits. The *woodpecker* is of this class; yet he deserves the gratitude, instead of the ill will of man.—He bores no trees, but those which are unsound, from which he extracts the insects which are slowly effecting their destruction. *Linnaeus* relates an occurrence in Sweden, which is pretty much to the point. Among the birds of that country was a particular species, which the country people apprehended were somewhat destructive to their crops. They accordingly made war upon

them, and by yearly repeated attacks exterminated them. In consequence the insects which were the principal food of these birds increased so as to do an hundred fold more damage to their crops of grain and grass, than the birds had done: they then strove to reinstate that species, and encourage their spreading in the country.

It would be very wrong to destroy almost any species of this interesting part of animated nature. Who would grudge them a little grain in compensation for their cheering songs, even if they were of no other service to us? But when we take into consideration the vast number of insects they destroy which would prove injurious to our crops, they ought to rank as auxiliaries to husbandry. Providence seems to have intended them for important purposes to us; and the person who sportively, or through mistaken apprehensions, should lay them low, would discover a disposition, little short of savage.

BEES.

Rural economy is incomplete, where bees are wanting. The cost of keeping them is nothing, and the care that is required about them is but trifling.

There are three sorts of bees in a hive. 1. The queen bee, which is larger, and of a brighter red than the rest. Her business is to conduct the new swarms and lay eggs in the cells for a new brood. 2. The drones, which have no stings, are of a darker color than the rest, and are supposed to be the males. 3. The honey bees, or working bees, which are by far more numerous than the other two kinds.

A bee-house should be at a suitable distance from any place where cattle are kept, or where horses are tied; from hog-sties, and every other place where filth is collected. It is well to place it in a remote part of the garden, and let some shrubbery (currant or gooseberry bushes) grow round it for the bees to light on, if they are so disposed, when they swarm. No trees should be near it; but in very hot weather, it may be occasionally shaded with boughs of trees. Let it stand leaning forward a little, facing the south-east, with the front part of the roof projecting over considerably, to prevent rains from wetting the hives. These should be kept clean,

dry, and sufficiently warm in winter; but not so warm as to tempt the bees abroad in warm winter days. All seams should be stopped which would admit insects; and the board on which the hive stands, should be carefully secured against warping. In very cold situations, the house should be filled with straw, watching against mice, and removing the straw in the spring.

Stocks should be removed either early in the morning, or in the evening, well tied up in a cloth, and suspended on a long pole carried on men's shoulders.

It is advisable, says Mr. *Nicholson*, to have large swarms; and for this purpose two or more small ones should be put together. The swarm should weigh from 4 to 6 pounds. This can be easily ascertained by knowing the weight of the empty hive, which should be marked thereon. (5000 bees generally weigh a pound.)

For joining two or more swarms, take a full hive, set it on a cloth, and then give it a smart stroke, which will cause all the bees to fall: search for the queen and destroy her; have another full hive ready, and put it over the bees, and they will soon crawl up into it, and become incorporated with those of that hive. This may be repeated for the purpose of adding a third swarm.

The following signs, according to Mr. *Huish*, generally precede the swarming of bees. 1st. An extraordinary number hang in clusters about the hives. 2d. An apparent idleness among the bees. 3d. A particular noise of *chip, chip*, made by the young queen, two or three nights before they swarm. 4th. An unusual bustle amongst the drones. 5th. A sudden silence succeeding a violent uproar. 6th. The continual motion of the wings of the bees which stand at the entrance. 7th. Violent commotions at the entrance of the hives, and the bees crowding out in great numbers.

In hiving, &c. approach them with the smoke, that arises from burning leather. This will make them retreat into their hive at any time, or leave the branch or trunk of a tree when hiving them, should they attempt to regain the place they at first occupied. Besides, this act of fumigation will disarm them of all resentment, and render them harmless. If, in swarming, they light on a branch of a tree or shrub, after they have settled, the

branch may be gently cut off and laid on the ground; and then the hive, supported on two sticks, is to be set over them, and the whole covered with a sheet, when they will soon ascend into the hive and commence working. In the evening, when all is still within, the hive is to be placed in the bee-house.

In dealing with bees, care should be taken not to breathe on them, as nothing is more irritating to them. When they are to be scraped together, make use of a wing for the purpose. It is advisable to fit your dress to them, by putting on clothes through which they cannot sting; and to protect the face, and particularly the eyes, by a pair of goggles. But at the time of swarming they are less inclined to sting than usual. If two clusters form in swarming, and remain separate, a queen will be found in each; and as no swarm that leaves a hive is ever too large, one of the queens must be destroyed, and then they will unite.

The hive should be proportioned to the size of the swarm; one, therefore, weighing from 4 to 6 pounds, should have a hive that will contain about 2 or 3 pecks. The hive is to have a hole in the top, say two inches square, which is to be covered with a sliding shutter; and is to be kept closed until the hive is filled. When this is the case, which is to be known by the bees lying inactive about its mouth, open the hole above, by drawing the shutter back, and set a small hive on the top, into which they will ascend, and fill it with the purest honey, without any mixture of bee-bread. When the upper hive is full, take it off in a cool morning, when the bees are inactive, and carry it into a room with the windows open to the sun, and as this enlivens them they will fly off to the hive left standing, to join their companions in filling another small hive, which is to be placed on the top, as before. When this is full, take it away, and put another in its place, which, in due time, is also to be taken away; closing the shutter, and leaving the lower hive for the winter food of the swarm. The upper hives should be sufficiently large to contain about 17 pounds of honey, which the bees, if the swarm is as large as it should be, will usually fill about 3 times in the season. In taking out the honey from these small

hives, which should be done speedily, let those bees which are found unable to fly be thrown into a vessel of cold water, so contrived that they can crawl out again, and they will soon recover their activity. In this method of managing, it will be seen, that there is no necessity for the process of fire and brimstone for getting rid of the bees; a procedure equally cruel and destructive of the race.

Another method of taking the honey, without killing the bees, is by driving them out of the full hive, at night, into an empty one, by placing the full hive bottom upwards, and fixing the other upon it. There should be cross-pieces in the empty one for the bees to light on. Strike gently on the two sides of the full hive to which the edges of the combs are fastened. This method is also used to join two or more swarms together.

One of the greatest errors in the management of bees, is, in giving the swarm old and decayed hives; these hives are generally infested with those insects which are the enemies of bees and ruin the swarms.

Were we merely to consult our own feelings, we should advise to feed bees when their stock is exhausted. If this be near the close of winter, interest alone will dictate the measure; but, if they are found destitute at an earlier period, their destiny should be averted from motives of compassion. Is the industrious insect, that toils for us incessantly during summer, unworthy of pity in the hour of distress? Honey is the most natural food for them. It is to be conveyed into the hives by little troughs, and the food is to be given daily, until they can provide for themselves. Let some good sweet-wort be mixed with the honey, and it will then go much farther. Sugar or molasses may also be used in place of honey. Some prescribe toasts of bread, sopped in strong ale, of which they will not leave one crumb remaining. The quantity of provisions they have in store is known by the weight of the hive.—The weight of the swarm, and the hive containing them, should always be known and marked; and then, after a reasonable deduction for the weight of the comb, the remainder must be honey and bee-bread.

the sap. Keep the sap clean from dirt while boiling; and avoid leaving it long in an iron kettle. When nearly boiled down to syrup (or thin molasses) a little lime thrown into the kettle will be of use. At this stage of boiling, as well as in sugaring off, avoid heating the top of the kettle too hot, or burning the sugar in any other way. When the syrup is well boiled down, turn it while hot, into a clean wooden vessel, let it stand 2 or 3 days and settle; then turn it carefully from the dirt at the bottom and strain it. Hang it over a gentle fire, and when it is warm, stir in one pint of milk to 4 or 5 gallons of syrup, which will rise as it begins to boil, and must be taken off. If you wish to make your sugar very nice, cool it until one half or two thirds will grain, turn it hot into a tight cask; let it stand undisturbed in a cellar, until it is grained at the bottom. Turn off the molasses and turn the cask bottom upwards over some vessel to catch what will drain out: let it stand as long as any will drop, then set your cask upright, and the moisture will settle to the bottom. If you wish to make dry sugar without draining, to ascertain when it is boiled enough, drop some on snow and let it cool; if brittle as rosin, it is sufficiently boiled.

BUSHES.

In many parts of our country, the pasture grounds are infested, and often overrun with noxious shrubs; this is the most slovenly part of our husbandry, and ought to be cured.

Eradicating them, says Mr. *Deane*, requires so much labor, that farmers are most commonly content with cutting them once in a few years. But the more cuttings they survive, the longer lived they are apt to be; and the harder to kill, as the roots continually gain strength.

It is undoubtedly true, that cutting bushes in the summer will do more towards destroying them, than doing it in any other season, particularly in August. Other circumstances being equal, the wettest weather is best for destroying shrubs by cutting. Spreading plaster on ground where bushes have been cut, may tend to check their re-sprouting, by encouraging the growth of grass.

It is said to be a good method of destroying bushes, to cut them with hoes close to the surface, when the ground is frozen hard; and that more may be destroyed in a day, in this way, than in the usual method of cutting with a bush scythe.

Bushes which grow in clusters, as alder, &c. may be expeditiously pulled up by oxen; and this is an effectual way to subdue them.

Elder is considered harder to subdue than almost any other kind of bush; mowing them 5 times in a season, it is said, will not kill them. The roots of the shrub oak will not be killed, but by digging them out.

To destroy bushes in swamps; flooding 2 or 3 summers is the most approved method. But if this is not convenient, draining will so alter the nature of the soil, that the shrubs, which it naturally produced before, will not be any longer nourished by it; and one cutting may be sufficient.

After all, extirpation, by digging them out, and by fire, is cheapest and most effectual.

SALTING OF MEAT, &c.

In packing down-pork, apply a large quantity of salt; then make a pickle, sufficient to cover all the meat, as strong as it can be made with salt, and, when cold, pour it on. When the pickle becomes considerably colored with the blood of the meat, draw it off, boil it, take off the scum till it become clear, and apply it again. Repeat this, if the pickle again become colored too much, and add more fresh brine, if necessary.

For a barrel of beef, take 4 quarts of rock salt, pounded fine; then 8 ounces of salt petre and 5 pounds of brown sugar. Let the salt be well rubbed into the pieces, as soon as the meat is cold, pack them close, and sprinkle the salt petre and sugar over each layer. The juices of the meat, if well packed, will form a sufficient quantity of brine to cover the whole. The next spring, draw off the brine, clarify it, as before directed, adding a little salt to it, and apply it again, and the beef will keep very sweet and fine tasted during the whole summer following.

The above is also an excellent method for curing pork and hams. When hams have been sufficiently cured in this, or any other way, they should be smeared over with molasses; smoked sufficiently and suddenly; the quicker the better; and let them be well sprinkled over with slaked lime, and put away in casks, filled with bran or oats, to keep during the summer. The box or cask in which they are put ought to be perfectly tight, raised about 6 inches from the ground, and the bran or oats packed in quite tight.

By the use of charcoal, (which is a very powerful antiseptick,) it is said, *meat may be preserved from the ravages of all small animals, and pure and sound for any length of time, and in any climate.* Take a tierce or box, and cover the bottom with charcoal, reduced to small pieces, but not to dust; cover the legs or pieces of meat with stout brown paper, sewed around so as to exclude all dust; lay them down on the coal in compact order, then cover the layer with coal, and so on till the whole is finished, and cover the top with a good thickness of coal.

The use of charcoal, properly prepared in boxes, is of great benefit in preserving fresh provisions, butter, and fruits, in warm weather; also, in recovering meats of any kind, when partially damaged, by covering the same a few hours in the coal.

Meat ought always to be salted as soon as it is cold. Tendency to putrefaction soon commences; and long before it is discernible. Salting should precede this tendency, and so prevent it; for salt cannot so effectually stop putrefaction, as it can prevent its commencement.

BEER.

Spruce Beer. Boil some spruce boughs with some wheat bran till the water tastes sufficiently of the spruce; strain the water, and stir in at the rate of two quarts of molasses to a half barrel; work it with the emptyings of beer, or with yeast. After working sufficiently, bung up the cask, or, which is better, bottle its contents.

Molasses Beer. Take 5 pounds of molasses, half a pint of yeast, and a spoonful of powdered ginger; put these into a vessel, and pour on two gallons of scalding hot soft water; shake the whole till a fermentation is

produced; then add, of the same kind of water, sufficient to fill up your half barrel. If the cask be greater, or smaller than this, the component parts must be in proportion. Let the liquor ferment about 12 hours; then bottle it, with a raisin or two in each bottle.

If honey instead of molasses be used, at the rate of about 12 pounds to the barrel, it will make a very fine beverage, after having been bottled a while.

To make Beer with Hops. Take 5 quarts of wheat bran, and 3 ounces of hops, and boil them 15 minutes in 15 gallons of water; strain the liquor; add 2 quarts of molasses; cool it quickly to about the temperature of new milk; put it into a half barrel, completely filling it. Leave the bung out for 24 hours, in order that the yeast may be worked off and thrown out; and then the beer will be fit for use. About the fifth day, bottle off what remains in the cask, or it will turn sour, if the weather be warm. If the cask be new, apply yeast, or beer-emptings, to bring on the fermentation; but, if it has been in this use before, that will not be necessary.—Yeast, particularly the whiter part, is much fitter to be used for fermenting, than the mere grounds of the beer barrel.

To recover a cask of stale Small Beer. Take some hops and some chalk broken to pieces; put them in a bag, and put them in at the bung-hole, and then stop up the cask closely. Let the proportion be two ounces of hops and a pound of chalk for a half barrel.

To clarify Beer. For a half barrel, take about six ounces of chalk, burn it, and put it into the cask. This will disturb the liquor and fine it in 24 hours.

VINEGAR.

Cider, (particularly such as is of an acid tendency,) placed in the sun, becomes very strong vinegar in a short time; the bungs are left open for the discharge by fermentation of the pomace, and for the admission of air at all times. If new cider be put on vinegar, or upon the lees or mother, after racking off the vinegar, it will hasten the operation. By adding one pound of honey to a gallon of cider, it will become such powerful vinegar, after standing some months, that it must be mixed with water for common use.

MISCELLANEOUS ARTICLES.

EARTHEN WARE.

Much of the earthen ware made in this country is *glazed with lead*: and it is laid on very sparingly, thin and slight: so that it is not only worn away by vegetables, and every thing acidulous, but is apt to scale off, and be swallowed with meat, greens and drinks. It is a preparation of *lead*, and consequently a strong *poison*.—Pickles, preserves, &c. should never be kept in earthen vessels.

CELLARS.

If you wish to live out half your days, be careful to cleanse your cellars, and not to be in the habit of breathing the gasses of putrefaction, vegetable or animal. We have every reason for believing that bilious or typhus fevers, of a malignant and fatal kind, have originated from the rotting of potatoes, cabbages, turnips, and other vegetables, in cellars. Beef brine, or pork brine, suffered to stand too long, become very offensive; and whatever offends the sense of smelling, is injurious to the health. Dead rats or mice, in a wall or ceiling, are detrimental to health, as well as offensive:

The following has been recommended as an effectual mode of freeing a room from the offensive smell, occasioned by a dead rat, or other animal: Take a small earthen vessel, into which, put a little salt petre, more or less, according to the size of the room; pour upon this a sufficient quantity of sulphuric acid, (oil of vitriol,) so as completely to saturate it, and shut the room up closely for an hour, in which time it will be found to be perfectly free from the offensive smell.

HAND PLOUGH.

A small hand plough might be very advantageously used for the purpose of eradicating weeds among several kinds of growing crops of roots: such as onions, carrots parsnips, &c. It should have two light handles, leaning well backward, of the length of, say four and a half feet, or of such length as will be found most proper for the purpose of *pushing* the plough forward by hand. It should have a beam and share, of such dimensions, that the plough would cut a furrow off, say an inch in depth, and about four inches wide. The share should be shaped similar to that of a large plough; and it should be kept well ground, so as to cut off all the roots of weeds which come in its way. It should be run close to the rows of roots, turning the furrows from them, in the first place, and then turning it back to them again.

STIMSON'S FARM.

(From the *American Farmer*.)

Mr. *Stimson's* farm in the township of Galway, Saratoga county, New-York, contains about 350 acres, of which he cultivates, as yet, only between 80 and 100 acres, which are laid off into 8 acre lots. He has certificates of premiums from the Agricultural Society of that county: For having the best managed farm in the county. For having raised 62 bushels of barley from one acre. For having raised 4 1-2 tons timothy hay per acre, from a lot of 8 acres, and he took the pains to weigh the hay from one of those acres 4 days after it was cut, and found it to weigh 5 tons and 324 lbs.— For having raised 104 bushels of corn to the acre. For having raised 357 1-2 bushels potatoes from half an acre.

His method for raising potatoes is, he opens the furrows 33 inches apart, plants 10 inches apart; hoes or hills them one way only; plants them shallow, viz: about 2 inches, as soon as they show themselves about 3 inches above the ground, he covers about 2 inches of them; in 8 or 10 days, or where the tops are about 6 inches high, he spreads the tops open, and hoes and covers them again to about 2 inches; and when grown up again to about 6 inches, he hoes and covers them as

before. By this process he thinks it possible that 1000 bushels may be raised from an acre.

His method for raising corn, is, he has a machine that crosses the ridges, he plants 3 to a hill; the ridges or hills are about 30 inches apart. He suckers after the second ploughing—he cuts the stalk and blades together close to the ground. The average product is 4 1-2 ears to a hill, the corn weighs 60 to 62 lbs. to the bushel.

His general method of farming is to lay off his land into lots of 6 to 10 acres, each lot is manured once in 4 or 5 years; his usual quantity is 8 waggon loads, with 4 horses, to each acre—first year is in grass—second in corn—third in barley—fourth in wheat, spring or winter wheat, with clover and timothy; 5 lbs. clover and 2 quarts timothy per acre, the northern or late clover he prefers—he mows his timothy for 2 years, pastures it one year; in the 4th year he turns down the sod, puts in wheat on the sod—1st and 2d corn—3d barley, or spring or winter wheat, and stocks it down as before.

Mr. Stimson has a field used as pasture, which he intends to plough, roll it well, give it a top dressing of manure, plough it the second time, manure it again, put it into wheat, harrow it in, and expects to make 35 to 40 bushels per acre.

The following is his product from 100 acres, as reported from actual survey and examination: 10 acres, having 400 apple trees on them, produced 25 tons hay; 8 acres corn, 560 bushels; 8 acres do. 720; 10 do. do. 300, and 16 tons of hay; 4 do. wheat, 140 bushels; 1 do. flax, 600 lbs.; 8 do. oats, 560 bushels; 8 do. hay, 32 tons; 8 do. do. 36 do.; 1 do. barley, 60 bushels; 3 do. hay, 10 1-2 tons; 4 do. do. 12 do.; 8 do. do. 24 do.; 2 acres 1000 bushels potatoes; 2 acres in vegetables, which also raised 400 chickens.

His wheat cost him 30 cents per bushel—corn 15 do. do.

SALEM ALMS-HOUSE FARM.

(From the Mass. Agricultural Repository and Journal.)

One of the most successful experiments in agriculture that we have ever known, is that of the alms-house farm, in Salem, which is under the care of Mr. Paul Upton.

This farm consists of about 35 acres, (as we are informed,) and was, two years since, in a state of nature, and very rough land. It has been brought to, and the produce during the year 1818, was as follows, viz. :— Pork killed, weighed 7960 lbs. 12 live pigs, sold for \$42. On hand, 57 pigs. Corn, 400 bushels. Potatoes, 2250 bushels. Turnips, 900 bushels. 3 tons of squashes. 50 tons of pumpkins, together with all the common summer vegetables for the alms-house.

We doubt whether any farm in the United States, has produced more, in proportion to its size ; and it is a proof what well directed industry can effect.

A brief comparison between the advantages and disadvantages of agriculture in Britain and in America. Selected principally from the writings of Mr. *Livingston*.

The first advantage England possesses, consists in her early spring ; this enables the farmer to commence his work sooner than he can in this country : to this cause it is owing, that such crops as require early sowing on a well prepared fallow, succeed better in Britain than here. Barley, for instance, requires four good spring ploughings, and yet should be put in by the first of May ; this cannot be done here, except upon very light lands, our clays being hardly fit to plough before May ; but light land will not produce good barley without manure.

In England it may be raised to advantage on strong loams, and even on clay. It is for this reason that barley is nearly as cheap in England as here, though every other grain is generally much dearer. The same reasoning applies to beans, (horse beans,) which are unproductive in England, unless sown in February and March, which is hardly possible here on strong clays, the soil these require. Turnips cannot be raised in our climate to so much advantage, as a food for cattle ; the season in which they are sown being usually very dry, and the plants liable to be destroyed by the fly.

Great Britain has also some advantage over us in the shortness of the winter, but much less than is generally imagined. Their autumn is cold and wet ; and though there is some apparent verdure, yet the vegetation is so slow, as to render it usual for good farmers to house

their cattle by the first of November, rather than suffer them to poach their fields, in gleaming a scanty subsistence from them; nor do they turn them to pasture till late in April.

These are the principal advantages that the British farmers claim over us. Let us now examine those we exclusively possess. The noblest of these is Indian corn, [which does not grow in England.] Neither the beans or turnips of Britain can be compared with this plant.— Carrots may be raised at less expense here than in Britain, because we have much fewer weeds, which are the greatest enemy to that root. Cabbages, potatoes, and pumpkins, would not be so much neglected here as they generally are, were it not that hay is made in this country at half the expense that it requires in the moist climates of Britain. Vegetation there is extremely slow; their spring is nearly one month earlier than ours; yet, though their wheat begins to grow in March, it is not reaped till late in August; ours is cut 6 weeks earlier, though it does not begin to vegetate till late in April; so that it takes five and a half months in Britain to perfect a crop which is performed here in little better than three. The same causes influence the growth of grass. In soils, therefore, of equal quality, much less will grow in a given time in Britain than in America, as far as may be inferred from the general average of their clover and natural grass in not exceeding ours, though they are longer in a growing state. It is true, that the moisture of the climate, and mild winters, give a great verdure to their fields at some seasons; but this only an apparent advantage, which deceives superficial observers, while it is attended with real inconveniencies; first, the grass itself is by that circumstance rendered less nutritious, as is well known by every farmer; secondly, while the hay is lighter, it is got in at more expense than ours, which is made at the driest season of the year. In our crops of grain we enjoy similar advantages; their harvests are frequently wet, while nine years in ten ours is got in without the least obstruction from rain. The produce would also, I am well satisfied, be greater here than in England, on highly cultivated soils, since it is well known that the strength of the straw depends upon

the dryness of the season. In a moist climate, therefore, without sun to harden the straw, heavy crops must be very often injured by lodging, especially if we take into consideration, that high winds are much more usual in Great Britain than here. Blight and mildew are effects of a moist climate. These are seldom and partially known in this country, prevailing only in particular districts, in extraordinary seasons. In Britain it often happens, that wet weather, when the wheat is in blossom, affects all the wheat in the kingdom, many parts of which, on this account, do not pretend to raise it.

If vegetation is slower in Britain than here, and if the grass is also less nutritious, it must follow, that with the same attention to stock our pastures with the best grass, and to keep the cattle out of them at improper seasons, a larger stock may be maintained on the same quantity of ground in this country than in England; and thus the difference in the length of our winter be amply compensated. This observation leads me to a circumstance in British husbandry, which might be advantageously practised by us. Many of their farmers sow rye, for the use of their sheep and lambs, in the spring. In order to do this they must be at the expense of a fallow; and as their rye grows two-fifths slower than ours, it must follow, that they can only keep three sheep where we may have five. If, therefore, this practice is advantageous in England, it would be much more so in America, to sow our corn fields with rye, to feed off with sheep in the spring, not only because of the additional numbers we can keep, but because we are more pinched for sheep-food in the spring; besides that, the rye that costs the British farmer a complete fallow, costs us nothing but the seed.

In the healthfulness of our stock, we have great advantages over Britain. Although some disorders prevail among neat cattle, *Mr. Livingston* observes, that during 20 years he only lost one creature, unless it was by some accidental hurt; or by bad keeping in the spring; and while the rot sweeps away whole flocks of sheep in Britain, it is a disorder entirely unknown in this country.

All these natural advantages being in favour of the American farmer, we shall be asked how it happens that the lands in Britain are more productive? The answer is : More labour is expended upon less land there ; and the product is always in proportion to the labor, the soil, and the climate.

The difference between the two countries in the price of labour, and of cattle, was formerly much greater than at present. The average price of labour in Britain according to Mr. *Lowell*, is about 67 cents per day, and ours does not exceed, probably, 75 cents. To balance this, may be placed the extra price of rents in that country. The farmer is seldom, there, the owner of the soil, and he pays a rent of from 5 to 30 dollars per acre ; his taxes also are at least three times as great as those paid by our farmers. Must not our inferior success in many of the operations of farming, compared to that of European cultivators, be owing to some radical defects in our system? We believe it is a want of enterprize among the farming class of our countrymen.

UTILITY OF AGRICULTURAL SOCIETIES.

The experience of ages, the increase of human knowledge, and its more general diffusion, tend to throw much light on agriculture, as well as to dissipate prejudices which have long existed ; nor can it be doubted, that whenever a spirit of emulation and enquiry is excited among the farmers of any country, the result will be beneficial to themselves and useful to the community. So necessary has it been considered in Europe to prosecute agriculture, that many persons of great abilities (distinguished in the various walks of life) have almost exclusively devoted their time and talents to it ; societies have been formed, liberally supported, and their utility demonstrated. They have well repaid every individual who has contributed by his wealth and intelligence to render them respectable and useful.

The vast improvement of agriculture in Great Britain, within a few years, is ascribed to the attention that gentlemen of fortune and leisure have paid to it, and to the establishment of a board of agriculture, and of societies, to foster and encourage individuals, and to bring to light

new discoveries. A combination of these has led to the high state of cultivation which now exists in England ; a country which, generally speaking, is less favoured by nature, as to its soil than our own. If in those nations where they have so long had the benefit of experience in farming, their importance is acknowledged, and by the information which they have spread, the value of laud has increased, and its products been greatly augmented, can we hesitate to believe, that similar effects will be produced here, if our societies are sufficiently encouraged, and enabled to excite an honourable competition among practical farmers ? By means of honorary rewards, in those countries, a laudable competition has been excited ; experiments have been made on extensive as well as more limited scales ; new modes of cultivation have been successfully attempted ; the various grains suited to the climate have been tried, and the results on different soils faithfully stated ; those species of cattle most proper for labour, for the dairy, or for food, have been selected or introduced ; that noble animal, the horse, has deservedly claimed the greatest attention, and fully repays the care which has been bestowed in procuring different breeds for the various purposes to which they are best adapted by their strength or fleetness ; the kinds of sheep remarkable for the quantity or quality of their fleece, or best suited for human sustenance, have by unremitted care and judicious selections been correctly ascertained, and their numbers greatly increased ; the most profitable swine have been sought for, and the means pointed out of fattening them to the best advantage ; implements of husbandry have been invented, and such as stood the test of repeated experiments have been brought into use ; and a system of farming has been established, which, by a rotation of crops for different soils, and the judicious use of manures, preserves the land in a state most likely to ensure an ample return for the labour and expense bestowed on it.— Notwithstanding all that has been done, they think it proper to continue their exertions, and to endeavour to attain a still greater degree of perfection.

But independent of the light of experience, the question admits of the most full and satisfactory determina-

tion in the affirmative. Confining ourselves to a few of the more obvious views of the question, let us ask, is there any thing novel or absurd in the idea that a large number of persons, by associating together and applying their faculties to the same subject of mutual interest, may thus enlighten, aid, and benefit each other? Differently constituted by nature; brought up under different circumstances; having had different opportunities for observation, and thus having been led to take different views of the same things, is it not naturally and most rationally to be expected, that what one may never have thought of, another may have had the opportunity to examine? what one has invented, another may improve—what one has never tried, another may have submitted to the test of experiment—and what one may be ignorant of, another may know? Thus by communicating one to another all that each individual may have learned by study, observation or experiment, each becomes possessed of the whole mass of information, and receives the full benefit of the collected wisdom and experience of all. No art would ever be improved by individual skill in any ratio equal to that to which it would attain by mutual communication. The greatest genius that the world ever produced would find himself much benefited, and his schemes much corrected and improved, by submitting them to others.

Agricultural societies furnish one of the most effectual methods for the circulation of useful information. At their annual meeting, useful observations are made, new facts are stated, errors are discovered, truths are established, and practical knowledge, derived from experience, is elicited, and communicated to the publick, which otherwise might have remained for many years confined within a very limited sphere.

Every man who cultivates the ground should be ambitious to contribute something from the stock of his knowledge, whether acquired by reading, observation or experience, to the general fund of agricultural information. If he is convinced that he has made any improvements, which promise to be useful to his fellow-creatures, he will not perform the part of a patriot nor philanthropist, if he does not put mankind in possession of

such improvements. If he can gain any equivalent for his discoveries by virtue of patents, premiums, or otherwise, let him obtain it. If not, he will do well to lay them before the public, and take his reward in the consciousness of having been of service to his fellow-creatures. The man who refuses a benefit which he might bestow without injury to himself, is but little better than one who does an injury without receiving any benefit from the injurious act. The latter destroys human happiness, and the former withholds the means by which happiness might have existed.

No plan perhaps can be found more effectual to extend a practical knowledge of ploughing, than the competitions excited at ploughing matches.

Another, and very important effect of these institutions will be, to cause farmers to think more of themselves as a body, and of the respectability of their profession than they have done.

These institutions, must also have a tendency to illustrate the important truth, that there is no science in which so great a variety of knowledge is necessary, as that of agriculture. When this truth is admitted, parents will be more interested in the education of their sons, and more particular in bringing them up to the profession of farmers. If schools and colleges are requisite to promote one species of knowledge; if military and naval academies have been patronized to promote another; is it true of agriculture alone, that it requires no aid—that art, which of all others, is the most important, and contributes most, and in the most direct and visible manner, to the happiness, wealth and prosperity of society?

Important consequences would result to the community, could agricultural societies make a thorough investigation every year into the state of farming in their respective districts, for the purpose of publishing the distinguishing features of each. Such an investigation might form the basis of a series of systematic efforts on the part of these societies; and act as a stimulus to industry. It would lead to a consideration, how far the aggregate of the harvest corresponded with the capabilities of the soil, assisted by a judicious husbandry. It

would be perceivable, at one view, how large a sum the difference would be between the gain of a negligent, and that of a skilful culture, on the mass of crops in the whole district. The great difference in the profits of farms, equal in extent and quality of soil, would lead us to inquire: Is it in the quality of the implements? Is it in the character of the stock? Is it, that in one case, artificial means are made use of to make manure, and not in the other? Is it in the greater economy of the household? Is it that the wet meadow is on one farm ditched and warmed with a coat of gravel, and not on the other? Is it that the fruit trees are pruned and kept clean, and the soil kept open around them while young, in the one case, and not in the other? Is it that the barn is open between the boards, and lets in the weather, so as to injure the hay in one instance, and not in the other? Is it that the farmer in one case ploughs his land in the fall, and in the other does not? Questions of this sort would naturally arise in seeking the results for the year, and the answers to them would furnish a mass of valuable facts, that might lead to reform. Farmers should be awakened to feel that they are united by the ties of interest, and that by lending the aid of their council and experience to teach each other, they may one and all be benefited. To this end, it might be useful to shew the sum of the produce of one farm added to that of another, and that of all the farms of a county, or state, gathered into one gross amount, and held up as an object of interest and importance, and set in comparison with other counties or states. For though a general knowledge of agriculture may be diffused over a great country, it is found by experience, that it cannot be materially improved unless by comparing the various practices which subsist in different parts of the same country. Whenever men unite in a common object of interest and honor, whatever intelligence and activity belong naturally to the few, are always in a greater or less degree transfused into the whole.

Many of our farmers when they see accounts of extraordinary crops raised in our country, are apt to suppose, that the difference between a common crop, and a

very large one, is the effect of so much additional labor and manure as would exceed in value the difference between the crops. Hence, it is so rarely the case, that farmers avail themselves of the experience of the few who have been greatly successful from superior method, diligence, and skill. And although the whole mystery may be resolved into thorough tillage, clean husbandry, and a liberal use of manure, the common cultivator will have it, in the face of well authenticated facts, that there is some secret fallacy, and that he of course, who has the best managed and most productive farm gets the least profit, and that a man is poor in proportion to the magnitude of his crops! The only means of counteracting this unfavorable idea, is to bring frequently into view of the farmer, examples as near home as they can be found, of substantial profit as the fruit of every improvement. Agricultural societies may do this, not only by means of the exhibitions and statements, offered at their annual shows, but by disseminating information, through the medium of the newspapers, of all the improvements on particular farms which come within their observation. The effects of negligent husbandry, exhibited in its consequences when it pervades a whole county, might, we think, afford an impressive lesson.

Although these societies, owing to the want of patronage, have effected but little in some parts of our country, there is no reason for discouragement: on the contrary, when we consider the recent date of their establishment, and the difficulties they have had to encounter, we shall find more occasion for rejoicing that so much has been done, than for being disheartened because more has not been effected. The agricultural class of the community has been almost universally attached to established practice. Many of our farmers seem to think it a sufficient justification of their system of farming, whether successful or not, that they have always pursued it, and that their fathers did so before them; they listen with unwillingness and distrust to any proposed innovation, and look upon the person who recommends it as a visionary man, whose councils it would be ruinous to follow: in short, it is the misfortune of too many of our farmers that they think they know enough

of their profession already, and that they therefore stand in no need of any additional light upon it. Considering these things it is not so much to be wondered at, that there are not more persons belonging to these societies.

It is greatly to be desired, that the prejudices which still exist in the minds of some, against agricultural societies, may soon give place to a full conviction of their utility, and it is incumbent on us to neglect no opportunity of pointing out and endeavouring to convince our fellow-citizens of the advantages of such institutions.— It is to be hoped, that those who really possess the means of contributing, will, instead of relaxing in the noble work, increase the support which they have been in use to afford, and that farmers in general will see the propriety of becoming members of them.

We conclude, by quoting *Washington's* opinion of Agricultural Societies. He remarks : It will not be doubted, that with reference either to individual or national welfare, agriculture is of primary importance. In proportion as nations advance in population and other circumstances of maturity, this truth becomes more apparent, and renders the cultivation of the soil more and more an object of public patronage. Institutions for promoting it, grow up, supported by the public purse : and to what objects can it be dedicated with greater propriety ? Among the means which have been employed to this end, none have been attended with greater success than the establishment of Boards, composed of proper characters, charged with collecting and diffusing information, and enabled by premiums and small pecuniary aids, to encourage and assist a spirit of discovery and improvement. This species of establishment contributes doubly to the increase of improvement, by drawing to a common centre the results, every where, of individual skill and observation, and spreading them over the nation. Experience, accordingly has shown, that they are very cheap instruments of immense national benefit.

Objects of attention, with a view to the settlement and success of a young agriculturalist.

Let this be held the Farmer's creed,
 For stock, seek out the choicest breed ;
 In peace and plenty let them feed.
 Your land sow with the best of seed ;
 Let it nor dung, nor dressing need ;
 Inclose and drain it with all speed,
 And you will soon be rich indeed.

Sinclair.

It is an object of extreme importance and difficulty to awaken due attention, without exciting useless anxiety. In selecting a situation in which to exercise the occupation of a farmer, various circumstances are minutely and deliberately to be regarded, and great consideration is required to form an accurate comparison of advantages and disadvantages. After these have been fully ascertained, a balance is to be drawn, and a decision to be made. More attention than time is requisite for this purpose, and hesitating, broken application, will often occupy a longer period in arriving at an injudicious determination, than, with persevering and dispassionate examination, is necessary to obtain a correct one. The soil is an object of particular consideration, in reference to a vast variety of circumstances ; as to its stiffness and moisture ; levelness or slope ; its exposure or its stoniness ; the manuring, draining, and fencing that may be required ; the state of the roads ; the accessibility of markets ;—the prices of manufactures, of produce, of labour, &c. To fix on good land is a prudential general direction.—For such it is not easy, with ordinary discretion, to pay too much, while for poor soils a small price very frequently exceeds their worth. No degree of fertility should tempt a man to purchase in an unhealthy part of the country, nor the pleasantest situation in a barren part. Examine how the neighbouring inhabitants fare. It is best to purchase from a good husbandman and a good improver.

Independently of the general salubrity of the place where farm mansions are proposed to be built, the nature

of the *air* and *water* requires particular notice ; the former should be pure and temperate, the latter wholesome and easily obtained. The most healthy spot, therefore, ought to be selected for building the house ; which, where choice of situation can be commanded, should be as nearly in *the centre of the farm* as circumstances will allow, and be exposed neither to the summer heats, nor to the rage of the winds and storms of winter.— Hence a gentle elevation will be found the most eligible. The buildings should be strong, substantial, and convenient. Trees planted around buildings, occasion a cool, refreshing, healthy air and shade during the heat of summer, and very much break the cold winds and tempests from every quarter in the winter. It is highly improper to build near ponds, or low wet lands, because the *miasma* which proceeds from them is so productive of fevers.

The constituent parts of a good system of agriculture are few and simple. To prepare the earth, by enriching, if necessary, by draining, by tilling sufficiently, by securing the crops with proper enclosures, and providing suitable buildings for their preservation, when harvested, in connexion with making suitable appropriations of lands for different kinds of crops, constitute a good system of husbandry.

But there are other things necessary to the success of the farmer. Industry, economy, and system, are indispensably requisite to the improvement of agriculture ; and, without these, no one has a right to anticipate success. Without industry, nothing important can be accomplished ; without economy, the best directed efforts will prove abortive ; and, without order and system, confusion will obtain in every part, and the most efficient energies be deranged. It is a maxim, that diligence and perseverance will surmount every obstacle, however difficult ; and that with determinate resolution, man may accomplish any object to which he shall prudently and skilfully direct his efforts. The duty, the comfort, the convenience, and the happiness of man, all require him to be industrious and persevering ; the energies of his mind, and the powers of his body, are suited to activity, in whatever employment he may be engaged.

At the foundation of a proper arrangement, it is necessary to have a plan of the farm, or at least a list of the fields or parcels of land into which it is divided, describing their productive extent, the soil, the preceding crops, the cultivation given to each, and the species and quantity of manure they have, severally, received. The future treatment of each field, for a succession of years, may then be resolved on with more probability of success.

With the assistance of such a list, every autumn, an arrangement of crops for the ensuing year, ought to be made out; classing the fields, or pieces, according to the purposes for which they are intended. The quantity of each crop, whether plough-land or mowing, as well as the extent of ground intended for pasture, will thus be ascertained. It will not then be difficult to anticipate what number of horses or oxen and laborers will be required during the season; nor the stock that will be necessary for the intended quantity of pasture land.—The works of summer and harvest will be foreseen, and proper hands engaged in due time to perform them.

As nothing contributes more to facility and satisfaction in business, than to prepare for what must be done, a farmer should arrange his plans regarding his crops, for three or four years; regarding team labor, when frost and bad weather do not intervene, for as many months; and regarding hand labor for as many weeks, according to the season of the year. A general memorandum list of business to be done, is therefore essential, that nothing may escape the memory, and that the most requisite work may be brought forward first, if suitable to the state of the weather.

The following rules, connected with the arrangement and the successful management of a farm, are particularly to be recommended:

1. The farmer ought to rise early, and to see that others do so, that both his example be followed, and his orders obeyed. An hour is gained in this way, which many farmers lose by indolence: this is a material object where a number of hands are employed.

2. The whole farm should be regularly inspected, and not only every field examined, but every beast seen, at least once a day.

3. Every means should be thought of, to diminish labor, or to increase its power.

4. A farmer ought never to engage in a work, whether of ordinary practice, or of intended improvement, except after the most careful inquiries; but when begun, he ought to proceed in it with much attention and perseverance, until he has given it a fair trial.

5. It is a main object in management, not to attempt too much, and never to begin a work, without a probability of being able to finish it in due season.

6. Every farmer should have a book, for inserting all those useful hints, which are so frequently occurring in conversation, in books, or in the practical management of a farm. Loose pieces of paper are apt to be mislaid or lost, and when a man wishes to avail himself of them, for examining a subject previously investigated and discussed, he loses more time in searching for the memorandum, than would be sufficient for making half a dozen new ones. But if such matters are entered into a book, and if that book has an index, he can always find what he wants, and his knowledge will be in a progressive state of improvement, as he will thus be enabled to derive advantage from his former ideas and experience. Without some record of this kind, the farmer may grow old, without growing wise, and many material circumstances must escape his memory, and be lost. It is from wanting the facts which such a book might contain, that we see farmers so tardy in improvement, so positive in error, and at three score, so little advanced in the knowledge of their profession. He may make this book a valuable legacy to his children. It may teach them our present mode of husbandry, and they may derive benefit not only from his success, but from his failure. Improvements will be perpetuated.

By the adoption of these rules, every farmer will be master of his time, so that every thing required to be done, will be performed at the proper moment; and not delayed till the season and opportunity have been lost.

To prevent random speculations and ruinous projects, with their ill consequences of every kind, it may be observed, that it is of the very first importance, that persons engaged, particularly on a large scale, in the profession of agriculture, should keep correct accounts of all their transactions, profits and losses. The advantages of clear accounts are obvious in every other occupation of life. Persons who are engaged in speculations of merchandize, to any extent, and who are known not to attend to this department, are always supposed to be in dangerous circumstances. But agriculture is erroneously considered by many as an exception to all other species of business, that it may be engaged in without preliminary study, and is capable of being properly conducted, even to a large extent, without any regular accounts, necessary as these are admitted to be in other situations!

It is a maxim in the science of agriculture, that by displacing a weed you make room for a useful plant.— The idea may be extended and applied to the habits of men. By exterminating habits of idleness, intemperance and litigation, room is left for all those innocent and useful habits, which insure to the possessor, independence, and respectability at home and abroad—and the fire-side blessings of harmony and ease. By the substitution of which, on the ruins of those demoralizing practices, which are so prevalent in many parts of our country, the American farmer not only improves his domestic condition, but renders himself worthy of that high rank and distinction in society which both the theory and practice of our government have assigned him, and which alone can render him capable of appreciating the blessings he enjoys, or thankful to the God who gave them.

The use of ardent spirits can scarcely be indulged in, without the certainty of an injury. The system in health requires only nutriment, and the addition of a stimulant so powerful as ardent spirits, is foreign to its wants, and of course must be hurtful in its effects. To good health, no addition can be made, and of consequence, any change produced must be a recession towards disease.

Too true was the assertion of Lord Bacon, that all the crimes on the earth do not destroy so many of the human race, nor alienate so much property, as drunkenness. It expels reason—drowns the memory—is the beggar's companion—and the true and only cause of the vast increase of crime in the world. There is certainly no character which appears so despicable as that of a drunkard; he displays every little spot in his soul in its utmost deformity. When once the youth becomes a devotee at the shrine of Bacchus, and fond of his libations, it is time for him to think. Let him not lull his conscience with the delusive idea of quitting when he chooses, but take a noble stand, and from that moment cease indulging in his cup. Drunkenness, that fell destroyer of mind and morals, has elicited the exhortation of the preacher—the pen of the moralist—the warning of the physician—the remonstrance of relations, and the yawning of the grave—but all will not do. It has reached an awful and alarming height—it daily increases. It is known to require an extraordinary and noble firmness of the heart to resist its blandishments and allurements. Is it then the temptation you are to quit when you choose?—Ah! no—young friends, hearken to advice; when the seductive goblet is offered to your lips, think not you will once more sip the liquid poison because you can quit when you choose; but consider that cup may probably be the one that will establish that habit with you, which you will never be able thereafter to conquer, and dash the proffered cup with indignation to the ground. (For suitable drinks in hot weather, see the article *Harvesting*.)

When young men take to gardening and planting, it is an happy circumstance, and they should lose no time in the business, for it is a thing that persons advanced in years have often repented of. It produces considerable satisfaction, and a peculiar pleasure, in the evening of life, when a man can point at good trees, and say, "These are my own *planting*!" but it were a superior thing to add, "And of my own *raising* too."

It is the simultaneous duty of the farmer, (says Mr. Cowen, of N. York,) to superadd to the cultivation of his farm, that of his mind; and to extend the same care

to the mind of his family. For this purpose it should be his object, in the first place, to acquire himself, and to impart to his offspring at least a common education.— This is a good foundation for mental improvement, but nothing more. It should be regarded in every man's hands, merely as the instrument of rearing and establishing that intellectual superstructure, which is to give him character, consequence, capacity and happiness in the various stations he may be called to sustain in society.

There is no greater mistake, than in imagining, that because a scholar has mastered his spelling, reading, writing, grammar and arithmetic, he is then entitled to dismiss his books, take up his farming tools, and bend a single eye to his agricultural avocations. Such a course is inexcusable. A wide and unbounded field of knowledge lies before him, inviting his culture, of which he as yet possesses no more than the utensils for improvement.

Nothing but absolute poverty can excuse a man from the purchase of books, and attention to study. But the farmer in the middle walks of life, who with his brethren constitutes the great body of our population, no matter how numerous his family, if bred as they should be to habits of strict economy and industry—he has leisure to pass without employment in business, many of his long winter evenings, and much of the day time during the same period, in the improvement of his mind. He has the means of purchasing a small collection of books for purposes of the most immediate utility, to serve as a manual for himself and family, and to fill up those little interstices of leisure continually occurring, which the poet calls “ Catching the transient hour, and improving each moment as it flies.” While his more enlarged researches are cheaply and liberally supplied by the well selected public library of the neighbourhood. Books, newspapers, &c. principally devoted to agricultural subjects, should occupy an important share of his attention.

If the farmer is advanced in life, he most probably has children who will mould their future lives by his example ; and he already fills a station which gives ample play for all the knowledge he can place in store. He is the member of a great and rising republic, whose con-

stitution and general policy invite his scrutiny ; in the selection of whose functionaries he is annually called to assist ; upon whose conduct he sits in judgment. In the exercise of so important a duty, what speed can he make, without the aid of that cool monitor, a well-instructed understanding ?

To form the character of the mere elector, he should study his national and state constitution with its ablest commentators. He should examine the history of nations, their rise, their progress, their decay, and final extinction. He should understand the resources, the geography, and the religious and moral habits of his own country. He should investigate the spirit of her laws, and search out her commercial relations. Until he does so, he cannot appreciate the conduct of his rulers. Difficulties, disasters, and inevitable misfortunes are confounded with faults and crimes ; or even the most upright, beneficial and prosperous efforts are metamorphosed into state villany, by those who are interested to hoodwink the master in his search to determine the merit of the servant. His ignorance and credulity are thus made the mere sport of the artful and designing knave, whom he gratifies perhaps at the expense of an able faithful delegate.

Again—By a judicious course of reading and reflection he disperses the darkness and terror which will ever attend superstition and ignorance. He forms a more correct estimate of the duties, flowing from the relation to his family, to society, and to his God !—Becomes better contented with the world, smooths the asperities and removes the peevishness and puerilities of age. He of all others is best qualified to attain and enjoy that enviable state of human happiness, so elegantly described by the Poet of the Seasons :

Rural quiet, friendship, books,
Ease, and alternate labor, useful life,
Progressive virtue, and approving heaven.

CONCLUDING REMARKS.

CONCLUDING REMARKS.

In the compilation of the foregoing sheets, much more time and labor have been required than was at first anticipated. The publication of the work has in consequence been delayed several months longer, than the time calculated upon, when the proposals were issued.

Owing to the numerous sources, whence we have gleaned materials for almost every article, (not less than 80 volumes having been examined in making the compilation,) it has not been thought necessary to refer to every publication from which extracts have been made. But we think it proper to observe, that we have generally used the language of others, whose opinions coincided with our own.

ERRATA.

Page 13, line 2 from bottom, for *whenever*, read *when even*; p 17, 12 from bottom, for *good*, r *yard*; p 18, 1 7 from bottom, for *conceived*, r *concerned*; p 22, 1 8 from top, for *simple*, r *single*; p 26, 1 14 from bottom, for *must*, read *most*; p 51, 1 11 from top, the word *better*, after *be*, is left out; p 52, 1 5 from bottom, for *especially*, r *excessively*; p 53, in the running title, *Fallowing* is improperly continued through many pages; p 76, 1 7 from bottom, for *absorbed*, r *absorbent*; p 83, 1 13 from bottom, for *their*, r *these*; p 93, 1 5 from top, for *post*, r *port*; p 103, 1 13 from top, for *new*, r *now*; p 124, at the commencement of the article on Cabbages, at the 3d paragraph, the word *Cabbages* was omitted; p 126, 1 15 from top, for *clear*, r *clean*; p 127, 1 6 from top, for *them*, r *their*; p 133, 1 2 from top, for *not quicken*, r *rot quicker*; p 145, for *Fall Fescue Grass*, r *Tall Fescue Grass*; p 153, 1 13 from top, for *best*, r *beast*; p 159, 1 8 from top, for *stalls*, r *stale*; p 160, line 18 from bottom, for *principle*, r *principal*; p 165, 1 3 and 23 from top, for *yearning*, r *yeaning*; p 171, 1 2 from bottom, for *lime ashes*, r *live ashes*; p 174, 1 15 from bottom, for *the rich*, r *this rich*; p 180, 1 13 from bottom, for *leveling*, r *beveling*; p 182, 1 15 from bottom, for *boughs*, r *bows*; p 196, 1 4 from bottom, for *where*, r *when*; p 200, line 12 from top, for *invest*, r *invert*; p 206, 1 21 from bottom, for *base*, r *bare*; p 222, 1 18 from bottom, after *in*, the word *the* is left out; p 233, 1 1 and 3 from bottom, for *butter*, r *batter*; p 234, 1 3 from bottom, for *thin*, r *their*; p 243, 1 9 from top, for *washed*, r *mashed*; 1 11, for *musk*, r *must*; p 261, 1 4 from bottom, for *where*, r *when*.

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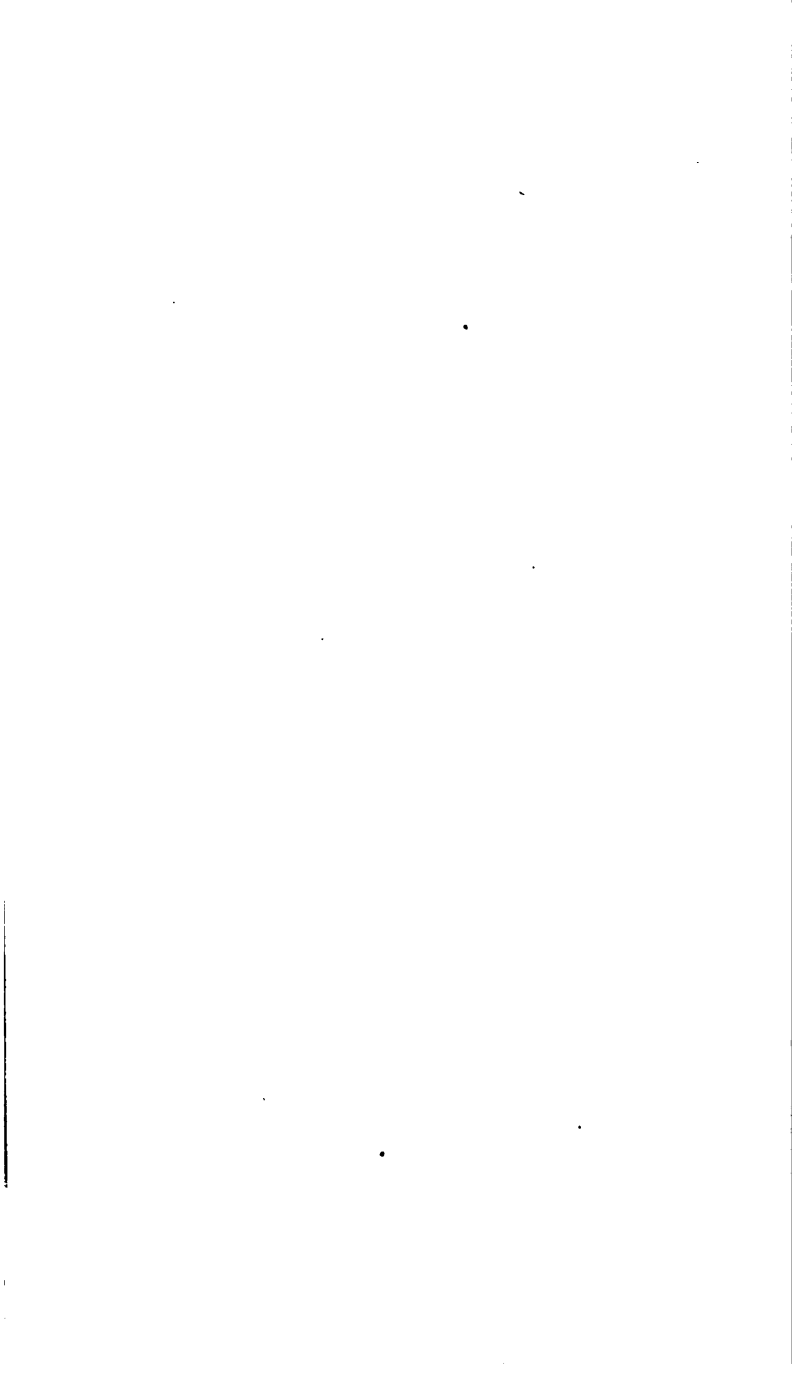
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