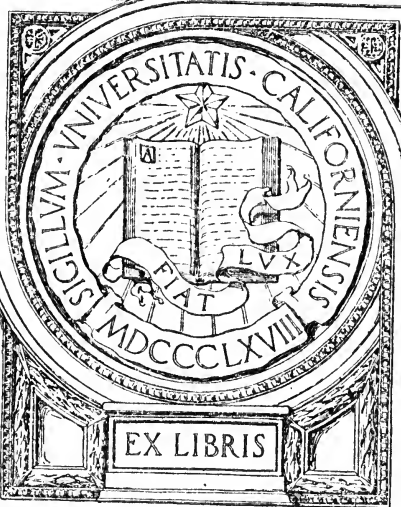




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THE
NEWENGLAND FARMER;
OR
GEORGICAL DICTIONARY.
CONTAINING
A COMPENDIOUS ACCOUNT
OF THE
WAYS AND METHODS
IN WHICH THE
IMPORTANT ART OF HUSBANDRY,
IN ALL ITS VARIOUS BRANCHES,
IS, OR MAY BE,
PRACTISED, TO THE GREATEST ADVANTAGE,
IN THIS COUNTRY.

BY SAMUEL DEANE, D. D.
VICEPRESIDENT OF BOWDOIN COLLEGE, AND FELLOW OF THE
AMERICAN ACADEMY OF ARTS AND SCIENCES.

THE SECOND EDITION,
CORRECTED, IMPROVED, AND ENLARGED, BY THE AUTHOR.

"FRIGORIBUS PARTO AGRICOLÆ PLERUMQUE FRUUNTUR,
MUTUAQUE INTER SE LÆTI CONVIVIA CURANT:
INVITAT GENIALIS HYEMS, CURASQUE RESOLVIT."—VIRGIL.

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TO THE
FARMERS
OF
NEWENGLAND ;
THIS EDITION
OF THE
GEORGICAL DICTIONARY,
REVISED, CORRECTED, AND ENLARGED,
IS INSCRIBED,
WITH MUCH RESPECT,
BY THEIR MOST OBEDIENT,
AND
VERY HUMBLE SERVANT,
THE EDITOR,

WORCESTER, MARCH, 1797.

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INTRODUCTION.

IT is much to be regretted, that the most complicated of all the arts, in which the brightest genius may find sufficient room to exert and display itself, should be slighted and neglected, by a people not generally wanting in ambition. And it is equally strange and unaccountable, that the most useful and necessary of all employments should have been considered, even by the enlightened people of Newengland, as below the attention of any persons, excepting those who are in the lowest walks of life; or, that persons of a liberal or polite education should think it intolerably degrading to them, to attend to practical agriculture for their support.

Perhaps, one occasion of the low esteem in which husbandry has been held, in this country, may have been the poor success which has most commonly attended the labours of those who have embraced the profession. Not only have most of them failed of rapidly increasing their estates by it, but too many have had the mortification of making but an indifferent figure in life, even when they have used the strictest economy, and worn out their constitutions by hard and incessant labour. The misfortune has been, that a great proportion of their toil has been lost by its misapplication. To prevent this evil in future is a leading design of the present publication. And since many among us begin to be convinced of the urgent necessity of having the attention of the publick turned to agriculture, it is hoped that the following attempt to promote the knowledge of its mysteries, and a spirited at-

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tention to the operations of it, will meet with the greater approbation and success. And as a very respectable Society in the Commonwealth of Massachusetts have undertaken to propagate the knowledge of husbandry, the day may be at hand, when the employment of the farmer shall no more be treated with contempt; when the rich, the polite, and the ambitious, shall glory in paying a close attention to their farms; when respectable persons shall confess it is one of the noblest employments to assist nature in her bountiful productions; when it shall be our ambition to follow the example of the first man in the nation, who does not think an attention to husbandry degrading; and when, instead of being ashamed of their employment, our laborious farmers shall, as a great writer says, "toss about their dung with an air of majesty."

Amidst the laudable efforts that are now making to promote so excellent a design as the revival of agriculture, the writer of the following sheets is humbly attempting to throw in his mite. He has been more prompted to engage in so arduous an undertaking, by an opinion he has long entertained of the need of a work of this kind, adapted to the state and circumstances of this country, than by any idea of his being thoroughly qualified to undertake it.

European books on agriculture are sufficiently plenty in the world, some of which are extremely well written; and this country is not wholly unfurnished with them. But they are not perfectly adapted to a region so differently circumstanced. Though the productions of English writers may be perused by the judicious to great advantage, it would be unadvisable, and perhaps ruinous, for our farmers to adopt the methods of culture in gross, which they recommend to their countrymen. Local circumstances so widely differ in the two countries, that, in many cases, the right management in the one must needs be wrong in the other. Britain, being generally liable to too much wetness, the English methods of culture must in many respects be different from those of a region that is mostly annoyed, as ours is, with the opposite extremity of drought. Difference of heat and cold must require a correspondent variation in the suitable crops and management.

ment. Difference of seasons and climates vary the fit times for sowing the same kinds of seed ; and the manures that prove to be most profitable in one country, cannot always be rationally expected to prove so in another, although they were equally obtainable. And though Americans speak the English language, yet the diction peculiar to different farmers on the east and west of the Atlantick, and the manner of their communicating their ideas on husbandry are so little alike, as to render it highly expedient that we should be instructed in it by our own countrymen, rather than by strangers, if any among us can be found capable of doing it in a tolerable degree.

The writer confesses he has never had sufficient leisure to attend very closely to the study of agriculture. But, having always had a high relish for natural philosophy, and particularly for this most profitable and important branch of it, he has paid all possible attention to it for a number of years, employed many of his vacant hours in perusing what has been published by the best writers, and in making useful experiments in husbandry. He flatters himself, therefore, that he shall not have the unhappiness of grossly misleading any of the most ignorant of his readers. Many things are written from his own experience, and from that of others in this country, on whose veracity in their communications he can rely. Things which are not certainly known are mentioned only as opinion or conjecture. Extracts are made from some of the best authors, and marked as such. He has not wilfully asserted any thing which he does not know to be fact. And though he has adopted the ideas of others, he has not passed any thing on the publick as his own, which has been published by others, unless it be through inattention or mistake. Whether the reasonings be just, every intelligent reader must judge and determine ; and to the candour of such the whole is submitted.

Long and particular accounts of experiments, such as abound in many European publications, are generally omitted, lest they should take up too much room, in a book that is meant to be comprehensive, and cheap to the purchaser, at the same time that it is designed to contain

a whole system of husbandry. Neither would the intention of comprehending much in a little room permit the pages to be filled with lengthy bills of the cost of culture, and computations of profit, which many writers have too much run into; and in which any writer in this country, where the price of labour is variable, would be in danger of deceiving both himself and his readers. Our farmers have a sufficient knowledge of arithmetick to do these things for themselves; and it would not be amiss for them to amuse themselves in this way, in some of their moments of leisure.

That the writer has been excited to treat on the present subject by a tender concern for the welfare of his country, more than by any selfish and sinister view, those who are best acquainted with him are sufficiently convinced. At the same time, he will not pretend to deny his feeling of an ambition to be one of the first of his nation, who has thus endeavoured to lighten the labours, and promote the happiness of his countrymen. Yet he most sincerely wishes, that other writers on the subject may soon carry the system nearer to perfection, as they undoubtedly will. But the disadvantages he is under by being so early, and having an unbeaten way to explore, will doubtless apologize for him with all who are candid and considerate, and partly atone for his errors and imperfections, from which it would be strange if he were wholly free.

Though agriculture, strictly considered, has nothing to do with the breeding and management of tame animals, yet it is so closely connected with those employments, in practice, that the farmer cannot be complete without a considerable knowledge thereof. It is by the assistance of labouring beasts, such as horses and oxen, that he must carry on his tillage, and send the produce of his lands to market. By the help of milch kine his grass, hay, and other fodder, are to be converted into butter and cheese. Bullocks, poultry and swine must be fed and fattened with the produce of his farm, that he and his family may be fed with their flesh, and the markets supplied with meat. And the sheep must assist him in the transmutation of the fruits of his ground into materials for clothing and food. Therefore the rearing, tend-
ing

ing, and whole management, of all these sorts of animals, are attended to in the following work ; including the methods of preventing and curing the most common distempers to which, in this climate, they are liable.

Noxious animals, such as beasts of prey, ravenous birds, and devouring insects, have too much connexion with agriculture, as the farmer knows by his sorrowful experience. He ought therefore to be instructed in the most effectual methods of defending his property against them. This arduous task, to which no one perhaps can pretend to be fully equal, the reader will find attempted, and it is hoped, in some good degree performed, in the following pages.

As fruit trees are of essential importance to the farmer, the rearing of them from seeds and otherwise, as also the grafting, transplanting and pruning them, are attended to in this work.

And as agriculture cannot be carried on to the best advantage, without a variety of suitable tools and machines ; the most important and useful of farming implements are treated of. Much of the ease and comfort of the labourer, as well as the profit of the farmer, depends upon their being well constructed. Their construction, therefore, is minutely attended to, although the art of the mechanick is the branch to which it most properly belongs.

The author attempted to arrange the parts of his subject analytically. But the variety of the materials he had collected was so great, and their heterogeneousness so obvious, that he found it not easy to do it to his own satisfaction ; which is one of the reasons why the book makes its appearance in the lexicographical form. And when he considers that what he is doing is not principally for the instruction of critical scholars, but for the direction of the common people, it appears that the want of a systematical arrangement is a matter of no great consequence. On the present plan, he has saved himself the trouble of writing a long index, which must have added several pages to the volume, and increased its price to the purchasers, which he wishes may be as low as possible, for their encouragement. Perhaps it need not be added, that the fashionableness of an alphabetical method is a
further

further apology for the form in which this book appears; nor the advantage the most illiterate reader will have of readily turning to any particular part of the general subject.

It is hoped that an acquaintance with this volume, if it should be perused by the generality of our farmers, will enable them to communicate their ideas to each other, and to learners in husbandry, with the greater perspicuity and propriety, and lead them to use nearly the same language in doing it, in the various parts of the country. For the writer has endeavoured that his diction should not only be concise, but plain and intelligible to ordinary readers; such as is most suitable to the subject, and not adapted to lead any into the use of absurd and ungrammatical language. How far these designs are accomplished the learned and judicious reader will be able to determine.

As a number of vulgar errors and prejudices are detected, and new methods of management proposed, it is expected that what is written will be censured by many, who have confirmed themselves in wrong practices by inveterate habits. But if persons will only be so fair as to allow, that there is a possibility of some want of perfection in their present established practice; which is at least highly probable, as this is a country where husbandry as an art has not been taught, nor much attended to; they will then see it is reasonable to give a candid hearing to any new scheme of improvement suggested, and to plausible arguments offered in support of its utility; and allow themselves to be influenced by them. If those who are in low circumstances should fear they may suffer loss, by trying any new practice in husbandry, it is hoped the richer sort will be inclined to do it by love of their country. For others will undoubtedly inquire concerning their success; and when they are convinced by experiments made by their neighbours of the advantage of any new practice, one would think they can need no other motive to induce them to adopt it.

On the other hand, let not the book be reprobated for containing so many things as it does, which are already well known to farmers. The farmer may find reasons for his good practice which he has not before thought of, and be induced to persevere in it. And besides, all useful knowledge

knowledge ought to be recorded, that it may be retained, and be in no danger of being lost, as a great deal has been in the world. It should also be remembered that things which are well known by some may be quite new to others; especially to young persons, and to all those who have newly turned their attention to husbandry.

The writer has had more zeal and courage in attempting to promote improvements in agriculture, since the happy termination of the late struggle for independence than before. Our holding the rank of a free and independent nation allows us to consider the country as indisputably our own, and ourselves as monarchs over our farms. Nor does it appear probable, that we shall soon meet with any thing that will give us a material interruption, in pursuing the arts, or enjoying the blessings of peace. If great improvements were now to be made, we might have reason to hope we should enjoy the benefits of them through life, and that posterity would not be deprived of them.

But the most forcible reason for our cultivating this art, is the indispensable necessity of it, to enable us to live as becomes an independent people. The alarming effect of the present low state of husbandry is, that we are necessitated to import much of our food, and clothing, while we are incapable of making proportionable remittances in the produce of the soil, or in any thing else. As a good system of national government is now established, I see no reason to doubt but that a spirited attention to husbandry and manufactures, accompanied with a more general practice of frugality and economy, would put us on a respectable footing; so that such a foundation would be laid for our increasing wealth, that we should be able, in a short time, to cancel our publick debts; and might reasonably hope ere long to become an opulent, respectable and very powerful nation.

As to the present edition, its appearing so soon after the first is occasioned by the rapid sale of the book, arising from the general acceptance it has obtained; and the increasing demand could not otherwise be supplied.

The author has taken the opportunity to correct a great number of small errors. Some few things are suppress-

ed in this publication. The diction in many parts is much improved. Many articles are more largely, and more accurately treated of than they were before ; and a number of new and important ones are added, with a view to render the work a more complete directory for husbandmen. And that the vegetables that are treated on may be known to persons in other countries, as well as in remote parts of our own, where they are probably called by different names from those English ones he had given them, he has now added the botanical names, which are extensively known by persons of erudition. On the whole, he thinks the book is far more increased in value than in size. If, in its present improved state, it shall be found to contribute towards reviving and continuing the spirit of husbandry, and towards the increasing advantage of those who are employed in it, he will consider it as the most happy reward he can have for his labour.

T H E

NEW ENGLAND FARMER:

O R

GEORGICAL DICTIONARY.

A G R

A G R

AGRICULTURE, in general, nearly the same as husbandry; but more strictly tillage, or the culture of land.

The word is compounded of *ager*, a field, and *cultura*, tilling; and intends the art, or employment, of rendering the earth fruitful by tillage, extending to the care of all useful vegetables. Horticulture, or gardening, is included in it; and, therefore, will not be wholly omitted in the following pages.—Though, in a more restrained sense, agriculture is used for the culture of arable lands, including ploughing, manuring, feeding, &c. yet it is really conversant with the care of pastures and meadows, orchards and forests; and with the cultivation of all the useful fruits of the earth, that in any way are produced by the care and labour of man.

Agriculture is justly thought to be the most ancient art; and it is certainly by far the most useful, necessary and beneficial. The subsistence and welfare of mankind depend more on it than on

any, or all others: And all other arts would soon be uselefs, were the culture of the surface of the earth neglected. No art, therefore, ought to be held in higher estimation. The ancients valued it highly; and no good reason can be given why the moderns should lightly esteem it. The Egyptians, Greeks and Romans, ascribed the invention of this art to their Gods; but Jews and Christians rather trace it up to Noah and Cain, the former of whom planted a vineyard, and the latter, long before him, was a tiller of the ground. Even Adam in paradise practised one branch of this art; he was put into the garden of Eden to dress it, and to keep it.

The immortal poet Virgil did not think agriculture a subject unworthy of his genius; and his Georgicks are esteemed as some of the most excellent of his works. Agriculture has drawn the attention of some of the greatest men in all nations, many of whom have had their hands, as well as their heads,

heads, employed in it. Cyrus the younger planted and cultivated his garden partly with his own hands : And it is well known that the Romans took some of their greatest generals from the plough. Cincinnatus, whose fame is great, and whose name is much honoured in America, was ploughing in his field, when the Roman army was besieged in its trenches by the *Æqui* and *Volsci*. Being sent for, he went to the army, routed the enemy, entered the city in triumph, and then returned to his former employment. The monarch of the great empire of China, every spring, attends to the ceremony of opening the ground, by holding the plough. What could more conduce to the encouragement of this occupation among his numerous subjects ? Agriculture has been so great an object in Britain, as to employ the pens of a multitude of its geniuses ; and the English books that have been written upon it are surprisngly numerous. In that country, if I mistake not, husbandry has been brought as near to perfection, as in any part of the world. And it is owing to this that the island supports so great a number of inhabitants ; and that the English nation has been so opulent and powerful.

Though other employments are oftentimes more lucrative to individuals than husbandry, none can be so advantageous to the world. If it is a slower way of gaining wealth than some others, it is perhaps the least hazardous of any. The farmer depends not on winds and waves, like the mariner ; nor on the good will of his neighbours and the publick, for employment and bread, like the mechanick. The business of husbandry is highly adapted to promote the health of the

body, and the cheerfulness and content of the mind. And if it were better understood in this country, and more spiritedly pursued, both the pleasure and the profit attending it would be vastly greater than we have yet experienced. It is an employment, which affords a variety of entertaining speculations to an inquisitive mind ; and is adapted to lead us into a considerable acquaintance with the works of nature, and with nature's God.

“In a philosophick view,” says one, “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 a boundless source of contemplation and activity to the industrious.”

AIR, the matter of which the atmosphere of the earth consists, or the fluid which surrounds the terraqueous globe. The air is always so loaded with heterogeneous particles, that it is impossible entirely to extricate it from them. It is therefore considered by some as a kind of chaos. That it has much water in it is easily observable. The dew that nightly falls out of it proves it. Ten thousand different steams from minerals, vegetables and animals, are continually ascending, and mixing with the air.

The air, therefore, contains much of the food of plants ; for it is well known, that all animal and vegetable substances nourish plants.

plants. Accordingly, the most barren turfs laid high in dikes, or such as in some countries are piled up for fences, or the walls of buildings, by being long exposed to the air, become so highly impregnated with the food of plants, as to be a rich manure. And it is well known to farmers, in some countries, that laying the surface of the land in steep ridges, only during one winter, conduces much to its fertility. The fertilizing particles in the air easily enter the soil, when it is loose and open, and much exposed to the penetration of air.

Seeds that are secluded from the air will not vegetate. Those which are buried deep in the ground will not sprout, till by some means they are brought so near the surface as to supply them with air. Numbers of new weeds will appear on fallowed land, after every ploughing: The reason of which is, that each ploughing brings up some seeds to the air, which were before too low, or too closely confined, to receive its influence.

Mr. Ray sowed some lettuce seed in the glass receiver of an air pump, exhausted of air, which seed did not grow, nor sprout at all, in eight days: Whereas some of the same seed, sown at the same time in open air, was risen to the height of an inch and a half. But the air being admitted into the receiver, the same seed, which had not discovered the least sign of vegetation in so many days before, in a week grew to the height of three inches.

A plant needs air in every stage of its growth. Its outer coat needs a free air to keep it in a dry state and give it solidity. It absorbs air and perspires it. It is an essential part of the nourishment of plants, which enters chiefly at

their roots, but very plentifully also through the pores of the leaves. Air is known to exist in all plants; they sensibly send forth much of it when they are burning in the fire.

A free circulation of air about all parts of the surface of a plant is necessary to keep it in a healthy state. It is the want of this, which causes thick grass and grain to lodge, before it is come to maturity. Therefore, care should be taken that grain be not sowed too thick, nor the weeds suffered to grow among it, in such plenty as to stop the free currents of air through it. The stems will be soft and feeble, if they are not hardened by a free current of air among them.

ANTICOR, "a swelling in the gullet and throat of a horse, and is the same which in man is called angina. It proceeds from the same causes that bring on many other diseases on horses, from hard riding, exposing a horse to the cold, giving him cold water to drink when he is hot, full feeding, and whatever else may cause a stagnation in the blood.

"The signs of this disorder are all those that accompany a fever; for an anticor, while it is internal, never wants a fever to attend it: But when it shews itself externally the fever begins to abate, unless it continue to be both external and internal.

"So long as the inflammation continues in the gullet, the horse forsakes his food: And though he has frequent inclinations to drink, the first gulp deters him from meddling with it again, until he has forgot the pain and agony it put him into. And the pain in the gullet is yet more manifest from this, that whenever a drench is given him he staggers, and seems as if he would fall
down.

down, and makes short interrupted groans, and sometimes will have a cold clammy sweat about his ears.

“The cure must be begun by bleeding, and that needs not be very sparing: For this disease seldom happens to horses that are poor and low. And here we also approve of sticking one or other of the veins in the hind parts, to make revulsion.

“After bleeding, the following clyster may be given:

“Take two handfuls of barley, two ounces of sal polychrest, reduced to fine powder: Boil them in two quarts of water for a quarter of an hour: Add to the decoction a pint of wine, four ounces of fresh butter, and two ounces of oil of rue. Let this be given bloodwarm, and repeated twice a day, or oftener.

“If he takes to food, nothing must be given him but moistened hay, and scalded bran; or whatever else must be chiefly such things as are proper to keep down the heat and inflammation, and abate the feverish symptoms; for which purpose we recommend, after bleeding, those things that are proper to promote sweat. Therefore, let the following drench be prepared for him:

“Take treacle water and carduus water, of each one pint; dissolve in these two ounces of Venice treacle: And after this has been given, clothe him well, and give him a little warm water to drink. Instead of the treacle and carduus water, a pint of stale beer, mixed with small beer, may be used. Nothing is so effectual to remove inflammation, especially after bleeding, as sweating: Therefore, if you find it difficult to promote sweat, you may give the following ball:

“Take old Venice treacle two ounces, volatile salt of hartshorn

fifteen grains, Mathews' pill one dram, camphor in powder six grains, powder of liquorice, or saffras in powder, as much as is sufficient to make it into a paste. Let this be given after the operation of the clyster is over.

“If the symptoms begin to abate, you may venture to give your horse a gentle purge.

“If the swelling appears outwards, and if the other symptoms abate, you may leave off purging: For what is intended by that evacuation, is chiefly to disperse the inward disorder. Nextly, you are only to apply ripening cataplasms, allowing him sal prunellæ, nitre, or the sal polychrestum, dissolved in his drink.

“Cow's dung alone, applied warm to the part, with lard, or ointment of marsh mallows, may be sufficient to bring the swelling to maturity.

“When the matter seems ready for a discharge, it may be opened in the dependent lowermost part, by the application of a hot iron; afterwards keeping a doffel in the mouth of the wound till the running abates; and applying compresses, and convenient bandage to keep the elevated skin close to the flesh, that it may be the sooner united. But if the cavity of the imposthumation be large, it will not be amiss to lay it open an inch or more.

“The cure may be finished with applying only the unguentum basilicum; or a digestive made with turpentine, the yolks of eggs, or honey, with a moderate mixture of brandy, or spirit of wine. And if any foulness appears, or if it heal too fast, or if spongy soft flesh arise, pledgits dipt in copperas water, or a solution of blue vitriol, may be applied, which will keep it smooth and even.

“But

“But if the swelling increase fast, with no tendency to digestion, and if it rise up towards the neck, affecting all the muscles of the part, the horse will be in danger of suffocation, unless a course different from the former be taken.

“Besides repeated bleeding, if he is not too much worn out, take a hot searing iron, and apply it to five or six places on the lower part of the swelling, cauterizing those parts, that they may be speedily brought to matter, which may be dressed with flax dipped in tar and turpentine, mixed before the fire, and applied warm. For by giving pain in those dependent and inferiour parts, you cause the humours to flow downwards from the swelling; and by making vents you prevent excessive violence of pain. Nor need you be afraid of the swelling that may happen in the fore-legs, &c. by cauterizing; for that cannot be of so ill consequence, as when it is upon the neck and throat; nor will it be of any consequence, if care be taken of the vents.

“*Solleyfell* recommends the making of small incisions with a fleam or lancet, in eight or ten places, on the swelling; and to thrust into the holes, between the skin and the flesh, pieces of the root of black helebore: And if the tumour be very large, he recommends the use of white helebore; at the same time chaffing the part with the ointments of agrippa and marsh mallows. The roots, by their hot quality, draw down and increase the swelling; and the ointments are to ripen the inclosed matter, and fit it for a discharge.

“The same author also recommends the use of Ruptories, for drawing an immediate flux of moisture from the diseased part. These are ointments of the same na-

ture as those made to draw blisters on the human body, and composed of the same materials. The way to apply them is, to spread them by little at a time on the part affected, holding a bar of hot iron to make them sink in.” *Gibson's Farriery.*

ANTS, an insect, which sometimes annoys fields. “They will destroy barley, rye, hemp seed, flax seed, and rape seed. Other grain is either too large, double skinned, or too bitter and ill tasted for them. When you find them in quantities near home, pour hot water upon them. The farmer, when he dungs his land, if he uses ashes, lime, or salt sand, he may be certain no ant will ever stay upon the ground where any of the three is spread.” *Scot's Farmer.*

APPLES, a well known esculent fruit, of great use for food, and for making cyder. An apple consists of the rind, the parenchyma or pulp, the seed vessels, and the seeds. The sorts, or varieties, are numerous almost beyond account: And it is said a seed will not produce fruit of the same kind with that from which it is taken. Sometimes I think I have found that it will; but I do not know that it will in all cases. The seed of grafted fruit will not produce such fruit as the graft produced; but probably such, if any, as the stock would have produced, if it had not been grafted.

All the kinds of apples are distinguished into sweet and sour; though some partake so equally of both qualities, that it is doubtful to which class they belong. They are also divided into natural fruit and grafted. The grafted and the natural fruit were originally the same. The grafted sort have been selected for propagation,

propagation, and are generally more pleasant for eating; the latter are of equal value for other uses.

Some apples ripen early; these are used to make into cyder: Others ripen later, and are better to preserve for use in the winter and spring. One sort is ripe in June; therefore called a jenneting or juneting apple. But most sorts are not ripe till autumn, and some not till winter.

The secret of preserving them through the winter, in a sound state, is of no small importance. Some say, that shutting them up in tight casks is an effectual method; and it seems probable; for they soon rot in open air.

But an easier method, and which has recommended itself to me by the experience of several years, is as follows:—I gather them about noon, on the day of the full of the moon, which happens in the latter part of September, or beginning of October. Then spread them in a chamber, or garret, where they lie till about the last of November. Then, at a time when the weather is dry, remove them into casks, or boxes, in the cellar, out of the way of the frost; but I prefer a cool part of the cellar. With this management, I find I can keep them till the last of May, so well that not one in fifty will rot. In the autumn of 1793, I packed apples in the shavings of pine, so that they scarcely touched one another. They kept well till some time in May following; though they were a sort which are mellow for eating in December. Dry sawdust might perhaps answer the end as well. Some barrel them up, and keep them through the winter in upper rooms, covering them with blankets or mats, to prevent freezing. Dry places are best for them.

Some may think it whimsical to gather them on the day above mentioned. But, as we know both animals and vegetables are influenced by the moon in some cases, why may we not suppose a greater quantity of spirit is sent up into the fruit, when the attraction of the heavenly bodies is greatest? If so, I gather my apples at the time of their greatest perfection, when they have most in them that tends to their preservation.—I suspect that the day of the moon's conjunction with the sun may answer as well; but I have not had experience of it. The same caution, I doubt not, should be observed in gathering other fruits, and even apples for cyder: But I have not proved it by experiments.

APPLE TREE, *pyrus*, a well known fruit tree of great importance to mankind. The way to propagate them is, by sowing the pomace from cydermills, digging, or hoeing it into the earth in autumn. The young plants will be up in the following spring. And the next autumn, they should be transplanted from the seed bed into the nursery, in rows from two to three feet apart, and one foot in the rows, where the ground has been fitted to receive them. The ground for a nursery should not be very rich, but mellow, and well pulverized, and cleared of the roots and seeds of weeds. It is a good rule, That the young trees, at their final transplanting into orchards, should not be put into poorer, but rather into richer ground, than that to which they have been accustomed. For by not finding their usual supply of nourishment, they will be stinted in their growth, and never become good trees.

If apple trees happen to be full of fruit, the first year of their bearing,

bearing, they will be so exhausted as to bear little or none the following year: But by the third year they will be so recruited as to bear another plentiful crop. Having got into this alternate bearing, they must continue in it. But trees which begin their bearing gradually become annual bearers. These observations do not so obviously hold with respect to any other fruit trees that I know of. The reason may be, that no other are so plentifully loaded with fruit at any time. It is wished that naturalists would observe whether accidents do or do not sometimes disadjust this regular alternate bearing, as when the fruit happens to be all killed by frost at the time of blossoming, or when the roots of a tree are highly manured in its barren year.

When a tree has part of its limbs grafted, the alternation will be the same in the grafted and in the natural part of the tree. For the nourishment abounds or is deficient in both at the same time. So that it is not to be expected that a scion will follow the rule of its parent tree in bearing.

It is said, that when an apple-tree has become barren, its fruitfulness may be renewed by stripping off all the bark from its body, and from some part of the largest limbs; and that this operation must be performed at the time of the summer solstice. But concerning this I can say nothing from experience.

ARABLE land, that which is fit for ploughing; or which has been ploughed from time to time. The name comes from the Latin *arare*, to plough. Any land is naturally arable, which is not too steep, too rocky, too wet, or too much filled with strong roots. But most, or all, these hindrances of the plough may be removed;

and land may become actually arable, which is not naturally so.

It is necessary that each farm should have a sufficient quantity of this sort of land: Otherwise the farmer will not be able to raise his own bread, roots, flax, &c. Nor will he know how to bestow his manure to so good advantage. But if so much as a tenth part of a farm be arable it may answer well enough.

ARTICHOKE, called *cynara* by botanists, an esculent plant highly esteemed. It is much cultivated on the other side of the Atlantick.

ARTICHOKE, *helianthus tuberosus*, called Jerusalem Artichoke, a plant of the sunflower kind, with an esculent root that is perennial. It is said to be a native of America. It grows luxuriantly; and yields as plentifully as any kind of potatoes. Many persons are fond of eating them; but they are said to be a flatulent food. Swine are excessively fond of them, and will fatten upon them. It would be worth while to cultivate them for this purpose: Especially those should do it who have not warm cellars, to save potatoes from freezing, as is often the case in new plantations. As this root will bear a great degree of frost, they may be left in the ground all winter. They are cultivated in the same manner as potatoes, and the same kind of soil suits both. A Mr. Crow in England obtained at the rate of 480 bushels per acre, of this root.

ASH, *Fraxinus Americana*, a well known and useful tree natural to this climate; of which we reckon three sorts, the black, the white, and the yellow. The body of the black ash is easily separated into thin strips, by bruising it with a beetle; and is, therefore,
much

much used for brooms and baskets. The white ash is of two sorts, or varieties, one of which is a stiff, light, and durable timber. It is, therefore, highly esteemed by the farmer, and much used for ploughs and carriages, and many of the tools used in agriculture. That is toughest which grows upon high land. But implements made of this wood should not be much exposed to the weather. For it soon rots, if it be not kept dry.

The bark of the ash is used by many to make vessels for storing of grain, seeds, &c. They are light to handle, sufficiently strong, and extremely durable.

The season of felling ash for timber is from November to February. If it be cut in the wrong season, the sappy part of it will be destroyed by worms: And turned to what is called powder-poff.

ASHES, a dust, consisting of the terrene and saline parts of wood, and other combustibles, which remains after burning.

It is not to be doubted, but that all the substances which plants contain are the food of plants; and as they have contributed to the growth of one plant, they may be made to nourish another. The fine particles of earth, and the fixed salts, which were contained in a tree, remain in its ashes. The growth of vegetables on burnt spots was evidence enough to convince men, long ago, of the advantage of this kind of manure. Ashes were found to be a good manure, as long ago, at least, as the time of Virgil. He says,

—ne pudeat

*Effoetos cinerem immundum jac-
tare per agros.*

Ashes are commonly accounted a manure most suitable for low

and moist lands. A cold and sour spot certainly needs them more than any other. But I have found them to be good in all sorts of soil.

They are not only a valuable manure, but an excellent antidote to the rapaciousness of worms and other insects. Therefore they are a more proper manure for all those plants, which are liable to suffer by worms and insects; such as cabbages, turnips, cucumbers, melons, peas, and other pulse. They should be spread evenly, and not in too great quantity.

Wood ashes is an excellent nourishment for the roots of trees. They restore to trees what has been taken from trees; and tend at the same time to drive away certain insects, which are hurtful to trees.

Ashes of all kinds are a good ingredient in composts, which are kept under cover. But when they are laid upon land unmixed, they should be spread as evenly as possible. They are thought to do better on the top of the surface than buried in the soil; for there is nothing in them that will evaporate. Their tendency is only downwards; and their salts will soon sink too low, if they be put under the surface. If they be spread upon ground, which has tender plants, it should be done just before a rain, which will dissolve and soften their acrimony: For tender plants, when the weather is dry, will be apt to be injured by them; at least, if they are in contact with the stems or leaves.

Ashes in their full strength are certainly best for manure; and they will not be in full strength, unless they be kept dry; nor will it be easy to spread them properly. And they should not be laid on lands long before there are roots to be nourished by them,
lest

lest the rains rob them of their salts, by washing them into the hollows, or by sinking them to too great a depth in the soil. A few bushels on an acre are a good dressing for grass lands that are low, and inclining to be mossy: But ashes from which lie has been drawn have no small degree of virtue in them. The earthy particles are but little diminished; and some of the saline particles remain in them.

A handful of ashes, laid about the roots of a hill of Indian corn, is good to quicken its vegetation. But it should not much if any of it be in contact with the stalks. The best time for giving corn this dressing, is thought to be just before the second or third hoeing: But some do it before the first, and even before the plants are up. Like other top dressings, it is of most service when applied at the time when plants need the greatest quantity of nourishment. This happens, in Indian corn, at the time when the plants are just going to send out ears and spindles.

ASPARAGUS, a valuable plant, the young shoots of which are a pleasant and wholesome food; of more account for the table than any other greens which the spring produces. They come up early, and are consequently of the greater importance. In latitude 44, the shoots are fit for use the first week in May. The fruit is a spherical, red berry, which ripens in autumn, containing two black seeds.

The root of this plant is esteemed in medicine, as an opener and diuretick.

To cultivate asparagus in the best manner, open a trench three feet wide, and twelve inches deep. If it be close to the south side of a garden wall, it will be up the earlier in the spring. Fill

the trench half full of good dung; make it level, and sprinkle a little rich earth over it, and lay on the roots, in their natural position, eight or nine inches apart. Or, if you cannot get roots, place the seeds at half the distance from each other. Cover them by filling up the trench with the blackest of the earth which was taken out. If you plant roots, the shoots may be cut the second year after; if seeds, they will not be fit to cut till the third year. All the shoots which come up before the middle of June, may be cut off without injuring the roots: After which time, the late shoots should be left to run up, and seed; otherwise the roots will be weakened. The seeds may be well preserved on the branches through the winter, hung up in a dry situation.

This plant grows well in ground that is shaded: The sprouts will be very large and tender; but they will not be so early: It is not amiss to have one bed in a shady place, to supply the table, after the season is over for cutting the first. In autumn, after the tops are turned white by the frost, they should be cleared off, and a layer of dung, or rich soil, an inch thick, laid over the bed. This should be done yearly, and the bed kept clear of weeds. If the bed should get too high by this management, the surface may be taken off with a spade early in the spring to the depth of two inches, before the young shoots are in the way. But when this is done, a thin dressing of rotten dung or compost should be laid on.

ASPEN. See *Poplar*.

AUTUMN, the third season of the year. See *Fall*.

AXE, a necessary tool for farmers. A narrow axe is meant; for a broad axe is a carpenter's tool.

A narrow axe should have a thick poll, as in that part it commonly fails soonest. It should be made of the best of iron and steel, be quite free from cracks and flaws, and nicely tempered; not so soft as to bend, nor so hard as to break.

Take care that you do not grind your axes thin at first, till you learn by using them what their temper is, and whether they will bear it. A rounding edge is best for chopping large logs, a straighter one for smaller wood.

Let the helve of an axe be made of the toughest of wood, either walnut or white oak. Let it be set in the centre of the eye, and at right angles with the outer side of the axe; let it be small near the eye, that the hands may not be too much jarred by the strokes in chopping, and gradually larger towards the other end. Three feet is the greatest length that almost ever will be needful: Shorter for chopping sticks not uncommonly large. It should never be less than 32 inches.

A good deal of rubbing with a whetstone, (after an axe is ground on a coarse grindstone,) is best; not only to bring it to a good edge that will not crumble, but chiefly to make the blade very smooth, that it may enter the wood easily, and not stick too fast when entered.

B.

BARLEY, *Hordeum*, a well known grain of which malt is made. In some countries, it is also much used for bread. If it be kept long before grinding, it will be the better for this use, as a certain bitter taste, which it has when new, is abated by age.—Barley is accounted cooling and detensive; a broth of it is therefore given to persons in fevers:

But it must be hulled before it is fit for this use.

It is a sort of corn very suitable for cultivation in this region, as it seems liable to no distemper, in our northerly part of Massachusetts especially; bears the drought well, and never fails of yielding a crop. I have commonly gained 40 bushels per acre, without any extraordinary tillage, and without much manuring. It will grow in any soil: Even a soil so clayey that it is fit for scarcely any other grain, will answer well for this, as I have found by long experience. But it does better on some other soils.

It should be sowed as early as the season and soil will admit. About the beginning of May is a suitable time. The quantity of seed for an acre is two bushels, if the grain be small; if larger, more in proportion: A correspondent of the Bath Agricultural Society writes: "The last spring (1783) being remarkably dry, I soaked my seed barley in the black water, taken from a reservoir, which constantly receives the draining of my dung heap and stables. As the light corn floated on the top, I skimmed it off, and let the rest stand 24 hours. On taking it from the water, I mixed the grain with a sufficient quantity of sifted wood ashes, to make it spread regularly, and sowed three fields with it. The produce was 60 bushels per acre. I sowed some other fields with the same seed dry; but the crop, like those of my neighbours, was very poor, not more than 20 bushels per acre, and much mixed with green corn and weeds, when harvested. I also sowed some of my seed dry on one ridge in each of my former fields, but the produce was very poor in comparison of the other parts of the field." The ground should have

have two ploughings at least. It should be well harrowed after sowing ; and then a roller passed over it to close the soil about the corns, that they may not fail of vegetating. And rolling prepares the surface for mowing the crop, and raking it up clean, which is a matter of great importance. For it is impossible to rake it up clean, when the ground has been laid rough at sowing.

In Scotland, after the grain is up, the farmers, near the sea coast, give it a top dressing of sea weeds, which has an excellent effect. This practice I would recommend to those of my countrymen who farm near the sea.

I should have observed, that barley must be sowed soon after ploughing, lest the moisture of the soil be too much evaporated. It being a dry husky grain, a considerable degree of moisture is requisite to make it vegetate. If the ground should be very dry at sowing time, and the season late, steeping the seed in lie would not be amiss. Steeping it in the wash of a barn yard has an excellent effect.

Some have got an opinion, that barley should be harvested before it is quite ripe. Though the flour may be a little whiter, the grain shrinks so much, that the crop seems to be greatly diminished and wasted by early cutting. No grain, I think, requires more ripening than this ; and it is not apt to shatter out when it is very ripe. It should be threshed soon after harvesting : And much beating, after it is cleared from the straw, is needless to get off the beards. Let it lie a night or two in the dew, after it is cut, and the beards will come off the more easily.

I had gained the idea of the necessity of barley's being well ripened before cutting, from my own experience, I have been more

confirmed in the opinion, by the following passage in an English writer, who appears to have been well acquainted with the culture of this corn. "This grain," says he, "may be greatly damaged, or spoiled, by being mown too soon; which may afterwards be discovered by its shrivelled and lean body, that never will make good malt."

The same writer says, "This grain I annually sow in my fields on different soils, whereby I have brought to my knowledge, several differences arising therefrom. On our red clays, this grain generally comes off reddish at both ends, and sometimes all over, with a thick skin and tough nature, somewhat like the soil it grows in ; and, therefore, is not so valuable as that of contrary qualities. Nor are the black, bluish, marly clays of the vale much better : But loams and gravels are better. On these two last soils the barley acquires a whitish body, a thin skin, a short plump kernel, and a sweet flour."

It has often been wished that the practice of hulling barley and other grain, were introduced into this country. The time is at length arrived ; and it is only to be wished that every part of the country were furnished with mills, and with persons who are skilful in the business. A Reverend gentleman, to whom I am indebted for many useful instructions and communications, writes me as follows :

"Barley is a hardy and profitable grain. When hulled, it is preferable to rice, in every branch of cookery for which rice is used.—Messrs. S. and Co. of Wells, have lately erected a hulling mill. It hulls and splits peas ; and hulls, not only barley, but all other kinds of corn and pulse with the greatest expedition."

He

He has sent me a sample of the hulled barley; which appears to be equal to any that is imported. And further says, "These hulling mills, when common, must give a spring to the culture of barley. When hulled, it may be ground and bolted. The raw, bad taste of barley, lies wholly in the hull."

I am informed that the toll they take for hulling barley at the mill above mentioned, is two sixteenths, or four quarts out of a bushel. This appears to be but a moderate toll.

Barley that has been hulled, is said to be made into an excellent flour by grinding and bolting, but little, if at all inferior, to that which is made of wheat; and of equal, or greater whiteness.

Barley is a corn that is very apt to degenerate, unless prevented by a frequent changing of seed. But it will not become oats, as some ignorant persons have believed. I have indeed known a spot where barley was sowed to produce an entire crop of oats. The secret was, that a considerable quantity of oats was mixed with the barley when it was sown, which was not attended to. When the corn was in its blade, a flock of sheep broke in, and ate it down, which was fatal to all the barley. But the oats, being not so forward in their growth, escaped; and were the more productive for the destruction of the barley, which allowed the oats more room and nourishment.

If ever so few oats are sown among barley, the crop, in a few years, will come to be mostly oats; because oats increase more than barley. Swimming the barley before it is sowed, will in great measure prevent this inconvenience. Almost every oat, and a few of the worst of the barley corns, will be on the surface of the water, and may be taken off.

But the speedy degeneration of barley is a good reason for changing the seed very frequently. In some parts of the country, the barley, for want of changing, has come to produce little or nothing.

Not only changing seed, but sorts of barley, should be attended to. Some sorts are at least more productive than others, if not of a better quality. The two rowed barley has seldom more than 32 corns on an ear: The six rowed has sometimes 72, that is 12 in a row. Of the latter sort one pint produced me three pecks in a single drill row. It was at the rate of about three pecks of feed, and forty bushels crop to the acre, on a poor gravelly soil. This sort is called bear, bere, or barley big. It is a winter grain in England and Ireland. But I must mention one inconvenience attending the six rowed barley, which is, that the feeds are apt to break off and fall, if the corn stands till it is fully ripe. I now cultivate a four rowed barley, which has not this inconvenience attending it: And it yields as plentifully as any other.

I would recommend the drill and horse hoeing method of raising barley, when it is designed for hulling, as the corns will be the more full and plump, and have a less quantity of hull in proportion to the flour.

The farmers in Pennsylvania have a four rowed barley, which is the sort that they principally cultivate. This also has the name of bear in Europe. Bear is much cultivated in Ireland and Scotland; but, in England, they chiefly cultivate other sorts, which they think better for malting.

I have received a naked barley, so called, with no more hull on the corns than wheat. How profitable this will be, time and experience

experience must discover. But this is undoubtedly what is called German barley, *tritico speltum*, or, in English, spelt.

BARN, a sort of house used for storing unthreshed grain, hay and straw, and all kinds of fodder. But the other uses of barns in this country are, to lodge and feed beasts in, to thresh grain, dress flax, &c. A barn should be large enough to serve the farmer for all these purposes: For there is always more lost by stacking of hay and grain, than enough to balance the expense of barn room.

Regard must be had to the situation of a barn. It should be at a convenient distance from the dwelling house, and other buildings; but as near as may be without danger of fire, if the shape of the ground permits. Too low a spot will be miry in spring and fall. Too high an eminence will be bad for drawing in loads, and on account of saving and making manures. If other circumstances permit, it may be best to place a barn in such a manner as to defend the dwelling house from the force of the coldest winds.

The most considerable parts of a barn are, the floor, the bay, the cow house, the scaffolds, the stable. See *Cow House*, and *Stable*. The threshing floor should be laid on strong and steady sleepers, well supported beneath; otherwise carting in loads upon it will soon loosen it, and render it unfit for the operation of threshing. It should be made of planks, well seasoned, and nicely jointed; and care should be taken to keep it very tight. If it should be so open as to let grain, or any seeds, pass through, the grain will be worse than lost, as it will serve to feed and increase vermin. A floor of boards should therefore be laid under the planks.

The fills of a barn should be made of the most durable kind of timber, as they are more liable to rot than those of other buildings, on account of the dung lying about them. White oak is very fit for this use. The fills must be laid rather low, not only for the convenient entrance of cattle and carts, but because the ground will be lowered round barns, by the yearly taking away of some of the surface with the dung. They should be well underpinned with stones laid a little below the surface of the ground; and well pointed with lime, to prevent loss of manure. And dung should not lie fermenting against the sides of a barn; but be speedily removed when warm weather comes on.

BARN YARD, a small piece of inclosed ground, contiguous to a barn, in which cattle are usually kept. It should have a high, close, and strong fence, both to shelter the beasts from the force of driving storms, and to keep the most unruly ones from breaking out. By the help of this yard, a farmer may prodigiously increase his quantity of manure, if he will be careful to take the right methods.

The ground of a yard for this purpose should be of such a shape as to retain all the manure, or prevent its being washed away by rains. It should be lowest in the middle; or at least so high on all the sides, that even the greatest rains shall not carry away any of the manure. This is a matter of so much importance, that it may be well worth while to form the ground to the right shape where nature has not done it. But a basin should not be dug so deep as to go through the hard understratum, that the manure may not escape into the earth.

A yard should be larger or smaller in proportion to the stock that is kept in it. A small one is bad, as the cattle will be more apt to push and hurt one another. A large one is more favourable to the design of making abundance of manure. Not only should the yard be contiguous to the barn, but as many of the other out houses as conveniently may be should be placed on the sides of the yard, especially those of them which afford manure or rubbish, as the hogsty, &c.

Many, who have good farm yards, are not so careful as they should be to make the greatest advantage by them, by confining the cattle continually in them, during the foddering season. The practice of driving cattle to water, at a distance, is attended with great loss of manure. Instead of continuing in this absurd practice, the well that serves the house, or one dug for the purpose, should be so near the yard, that a watering trough may reach from it into the yard. Some have a well in the yard; but this is not so advisable, as the water may become impregnated with the excrements of the cattle, and rendered less palatable. He that has a large stock, may save enough in manure in this way, in one year, to pay him for making a well of a moderate depth: Besides securing the advantage of having his cattle under his eye; and of preventing their straggling away, as they sometimes do. Innumerable are the accidents to which a stock are exposed, by going to watering places, in winter, without a driver, as they commonly do. And oftentimes, by means of snow and ice, the difficulty is so great, as to discourage them from going to the water; the consequence is, that they suffer for

want of drink, and the owner is ignorant of it. All these things plead strongly in favour of the mode of watering I have here recommended.—They should not be let out, even when the ground is bare: For what they get will cause them to winter the worse; and they will damage the fields.

There should be more yards than one to a barn, where divers sorts of cattle are kept. The sheep should have a yard by themselves, at least; and the young stock another, that they may be wholly confined to such fodder as the farmer can afford them. But the principal yard may be for the cows, oxen, calves and horses. And the water from the well may be led into each of these yards by wooden gutters.

If the soil of the yard be clay, or a pan of very hard earth, it will be the more fit for the purpose of making manure, as the excrements of the cattle will not be so apt to soak deep into it. Otherwise a layer of clay or marle may be laid on to retain the stale, and the wash of the dung, which otherwise would be almost entirely lost.

Some farmers seem well pleased to have a wash run away from their barns upon the contiguous sloping lands. But they are not aware how much they lose by it. A small quantity of land, by means of it, may be made too rich. But the quantity of manure that is expended in doing it, if otherwise employed, might be vastly more advantageous; especially if it were so confined as to be incorporated with a variety of absorbent and dissolvable substances; and afterwards laid on those parts of the farm where it is most wanted.

It is best, in this climate, that a barn yard should be on the south side of a barn. It being less shaded, the manure will make the fast-

er, as it will be free from frost a greater part of the year, and consequently have a longer time to ferment in. The feet of the cattle will also mix the materials the more, which are thrown into the yard, and wear them to pieces, so that they will become short and fine.

After the yard is cleaned in the spring, the farmer should embrace the first leisure he has, to store it with a variety of materials for making manure. For this purpose, he may cart into it swamp mud, clay, brick dust, straw, thatch, fern, weeds, leaves of trees, turfs, marsh mud, eel grass, flats, or even sand and loam. If he cannot get all these kinds of rubbish, he may take such of them as are the most easily obtained. Any of these substances, being mixed with the dung and stale of cattle, will become good manure. But some regard may be had to the nature of the soil on which the manure is to be laid. If it be clay, the less clay and the more brick dust and sand will be proper: If a sandy soil, clay, pond mud, and flats will be better ingredients.

All the materials above mentioned, and many more that might be named, will in one year become good manure, by being mixed with the excrements of the cattle, and prevent the waste of them. And this is thought, by the best writers on husbandry, to be the cheapest method a farmer can take to manure his lands, considering the small cost of the materials made into manure.

If water should stand long in any part of the yard, the manure must be raked out of the water, and heaped round the borders of the puddle, that it may be dry. For there will be no fermentation where there is too much wetness: The materials will not dissolve, but turn sour. As these

heaps grow dry, the water should be scooped up, and thrown upon them from time to time. This will increase the fermentation in the heaps, and they will grow mellow the faster.—It will be of service to shovel the whole of the manure into heaps, a few days before it is carted out, as it will bring on a brisk fermentation, and make it fitter to be laid upon the land. Or if shovelling be thought too laborious, turning it up with a plough will be advantageous. Or if there be not a deep layer, tearing it with a harrow may be sufficient.

BEAN, *Vicia*, a kind of pulse much used as food, both for man and beast. The sorts and varieties of beans are numerous almost beyond account. But those which are most cultivated in this part of the world are, the English bean, to which the name Windfor is applied; kidney beans of various kinds; such as the case knife bean, the Canada bean, the cranberry bean, the short bean, the white bean cultivated in fields, and the scarlet bean. Sivy, or Saba beans, are also cultivated in this climate of late to advantage. They are known in some places by the name of thousand for one beans.

English beans require a moist and strong soil. Nothing that I know of will flourish better in a stiff clay. They should be planted as early as possible in the spring. In Europe they sow them in February. There is no danger of their being hurt by a small degree of frost, if they should happen to come up early. In Europe some sow them in the broad cast way: But the drill method is better, on account of hoeing between the rows, as they will need hoeing. When they are about a yard high, if they incline to be too tall, the tops should

should be broken off, in the same manner as tobacco. When the first crop is all gathered, the stalks should be cut off close to the ground, excepting those on which seed is left to grow more perfectly ripe. The suckers will rise from the roots, and give another green crop late in the fall. I have had a plentiful second crop fit for the table in November: But they will not be ripe, nor so good for eating as the first crop.

A smaller English bean, called the horse bean, and used to feed horses, I have attempted to cultivate. I planted them on a rich clayey loam, made mellow. The plants grew finely, and blossomed; but bore no fruit at all, though the plants appeared in a healthy state through the summer. But I made only one experiment: Possibly, others might have better success.

The caseknife bean, is so called, because the pod is shaped like that instrument, and of nearly the same size. The green pods, half grown, are excellent food. This bean, as all other of the running kind, are produced in great plenty by the help of hog dung, with a little mixture of ashes. They ripen rather late; but a sufficient quantity of them for seed are usually ripened. They are a tender plant, and should not be put into the ground till after the middle of May. The poles for them to climb upon may be set at the time when the seed is put in, or afterwards, as may be most convenient. They are amazingly productive. A bushel of pods may be had from one or two poles. But it is time that new seed be obtained from some distant country, as of late they do not well run up the poles.

Canada beans have no running vines. They ripen early and are

fruitful. They are oblong shaped, and of various colours, speckled, white with black eyes, cream coloured, &c. The pods are not so tender as to be good for eating, unless when they are very young. These, and all other of the bush kind, grow best in the drill way.

The cranberry bean is so called from the resemblance it bears, when ripe, to that fruit. The vines grow luxuriantly, and abound with leaves, so that strong poles are required to support them. They do not ripen quite so well as might be wished in the most northern parts of Newengland; but they are more fruitful than almost any other that I have met with. The green pods are sweet, tender, and a very luscious kind of food. But they are best to eat shelled.

The short bean is so called from its shape. It is of a brown colour. Many grow in one short pod, and each looks as if it were cut off square at one or both ends. The excellency of this kind of bean is, that the pod is fit for eating when the bean has got its full growth. But the pods are liable to be hurt by a black rust, if they are exposed much to the sun; though they will be fresh and fair when they grow in a shady place. Planted with Indian corn, they grow extremely well, and are fit to eat green till some time after the first autumnal frosts begin.

The field white beans commonly grow best on a dry and warm soil, but moderately rich. The way to harvest them is, to pull them up by the roots, a short time before the first frost is expected, and let them lie on the field. The green ones will soon ripen, and escape injury from the frost. They must be gathered in and secured, before they begin to shatter out of the pods.

The

The haum, or vines of beans, should not be wasted, but carefully preserved: They are a sort of fodder which sheep and goats are very fond of, though no other creature will eat them.

Of beans called scarlet the white are the best and most productive.

As dried beans are of late become a considerable article of exportation, farmers should be informed that the white beans are most prized by far in foreign markets, and bear a higher price than any other.

Callivance are a bean of great value, and yield great crops in some of the warmer parts of New-england.

BEER, a pleasant drink made with malt and hops. It is distinguished from ale by having a greater quantity of hops; whence it is more bitter, and will keep longer. And beer that is made of the highest dried malt has the name of porter.

Much has been published for the direction of those who undertake large breweries. It is much to be wished that many such were carried on in this country, where barley for making malt can be so easily raised. The use of ardent spirits, which are more costly, and less wholesome than beer, might thus be lessened. They who are disposed to undertake brewing, may supply themselves with volumes on the subject.— I shall only undertake to direct farmers, who may be disposed to brew beer for their own consumption.

Almost any householder may brew, without putting himself to much if any charge for an apparatus. Instead of a large copper, which is necessary in a brew house, a large kettle or two may answer the purposes of heating

the water, and boiling the wort. Hoghead and barrel tubs, and other vessels, may serve for mashing tubs, backs, coolers, and tuns.

The water used for making beer, or ale, should be soft, and such as is fit for washing. For this will better penetrate the malt, and cause it to discharge its spirituous virtue. Some recommend throwing a spoonful of salt into a kettle full, which will cause any foulness contained in the water to rise to the surface when it boils, which may be skimmed off. When the water is very good this will be needless. But let the water be ever so pure, a little bran, or malt, should be thrown upon the top, while it is heating; to be taken off when the water begins to boil. If malt be used, throw it into the mash tub. The design of thus covering the water is, to prevent the best, most subtil and volatile particles of the water from evaporating, or going off in steam. The water, for the same reason, should but just boil; after which it should not be left to cool gradually, as the evaporation would be too great: But as much cold water should be thrown in, and mixed with it in the mash tub, as will bring it to the right temper, perhaps about three gallons to half a barrel. For the malt should not be scalded, but steeped in water, as warm as it can be without scalding; because the scalding of the malt would rather close up its pores, and prevent its impregnating the water with its virtue, so much as it will in a tepid menstruum. It will also render it glutinous and adhesive, so that the water will not have a free passage through it. The cold water should be put first into the mash, and the hot after it.

The mash tub should have a cock, or a tap and faucet, fixed into its bottom, and the hole covered within with a little flat shaped inverted basket, fastened with nails, that it may not get out of place by the mashing, and a close straining cloth may be put over it, and fastened in the same manner.

The water being in the mash tub, one person should put in the malt by little and little, and another should stir it about with a stick or paddle, that it may not remain in lumps, or fail of being thoroughly wetted. This is all the stirring that is needful. For too much stirring would cause the malt to thicken, so as not to give a free passage to the water that is to pass through it.

Some of the last of the malt, instead of being stirred into the water, should be strowed loosely over the surface, to serve as a coat for the rest, and prevent the copious passing away of the spirit in steams. Besides, the tub should be closely covered with sacks, or other cloths, that none of the steam may escape. In this situation it should stand for two or three hours. Then with a small stream draw off the wort, upon a handful or two of hops, into the back, which is placed under the mash tub. Fill with water again, and mash; in half an hour run it off; in the mean while be pouring hot water into the mash as it is running. It should be poured in on that side of the tub which is most distant from the cock, or so that all the malt may be washed with it as equally as possible. This water may be almost or quite boiling hot, as mixing it with that in the tub will so cool it as to prevent scalding. Continue thus to pour in water and run it off, till you

have the quantity in the back which you design for your strong ale or beer. Then stop the cock, and fill the grains with a sufficient quantity of cold water, for small beer, or it may be hot if the weather is cold, so that there be no danger of souring. Let it stand, covered as before, and boil your first run. When it has boiled smartly for half an hour, put in your hops, and boil it another half hour, or till it breaks or curdles, as it will when it is sufficiently boiled. Or you may put your hops into a thin coarse linen bag, leaving room for them to swell, and boil them the first half hour in the wort, which I take to be a better method.

When your wort is boiled enough, strain it into your coolers, in which the thinner it lies the better, as it will cool the faster.

The next thing is to put the wort into the tun, an open vessel, to ferment. If very fine and clear drink is desired, the sediments in the coolers should be left behind, and strained through a flannel bag: For the less of the grounds go into the tun, the purer the beer may be expected to be in the cask, and the more easily fined.

That which is intended for long keeping should be almost or quite cold before it is put into the tun, because a slow fermentation will be most proper for it. But ale, or small beer, for speedy use, may be put up a little warm.

Then stir in your barm, or yeast, a pint of which is enough for a barrel. If the fermentation be too slow, beat in the yeast once or twice, but not oftener, lest the drink should be injured by it.

In two or three days the beer will purify itself by throwing up the lighter parts to the top in a white curled foam, and precipitating

tating the heavier and fouler parts to the bottom. It should then be tapped just above the lees, and, having taken off the yeast, the beer must be drawn off into the casks in which it is to be kept : Which should stand with the bungs open, till the fermentation ceases, and be kept constantly full, not by pouring in that which runs over with the yeast at the bung hole ; but with some of the same beer kept in a vessel by itself. Thus it will throw off the yeast, and deposit a dreggy part sufficient for the beer to feed upon in the cask. Reserving the yeast for use, bung the casks close as soon as the working ceases. If the brewing be done in October, the bungs should not be taken out till spring. Then open the vent holes : For the coming of warm weather will cause a new fermentation. This being over, keep the casks well stopped till September following : Then fine it with isinglass, first racking it off, if it be not pretty fine.

But for ales and small beers, it may answer well enough, to omit the tunning, and remove the wort from the coolers directly into the casks ; observing to keep them full, that they may purge themselves of the yeast.

Butt beer of the strongest kind, takes eight bushels of malt for a barrel. But a smaller quantity will make a pleasanter and wholesomer drink. The same quantity will make a barrel and a half of good strong ale ; or six barrels of small beer.

RECEIPT for brewing for a private family.

Take four bushels of malt, and from ten ounces to a pound of hops, as you wish your beer to be more or less bitter. Brew according to the above method. You will have one barrel of good ale,

and another of small beer. For the small beer half a pound of hops will be enough. Some use the hops that have been boiled before : But fresh hops will be far better and wholesomer.

SPRUCE BEER.

Take a sufficient quantity of spruce boughs ; boil them in water about half an hour, or till the outward skin, or rind, peels off : Strain the liquor, and stir in at the rate of two quarts of molasses to half a barrel. Work it with beer grounds, or emptyings ; or rather with yeast.

Instead of spruce some use juniper, and prefer it. It is the low species, commonly called savin. A little wheat bran should be boiled in this beer to give it a briskness.

MOLASSES BEER ;

according to a method said to be practised in Philadelphia.

“ Take five pounds of molasses, half a pint of yeast, and a spoonful of powdered race ginger : Put these ingredients into your vessel, and pour on them two gallons of scalding hot, soft and clear water : Shake them well till it ferments ; and add thirteen gallons of the same water cold, to fill up the cask : Let the liquor ferment about twelve hours, then bottle it off, with a raisin or two in each bottle.”

A good HOUSEHOLD BEER.

Take a heaped half peck of wheat bran, and three or four ounces of hops : Boil them a quarter of an hour in fifteen gallons of clear water : Strain it through a close sieve, and sweeten it with two quarts of molasses : Cool it quick till it is no warmer than new milk, and fill your half barrel. Warm water may be used to fill up the cask if needful. Leave the bung out for 24 hours, that the drink may work, and throw off the yeast, and it will be fit for use. About the fourth

fourth or fifth day, bottle off what remains in the vessel, especially if the weather be hot, that it may not turn sour or stale. If the cask be new, or not before used for beer, apply yeast or beer grounds to ferment it: Otherwise it will not be necessary.

The practice, which is common in this country, of fermenting our small drinks, with the sediments, or dregs of the same, ought to be laid aside. For this is undoubtedly the foulest, and most unwholesome excrement of liquor. Practice is apt to reconcile the minds of people to the most absurd and unwholesome things. Would not a man be considered as insane, who should take the emptyings of cyder, and put it into his new cyder to ferment it? But how much better a practice is it, to ferment our small beers in this manner, with the sediments of small beer? It is true, that yeast is also an excrementitious part; but that which is white, is evidently far lighter, and freer from filth, and contains much of the volatile and spirituous parts. As I had rather receive the breath or perspiration of cattle into my body, than their dung, or stale, so I prefer the white scum in my drink to the ponderous dregs of liquors. These observations will as well apply to the fermenting of dough.

To mend disorders in beer, and improve it, the London and country brewer gives the following directions.

To cure a butt of ropy beer.—Mix two handfuls of bean flour with one handful of salt, and stir it in.

To feed a butt of beer.—Bake a rye loaf well nutmeged, put it in pieces into a narrow bag of hops with some wheat, and put the bag into the cask at the bung hole.

To cure musty drink.—Run it through some hops that have been boiling in strong wort, and afterwards work it with two parts of new beer, to one of the musty old. This is called vamping, and is a cure for musty, or stinking beer.

To feed and give a fine flavour to a barrel of beer.—Put six sea biscuits into a bag of hops, and put all into the cask.

To fine or clarify beer in twenty four hours.—Put in a piece of soft chalk burnt, about the bigness of two hen's eggs, which will disturb the liquor, and cause it afterwards to be fine, and draw off brisk to the last, though it were flat before. This will do for a kilderkin, or half barrel.

To fine and feed butt beer.—Cut isinglass into small pieces, and soak it in some stale beer; then boil sugar in small beer or ale to a thin syrup, and mix it with some of the isinglass beer, which put into a butt of beer, stirring it briskly together. It will fine and preserve the drink well.

To recover a kilderkin of stale small beer.—Put two ounces of good hops, and one pound of mellow fat chalk, broke into a dozen pieces, in at the bung hole, and stop it up close. It will prove sound and pleasant to the last.

To fine a kilderkin of ale or beer, and preserve the same sound and pleasant for a long time.—Take a large handful of hops, boiled in a first wort only half an hour, and dried; half a pound of loaf sugar dissolved in some of the ale or beer; one pound of chalk broke in six pieces; the white part of oyster shells, calcined in a clear charcoal fire to a whiteness, and the stems of tobacco pipes, that have been used and are burnt again, of each in powder four ounces. Put in your
hops

hops first, with the pieces of chalk; and then mix your two powders and loaf sugar in some of the ale or beer, and pour all in immediately after the hops and chalk, stirring them well about with a staff, and bung down.

Some put these into ale quickly after it has done working; others will rack off their October or March beer into another cask, and then put in these ingredients, and stir it well with a staff: Or give the vessel a roll or two, that the bottom may be turned up. You may tap it at a week's end: You will have a clear wholesome ale or beer.

BEEES, an industrious and profitable species of insects. Rural economy is incomplete where bees are wanting. The cost of keeping them is nothing, after the house and boxes are made; and the care that is required about them is but trifling, affording an agreeable amusement.

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 swarm, and lay eggs in the cells for a new brood: And her fertility is so great that she brings forth many thousands of young ones in a year. 2. The drones, which have no stings, are of a darker colour 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 situated at a good distance from places where cattle are kept, especially from hogsties, hen and dove houses, and remote from filth and dunghills. It should be defended from high winds on all sides, so far as may be, consistently with admitting the heat of

the sun. The house should be open to the south, or south-west, and the backside should be very tight; with a tight roof projecting, that driving rains may not injure the bees. If snow lodges upon or about the hives, it should be brushed off without delay. The bench on which the hives stand, should be a little canting outwards, that if wet should fall on it, it may run off without entering the hives. Mr. Bromwich proposes, "that a bee house be boarded in front: And that the backside should consist of three doors, which, opened, give a full view of the hives, and give opportunity to assist or lift them. All seams are to be stopped, which would admit insects, from which the house is often to be brushed.

"If the house should be in danger of being too hot, when thus inclosed, it may be occasionally shaded with boughs of trees. As winter approaches, all the seams of the house are plastered with clay. In very cold climates, the house should be filled with straw, to keep the bees warm, watching against mice, and removing the straw in the spring.

"Cut a hole through the front, of the same size as the mouth of the lower hive, and directly against it. Under this passage, on a level with the floor, is a lighting board, at the mouth of each hive, of about five inches long, and three wide. It is a little shelf for the bees to land upon after their excursions. These being separate, not in one piece of the length of the house, is to prevent intercourse between colony and colony. But more essential to prevent mice, snails, and other intruders. These lighting boards are sometimes painted of different colours, to direct

direct each bee to his home more readily.—A long shelving board should be placed over the alighting boards, to shelter the bees in a rainy time. It should be twelve inches wide, and placed nine inches above the mouths of the hives.”

Broom, clover, and mustard, are said to afford bees an excellent pasture; and they appear very fond of the flowers of poppies. Gardens, and any places where flowers abound, and especially where there is a succession of flowers through the greater part of the year, are most favourable to them: For they undoubtedly draw the principal part of their honey from the nectaria of flowers. Fields of buck wheat are good, as they continue in bloom for a long time. In Germany they move their bee hives in boats to the neighbouring fields of buck wheat.

Bees are wont to send out new swarms in May and June. Much has been written concerning the management of them on these occasions. But the new mode of managing them renders all this unnecessary. It is this: Let the bee house be made so tall as to admit three tier of hives, or boxes, one above another. The hives should not be tall shaped, but rather broad and short, that they may take up less room. A hive of such dimensions as to be equal to a cube of 19 inches, will be sufficiently capacious. Mr. Thorley directs that they should be 10 inches deep, and from 12 to 14 inches broad in the inside. If hives be made larger, the swarms will not multiply so fast. An under hive is made with a round hole through the top of three inches diameter, covered with a sliding shutter. Each hive or box should have a

passage at the bottom for the bees to pass in and out, four or five inches long, and about one third of an inch deep. One of these hives should be placed directly under an inhabited hive, before they are disposed to send out a new swarm. This will prevent the going out of a swarm, and save trouble and watching: For instead of swarming, when the upper hive is full, they will build and deposit their honey in the one that is below: And when that is full, let them find another beneath it; they will take possession of the lowermost. It is their manner always to begin at the top, and build downwards. For another method of management, see *White's collateral Bee Boxes*.

When the top hive is well filled with honey, it may be discovered by lifting it, or more accurately by weighing it gently with a steelyard, in a cool morning, when the bees are stiff, and not apt to come out.

When a hive is taken up, there is no need of murdering the poor insects with fire and brimstone, as has been the usual practice. Only drive in the shutter, and run a thin long knife round, to part it from that which is below it; slip the hive off upon a smooth piece of board, or slide the board under, and carry the hive into your dwelling house, which you may do in a cool morning without any danger from their stings. Lay the hive upon its side, and have a window of the room open. As the sun gets up, and the air grows warmer, they will quit the hive, and go into the hive next to the place whence they were taken. When you take out the honey, which should be done speedily, the bees that are found among the

the honey, stiff and unable to fly, should be thrown into a tub of water. They will soon recover their activity, and go after their companions.

Some practise feeding bees. But, says one, "There is but little use in it, because those which have not a good stock of honey to serve them through the winter, are not fit to keep."—He adds, "There are some stocks of bees in the spring time, that may seem worthy of our care to preserve; such as have but little honey, and a good number of bees, by means of a cold and dry spring, yet in all probability may prove an excellent stock, and may be worth consideration."

"The best method of supplying bees with food, is by small canes, or troughs conveyed into their hives; and beginning in March, when they begin to breed and sit on their young, it must be daily continued, till the season affords them ease and provision abroad.

"Honey is not only the best, but the most natural of all food, and will go much further mixed well with a moderate quantity of good sweet wort. Some prescribe toasts of bread sopped in strong ale, and put into the hive, whereof they will not leave one crumb remaining."

Mr. Thorley advises when flocks of bees are weak, to double them, which he thinks the most effectual way of preserving them in common hives. He does it by the help of a fume, or opiate, which will so stupify them for a time that they may be handled at pleasure. Having done this, the queen must be searched for and killed. And examine whether the stock to which you intend to join the bees of another, have honey enough to maintain the

bees of both: It should weigh 20 pounds.

"The narcotick, or stupifying fume, is made with the large mushroom, commonly known by the name burnt, pucksist, or frog cheese. It is of a brown colour, turns to powder, and is exceeding light. Put one of these pucks into a large paper; press it therein to two thirds, or half its former bulk, and tie it up very close: Then put it into an oven, after the bread has been drawn, and let it remain there all night: When it is dry enough to hold fire, it is fit for use. The manner of using it is thus:

"Cut off a piece of the puck, as large as a hen's egg, and fix it in the end of a small stick slit for that purpose, and sharpened at the other end, which place so that the puck may hang near the middle of an empty hive. This hive must be set with the mouth upwards, near the stock you intend to take. This being done, set fire to the puck, and immediately place the stock of bees over it, tying a cloth around the hives, that no smoke may come forth. In a minute's time, you will hear the bees fall like drops of hail, into the empty hive. You may then beat the top of the hive gently with your hand, to get as many of them as you can: After this, loosing the cloth, lift the hive off to a table, knock it several times against the table, several more bees will tumble out, and perhaps the queen among them. She often is one of the last that falls. If she is not there, search for her among the main body in the empty hive, spreading them for this purpose on a table.

"You must proceed in the same manner with the other hive, with the bees of which these are

to be united. One of the queens being secured, you must put the bees of both hives together, mingle them thoroughly, and drop them among the combs of the hive which they are intended to inhabit. When they are all in, cover it with a packing or coarse cloth, which will admit air, and let them remain shut up all that night, and the next day. You will soon be sensible they are awaked from their sleep.

“The second night after their union, in the dusk of the evening, gently remove the cloth from off the mouth of the hive, and the bees will immediately fall forth with a great noise: But being too late they will soon return. Then keep them confined for three or four days; after which the door may be left open.”

It is convenient to have a pane of glass in each hive, in order to watch the motions of the bees, and to know by inspection when is the right time to take up a hive. The Reverend Mr. White says, “In the back part you must cut a hole with a rabbet in it, in which you are to fix a pane of the clearest and best crown glass, about five inches in length, and three in breadth, and fasten it with putty. Let the top of the glass be placed as high as the roof within side, that you may see the upper part of the combs, where the bees with their riches are mostly placed. You will, by this means, be better able to judge of their state and strength, than if your glass was fixed in the middle. The glass must be covered with a thin piece of board, by way of shutter, which may be made to hang by a string, or turn upon a nail, or slide sideways between two mouldings. Such as are desirous of seeing more of

the bees' works, may make the glass as large as the box will admit, without weakening it too much. Or they may add a pane of glass on the top, which must likewise be covered with a shutter, fastened down with pegs to prevent accidents.

“Be careful to fasten the shutter so close to the glass, that no light may enter; for the bees seem to look upon such light as a hole, or breach in their house, and on that account may not so well like their habitation.”

BEET, *Beta*, a well known esculent root.

There is a sea beet which grows in salt marshes; and a white beet cultivated in gardens for the sake of its leaves, which are sometimes used in soups. The root is small, and commonly hard and tough.

But the sort which is most valuable is the red beet, with a large, pyramidal, fleshy root; the leaves of which are large, thick and juicy. The larger these roots grow, the more tender they are: And the deeper their colour, the better. The best of red beets have reddish leaves. In some of the varieties the leaves are all over red.

Beets require a mellow and warm soil, moderately rich, and well pulverized to a good depth. For as they naturally run deep, in shallow ground they will be short, stringy, and irregular shaped.

Beets should be sown early. A good method is, to set the seeds in squares of about eight or nine inches in poor ground; in rich ground they should be at least a foot asunder. If a fourth part of the seeds should fail, the crop will not be lessened.

When the seeds are strong and good, they are apt to come up double. In this case they should
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by all means be singled while they are young. Otherwise it may be expected that the roots will be small, and sometimes twisted about each other. Those which are taken out may be transplanted; but they are not so apt to make good roots. Though they may be thick, they will be apt to be wanting in length.

The ground should be hoed two or three times, after which the leaves will so cover the ground, as to stop the further growth of weeds.

The under leaves may be broken off towards fall, and thrown to the swine, which are very fond of them. This will not injure the roots at all; for if they are left on, they will soon decay. Taking away part of the leaves will let in the sun and air, which will be of advantage to the roots.

The roots should be taken up before any severe frost comes; none of the fibrous roots should be taken away; nor the heads cut very close. In this state, also, they should be boiled, that none of their rich juice may escape.

They may be used in autumn, and kept good all winter. But if any frost touches them, though they will not presently rot, they will become tough, and unfit for the table. And, in the spring, their early sprouting depreciates them.

A new species of beet has lately made its appearance in this country. The German name of it is *mangel wurtzel*: It is commonly called *scarcity root*, from an idea of its being a good preventive of scarcity, or succedaneum for grass. Like other tap rooted plants, it bears drought well, and produces abundance of leaves, which the cattle are fond of. These plants have every ap-

pearance of beets, excepting that the seeds are smaller, the roots much larger, and grow chiefly above the surface of the ground. Ten pounds is the weight of some that I have seen; but in a rich soil, some have grown to two feet in circumference. The leaves may be frequently stripped off, to feed cattle and swine, which does not appear to injure the roots at all, but rather to increase their growth. They are less fit for the table than the common red beets. Those which I have seen were scarcely eatable.

BIDENS, a tool recommended by Mr. Tull, with an eye and helve like a hand hoe. Instead of a blade, it has two prongs, two inches, or two and a half asunder, and six inches long, steeled at the ends. The uses of it are, to take up weeds strongly rooted, and to loosen the soil among plants, without wounding the roots. It was invented and used by the Romans.

BIRD GRASS, *Poa avaria, spicalis subbifloris*. Usually known in this country by the name *Fowl Meadow Grass*. It acquired this name by being supposed to be brought to a piece of meadow in Dedham, by ducks, and other wild water fowl. Mr. Roque, an ingenious Frenchman, tells us, "He has found by experiment, that this grass thrives best on the driest land." But if it did so in England, where he has cultivated it, I doubt whether it will do so in this country, where the heat of the sun in summer, is so much greater. The fowl meadow, where its growth is most natural, is a low wet soil, and so miry that carts cannot well go on it: And from thence it has been propagated in many swampy places. But Mr. Roque tells us, "It grew two feet and a half

half the first year in a dry soil; four feet the second year: That at every joint it sends out branches, which will strike root wherever they touch the ground: That on taking a full grown plant of this grass out of the ground, it was found capable of being divided into twenty smaller roots, or off sets; that these off sets, though taken thus from the root even in the beginning of July, will bear seed the same year."

Mr. Eliot thinks drained swamps are a very proper soil for the cultivation of this grass; he allows that it makes a good hay, little inferior to English hay; 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.

BLIGHT. See Mildew.

BLOOD, the liquor which circulates through the arteries and veins of animals. It consists of water, oil, salt, earth and air, all which substances are ingredients of the food for plants. It abounds with oil and salt more than most bodies; therefore it may be allowed to be one of the richest manures; and experiments have proved it to be so. It is best to mix it with other substances before it is used. If a farmer could get the blood of animals in sufficient quantity, he might bring his lands to any degree of richness. He may afford to give a good price for the filth at slaughter houses, as a large proportion of it is blood.—It is owing, in great measure, to the blood of fowls, and other animals, which is spilt in back yards, that what is called door dung is so valuable a manure. The farmer should take care to have all his killing done in places where the

blood will be saved for manure. A little of it mixed with a large quantity of dirt, the scrapings of a yard, &c. will make the whole a rich compost.

BOG, a piece of land with a wet miry soil, or a swamp. Some bogs, when they have a sward of grass roots, will shake and tremble under the foot. Such land is unprofitable, or even a nuisance, until it be drained. But after draining, it becomes the best of soil, producing the greatest of crops, without any manure. The way to drain a swamp effectually, is to pass a ditch through the middle of it; and another ditch round the border, to cut off the springs which come from the upland.

In order to judge whether a bog will pay the expense of draining, the depth of the drain which will be necessary at the outlet, and its length, must be considered, and also the depth of the soil in the bog. If the soil be very thin, it will not be of so much value when drained. It will be thinner after drying than before; but it should have depth enough for the deepest ploughing, after it is dried and settled. Otherwise the operation of draining may as well be omitted. See *Eliot on Field Husbandry*.

BROWSE, young sprouts from wood, twigs of trees, and bushes. In a new country, browsing is a considerable part of the food of cattle. They will eat browse all parts of the year, unless when the snow is so deep that they cannot wander in pursuit of it. Late in autumn, and early in spring, much hay may be saved by turning out cattle to browse. In the former part of summer, when the young shoots are in the most tender state, some cattle will even grow fat upon browse. Salt hay is found to

give

give cattle an extraordinary appetite for this kind of food.

BUCK WHEAT, *Polygonum*, a dark coloured grain, shaped like the seed of onions, but much larger, and of a dark brown colour. It yields plentifully, and is said to be better than barley for fattening of hogs and poultry. It should not be sown in this climate, till after the middle of May. One bushel is enough to seed an acre, if sown broad cast; less than half that quantity, if drilled.

In the state of Newyork, farmers sow it with their winter wheat about August. It affords them a ripe crop in the fall, and is no damage to the crop of wheat which grows with it, and succeeds it.—When the plants are green, they are large, sappy and soft. European writers, therefore, greatly recommend sowing it for a green dressing, and ploughing it into the ground, in its most green and juicy state.

BULL, the male of the ox kind.

The marks of a good one for propagation, according to Mortimer, are these. He should have a quick countenance, his forehead large and curled, his eyes black and large, his horns large, straight and black, his neck fleshy, his belly long and large, his hair smooth like velvet, his breast big, his back straight and flat, his buttocks square, his thighs round, his legs straight, and his joints short.

One good bull will answer for a large number of cows. But to mend our breed of cattle, more attention should be paid to the properties of bulls. Those calves which are not large, or not well shaped, should be castrated while they are young, that a mean race of cattle may not be propagated. Neither should the practice of

suffering bulls that are too young, to go to the cows, be continued. For either the cows, through the insufficiency of the bull, will go farrow, which is a great loss to the farmer, and a breach upon the dairy; or at best, the calves will be small, and scarcely worth rearing; as some of our best farmers are now fully convinced. A bull should be three years old, before he is used for propagation.

Crossing the breed is accounted a matter of considerable importance. A bull procured from some place at a considerable distance, is believed to answer better than one that is home bred. Gentlemen in Ireland will sometimes give an enormous price for a young bull from some parts of England.

BURN BAKING, or *burn beating*, often called *denshiring*, or *devonshiring*, from its being long practised in Devonshire. The turfs of swarded land are cut up with a kind of hoe, called a beating axe, which, after drying, are piled and burnt. The ashes and burnt soil are spread over the surface, from whence the turfs were taken, by way of manure; then ploughed in, and mixed with the soil; first with a shoal furrow, and deeper at the second ploughing.

The Marquis of Tourbilly says, "The paring mattock, or beating axe, should have an edge like an adze, of well tempered steel, and about nine inches wide; that the iron part should be six inches in length, growing narrower towards the handle; that the hole to receive the handle should be two inches in diameter; that the handle should be of wood, about three feet long; that the instrument without the handle should weigh from ten to twelve pounds; that the turfs

raised

raised will be about 18 inches long, a foot broad, and four inches thick ; that they must be set up to dry, leaning against each other ; that when the season is not very wet, they will be dry enough to burn in about three weeks ; that when dry, they must be piled up in the form of ovens, the mouths to the most windward side ; that a hole should be left in the top for the smoke to go out ; that as soon as they are piled, they must be set on fire with some straw or heath ; that if they burn too fast, earth must be thrown on to deaden the flames ; and that they will continue burning some days. When the burning is ended, he advises, that the ashes be piled up in round heaps ; that when it is time to sow winter grain, the ashes should be spread, and the corn sown on them, and then the ground ploughed with a shoal furrow, and harrowed."

He says, " half the usual quantity of seed will be sufficient ; and that it ought to be sowed two weeks later than other ground." The reason is, because the grain will grow rapidly, and be uncommonly large.

I conceive this must be a good method of culture for our cold lands, inclining to moss, which can no other way be made to produce well the first year after breaking up. But this method will not readily be adopted in a country where labour is dear. The work, however, might be greatly diminished, by paring the surface with a very sharp ironed plough ; though in order to do this, the ground must have an extremely even surface, and be free from stones. I have said so much of this culture, in hopes of exciting some, who are curious, to make trial of it.

BURNET, *Pimpinella*, a valuable perennial plant, which has lately been brought into use as a grass for feeding cattle, by Mr. Roque, in the neighbourhood of London. Several English farmers have testified, from their experience concerning it, that it grows and flourishes well, even on the poorest and driest of sandy and gravelly soils ; that an acre will yield three loads of hay, by cutting it twice in a year, or more than forty bushels of feed ; that the seed is better for horses than oats, and the straw, after it is thrashed, equal to the best of common hay ; that it continues in perfect verdure, and even growing during the winter ; that it affords excellent winter pasture for cattle and horses ; and that it makes cows give an extraordinary quantity of the very best tasted milk.

I have had a bed of this grass for two years past on a hungry sand. It has grown luxuriantly, the stems rising to the height of three feet ; and the seeds ripened the year it was sowed, though it was not sowed till the end of May. The second year the seeds ripened, I think, in June. The severity of our winter frost neither killed any of it, nor so much as altered the verdure of the stems or leaves. Some of it was cut up and given to cattle, as soon as the snow was off, which they ate very greedily.

I think this plant bids fair to be a profitable grass in this country, where frost occasions the confining our stocks to dry fodder for six or seven months. For, on a pasture of this grass, cattle, horses and sheep, may feed till the ground is covered with snow ; and again in the spring, as soon as the ground is bare.

It is also excellent for foiling, or to give green to cattle in racks; and when it is made into hay, the leaves are not apt to crumble, or any part of the hay to be wasted.

They who wish to propagate this grass, may be assured, that there is not the least difficulty in doing it: For it is not only a most hardy plant, but I have not found it to be at all liable to be hurt by any kind of insects. The English farmers recommend keeping it clear of weeds during the first summer, or till it is so large as to cover the ground. This may be done partly by harrowing; For as it is a strong tap rooted plant, the teeth of the harrow will not injure the roots at all.

BURNT CLAY, a manure very proper for all close and compact soils, especially for a soil that is clayey, which it opens, warms, and invigorates; and so disposes such lands to part with their vegetative virtues, of which they are not wanting.

"I made," says one, "a number of clay walls nine inches high, the same in thickness, and placed at the same distance from each other, in the same parallel direction, forming a square of about three yards. These vacancies I filled with brush wood, and on that threw some cinders, or small coal: After which I covered the whole square with clay about three inches thick, leaving the ends of the tunnels open, which I then lighted on the windward side. As soon as the fire had got sufficient head, I stopped the mouths of them; and when I perceived the covering was almost burnt through, I had a small sprinkling of small coal thrown on the heap, and then another covering of clay as thick as the former: And thus I went on till my heap was seven or eight feet high. When

I found my fire was well kindled (which was commonly about the time I put my second coat on) I used to enlarge the base of the fire, by continuing the tunnels, and adding new ones to the sides, which were filled and covered as the others, and then lighted, till I made my fire about seven yards square: For I found it never burnt well in the middle, if it was too large at first."

"I put about ten cart loads on an acre, and found it an admirable manure, for either meadow, pasture, or corn. For the latter it will not last longer than three crops, though longer for the two former. And with this manure I have made prodigious improvements. But I do not believe it will answer for a sandy soil, as it will render it still lighter." I have myself tried it upon a sandy soil without any advantage.

Mr. Eliot proposes a method of burning clay somewhat different from this and more simple. See *his Field Husbandry*.

BURNT GRAIN. Wheat is said to be burnt, when the mealy part of its kernels is converted to a black powder, of the consistence of lampblack. M. Duhamel calls this distemper *ustilago*, the burnt ear. Grain which is so affected, should not be used for food without washing, being very unwholesome. Grain distempered in this manner, is called by our farmers, smutty; but the best modern European writers choose to call it burnt grain; and they affix the name smut to another distemper. I greatly suspect that the original cause of smutty ears and burnt grain is the same: And that all the difference in the distempers is, that in some ears it begins sooner from some latent cause, in others later by contagion. See *Smut*.

It has been recommended, in order to prevent the distemper, that the seed be steeped in hot lie of wood ashes, with the mixture of a little lime. This I have tried year after year, without the desired effect.—Steeping in brine, and sifting on the grain powdered quicklime, are better preventives, but are not always effectual.

M. Tillet, after diligent researches concerning this distemper, recommends washing the seed in water to clear wheat of the black powder, steeping it in brine of sea salt, or of nitre; or steeping in strong alkaline lies, made of the ashes of sea weeds, of potash or ashes of tartar; or in lies of common ashes, much impregnated with salt and human urine, or cow's urine, alkalized by putrefaction. Of these various articles those may be used which are most easily obtained.

If the seed be tinged with the black powder, it should be washed and violently agitated in several clear waters, till the black is quite off, and then steeped. If it is not spotted, it should be plunged in a basket into strong lie of wood ashes and lime, as hot as a man can bear his hand in it; stirring it well, let the lie drain out. The seed thus prepared, must be spread upon a floor, till it is dry enough to sow.

BUSHES, shrubs. These are apt to spring up and increase in pasture lands, which have never been tilled, if timely care be not taken to destroy them. Eradicating them requires so much labour, 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.

Keeping cattle short in pastures will cause them to browse the more; and this will have a tendency to subdue many kinds of bushes. Those which grow on high ground are oftener subdued this way than those which grow in swampy low lands, the latter being less palatable to the cattle.

It has often been asserted, that when the sign is in the heart, and the moon in her wane, in June, July or August, if bushes are cut they will certainly die. But, by a sufficient trial, I have found this to be a great mistake. In August, 1782, on the day recommended, I cut several acres of alder bushes. And on the following day, when the moon was in the next sign, I cut a large quantity more of the same kind, and in the same swamp. The former are sprung up again very generally, and are become tall now in the year 1789; and so are the latter. The cutting was as ineffectual on the one day as on the other.

But it is undoubtedly true, that cutting bushes in the summer will do more towards destroying them, than doing it in any other season; and the former part of summer is a better time than the latter. Other circumstances being equal, the wettest weather is best for destroying shrubs by cutting; because the sap vessels of the stumps will continue open the longer; there will be the greater discharge of sap through them, and the roots will be the more weakened.

Bushes which grow in clusters, as alder, and some other sorts, may be expeditiously pulled up by oxen; and this is an effectual way to subdue them. The expense of it I suppose will not be more than that of cutting them twice would amount to.

Elder

Elder is a kind of bush which spreads fast in some soils, and has been accounted harder to subdue than almost any other. Mr. Eliot says, "He knows by experience, that mowing them five times in a year will kill them." This has been proved by the experience of other farmers. The roots of the shrub oak will not be killed, but by digging them out, or by pasturing goats on them.

The bushes in swamps are in general more hard to conquer, than those which grow upon upland. Flooding a swamp, where it is practicable, or can be done without too much cost, is perhaps the most approved method which can be taken. Flooding for two or three summers will totally destroy them, root and branch.

But if a swamp cannot conveniently be flooded, the next thing is, to consider whether it cannot be drained to advantage. 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. Therefore they will mostly die without cutting, or it may be expected that once cutting will be sufficient. But if draining were not serviceable on any other account, perhaps it would not answer to go to the expence of it merely for the sake of clearing a swamp of the bushes.

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CABBAGE, *Brassica*, an excellent plant in high estimation, which, when well sodden, is a very wholesome food. Many sorts of cabbages are cultivated. The common white and red cabbages, the savoy, the cauliflower, and the low dutch cabbages are common in this country. The

savoy, for keeping in the winter, seems to be equal to any. Besides these, other sorts are cultivated in Europe, as the borecole, the broccoli, the battersea, &c.

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 well rotted, door dung and ashes, are suitable manures for them.—Each plant should have at least four feet of ground: In other words, the plants should be two feet asunder. In gardens and small yards this is a good distance. But in fields, where they are to be cultivated by the plough, a greater distance is necessary. The rows may be three feet apart, and the plants two feet in the rows; or perhaps a foot and a half may answer, unless it be for the largest sort.

Some think cabbages will not answer more than one year on the same spot. But this is an erroneous opinion. I have raised them for eighteen years in the same part of my garden, being an unfavourable soil, dry and gravelly: And the crops are better than they were at first, though the ground has been but little manured. Though cabbages seem to require much nourishment, they do not impoverish the soil. This is so well known to Europeans, that they call cabbages a fallow crop, meaning a crop which answers instead of fallowing. They form so close a covering for the surface of the ground, as to cause a putrefaction of the soil, which increases its fertility.

Some set the seeds where the cabbages are to grow. By this they escape being stunted by transplanting. For winter cabbages, the latter part of May is early

early enough to put the seed into the ground, whether the plants are to be removed or not. I have tried both ways, and on the whole, I prefer transplanting. They are otherwise apt to be too tall, and to have crooked stems. Wet weather is favourable for transplanting them; and the holes should be filled with water before the plants are set, unless the ground be naturally very moist. Then the roots should be inserted immediately into the water, held with one hand in the right position, and fine soil scattered in with the other. This has a better effect than pouring a much greater quantity of water on them afterwards. Suds would be better than clear water for wetting the plants.—Covering of plants with leaves is not a good practice. They will be much heated through some sorts of leaves, the free circulation of air about them will be prevented, and their perspiration partly obstructed. If a hot sun cause them to droop, a shingle stuck into the ground will be a sufficient shelter, if it be on the south side of the plants. I commonly allow each plant two shingles, one on the southeast side, and one on the southwest, meeting at the south corner.

The principal things which prevent the growth of cabbages, are, the fumble foot, so called, grubs, maggots and lice. Manuring with ashes and lime tends to prevent the first, as the roots become misshapen by means of being wounded by insects, to which the hot qualities of ashes and lime are antidotes.

The grub, or black worm, travels in the night from plant to plant, eats off the stalks just above the ground, and buries itself in the soil when the sun is up. To guard against this worm,

a little circle of lime, or rock-weed round the plant is of service.

To destroy lice on cabbages, they should be washed with strong brine, or sea water, or smokes should be made among them with straw, sulphur, tobacco, &c. But the hard frosts in autumn do not fail to subdue them. A moderate frost will very much thin them.

If cabbages grow near to a barn yard, or other yard where cattle are lodged, the under leaves, when they begin to decay, may be taken off, and thrown to them. The plants will not be at all injured, and they are an excellent food for cattle, and will increase the milk of cows. But the least decayed of them should go to the cows, lest they give the milk an ill taste. Much account is made of cabbages in England for feeding cattle in the winter. But the difficulty of preserving them alters the case with regard to us. They can gather them there as they have occasion to use them, through the winter, and in the spring.

Preserving cabbages through the winter for the table, is a matter of some difficulty in this country. My method is, to pull them up in windy, dry weather, and let them lie, a few hours, with the roots upwards, to drain; or hang them up on trees or fences for this purpose. The later they are taken up, the better, while the ground continues open. I let as much soil remain on the roots as I can, and set them upright together in a cellar, which is so cold as to admit of some degree of frost; and I seldom fail of making them keep till April. In very warm cellars they will soon decay; and in rotting the smell becomes extremely disagreeable, and undoubtedly very unwholesome.

But

But that I may have a few yet later in the spring, I make a trench in the driest sandy ground, nine inches wide, and of equal depth; in which I place a row of cabbages, with the roots upwards, contiguous to each other; fill the cavities about them with some dry straw; and then shovel the earth up to the stalks on each side, almost as high as the roots, shaping it like the roof of a house. The cabbages will come out in May as found as when they were put in, and the outer green leaves will be turned quite white. As they are not apt to keep well after they are taken out, two or three at a time may be taken, as they are wanted for use, and the breach immediately closed up with straw and earth as before.

CALF, the young of a cow, whether male or female. The method of managing calves to advantage is of no small importance to a farmer; for on the raising of young stock, his living and wealth in great measure depend. When calves are designed for veal, they should be taken from the cow the next day after they are calved. Let them suck only two teats during the first week; three during the second; and let them have the whole of the milk during the third and fourth weeks; and then kill them. If they have all the milk at first, they will grow so fast that they will soon need more than all: The natural consequence is, that they will grow lean, and not be fit for veal. Many kill them at three weeks old; but the veal is not commonly so good, and the skins of calves so young, are of but little value.

When calves are to be reared, some let them go with their dams till fall. Though this makes the best cattle, it is not best for the

owner: It is too expensive. They 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 hay tea may be mixed with their milk; or their milk may be mixed with meal and water. After a calf has suckled, or drunk milk, for the space of a month, take some of the freshest and sweetest hay, and put little wisps of it into some cleft sticks, stuck up in such a manner that he can easily come at them, and he will soon learn to eat.

As soon as the grass is grown, calves should be turned to grass, housing them a few nights at first, and giving them milk and water, till they are able to feed themselves sufficiently with grass. Those calves are generally best, which are weaned on grass: For if they are weaned in the house, on hay and water, they are apt to grow big bellied.

Mortimer says, "The best calves for bringing up, are those calved in April, May, and June: Because it is seldom that those which come later acquire sufficient vigour to support them during the inclemency of the following winter; and the cold causes them to droop, and many of them to die." Much oftener may this be expected to be the case in this country, where the cold in winter is so much more intense.

Those which come earlier are preferred in this country, being more hardy, and better able to endure the rigour of the first winter. But the cost of rearing them is greater. All things considered, April may be as suitable a time as any.

"When calves are weaned, they should not be suffered to be with

with their dams any more till fall: Neither should they be pastured within sight or hearing of them: It will cause them to neglect their feeding; and they will not forget their sucking.

“At the setting in of cold nights in autumn, calves must be nightly housed: And not be out early in the morning, nor late in the evening. And as the pinching cold of winter will be extremely detrimental to them, they should be kept very warm in their house, well supplied with water, and let out only in the warmest days. A great deal of care is necessary to bring them through the first winter, which is the most dangerous period of their lives. They will acquire so much strength during the following summer, that they will have nothing to fear from the cold of a second winter.” *Buffon's Histoire Naturelle.*

CANKER, “a disease incident to trees, proceeding chiefly from the nature of the soil. It makes the bark rot and fall off. If the canker be in a bough, cut it off: A large bough should be cut off at some distance from the body of the tree, and a small one close to it. But for over hot, strong ground, the mould is to be cooled about the roots with pond mud and cow dung.” *Dict. of Arts.*

CANKER WORM, an insect, so called, I suppose, from its having much the same effect upon apple trees as canker. This worm is produced from the eggs of an earth coloured bug, which having continued under ground during winter, passes up on the bodies of apple trees early in the spring. They are hatched as early as the end of May, and are so voracious, that in a few weeks they destroy all the leaves of a

tree, prevent its bearing for that year, and the next, and give it the appearance of its having been burnt. As the perspiration of trees is stopped by the loss of their leaves, they sicken and die, in a few years.

The worms let themselves down by threads in quest of prey, like spiders; by means of which, the wind blows them from tree to tree; so that in a close orchard, not one tree will escape them. But trees which stand singly are seldomer infested with these insects. As they are the most pernicious kind of insects with which Newengland is now infested, if any person could invent some easy, cheap, and effectual method of subduing them, he would merit the thanks of the publick, and more especially of every owner of an orchard.

Several methods have been tried, with some degree of success: 1. Tarring. A strip of canvas, or linen, is put round the body of a tree, before the ground is open in the spring, and well smeared with tar. The females, in attempting to pass over it, stick fast and perish. But unless the tarring be renewed every day, it will become hard, and permit the insects to pass safely over it. And renewing the tar in season is too apt to be neglected, through hurry of business and forgetfulness. If birdlime were to be had, it might answer the purpose better, as its tenacity will continue for some time. 2. Some tie straw round the bodies of the trees. This serves to entangle and retard the insects, and prevents the ascent of many of them. But they are so amazingly prolific, that if ever so few of them get up, a tree is greatly damaged, at least for an ensuing season or two.

The pasturing of swine in an orchard, where it can conveniently be done, I suppose to be an excellent method. With their snouts and their feet, they will destroy many of the insects, before they come out of the ground, or while they are coming out. And I have never known any orchard, constantly used as a hog pasture, wholly destroyed, or even made wholly unfruitful by these worms. But this method cannot always be taken; and if it could, I do not suppose it would be quite effectual. When the trees are young, the swine will be apt to injure them by tearing the bark.

There are several experiments I could wish to have tried, for subduing these insects: Such as burning brimstone under the trees in a calm time;—or piling dry ashes, or dry loose sand, round the roots of trees in the spring;—or throwing powdered quicklime, or foot, over the trees when they are wet;—or sprinkling them, about the beginning of June, with sea water, or water in which wormwood, or walnut leaves, have been boiled;—or with an infusion of elder, from which I should entertain some hope of success. The liquid may be easily applied to all the parts of a tree by a large wooden syringe, or squirt.

I should suppose that the best time for making trial of these methods would be soon after the worms are hatched: For at that stage of their existence they are tender, and the more easily killed. Sometimes a frost happening at this season has destroyed them. This I am told was the case in some places in the year 1794.

But as tarring the trees is the best antidote that we yet know

of, and as many persons of experience believe it is possible, that the insects may be thus quite prevented passing up the trees, I shall here give directions how to perform it in the most effectual manner.

In the first place, it is necessary to begin the operation very early in the year. Not observing this caution, has occasioned the want of success which many have complained of: For it is certain that the bugs will begin to pass up as soon as the ground is so much thawed, that they can extricate themselves from the soil; which is, in some years, as early as February. Therefore, to make sure work, it is best to begin as soon as the ground is bare of snow in that month, that the first thawing of the ground may not happen before the trees are prepared; for, beginning after ever so few of the insects are gone up, the labour will all be lost.

Another thing to be observed is, to fill the crevices of the bark with clay mortar, before the strip of linen or canvas is put on, that the insects may not find any passages for them under it.

Having put on the strip, which should be at least three inches wide, drawn it close, and strongly fastened the ends together, a thumb rope of tow should be tied round the tree, close to the lower edge of the strip. The design of doing this is, that the tar may not drip, nor run down on the bark of the tree, which would injure it.

When all the trees of an orchard are thus prepared, let the strips be plentifully smeared with cold tar, put on with a brush. Perhaps tar mixed with a small proportion of fish oil would be still better. It would not hard-

en so soon as tar alone. And oil is known to repel most kinds of insects. The smearing should be renewed once a day without fail. The best time is soon after sunset; because the insects are wont to pass up in the evening, and the tar will not harden so much in the night as in the day, because of the dampness of the air. The daily task must be renewed, and performed with the greatest care, till the latter end of May, or till the time when the hatching of the worms is commonly over, which will be earlier or later, according to the difference of climate.

Another mode of tarring, and which bids fair to be preferred to the foregoing, is as follows. Take two pretty wide pieces of board, plain them, make semicircular notches in each, fitting them to the stem, or body of the tree, and fasten them securely together at the ends, so that the most violent winds and storms may not displace nor stir them. The crevices betwixt the boards and the tree may be easily stopped with rags, or tow. Then smear the under sides of the boards with tar. The tar, being defended from the direct rays of the sun, will hold its tenacity the longer; and, therefore, will not need to be so frequently renewed. And the trees may be more secured in this way from the dripping of the tar, as a margin of two or three inches, next to the tree, may be left unsmear'd.

If the trees are small, the stems may be encircled with cartridge paper, in the shape of an inverted funnel. The outside of the paper should be well smeared with fish oil. The insects will proceed to the brim of the paper, but will not be able to pass it; as the oil will hang on that part.

Another expedient, much recommended, is, to put a strip of raw sheep or lamb skin round the body of each tree, the wool outwards. It is asserted, that, though the insects can pass over hair and straw, they cannot pass over the wool. But, to render this the more effectual, it will be proper to open the fibres of the wool now and then, with a coarse comb.

When it so happens that the worms are permitted to prevail in an orchard for two or three years, the limbs will be so corrupted, that the trees are not apt to recover their fruitfulness, although the ascent of the worms should be afterwards prevented. In such a case, it is advisable to cut off all the limbs from the trees, near to the stock where they are produced, that so the tops may be wholly renewed by fresh shoots, as they will be in a few years.

It is not less than about fifty years, since this insect began its depredations in Newengland, in the parts which had been longest cultivated. But perhaps there is some reason to hope that Providence is about to extirpate them: For a kind of little birds has lately made its appearance in some parts of the country, which feeds upon the canker worms. Should these birds have a rapid increase, the insects will be thinned, so as to be less formidable, if not wholly destroyed.

CARRIAGE, a general name of carts, waggons, sleds, and other vehicles, employed in carrying loads. Those which are designed for riding, are called pleasure carriages.

CARROT, *Daucus*, a well known and useful root for food. The seeds are carminative and diuretick, and the root is useful to abate the malignity of cancers.

A sandy

A sandy soil is very proper for carrots; but they do very well in gravelly, and even in loamy soils, when made rich and loosened to a sufficient depth. The largest I have ever raised has been in gravel. The ground should be ploughed, or dug, more than twelve inches deep, and well pulverized.

I have found by long experience that carrots should be sowed early. The last week in April is late enough, when intended for feeding of cattle; and they may be sowed earlier, if the ground be in good order, and so dry as to be made light and loose. The earliest sown will be the largest, and, in the northern parts of this country, nearly as tender and good tasted as if sown later.

A small quantity of dressing will be sufficient for them. But whatever manure is used, it should be well rotted, and made fine, or putrefy very soon in the ground; otherwise the little obstacles in it, will cause the roots to divide, and become forked. I have known carrots, manured with old hog dung, grow to a surprising bigness. But if a large quantity of this strong manure be used, they will grow so fast as to burst open. It is a crop that bears drought well, as it draws its principal nourishment from a considerable depth. Nor is the ground apt to be exhausted by continued crops.

Carrots may be sown pretty thick, as they are remarkable for growing better in a crowded situation than almost any other kind of roots. And it is easy to thin them at any time when it is thought proper, as they are so shaped as to come up easily, in a light soil.

In the garden I sow them in drills, or little furrows, made an

inch deep with the head of a rake, from 9 to 12 inches apart, across beds four feet wide. This prevents treading the ground hard too near to the roots; greatly facilitates clearing them of weeds with a hoe, and keeping the earth loose to a sufficient depth. I do not thin them much, till I begin to pull them for use, about the beginning of July; from which time I pull them, not only for the table, but to feed swine, as that sort of animals are so fond of them, that they will greedily devour both roots and tops.— The spaces between the beds may be kept clear of weeds, by turning over the soil with a narrow spade, once or twice in May and June. It will not only subdue the weeds, but increase the pasture of the nearest plants.

But the field culture of this root begins to prevail in the country: As carrots are found to be valuable, for feeding not only swine, but horses and cattle, and for fattening them. But to fatten swine on them, they should be boiled, or parboiled. They are so easily cultivated, and so hardy, that they may be raised in fields to great advantage. They will grow well in a soil that is but moderately rich, if it be ploughed deep, and made mellow. And there is no difficulty in keeping them through the winter, in good order for feeding cattle. The ground should be ploughed in the fall preceding, and ploughed very deep. 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. And if some of the earth, which was never before stirred, should be thrown up to the surface, it will be no damage, provided it be such earth as crumbles easily,
and

and does not remain in lumps, after the winter frosts have acted upon it.

If the land incline to much wetness, it should be water furrowed, after the autumnal ploughing, that so it may be dry, and fit to be ploughed again very early in the spring. It must be well harrowed before sowing, first with a heavy harrow, and afterwards with a lighter one, with shorter teeth placed near together. After the seed is sown, the ground should be raked. When sown in the broad cast method, they should stand so far apart after thinning, as to have each half a foot of soil. There will be no danger in thinning them early, as they are a plant which is seldom diminished by insects.

After the first hoeing, the European farmers harrow them. It is said not one in fifty will be destroyed by the operation. It will loosen the soil, and greatly forward their growth. But it will be advisable to go among them after harrowing, and uncover those which are buried under heaps of mould. A Mr. Billing, in England, one year, sowed thirty acres of carrots, and had an extraordinary crop. Some of the best of the land yielded him twenty four cart loads per acre. If his cart contained 40 bushels, which is a common size in this country, he had 960 bushels from an acre. And this is not a greater crop, than a gentleman at Newbury had last year, unless I am misinformed. And lately at or near Philadelphia a thousand bushels have been raised on an acre.

Mr. Billing had 510 loads of carrots on 30 acres, which he thinks equal in use and effect to near 1000 loads of turnips, or three hundred loads of hay. If

so, he had as good a crop as ten loads of hay per acre would have been. But the half of this quantity is seldom if ever obtained in hay; or if it were, it must be very coarse, and not near so valuable as hay in general.

This farmer found, that his carrots answered extremely well, not only for fattening swine, but bullocks; and for feeding milch cows, sheep and horses; and that the land was left in a better condition for a succeeding crop, than land after a crop of turnips.

It is with pleasure that I find the attention of some of my countrymen turned to the field culture of this excellent root. They who have but little land may probably enable themselves to keep considerable stocks by means of it.

This root has greatly the advantage of turnips, not only in its being a richer and more nourishing food, and in yielding a larger produce, but also in its being never, or very seldom, annoyed or hurt by insects. This crop, rightly managed, I have never known to fail, as it is well known the other often does.

The drill method, sowing on narrow ridges, raised by the cultivator, is preferred by some, and is that which I use. But the labour will perhaps be increased a little. The seeds will do best sown by hand, as their shape will not well admit of their being drilled. To prepare them for sowing at all, they should be well rubbed, and passed through a sieve. The first hoeing of carrots in rows must be also by hand; at which hoeing they should be thinned to one or two inches asunder, if large ones are desired. The after hoeings may be expeditiously done by the horse hoe and cultivator alternately. It is

not amiss, if they grow large and rank, when they are chiefly designed as food for cattle, though small sized ones are preferred for the table. For this use they need not be thinned to more than half an inch asunder in the rows: And perhaps not so much in good ground. The way to keep carrots good for eating through the winter, is to bury them in a dry sand of the yellow kind from pits. Or, if they are put into casks, covering them with fresh turfs may be sufficient.

I will conclude this article with an extract from a writer in the *Scots Farmer*. "Let the spirited farmer," says he, "apply much of his land to the culture of carrots; for he will find no article half so profitable in his whole farm, as this, well conducted. Few men will bestow attention or expense enough to cultivate this plant on a large scale, notwithstanding the undoubted profit attending it. A spirited farmer, that has money in his pocket, will introduce carrots instead of turnips. He should, when his soil is proper, totally substitute them in the room of turnips; for it is no exaggeration to say, that one full crop of carrots will pay better than ten of turnips." Whether this writer is not rather too sanguine I will not undertake to say. But from long experience I much prefer them to turnips on the whole.

CART, a wheel carriage, of essential importance to the farmer, to carry his manures, remove stuff for fences, get in his crops, &c. Horse carts are sometimes used; but ox carts generally. Of the latter some are short, some long. The short cart is eight feet long, four feet wide, and two feet high. The long cart is used for carting hay, straw, and

other bulky matters; therefore it is made from ten to twelve feet, or more, in length, four feet in breadth; and instead of sides it has only long, sharp pointed stakes. In some parts of the country they lengthen out a short cart, with what are called ladders, when they cart hay. But this is not a good practice. The load lies higher than in a long cart, and is more liable to be overset.

The greatest excellencies of a cart, are lightness, strength, and durableness. Therefore, it is very proper to construct carts of ash timber. But as white oak is not so apt to decay, the principal parts are commonly made of that.—A cart should be kept under shelter when it is not in use. It will last the longer.

The axle, and wheels, should be of the toughest of oak.—Wheels to be used on a farm only, need not be shod with iron. A wooden rim, well made, will last several years, and is easily renewed, and it will do less injury to the grass grounds in passing over them. The softer the soil is, the wider the rim of a wheel should be. Some have the rims a foot wide, to cart upon marshes.

CATERPILLAR, a worm that feeds on leaves and fruits. These insects differ in colour and size according to their situation, and according to the different matters on which they feed. The principal inconvenience the farmer meets with from caterpillars, is the damage they do to his orchard. A hairy kind of caterpillars build their nests on apple trees in May, and are gone entirely in June, about the summer solstice. But they feed so industriously on the leaves, as to destroy a great part of them, if they be not timely prevented.

As they are far less mischievous than the canker worm, so they are more easily subdued. Some destroy them by firing gunpowder at their nests. The same may be effected with a match of brimstone on the end of a pole. Some say these and all other insects on trees may be easily destroyed with quicksilver. See the *Article Quicksilver*.

I have an orchard, which has been always much annoyed by caterpillars. But in the spring of the present year, I hung rock weed in the crotches of the trees, and not one nest that I can find has since been formed upon them. I have made only this one experiment with rock weed; but I am apt to believe it will always be attended with success. They whose situation is remote from the sea, must have other methods of destroying these insects, or of preventing their multiplication. Woollen rags steeped in old urine may be equally efficacious.

Since I wrote the above, I have once more successfully defended the trees in my orchard from the ravages of the caterpillar, by the application of rock weed. The rock weed should be applied pretty early in the spring; the beginning of April is a proper season. The dripping from this salt plant is undoubtedly serviceable also to the roots of the trees; and prevents the ascent of the black lice and several other species of insects.

Nests which have been neglected till the insects have forsaken them should be destroyed; because they contain the seeds of swarms in the coming year. A nest will be found to contain several of their chrysales.

CATTLE, a name applied to all quadrupeds, which are used for tilling of ground, and for the

food of man. The name comprehends, at least, all the bos kind, besides sheep and goats. Europeans sometimes distinguish cattle into large and small; and black cattle is a name they very frequently give to the ox kind. I shall speak here only of black cattle, including bulls, oxen, steers, cows, and heifers.

As soon as a calf is weaned, it should run in the best of pasture till autumn, and be carefully tended, kept warm, and live upon the best of fodder, through the first winter. Afterwards it will become so hardy as to require less care. But cattle should be frequently looked to and examined; that so, if they be overtaken with any sickness, hurt, or lameness, suitable remedies may be seasonably applied. And in order to do this, they should be accustomed to come home, and be shut up in the yard every night. By this method, a farmer will save a much larger quantity of dung. And, in case of an uncommonly cold storm, the cattle may be housed with very little trouble, as the yard is contiguous to their house.

Cattle, from one year old to three, will usually get a living in summer, and even thrive, upon the commons, or in the meanest, and most bushy pastures. And in winter the poorest fodder will keep them alive. And, as our farmers know these things, they are very apt to treat their young cattle in this manner. Those which are so treated, may oftentimes become as hardy cattle as any; but they will be small, and therefore not so profitable. Farmers in general are too ambitious to keep a large stock of cattle: A necessary consequence of which is, that they are pinched in their food, and never come to their full

ill growth. Another ill consequence is, their growing unruly and mischievous through hunger, learning to leap over fences, or break through them.

It would certainly be more conducive to the interest of farmers, to keep smaller stocks of cattle than most of them do: For then they would be able to feed them to the full. Their oxen would be much larger and stronger than they are, and their cows would give plenty of milk, and bring larger calves: Not to say how much they would save in taxes, by reducing their number of rateable cattle.

Farmers should allow their young stock a pretty good pasture. This would keep them out of mischief, prevent their learning bad tricks, and prevent many ill accidents which befall them. And it would be no small advantage always to know where to find them. But, in the common method of treating them, it is too common a case for them to straggle so far from home, that the owner entirely loses them; or else spends as much time as they are worth in seeking after them.

If a young stock were well fed at all seasons, the heifers would commonly have calves at two years old, which is no small advantage, and steers would be fit for labour earlier in proportion. And when they come to be killed off, the quantity of beef would make amends for their being so fed as to be well grown. If the farmer's view in increasing his stock, be to make as much dung as possible, he should be reminded of what he ought to know already, that the dung of a small stock will be equal to that of a large one; if it consume the same quantity of fodder. If a farmer make this objection to

pasturing his young stock, that his farm is not large enough to admit of it; he may find an answer, by turning to the article, *Mowing Grounds*, where diminishing their number of acres, and increasing that of pasture ground, is recommended, and sufficient reasons assigned.

In the winter, cattle should be housed, to defend them from the inclemencies of the weather. For though nature furnishes them with a thicker covering of hair in winter than in summer, the difference is not near so great as that of the weather in this climate. Working oxen, and milch cows, will suffer more than the rest by lying abroad. If the farmer cannot conveniently house all his cattle, those should be left out which are between the age of one and three years. And those that lie out should have a shed, open only to the south and west, to shelter themselves under in stormy weather.

The injuries which cattle receive from one another, when they are lodged together in a yard, is an additional reason for tying them up in the barn. To which it may be added, that a great part of the fodder given them is wasted, even when it is given them in racks; much more, when it is thrown upon the ground. They trample it into the dung with their feet, which is no inconsiderable loss.

Cattle will bear to be cold much better than to be wet. If they be left out in cold storms of rain, it pinches them exceedingly; so that they will not look so well again for several days after it. The sides of the house where they are lodged, need not be very tight. It might be apt to make them too tender. It will certainly abate the freshness of

the air they breathe in, and hurt the agreeable flavour of their fodder. But the covering of their house should be perfectly tight. No window should be open, through which snow or rain may drive in upon them. The floor they lie on should have a gentle descent backward, that they may be wetted as little as possible by their stale; and they should always have straw or litter under them, not only to soften their lodging, but to lay them the more warm and dry, and absorb the wetness.—The better they are littered, the more manure will the owner make for his farm. This is an object of high importance.

It would be a good method for cattle that are tied up, to fodder them in racks. They would not be so apt to rob one another; nor to get their fodder under their feet; nor to render it unpalatable by their breathing upon it.

Where salt hay can be had, cattle should now and then be treated with a little of it. It will so increase their appetite, that they will eat poor meadow hay, and straw with it, or after it. But farmers, who are far from the sea, and not furnished with salt hay, should now and then sprinkle some of their meanest fodder with salt dissolved in water, which will answer the same valuable purpose. And at no season of the year should cattle be kept, for any long time, without salt. They are greedy after it, and it conduces to keep them in health.

As to summer feeding, it is not fit that a whole stock go promiscuously in the same pasture. Some would be overmuch fed, and some not enough. A farmer's pasture grounds should be made into a number of separate

inclosures; the greater the number the better. Milch kine and cattle fattening for slaughter should have the first of the feed in each inclosure; then working oxen; afterwards, young stock, horses and sheep. When each kind have had their turn, for two or three days, or perhaps a week, the apartment may be shut up, till it be sufficiently grown for the milch cows.—By such a rotation much may be saved; but little of the grass will be wasted by trampling; and what one sort leaves another will eat; so that none of the grass will be lost.

Oxen should not live to be more than eight years old, nor cows more than ten or eleven. When they are kept longer, they do not fatten so easily; and the beef is not so good. Cattle to be fattened should have the best of pasture during the whole grass season, or they will not be fat so early as December; and they should lose a little blood, when they are first turned to grass. In autumn, when grass grows short, or is corrupted by frosts, their fattening should be promoted by feeding them morning and evening with the stalks of Indian corn, pumpions, potatoes, or carrots; and especially with ears of corn, if the owner can afford it. Indian meal is supposed to be still better to complete their fattening. Oil cakes from the linseed mills are much recommended in English books, as conducing to the speedy fattening of cattle.

CHANGE of CROPS, a method of cultivating different sorts of vegetables in succession, on the same piece of ground, with a view to make tillage lands more profitable in the long run; and, at the same time, to prevent exhausting them of their strength.

Those

Those who believe that the food of different plants is different, cannot but look on the changing of crops as a matter of essential importance. For, on their hypothesis, land which is worn out with one sort of vegetables, may be in good order to produce a large crop of another sort. But there are other reasons for the changing of crops, which are more substantial, being founded in undoubted fact, and proved by experience.

Some plants are known to impoverish land much faster than others: Such as Indian corn, flax, hemp, &c. And it would not be a prudent method to scourge a piece of land with such crops, year after year, till its strength were all exhausted. For it has been justly observed, that it is easier and cheaper to keep land in heart, than to restore it after it is worn out. It is advisable, therefore, in general, to take but one crop of flax from a piece of land; and not more than two of Indian corn, in succession; nor indeed more than one, unless abundance of manure be applied.

Again, some plants take the principal part of their nourishment near the surface of the soil, and others draw it from a greater depth: And a regard must be had to this in choosing a rotation of crops. For it will be found that after land has been much worn by plants, the roots of which chiefly consist of either long or short lateral fibres, it will be in good order to produce plants which are tap rooted. Clover, for instance, will grow rank and good, on a spot which will not answer for wheat, barley, or oats. The clover will draw its principal nourishment from those parts of the soil, to which the

roots of preceding crops have not reached. And if grounds have been dunged for several years, the nutritive particles of the dung may have penetrated deeper into the soil than any roots have reached. In a loose sandy soil, used for grain, this will often be the case: So that part of the manure laid on it will be entirely lost, unless a crop of tap rooted plants should overtake it in its descent.

Preventing the prevalence of weeds is another good reason for the changing of crops. 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. The weeds, which are several times cut to pieces, and hoed into the soil, during a summer, answer much the same end as green dressings: And by keeping the soil loose, the enriching particles floating in the atmosphere, are plentifully imbibed. See *Rotation of Crops*.

Also, a change of crops, judiciously managed, supercedes the necessity of fallowing, which is no small advantage. Instead of an expensive resting of the soil, during a year of fallow, land may yield an unintermitting profit to the owner. Wheat land, for instance, may be recruited, and cleared of its weeds, by a crop of beans, or potatoes, as effectually as by fallowing. If such a crop should only pay the cost of culture, it may be considered as gain.

What particular routine of crops is best, is not easy to determine. Green and white crops, alternately, are in general recommended. I suppose one course may be

be best in one county, and another in another. In the county of Bristol, Massachusetts, it is called good husbandry, to plant Indian corn the first year after ground is broken up; to sow rye, wheat, oats, or barley, the second year; and lay it down with clover. After two or three crops of clover are taken off, the land is broken up again, and managed as before.

But in the counties of Cumberland and Lincoln, in the same commonwealth, this course would not answer so well. Indian corn is not found to be the most beneficial crop for the first year, in this climate. It will be backward, and in danger of not ripening well, unless it be on a sandy spot, with a southern exposure. And when land is broken up, it will not be subdued enough to lay down for grass so soon as the third year, on account of the toughness of the sward. But when laid down, it may lie six or seven years, before it will need breaking up again; for the lands are so natural to grass, that the crops will continue to be good.

An eligible course of crops in these northern counties may be, pease, oats, or potatoes, the first year; Indian corn, much dunged, the second; barley or rye, the third; and the fourth, herdsgrass and clover mixed, and so on to the tenth. As the clover diminishes, the herdsgrass will increase, which is a more valuable grass for fodder. But every judicious farmer must judge for himself in these matters. Soils differ so greatly, even in fields which lie contiguous, that the course of crops which is suitable for one, would be unsuitable for another.—Change of crops is no new doctrine among farmers.

“Repeated observations convinced the Romans, that besides the alternate resting of the land, wheat may, as Pliny observes, be sown after lupines, vetches, beans, or any other plant which has the quality of fertilizing and enriching the soil.—A judicious change of crops is of great importance in the common tillage husbandry, as it enables the farmers to save the expense and loss of a crop, in the fallow year; and to conquer his great enemies, the weeds, by attacking them at different seasons of the year, and in different periods of their growth; especially when the intermediate crops are hoed, as those of pease and beans; for the repeated hoeings, not only destroy the weeds, but also very much enrich the land. The benefit of changing crops appears to arise from these circumstances, rather than from any different food that the several crops are supposed to extract from the soil.” *Complete Farmer.*

CHANGE of SEEDS, taking seeds to sow, from different countries, climates, fields, or soils. This is a matter of great importance in agriculture, which has been too little attended to by farmers in this country. All seeds, which are not natural to the soil and climate, will degenerate, grow gradually worse and worse, till they are naturalized; and then remain at a stand, as Mr. Dixon has justly observed. But those plants, which are the natural growth of the country, are not liable to grow worse. If so, all sorts of plants ere now would have been reduced to nothing. The best countries and soils to procure seeds from for sowing, are those to which they are natural. For if we take them from any other place, they will

will be such as have already begun to degenerate; so that we shall not have them in perfection.

We cannot avoid sowing more or less of the seeds of weeds with all kinds of grain, unless we spend too much time in cleaning them. Therefore, when we sow grain raised on the spot, we shall unavoidably sow the seeds of weeds which are natural to the spot, and they will mightily increase. But when we sow grain, which is not raised in the same country, or in the same kind of soil, the seeds of weeds which are sown with it, will not be so likely to thrive fast, and become troublesome. This may be allowed to be one advantage in changing seeds; and a good reason for changing them yearly.

As animals, particularly sheep, and some other kinds, are known to be improved by removing them from one country to another, so seeds brought from distant countries have often been found to produce plants more healthy, and of a larger size, than seeds of our own growth. The Siberian wheat, which was sent into this country about the beginning of the late war, was a proof of the truth of this observation. For five or six years, it produced so much better crops than our own seed wheat, that every farmer was eager to obtain some of it; and some gave double price for it. It was at first perfectly free from smut, and from blight, and commonly produced thirty fold, in land which was suitable for it.—And the true reason of its degenerating here so soon as it did, I imagine might be, its having been sowed in England (a climate not natural to it) for some years before it came to us: So that it had begun to degenerate before we received it.

Some feeds will answer well, when carried from a southern to a northern climate. Perhaps all those sorts will, which are so quick in their growth, that their plants come to maturity very early; such as flax, turnips, and many other sorts.

By several experiments, I have convinced myself that the seed of flax, carried as much as a hundred miles to the northward, will answer a very good purpose. The crops have sometimes been almost double in value. I suppose the people of Ireland have long been convinced of the utility of this changing of flax seed; which has made them so fond of procuring it from America, and other places. American seed answers extremely well on their high, dry lands.

As to turnips, the best and largest that I ever raised, were from seeds brought from Philadelphia. But the seeds of plants, which scarcely come to maturity before the onset of autumnal frosts, should never be removed from south to north. The last year, I procured seeds of squashes from the western islands; and they brought no fruit to maturity.

Wheat and rye should be ripe, not only before the approach of frosty nights, but even before the chilly nights which happen about the end of July. For the coldness will be apt to retard the ascent of the sap in these plants, and prevent the filling of the grain. Winter rye from the county of Barnstable, was once sowed in the county of Cumberland, Massachusetts. It ripened later, on account of the small difference of latitude, and was so blighted as not to produce half a crop. But bringing grain from the northward, will always be a good

good change. It will ripen earlier, in proportion to the distance, and escape the chilly nights I have mentioned. But I should not be fond of bringing wheat or rye from a place very far distant, unless I could have it yearly; because I imagine that the greater the change of climate is, which seeds undergo, the more rapidly they will degenerate.

Seeds may be removed, as I have found, from a northern situation too far to the southward. I have known seed of Indian corn carried as much as two whole degrees south from its native place, which was so much scorched by the greater heat of the sun as to produce little or nothing. So that care must be taken to make changes within reasonable bounds.

If a farmer have not opportunity to procure seeds from distant places, let him at least procure them from neighbouring fields, rather than from his own. For if considerable changes are as highly advantageous, as they are generally allowed to be, it follows that small changes will be expected to have some degree of advantage.

Any one, whose farm has various kinds of soil in the different parts of it, may easily make changes of seed which will be useful. The English farmers think it best to take seed wheat from a strong clay land, whatever kind of soil they are going to sow it upon. They choose also to take from a field which has been changed the preceding year. And they will never take for seed, wheat that grew on a sandy soil. It is a proverb with them, that *sand is a change for no land*. The reasonableness of these opinions I know not how to investigate; but if they have founded

them upon a long course of experiments, they are not to be slighted.

CHARCOAL, wood charred, or burnt with a slow, smothered fire. The making of charcoal is a business mostly performed by farmers. And in clearing new lands, making their wood into coals is better than burning it to waste, unless the distance of a market for coals be too great. One cord of wood will make forty bushels of coals; And those farmers who are not distant from populous towns, or who are near iron works, may turn their coals to considerable profit.

I have long observed, that where coal kilns have been burnt, the ground has discovered a remarkable fertility for many years after; and more especially when it has been naturally a cold and wet soil. The dust of the coals and that of the burnt turf, have conspired to produce this effect. Hence I have concluded that small coals, or the dust from coal kilns, spread over four meadow lands, would answer the end of a good manure. Being extremely porous, the pieces of coal imbibe much of the superfluous water, as well as increase the heat on the surface, as all black substances do. And when the weather becomes dry, they discharge the moisture, partly into the soil when it grows dry enough to attract it, and partly into the air, by the action of the sun upon it. Autumn is, on several accounts, the best season for laying on coal dust; and I would recommend it to all who have bottoms of kilns, to make this use of the dust.

I have been confirmed in my opinion, by reading in the *Complete Farmer* as follows: "The dust of charcoal has been found, by repeated experience, to be of great

great benefit to land, especially to such as is stiff and four. It is to be used in the same manner as foot and wood ashes."

CHARLOCK, *Sinapi*, a well known and troublesome weed. It is known also by the names chadlock, catlock, carlock, and white rape. It is similar to radish. The young plants so nearly resemble turnips, that they are scarcely distinguishable, unless it be by the taste. Mortimer mentions a field of barley, mowed when the charlock was in blossom, which took off only the tops of the blades of barley; and which gave the barley an opportunity to get above the weeds, and so it produced a good crop. He supposes cow dung increases it more than any other manure: And recommends feeding fallows with sheep when they are infested with this weed. It is well known that sheep will eat this weed rather than turnips. The seeds will live in the earth many years, and afterwards vegetate by means of tillage.

Grain should be sown thick, where there is danger of its being injured by charlock, so that the crop may overtop the weeds. Barley sown thick will certainly prosper in such a situation.

CHEESE, a sort of food made of milk, purged of the serum, or whey, and dried for use.

Some cheeses are wholly made of unskimmed milk, which are called new milk cheeses, although part of the milk be kept over night, or longer. These cheeses, as any one would expect, are the fattest, and most valuable.

Another sort are called two meal cheeses, being made of the morning's milk unskimmed, together with the evening's milk skimmed. These, when well made, without the mixture of

any four milk, are not much inferior in quality to new milk cheeses.

The third sort of cheeses are wholly made of milk deprived of its cream. This kind is tough, and hard to digest; and containing only the glutinous part of the milk, it affords little nourishment, and is scarcely worth making.

The method of making cheese, in Yorkshire in England, is as follows.—“If your milk be not just come from the cows, make it blood warm, turn it into a clean vessel for the purpose, and put in the rennet; be sure to give it no more than what will make it come lightly. After it comes, stir it with your hand, till it be gathered, and parted from the whey. Then take the curd up in a strainer, and work it with your hands, till you get as much of the whey from it as possible: Then lay it in a clean linen cloth, and put it into the hoop: After it is slightly covered with the cloth, put it into the press: Let it stand in the press two hours; take it out, and the cloth from it, and rub it over with fine salt: Put it in a dry cloth, and press it eight hours: Then put it in another cloth, and let it remain in the press till your next cheese be ready. When you take it out, rub it well with salt, and wrap the round ring of the cheese with a garter made of linen yarn, and pin it at the end, which keeps the cheese in a good shape: Then let it lie in brine twenty four hours. Add a little salt to your brine every time you put in a new cheese. When you find the brine turning unfavoury, make new brine; and turn the cheese in the brine vat twice in twenty four hours, always rubbing a little salt on the

top of it when it is turned. When you take it out of the brine, dry it with a cloth; and turn it every day on the shelf for two months. The shelf should be a little wider than the cheefes, and the garters should continue round them five or six days."

A dairy woman in my neighbourhood, whose cheefe is most excellent, is nearly in the Yorkshire practice. But lest the salt should not penetrate the whole of the cheefe equally in every part, she sprinkles a little fine salt on the curd, when she breaks it, perhaps as much as an ounce to a cheefe of fifteen pounds weight; and her cheefes never appear to be too much salted.

This may be partly owing to another improvement in her method. To the brine, in which she lays a cheefe after it is pressed, she allows as much nitre as will lie on a shilling. She has found, by long experience, that the nitre not only gives a reddish cast to the rind of the cheefe, but makes it more tender after it is thoroughly dried. It also prevents the cracking of the rind, which is a matter of much consequence. At the same time it prevents the distention of the cheefe by wind, makes it mellow and soft throughout, and improves the taste.

But it is in vain to attempt the making of good cheefe, unless the rennet be uncorrupted, and perfectly sweet. See the *Article Rennet*.

In this country, where the summers are hot, and flies abound, cheefes are often destroyed, or greatly damaged, by maggots. To prevent this, every precaution ought to be taken to prevent fly blows getting into a cheefe while it is making. For it is certain that cheefes will some-

times prove maggoty, which could not have been fly blown after they were made. To prevent this evil, the milking pails, the cheefe tub, &c. should be kept in dark places till the moment they are used, after being dried before a hot fire. And if the milk stand any time, or more than during one night, the room it stands in should be dark: Because flies are not apt to lay their eggs in dark places.

After cheefes are made, they will sometimes have little flaws in them, or cracks in drying, which the flies will be fond of depositing their eggs in. To prevent this, the cheefes should be smeared with a little tar mixed with salt butter: Or the cracks may be filled with a soft paste of flour as often as they appear.

But all this precaution will be apt to prove insufficient, unless the cheefes be dried in a dark room. As flies do not frequent dark places, cheefes dried in a dark room may be full of cracks, and yet escape maggots.

Some persons choose to medicate their cheefes with the juice of some wholesome plant, as sage, baun, mint, tansy, pennyroyal, &c. which they put into the curd. But I think this is no real improvement. To give cheefe the hue of that which is made in Gloucestershire in England, a little of the annotto may be put into the milk.

CHICK WEED, the same as *alfine*, a tender creeping weed, often troublesome in old gardens, and which grows luxuriantly in shady places. Swine will feed upon it when they are hungry.

CHURN, a wooden vessel, in which butter is produced by churning. It is broad at the bottom, and narrow at the top, to prevent the contents from coming

ing out at the top during the agitation. But the shape does not perfectly answer this design.

Churns are commonly made of pine. But when they are new, they give the butter a tang of the wood; so that oak is generally preferred. The hoops are of ash, and should be made very smooth and regular, that the vessel may be easily cleared and kept sweet.

But on great farms, and where the dairies are large, the barrel churn is to be preferred. Its name gives the idea of its shape; and when it equals a barrel in size it can be easily managed. On each head of it is an iron spindle, and on each spindle a winch, by which the vessel is turned on a horse made for the purpose. A much greater quantity of cream, or milk, may be churned in this than in the common churn; and the labour is easier. There are two boards within this churn on each side of the centre, like shelves, which serve to agitate the cream.

The aperture in the barrel churn ought to be five or six inches square, to which a stopper must be exactly fitted, which must be kept in its place by a bar of iron across it, held fast by staples.

CHURNING, the motion which is given to cream or milk, in a churn, in order to separate the butter. In common churns, this work is very laborious, though it falls to the lot of the weaker sex most commonly to perform it. But the labour may be lightened by a springy pole placed over head, in the same manner as that of a turner's lathe, to the loose end of which the staff of the churn is tied. This pole will pull up the dash after every stroke; which, when done by

hand, is the heaviest part of the work.

CIDER, a palatable and wholesome drink, consisting of the juice of apples.—The juice of sweet apples contains more spirit than that of sour ones, and therefore is of more value.

The more palatable the apples are, other things being equal, the more pleasant will the cider be, when new, which is made of them. But it is believed by some, that a mixture of different sorts makes the best cider; inso-much that a number of poor sorts together will do better than one good sort by itself. But different sorts, which are made together into cider, should by all means be nearly of equal ripeness; otherwise the juice will not agree in fermenting. Apples should be sorted according to their different degrees of mellowness and ripeness. The apples which are first ripe may be ground in September, the next in October, and the last in November. The first sort must be for immediate use, unless it be preserved longer by means of boiling: The last will be proper to keep the longest. The most crabbed apples make the most durable cider.

It seems to be the general opinion of writers on this subject, that apples should lie and sweat in a heap, some days, or weeks, before they are ground: The chief advantage of which I suppose to be their becoming softer, and more easy to be reduced to such a fineness, by grinding, that all the juice may be expressed. But if apples when gathered are so ripe as to be just beginning to rot, the shorter time of sweating they have the better: For in a large heap the rotting will soon begin and rapidly increase; and

the cider made of apples partly rotten will be weak, and have a disagreeable taste.

The management of cider, after it is made, is of the greatest importance. It should be strained through a sieve, to separate the liquor as much as possible from the pulp of the apples, and from all the rubbish mixed with it. Some strain it through sand; but this robs the cider of its richest particles. And the sooner it is put into a cool cellar, the better, as it will tend to prevent a too hasty fermentation, which should always be guarded against.

If a hole be dug in the ground, so near to a cider press that the cider may run into a strong cask placed in it; this is no bad method of preserving cider in a sweet state; the cask may be bunged up tightly, and the hole covered with boards, and earth over them. The fermentation will be so small that the liquor will be very sweet in the spring following, as has been proved by experiments.— But I am suspicious of its fermenting too rapidly, after it is taken out, unless it be fined, and then racked off without delay, and afterwards kept in a very cool cellar.

“An experiment, says a valuable correspondent, in the county of Suffolk, was made in the year 1764. Some iron bound casks of cider were placed in a cellar which was always so full of cold spring water, as to keep the casks constantly covered, with the water running upon them continually. As the water was at all times equally cold, it kept the cider not only from the influence of the air, but also from all those changes which can raise frets and fermentations in liquor. In which place it continued from October to May following. It

was then drawn off into barrels, and was pronounced to be the best of cider, by very good judges.”

He adds, “In this manner the famous Falernian wine, so often mentioned by the Latin poet Horace, was kept, being sunk in the river Tyber, which washed the walls of Rome.”

If cider were first purged of its faeces by fermentation, racking and fining; putting it thus under water, I think, would render it a very durable liquor, if not unchangeable till its removal. And it need not be removed long before it is used.

Much cider is spoiled by its being put into bad casks. New ones are generally the best. But even these should not be trusted, without scalding them with water in which some salt has been boiled.

When a cask has got a putrid taint it should be unheaded, every part of the inside well scraped, and a fire made in it.

To prevent casks becoming foul and unfit for use, they should as soon as they are empty be washed clean, scalded, and a little brimstone burnt in them, and then stopped very tight, that no air may enter them.

Some say the lees may be left in a cask, without any danger of giving it an ill scent, and that for a long time, if it be tightly stopped. But I prefer the above method.

The casks in which cider is kept should be well hooped. Old wooden hoops should not be trusted, unless they will bear a smart driving. They may look sound, when they are so decayed as to be easily burst asunder. If a cask be musty, by means of remaining too long empty and foul in the cellar, it may be cleared

of its mustiness by burning a few matches of brimstone within the bung hole. But casks, which have had pricked cider, or vinegar, in them, should not be used any more for cider. A small degree of mustiness may be cured by a decoction of sweet fern. It should be poured hot into the cask, and well agitated, that it may equally affect every part of the inner surface.

They who wish to preserve their cider in a very sweet and mild state, should manage it in the following manner: "After straining, let it stand a day or two in an open tun, covered only with a cloth or boards, to keep out the dust, that the more gross parts may subside. Then draw it off into vessels, wherein it is intended to be kept, observing to leave an eighth part of them empty. Set these vessels in your coldest cellars, with the bung open, or covered only with a loose cover, both that the volatile steams may have free vent, and that the must may be kept cool: Otherwise it is apt to ferment too much. Having fermented in this manner for fifteen or twenty days, the vessel may be stopped up close; and in two or three months time, the cider will be fit for drinking. But if you expect cider in perfection, so as to flower in the glass, it must be glued, as they call it, and drawn off into bottles, after it has been a short time in the cask. Glueing is done by pouring into each vessel a pint of the infusion of sixty or seventy grains of the most transparent isinglass, or fish glue, imported from Archangel, in a little white wine and river or rain water, stirred well together, after being strained through a linen cloth. When this viscous substance is

put into the cask, it spreads itself over the surface like a net, and carries all the dregs to the bottom with it." *Dict. of Arts.*

Cider should not be too often drawn from the lees; for each time it will lose some of its strength. The first racking, in December, may often be sufficient: If not, it should be racked again in March. And to prevent its fretting or fermenting at other times, care should be taken at every racking to stun the cask well with matches of brimstone. This is found to conduce more to keeping liquors in a good state, than any thing else.

To make matches for this purpose, take strips of old canvas or linen, six or seven inches long, and nearly as wide as the bung hole; and dip them half their length in melted brimstone. Burn one of these matches in the barrel to be filled, put in two or three pailsful of the cider, then burn another, stop up the cask, and roll or shake it well for a few minutes; fill up the cask, and bung it tightly; for there will be no danger of any fermentation that will injure the cask.

If new cider be treated in this manner when it comes from the press, it will not need racking till February or March.

The above method is doubtless good. But I have found it answer well, to do nothing to cider till March, or the beginning of April, except giving a cask a small vent hole, and keeping it open till the first fermentation is over; then draw it off into good casks; and then fine it with skimmed milk, eggs broke up with the shells, or molasses. A quart of molasses will give a fine colour to a barrel of cider, as well as carry all the lees to the bottom.

bottom. But lest it should incline the liquor to prick, I put in, at the same time, a quart of rum or brandy; and it seldom fails of keeping well to the end of summer.—But cellars should have neither doors nor windows kept open in summer, where cider is kept. And the casks should stand steady, and never be shaken, so as to disturb the sediment.

Those who choose to boil their cider, must do it as soon as it runs from the press. Some boil it, till it is reduced to one half. But much of the finest spirit evaporates; and though it will be made a good deal stronger by boiling, it becomes a harsh, heady and unpleasant liquor.

The best method of reducing the quantity without waste, if strong cider be thought desirable, is by freezing. A strong cask, two thirds filled, may be exposed to the greatest cold of December and January; and then the fluid part drawn out from the surrounding ice. The liquor will be strong, pleasant and wholesome, after mellowing by age; and be free from that tang of the kettle, which renders boiled cider unpleasant, and unwholesome.

The best way is, to give cider no more boiling than is necessary to purify it; that is, to boil it no longer than the scum continues rising upon it. And the scumming must be continued so long as it continues boiling.

Boiling in brass kettles, even for a short time, gives cider a disagreeable taste, and renders it unwholesome. I should prefer iron kettles for this use rather than any other, in full confidence that if particles of iron should be plentifully mixed with the liquor, they would have a salutary effect,

rather than the contrary. But this will make it a black liquor.

When cider is in danger of pricking, almost any alkalious substance will prevent it. But such substances should be used cautiously, either in a small quantity, or just before the liquor is used.

Two or three spoonfuls of ginger in a cask of cider will correct its windiness, and make it more palatable. Honey and spices will mend cider that is two vapid and flat. But medicating it with raisins and currents, often occasions cider to turn sour, unless prevented by the addition of spirit.

CIDERKIN, the English name of what we call water cider. The forementioned correspondent very judiciously recommends the English method of making it, which he represents as follows: "When the cider cheese has been pressed till it will run no longer, remove the pomace into the trough at evening, and throw a sufficient quantity of hot water upon it; let it lie all night, and in the morning make a new cheese of it, and press out the liquor." If the pomace was ground over again, the ciderkin would be stronger. But there is danger of its becoming pricked during this operation, unless the weather is very cool. If the attempt is made in a warm season, cold water should be used. And in any season, though hot water will make the ciderkin the stronger, it will have a bitterish taste, which will not be agreeable to every palate.

This, he says, will be fit for drinking in June or July, as free from change as cider commonly is in February or March. But I should think it more safe to use it earlier, lest it should be spoiled

spoiled for want of strength sufficient to preserve it ; but the best method of keeping it is to bottle it.

But the best way of managing ciderkin is, to take it directly from the press, give it a heating, or a gentle boil, and take off the scum. This greatly prevents fermentation, and prepares it for long keeping. From my own experience I can testify the excellent quality of boiled water cider, when it has been made in the common way ; especially when it has been bottled in the latter part of winter, or beginning of spring. So that I can give full credence to his assertion, " That in the hottest part of the following summer, it will be one of the pleasantest of liquors, that can be procured from any country : And that it might make a very good export to the West Indies ; there being no danger of the bursting of the bottles, as there is when cider has a stronger body."

When apples are not plenty it is good economy to increase the quantity of good drink, by the making of ciderkin. A cheese of middling size will yield at least one barrel of ciderkin.

When cider needs fermenting, Mr. Chapman directs, " To one hoghead of cider, take three pints of solid yeast, the mildest you can get : If rough, wash it in warm water, and let it stand till it is cold. Pour the water from it, and put it in a pail or can ; put to it as much jalap as will lie on a six pence, beat them well together with a whisk, then apply some of the cider to it by degrees, till your can is full. Put it all into the cider, and stir it well together. When the ferment comes on, clean the bung hole every morning, and keep

filling the vessel up. The ferment, for the first five or six days, will be black and stiff ; let it stand till it ferments white, as it will in fourteen or fifteen days ; at which time stop the ferment ; otherwise it will impair its strength.

" To stop this ferment he directs to rack it into a clean cask, and when near full to put in three pounds of coarse red scouring sand, and stir it well together, and fill it within a gallon. Let it stand five or six hours, then pour on it softly a gallon of English spirit, bung it up close, but leave out the vent peg a day or two. Then just put it in the hole and close it by degrees. If the cider be strong, the longer you keep it the better will be the body. It may lie in this state a year. If it be not then bright and clean, force it."

The forcing he recommends is this : " Take a gallon of perry or stale beer : Put to it an ounce of isinglass, and let it sleep three or four days. Keep whisking it. When it comes to a stiff jelly, beat it well in your can with a whisk, and mix cider with it till you have made the gallon four : Then put two pounds of brick rubbings to it, stir it with two gallons more of the cider added, and apply it to the hoghead. Stir it well, and stop it close. The next day give it vent, and it will be fine and bright.

" To cure acid cider he directs to the use of weak alkalies, chalk, oyster and scollop shells, egg shells and alabaster, calcined. But when a hoghead is soon to be drunk, salt of tartar, or salt of wormwood with milk and isinglass.

" To cure oily cider—one ounce salt of tartar, and two and a half of sweet spirit of nitre in

a gallon of milk—for a hog-head.

“To cure ropy cider—six pounds powdered alum, stirred in well; then rack the cider, and force it.

“To cure ill flavoured cider—ferment it with yeast and jalap—stop it after four days—and apply a pound of sweet spirit of nitre to a hoghead.

“To colour cider—two pounds of sugar burnt black, dissolved in two quarts of boiling water. Half a pint of this will colour a hoghead; add a quarter of an ounce of alum to set the colour.”

To meliorate common cider, and render it as strong and pleasant as wine, the addition of honey, or clarified sugar, with the distilled spirit of cider, will do wonders; making it equal to French wines. This is the more worthy to be attended to, as the lees of cider and pomace from which cider has been made, by distillation may be made to yield a sufficient quantity of cider brandy, to make all our cider as strong as some wines. But if these were not sufficient, cider that is too sour for drinking, provided it be not vinegar, will make a good brandy, and yield more spirit than that which is pleasanter.

The reader may find particular directions concerning this matter, in *Tracts on practical Agriculture, by B. Weston, Esq.*

The method of a gentleman in the county of Essex, whose cider is become famous for its extraordinary quality, is as follows:

“Gather the apples dry: House them in an airy apartment: Spread them not more than two feet thick: If the weather prove warm, turn them once or twice: If they begin to rot, grind them in a cool day. But the longer apples are kept in a

found state before grinding, the greater certainty of having good cider.—Put the liquor from the press into vats containing at least three or four barrels, with a tap fixed near the bottom. Cover it close, and let it remain till the first fermentation is over, which is known by a white froth coming up through the dark scum on the top. Then draw off the liquor into casks perfectly sweet, and stummed with matches of brimstone: And put two gills of brandy in each barrel. Stop the barrels so tightly that no air can get in. In March draw off the cider again into stummed casks, with brandy as before.

“To refine, and give a deep amber colour, take the whites of six eggs, with a handful of fine beach sand washed clean: Stir them well together. Take one quart of molasses, boiled down to a candy: Cool it by pouring in cider, and put this, together with the eggs and sand, into a barrel of cider.—When cider is thus managed, it will keep good for years.”

CIVES, or CHIVES, a perennial species of onion, of a very small size, seldom growing a foot high. The roots are but little bulbous, and they grow in tufts. The way to make them increase fast is, to divide the tufts into small parcels.

Another kind are called French cives. Their increase is more rapid. Both kinds are up early in spring, and are much used in sallads.

CLAY, a ponderous kind of earth, consisting of fine particles, firmly cohering when dry; and when wet viscid and tenacious. It is of various colours in different countries. But in this country it is mostly either a dull blue, or of the colour of ashes. In

Nevascotia,

Novascotia, the clay is of the colour of a well burnt brick.

CLAY SOIL, land which consists almost wholly of clay, with perhaps a thin surface of dark mould over it, made by substances which have consumed upon it. This kind of soil abounds in the northeastern territories of Massachusetts.

Clayey lands are apt to be very barren in their natural state, unless when a summer is so divided betwixt rain and sunshine, that they are kept on a medium continually betwixt drought and wetness, which seldom or never happens. In a wet season, plants growing on such a soil are drowned, as the closeness of the clay will not suffer the water to soak into the ground: And in a dry season, the ground becomes so solid that the roots of plants cannot penetrate it, some few strong feeders excepted.

This kind of earth, however, is thought to contain more of the food of plants than almost any other. But something needs to be done to bring it into action. The European farmers think their clay soils the richest, and most valuable of their land. But many of our farmers despise them, for want of knowing what methods to take to render them profitable; or through fear of the labour, or expense, of doing it.

Some of these soils, without much alteration, will bear good crops of grass, if care only be taken not to feed them close in autumn, nor to let cattle in upon them in the spring. But the farmer, who wishes to keep them in tillage, must alter them by the admixture of such substances as may serve to open the soil, and break the cohesion of its particles. When this is once accomplished, the land will become

highly valuable; holding the manure to admiration, and never returning to its pristine state.

Dung is helpful towards opening a clayey soil, by the fermentation it raises, as well as by the mixture of its earthy, saline and oily particles. But dung of itself will not be sufficient, unless it were laid on more plentifully than farmers can well afford. A mixture of dung and sand is found to be a much better dressing for this sort of land, than dung alone. And if sand be not too far distant, it would be advisable to put on a layer of it two or three inches thick. Beach sand is preferable to any other, as the saltiness of it will help to make the ground fruitful. But pit sand will do very well; or rather, that which has been washed down to low places in the roads.

In places where sand is not to be had, the ground may be loosened with other substances. Gravel, or light loam, from neighbouring spots, may be carted upon it; dust from saw pits, chips and rubbish from the back yards of houses, straw and stubble, swamp mud, the bark of trees and rotten wood, or burnt clay. I have known a clayey spot made very fruitful, merely by the remains of a rotten log fence, when mixed with the soil.

When a clay soil is sanded, or any other thing laid on to open it, it will take several ploughings and harrowings to mix it, so as to bring the land to a good consistence. As the expense of mixing it at once would be too great, it is better to use it for two or three years after, for the growing of such tillage crops as are most suitable to a clayey soil, such as barley, flax, &c. The soil will grow better year after year,

till the sand, &c. is thoroughly mixed with the soil; after which it will be fruitful forever without large dressings. Hoed crops will mix it sooner than any other method, and without any expense.

A small quantity of dung, each year that it bears a hoed, or a green crop, will be proper: And the most suitable dungs are those of horses and sheep, pigeons and other fowls, which by their heat will correct the natural coldness of the soil.—Folding with sheep has an excellent effect on this kind of land.

Such a stiff soil is also mended by frequent ploughings. The Europeans allow three ploughings previous to seeding, to be enough for a free soil; but to a clayey soil they give four or five. The oftener it is stirred with the plough, the more the cohesion of the particles is broken, and the more easily the roots of plants can penetrate it in search for their food. But it never should be ploughed when it is so wet as to potch with the feet of the cattle, or to run like mortar. In this condition, the more it is worked the stiffer it will become. On the other hand, when it is very dry, it cannot well be ploughed, by reason of its hardness. Suitable seasons should be embraced, for ploughing it, when it is neither too wet nor too dry. At the first ploughing it comes up in large clods; but the oftener it is ploughed in fit times, the smaller the clods will be, and the more fine mould will be among them.

Exposing the clods to the sun and air has some tendency to mellow the soil: But a winter furrow is of very great advantage. The frost does much towards breaking the cohesion, as I have found by experience.

Clay soils, after all the melioration that can be given them, will be more suitable for some plants than for others. Those plants in general which require a great degree of heat, or a long summer, are not so well adapted to be cultivated in a clayey soil, such as Indian corn, tobacco, &c. But it may be made to produce good crops of wheat, grass, barley, oats, flax, cabbage, &c. No good eating potatoes or carrots are ever produced in such a soil.

Fruit trees, in general, and I think all sorts, excepting pear trees, answer but poorly in a clayey soil, how much soever the surface may have been mixt with other substances. The roots of trees will need to draw some of their nourishment from a part of the soil below that which has been meliorated by mixing; but the compactness of it will scarcely suffer them to penetrate it.

Fallowing and green dressing may help to pulverize a clay soil; and sowing it frequently with pease is recommended. Any crop that forms a close cover for the surface causes the soil to putrefy, breaks the cohesion of its particles, and prevents the ground from hardening by the influence of the sun.

If a clay soil lie so flat that water stands on it some part of the year, it cannot be brought to a good consistence without ploughing in ridges, and water furrowing. The ridges may be wider or narrower, according to the degree of wetness to which it is subject. Sometimes deep drains will be necessary to give it the needful degree of dryness.

CLEARING of LAND, an operation often necessary to be performed in this new country, especially in the most inland parts,

parts. Lands which were before in a state of nature, are said to be cleared, when they are so freed from their natural growth, as to become fit for tillage, mowing, or pasture.

In those parts of the country where wood is of little or no value, the method of clearing upland is as follows:—The trees are felled in one of the summer months; the earlier in summer the better, as they will have a longer time to dry, and as the stumps will be less apt to sprout. The trees lie till the following spring; when the limbs which do not lie very near to the ground should be chopped off, that they may burn the better. Fire must be put to them in the driest part of the month of May; or if the whole of May prove wet, it may be done to advantage in the beginning of June. Only the bodies of the trees will remain after burning, and some of them will be burnt to pieces. Then they are to be cut into pieces nearly of one length, drawn together by oxen, piled in close heaps, and burnt; only reserving suitable trees, which will be needed for the fencing. The heating of the soil so destroys the green roots; and the ashes, made by burning, are so beneficial a manure to the land, that it will produce a good crop of Indian corn, or wheat, the same year, without ploughing, hoeing, or manuring. Indian corn is most commonly the first crop; and it will bear a good crop of winter rye the second year, if the seed be only hacked in with hoes in September, before the Indian corn is harvested. After which, if grass seeds be thrown in with the rye, the land will be fit for pasturage, if not for mowing. The few sprouts which spring up from the

stumps in the first summer, should be pulled off, and the ground is quite subdued. But if wheat or rye be the first crop, the ground must be well harrowed; once before sowing, and once after. And it often happens that the first and second crops pay the farmer well for all the labour of clearing and fencing. It is certain that sometimes the first crop will do it.

The invention of this kind of culture has been of essential advantage to the poorer sort of people: And it has been conducive to bringing forward rapid settlements in our new towns and plantations. A farm may be thus begun in the wilderness with little or no stock.

But those persons who are able to do it had better plough and harrow their ground after burning, before they seed it. The ashes will thus be well mixed with the soil; and the land has always been found to retain its fertility the longer, when so managed.

If new land lie in such a situation, that the natural growth may turn to better account, whether for timber or fire wood, fencing or charcoal, it will be an unpardonable waste to burn the wood on the ground. But if the trees be taken off, the land must be ploughed after clearing, or it will not produce a crop of any kind. And some warm kind of manure will be needful, if Indian corn is planted on it. This is the case at least in the most northerly parts of Newengland. But rye will answer extremely well without manure.

When new lands are destitute of trees, and covered with oak shrubs, the clearing is more expensive, and the first crops not so profitable. But such lands should

should not remain unsubdued, as, in their present state, they are quite unprofitable, and a nuisance. The bushes should be cut with stub sitches or axes, piled in heaps, and burnt. After which the roots may be subdued by goats; or ploughed up with a strong team, the plough being proportionably strong. Some of those spots will require a team of 50 oxen to plough them. After ploughing, the roots must be taken out with a strong narrow hoe, with a good sharp edge.

Other methods must be taken for subduing low swampy lands. See the articles *Bog*, *Bushes*, *Draining*.

CLIMATE, a word used by Geographers, to denote a space on the earth contained between two parallels of latitude, so far distant from the next climate, that the length of the longest day in one, differs half an hour from that in the other. But the word is often used less accurately, to signify a region, or large tract of land, or a distinct country.

A farmer must pay due attention to the climate, in which he is situated, or he will not carry on agriculture to advantage. He must govern all his schemes of management by the peculiarities of the climate: Because that which proves successful in one; will not do so in another.

"The climate," says Mr. Dickson, "determines the times of ploughing and sowing; it directs our choice in the kind of plants to be cultivated; it regulates the whole economy of the farm, and informs the husbandman how to appoint the order of the different kinds of labour necessary, so as he may be always usefully employed. Nothing has more effectually retarded the progress of agriculture, than the

attempts that have been made to introduce general schemes, without any regard to the climate. A lover of agriculture, captivated with a scheme of husbandry, which he has observed in Flanders, or in some of the southern counties of England, without any proper preparation, attempts to put this scheme in practice in one of the shires of Scotland, notwithstanding the great difference of climate. This attempt proves unsuccessful, as it is natural to expect, where circumstances are so different. No person is so foolish as to suppose, that all kinds of plants can be cultivated with equal success in all climates: It is even vain to imagine that they can be cultivated with equal success in all parts of this island, or in all places in the same latitude. A very small distance sometimes makes a very great difference in climate, in the degrees of heat and cold, and in the quantity of rain that falls."

CLOG, a wooden instrument, fastened to the neck or leg of a beast, to prevent his leaping over, or breaking fences. The best clog for the fetlock of a horse, is made of one piece of tough wood bent over at one end. Into a notch, near this end, a leathern strap, nailed to the long part of the clog, is slipped over the end. It may be put on, or taken off, in an instant.

CLOVER, *Trifolium pratense*, a species of trefoil, esteemed as an excellent grass for the feeding of cattle, both green and dried. The hay made of clover is more suitable for horses than any other that this country affords. Horses kept on it will fatten, even in the most unfavourable season of the year. It answers well when used as soiling,

ing, or eaten out of racks without drying.

Green clover is known to be good feeding for swine. Keeping them in pastures, where there is plenty of this grass, will make them grow fast, and fatten so as to almost become fit for the knife. But when they go in pastures they should have rings in their noses. Otherwise they will root out the clover.

Red and white clover are the only sorts known and esteemed in this country; as to the wild sort, or variety, with a rough leaf, it is of no consequence. It is the red clover that is of most importance for mowing. The white is generally too small and short, unless when it is drawn to a greater height by being mixed with other grasses.

Many farmers, instead of sowing clean seed of clover, content themselves with sowing chaff and dust from the floors of their barns. This is a slovenly and uncertain method, oftentimes attended with great loss. Fowls are usually admitted into barns; and when this is the case, none can tell how much, or how little of the hay seed remains among the dust: So that the farmer who sows it, may either over seed his land; or, which is a more common case, not seed it half enough. A consequence of which last will be, that he will have no good crop of hay from his sowing. He must either plough up his land again, for the mere purpose of seeding it with grass, or let it lie useless till the grass gradually gets in; either of which expedients will be attended with inconvenience and loss.—I am aware that farmers, especially those in the northern parts of Newengland, will object, that if grass do not get in the first year,

it will the second. But they should consider that the loss of the first year's crop is considerable. Not only so, but it is losing the best crop that is to be expected from a clover lay; and the land will become bound and weedy, before it is filled with grass roots; so that no large crop will be had from it afterwards, nor any clean or unmixed crop, from which it will answer to take clean seed.

The quantity of clover seed proper for an acre is about ten pounds, or some say less. The price of a pound is from eight pence to one shilling. The cost of the seed need not terrify a farmer; because he will be more than paid double for the seed, by the advantage the first year's crop will receive from a good seeding of the ground.

It is no small recommendation of this grass, that it is adapted to a soil, that is suitable for scarcely any other grasses, which are cultivated in this country; to a soil that is dry, light and sandy. It does well also on gravel and loam. A wet soil is not good for this grass, especially if water and ice appear on it in the winter, or spring. In case of drought, it is lucky for farmers to have some of their mowing lands in this grass: It bears drought better than most other grasses, as might be expected for two reasons—because it is so early as to be grown up to maturity, before the hottest part of summer, when the severest droughts most commonly happen; and because the plants, being tap rooted, draw great part of their nourishment from a depth, where the soil is not much affected with an early drought.

European farmers recommend sowing it in the spring, after the grain

grain is up, and harrowing it in; and they tell us the harrowing will not damage the corn, but rather be a service to it, when it is either spring or winter grain. That it should be sowed in the spring is granted, unless it be in countries where there are no severe winter frosts. The young plants, which come up in the fall, cannot bear the frost so well as those which have had a whole summer to bring them on towards maturity. Their reason for not sowing it at the same time as the grain it grows with, is an apprehended danger of its growing so fast as to obstruct the growth of the grain. But I have never found this to be the case in fact.

Mr. Eliot recommends a different method, which is ploughing in the seed; which, he thinks, and not without reason, will cause it to bear drought the better, and become the more strongly rooted. I believe I may add, that it will be more likely to escape in the frosts of winter, which are so intense in this country, as often to kill almost whole fields of clover.

Peat ashes are said to be a very proper dressing for clover grounds.—But this grass answers so well in this country without manure, that the farmers choose to set apart the whole of the manure that they can get for other purposes.

Some think clover is so far from needing any manure, that it will recruit lands which are worn out. That it will do it more than other grasses I cannot yet see any reason to believe. It will bear no crop worth mowing, on lands which are quite exhausted. But it is probable it may produce good crops, on lands which are much impoverished near the surface, by bearing

plants with short, fibrous, or horizontal roots; because clover sends its main roots to a great depth. And while a field lies several years in clover, the soil near the surface may be considerably recruited. But whether the land on the whole will be in better heart, after several heavy crops of clover are taken from it, and no manure laid on, seems rather doubtful.

Writers on agriculture seem, however, to be agreed, that a clover lay is proper for the culture of wheat. The rotting of its large roots and stalks may answer as a good manure, no ways adapted to distemper the wheat, as some other manures are thought to be.

Some skilful farmers insist much on the propriety of sowing clover seed with barley. I suppose it will answer well with almost any grain that we call English. But with a crop of pease, or with any other crop that forms a close shade to the soil, it will not answer. The young plants must have some advantage of the sun and air, or they will not live. And if it be sown with flax, at least in some loose soils, the pulling of the flax will be apt to eradicate much of the clover.—Crops which lodge are also destructive to the young clover, by forming so close a cover as to stifle it. Therefore, when clover seed is sown, either with barley or flax, the ground should be rather under than over seeded, to prevent lodging.

Clover being an early grass, it is commonly fit to cut in June. When half the heads are turned from red to brown, and on the decay, it is the right time to mow it. But if the seed is to be saved for use, it must stand till it is all dead ripe, both heads and stalks.

stalks. It requires more care to make clover into hay than most other grasses. That which is mowed in a morning should be spread, turned, and raked up before night. The next day, if the weather be fair, it must be opened, stirred once or twice, and cocked up again. Then, after sweating a day or two, it may be put into the barn. Rank clover requires much more drying than that which is of a moderate growth. And the hay is not so good.

In the most southerly parts of Newengland, land in good heart will bear two crops of clover in a year. Mr. Eliot, therefore, recommends sowing the second crop for feed, the first crop having been mowed early. But two crops are not to be obtained in the northern parts of this country. And, if they were, so frequent a cutting would be apt to make the roots shorter lived. It is advisable to pasture it in May, and then let it grow for feed. It is best to cut clover for feed on land that is soon to be broken up: Because a crop of feed weakens the roots much more than a crop of hay; and it is doubtful whether it will bear any considerable crop afterwards. Indeed, no crop of clover is of any great importance for hay, after the second year. For it is a biennial plant.

The white clover, vulgarly called honeyfuckle, is an excellent grass, and seems very natural to this country: But when sown by itself, it does not grow tall enough for mowing. It is good for feeding in pastures, during the fore part of summer, at which time it often appears in great plenty.

The hop clover is new in this country, but seems to appear not

very promising. It is said to flourish on the most barren sands, and continue long in any soil. It is of two kinds, large and small, and the heads are yellow. I once sowed a small bed of it. It did not prosper, being almost wholly destroyed by the following winter.

The European farmers are cautious of turning neat cattle in to feed in a field of luxuriant green clover, for fear of their being *hoven* with it, as it is called, or so swelled by eating it greedily, as to be killed by it. But this is an inconvenience, which I have never known to take place in this country. The way to save the life of hoven beasts, is, to stab them between the hip and the short ribs, where the swelling rises highest. It is performed with a narrow, sharp pointed knife, which makes an orifice in the maw, and lets out the air that oppresses. The wound soon heals of itself.

COLE SEED, *Brassica Rapa*.
 "This plant, which is generally known by the title of rape; or cole seed, is much cultivated in the isle of Ely, and some other parts of England, for its seed, from which the rape oil is drawn; and it hath been also cultivated of late years, in other places, for feeding of cattle, to great advantage.

"The cole seed, when cultivated for feeding of cattle, should be sown about the middle of June. The ground should be prepared for it in the same manner as for turnips. The quantity of seeds for an acre of land is from six to eight pounds, and as the price of seed is not great, it is better to allow eight pounds; for if the plants are too close in any part, they may be easily thinned, when the ground is hoed; which must be

be performed in the same manner as is practised for turnips, with this difference only, of leaving these much nearer together; for as they have fibrous roots and slender stalks, so they do not require near so much room. These plants should have a second hoeing, about five or six weeks after the first, which, if well performed in dry weather, will entirely destroy the weeds, so that they will require no farther culture.

“Where there is not an immediate want of food, these plants had better be kept as a reserve for hard weather, or spring feed, when there may be a scarcity of other green food. If the heads are cut off, and the stalks left in the ground, they will shoot again early in the spring, and produce a good second crop in April, which may be either fed off, or permitted to run to seeds, as is the practice where this is cultivated for the seeds: But if the first is fed down, there should be care taken that the cattle do not destroy the stems, or pull them out of the ground. As this plant is so hardy as not to be destroyed by frost, so it is of great service in hard winters for feeding of ewes; for when the ground is so hard frozen as that turnips cannot be taken up, these plants may be cut off for a constant supply. This will afford late food after the turnips are run to seed; and if it is afterwards permitted to stand for seed, one acre will produce as much as, at a moderate computation, will sell for five pounds clear of charges.” *Gardener's Dictionary*.

The Rev. Mr. Eliot, who made some trial of this plant, is doubtful whether it will answer for winter feeding in this coun-

try, because of the severity of our frosts. But the above author adds—“The curled colewort, or Siberian borecole, is now more generally esteemed than the former, being extreme hardy, so it is never injured by cold, but is always sweeter in severe winters, than in mild seasons.”—A gentleman informs me, that, in Boston, Newengland, he has made trial of this plant, and found that the winter did not injure it. It is fit for the table from December to April.

I myself made trial of three kinds of borecole the last year, in the latitude of 44. It grew very well till winter; but not one plant in fifty had any life in it in the following spring. The sorts were the green, the white, and the red. But it is probable that in some parts of Newengland, and in warm situations, this plant may be cultivated with advantage; though not in fields, I think it may in gardens.

COMPOST, a mixture of various manures and soils, to be laid on land to promote vegetation.

Composts ought to be different, according to the different soils on which they are to be laid. A soil that is light and loose requires a compost that is heavy, or one which has a large proportion of the mud of deep ditches, swamps, or ponds, and cow dung. But clayey and heavy lands require a compost, in which something that is light and warm predominates, as lime, the dung of horses and sheep, &c.

Composts may be made of common earth, turfs, the dirt of streets, straw, mud; together with dung, lime, marle, ashes, weeds, salt, or oily substances, and any kind of animal or vegetable

table matters. They should be well mixed, and lie one year, one summer at least, in heaps, and be several times shoveled over, to promote fermentation and putrefaction, and to destroy all the seeds of weeds.

They should be kept, if practicable, in a temperate degree of moisture. If they lie too wet, they will turn sour, and not putrefy: If too dry, there will be no fermentation at all.

Composts are esteemed better than dung, for the dressing of land for wheat, as there is not so much danger of distempering the grain, nor of increasing the growth of weeds, nor of propagating insects.

A compost of clay, turf, ditch earth, with lime, soot, or ashes, is an excellent dressing for grass lands. The time to lay it on is in autumn. Neither would it be amiss to do it in the spring; only as carting it on would be apt to injure the surface when it is wet and soft. See *Dunghill*.

COPSE, or COPPICE, a piece of underwood. "When a copse is intended to be raised from mast or seed, the ground is ploughed in the same manner as for corn; and, either in autumn or in spring, good store of such masts, nuts, seeds, berries, &c. are to be sown with the grass, which crop is to be cut, and then the land laid for wood. They may also be planted about autumn with young sets, or plants, in rows about ten or fifteen feet distance. If the copses happen to grow thin, the best way of thickening them is, to lay some of the branches or layers of the trees, that lie nearest to the bare places, on the ground, or a little in the ground. These, detained with hooks, and covered with fresh mould, at a competent

depth, will produce a world of suckers, and thicken a copse speedily." *Dict. of Arts*.

CORN, the farinaceous seeds of certain vegetables, of which bread is made. But the name is usually applied, not only to the seeds, but to plants which produce them.

As these seeds are various, the idea commonly affixed to the word *corn*, differs in different countries, according as one or another sort is most cultivated. In this country it is chiefly applied to maize, or Indian corn. But in Europe it is a general name of grain, including wheat, rye, barley, oats, rice, buck wheat, &c.

It is greatly to be wished that several kinds of corn were raised in greater plenty, in the northerly parts of Newengland; that we might no longer depend upon importation for those necessary articles, while we are so poorly able to make remittances for them in our own produce. I am persuaded, the same quantity of labour, which is used for this purpose, and on a less quantity of soil, if wisely applied, would produce the happy effect. No sort of corn should be sown on a soil which is naturally unsuitable for it. Maize, for instance, not on clay, nor wheat upon sand, or gravel. Neither should attempts be made to raise grain without sufficient tillage; that so what is done may not be labour thrown away. It is ridiculous, in ordinary cases, to hope for a large crop of grain from one ploughing; or to imagine that the grain will be plump and good, when it is suffered to be choked with weeds. In the older countries, farmers do not sow wheat, nor scarcely any other grain, till after two or three ploughings:

ploughings : And they make as much account of weeding their grain, in some places, as we do of weeding our gardens.

The more tillage is given to land, the less manure is needed : And the increase of crops would richly pay for the extra tillage. The cost of second and third ploughings is but little, as it may be performed with one horse, or a small yoke of oxen.

The only grain, to which we afford near, enough tillage is Indian corn : But even to this more might be profitably applied. They who hand hoe it without ploughing are no small losers by that management. See more concerning corn, under *Wheat, Rye, Barley, &c.*

COULTER, an important part of a plough. See *Plough.*

COW, "the female of the ox kind. The marks of a good cow, according to some, are these : The forehead broad, the eyes black, the horns large and clean, the neck long and straight, the belly large and deep, the thighs thick, the legs round with short joints, and the feet broad and thick.—Red cows are said to give the best milk, and black ones to bring the best calves. But the cow that gives milk longest is the most beneficial for breeding and profit, especially where one only is kept. Just before calving, cows should be very well fed ; and if they calve in winter, their drink should be a little warmed, a day and a night after their calving." *Dict. of Arts.*

I may add here, if the cleaning of a cow after calving be delayed, it may be promoted by giving her a pail of warm water with some ashes in it.

Cows should be milked regularly, morning and evening, and

always at the same hours, as nearly as may be. At six in the morning, and six at night, is a good general rule, as the times of milking will be equidistant from each other. But if they are milked three times a day, as a modern writer on husbandry recommends, it may be done at five, one and eight. He believes that if they are full fed, they will give half as much again milk, if milked thrice as if only twice. At the same time, it would prevent a too great distention of their bags, to which our best cows are liable. If the milking be once omitted, they will give much more at the next milking ; but it will cause them to give less milk on the whole, and tend to dry them up.

No animals that we keep are more profitable than cows. Supposing a cow to yield one gallon of milk per day, one day with another, for forty weeks, (and it is a poor cow that will not do more than this in a year) at only two pence per quart, the milk will come to 9l. 6s. 8d. which will pay for her body, and for her year's keeping. The clear profit of a cow, therefore, in two years, may be allowed to be about 10l. supposing her to be worth 5l. and her keeping to cost 4l. 6s. 8d. per annum. But in some places their keeping is lower than this ; and oftentimes a cow may be purchased for ten or twelve dollars.

COW HOUSE, that apartment in a barn, in which cows and other neat cattle, are tied up and fed, during the winter, and part of autumn and spring.

Farmers may think they need but little teaching concerning these apartments, as they have been so long acquainted with them. But I shall take the liberty

erty to give them the following directions, which they may receive or reject; as they think fit.

In the first place; it is of no small importance that the floor under a cow house be very tight, so that none of the stale may be lost, which is of great value as a manure, when mixed with other substances. A farmer would be no more blameworthy for throwing away the dung than the urine of beasts, which contains abundance of fertilizing salts and oils. But if it be suffered to run through the floor, it is entirely lost.

The descending position of the floor has been mentioned under the article *Cattle*. This descent will convey the stale through the chinks in the side of the barn; unless some caution be used to prevent it. One edge of a plank may be fitted to the sill, nailed to the posts of the building, and the joint between that and the sill caulked. Or a quantity of dry earth may be laid along on the sill. Green sods will answer as well. It will take several cart loads for a long apartment. This earth will be gradually taken up and mixed with the dung, as it is shoveled out during the winter. Or if sods are used they will be well impregnated with the excrements of the cattle, and partly dissolved, by lying from fall to spring in such a situation. If the dung be designed for a sandy soil, clay will be the best earth for this purpose; if for a clayey soil, sand will be most proper. Any kind of earth, however, will serve to absorb and preserve the stale.—But if a farmer choose to lay straw, weeds, or barn dust, for this purpose, I will not contend; though I think earth is better, as it will be freer from weeds, and sooner fit to use

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as a manure, than those vegetable substances. After this earth is thrown out and mixed with the dung in the heaps, it will be of service in preventing the evaporation, and soaking away of the best part of the manure.

When a farmer thinks himself not well able to be at the expense of a floor of good planks, let him get a quantity of good clay, make mortar, and lay a bed of it a foot thick or more, for a floor; giving it a proper descent backwards, that the cattle may lie dry, and raising it at the hinder border, to prevent the escape of the urine. The floor will grow thinner by being gradually shoveled up with the dung; but it is easy to repair it; and the faster it wears away, the more the quantity of manure is increased.

Also, the floors over a cow house should be more tight than they commonly are. It would prevent the descent of dust and chaff. It would cause the hay above it to be less injured by the air; as well as less contaminated by the breath of the cattle, and the steam of their excrements.

There are different ways of tying up cattle. Some prefer one way, and some another. I prefer stanchions to bows: Not only because the cattle take up less room in this way, but are less apt to waste their fodder. They are also more secure in this way; so that they do not so often break loose, and worry and wound each other.

A cow house should be in the southerly part of a barn, when it can well be so ordered. The cattle will be less pinched with the cold northerly winds. Another advantage is, that the heaps of dung thrown out on that side, being

being in a funny place, will be thawed earlier in the spring, so as to be fit to be carted out in season. On the north side, ice will sometimes remain in the heaps, or under them, till the last of May, or beginning of June.

In this climate, cattle must be housed near half the year; from the middle of November to the last of April, and occasionally at other times. Though they must have fodder for two or three weeks before and after these periods, I think it advisable to let them lie in the barn yard, and eat out of a rack, unless the weather be stormy or the air uncommonly cold. For if they be kept too warm in the fall, they will become tender, and not winter so well; or if lodged too warm in the spring, they are more apt to be lousy.

CRADLE, a frame joined to a sithé, useful in harvesting, by the help of which, three times the quantity of grain may be cut down in a given time that can be with a sickle, and laid tolerably even and regular, for binding in bundles. It is oftener used for cutting oats and rye than for wheat. There is danger, however, of too much waste in cradling, when the corn is thick and heavy, or does not stand upright; the labour also would be too painful and tiresome.

CREAM, the fat part of milk which rises to the surface.

To produce the greatest quantity of cream, the pans in which the milk is set should be flat shaped, so that the milk may not be more than three inches deep. Those in common use are not much amiss. They should be well scalded with hot water, as often as milk is set in them, and be thoroughly cooled. If the

place where milk is set be too warm, it will be apt to turn sour, before the cream has had sufficient time to ascend; and none will rise after the milk begins to coagulate. If the place be too dry, the cream will become tough and hard before it is taken off. If the place be so cold as to freeze the milk, every one knows that but little cream will be gotten from it. The time of skimming must be regulated by the weather, and other circumstances: But nearly the whole will rise to the top in twenty four hours. In large dairies it may be troublesome to let it stand longer.

In the *Scots Farmer*, the following method of skimming is recommended. "The maid gently raises the dish, laying the lip of it on a large pan, and with her fingers ends she divides the cream near the lip of the dish, in such a manner that the milk which is underneath may be poured into the great pan through this division, leaving the cream by itself in the dish."

Some set their milk in trays lined with lead. This should never be done. For the least acidity in the milk will dissolve the lead, and poison the milk. Tin pans are good, being light and handy, and wooden trays answer very well, if kept sweet.

CROP, a year's produce of corn, hay, &c. which a piece of land yields.

The variableness of crops is so great, that none can judge from a single one, whether the same sort would be profitable in the long run. A season that does not happen to be suitable to the soil and plants may either prevent a crop, or render it unequal to the labour laid out to produce it. We should not, therefore, judge

judge of the comparative advantage of any kind of crop from one instance ; nor be discouraged, but by the failure of a crop in a season which is suitable to the soil on which it is raised.

The continual cropping of land with wheat, without intervals of fallowing, will soon exhaust all its strength, unless much be expended in manuring it. For this reason, the horse hoeing husbandry is much recommended by some writers, by which land is not so easily impoverished, as the intervals are always fallowed. So that there is an alternation of cropping, the intervals this year being where the rows were last year. But this culture can hardly be expected to be advantageous in a new country ; nor in any soil which is not quite free from obstacles. The trouble and cost of it would be intolerable, to Newengland farmers, in general.

Small crops are often more profitable on the whole than larger ones. That is the best crop which amounts to a given quantity, with the least expense of labour, seed and tillage ; provided it leave the soil in equal condition for future crops. Yet, in general, land will pay far better for generous manuring and tilling, than for a partial and slovenly cultivation : For, in the former case, a large crop is almost certain ; in the latter no crop worth the culture, such as it is, can be rationally expected. And, in the former case, the land is left after the crop in a far better condition.

CUCUMBERS, *Cucumis*, a cold fruit, which is pleasant to the taste of most people, and much used by those who find themselves able to digest them. They are rendered wholesomer by pickling.

The method of growing them is simple and easy. They should not be planted till after Indian corn ; For the least degree of frost entirely destroys them. The dung of swine should be put under them, which makes them grow more rapidly than any other manure which I have ever tried.

Some steep the seeds, and cause them to sprout, before they are planted : But I have never found any advantage in it. It is not amiss, however, to wet them a little, and coat them with powdered soot.

Mr. Miller thinks the seeds should not be sown till they are three or four years old. Four plants are enough to stand in a hole together ; therefore, when they get into rough leaf, they should be thinned to this number. The vines should be so conducted as to interfere as little as possible with each other. They who wish to raise them at all seasons of the year, may consult the *Gardener's Dictionary*.

I have known surprising quantities of cucumbers raised from tubs. The method is this : Take a very tight barrel tub ; fill it up to the bung with stones, then a little straw, and earth over the straw, enough to fill the barrel. Fill the lower half with water. Instead of letting it steep through the earth, it should be passed through a tube, placed in the earth for that purpose, as often as more water is wanted. The bung should be left out, and the water kept as high as the hole, by repeated waterings. The plants lying so high will be out of the way of insects, which is a great advantage ; and they will not be hurt by drought. The plants should be a little sprinkled, however, with water, once

in a while, if the season prove very dry.

CULTIVATOR, a plough, with a double share and two mouldboards, useful in raising ridges, and in hoeing plants that grow in rows, as in the new husbandry. See that *Article*.

CURRENT, *Ribes*, a species of fruit tree. There are three kinds of currants produced in this country, red, white and black. The red and the white are a wholesome cooling fruit, and flourish well in this part of the country. They are easily propagated by cuttings, setting the young twigs in the ground, which will furnish themselves with roots; and will bear fruit the second year. Some plant them singly, others in clumps. The latter method is disapproved by the best gardeners. If they be set single round the borders of a garden, close to the fence, and fastened to the fence, to prevent their being bowed to the ground when loaded with fruit, they will take up little or no room, and make an agreeable appearance. And it will be easy to keep them free from weeds. When they are planted on the south, or south east side of a wall, the fruit will be ripe in June; but on the north side, they may be kept till October on the bushes, in a sound state.

A wine that is not unpleasant is made of the red kind; but that which is made of the white is preferable; and this ought to be more attended to. This wine mellowes exceedingly by age, becoming equal to the best of Malaga wine, after being bottled a year or two.

The way to make currant wine is as follows: Take ripe currants, wash them, clear them from the stems, add a gallon of water

to a gallon of currants, and bruise them well in the water. Strain it through a cloth. Then to one gallon of the mixed juice and water, put two pounds and three quarters of good brown sugar. Stir it well. When the sugar is dissolved, put the wine into a cask not stopped. When the first fermentation is over, bung it up tightly, and in six months it will be fit for bottling.

CUSTOM, an habitual manner of doing any thing. Methods of agriculture, as well as methods of doing other things, are not seldom founded merely on custom. Farmers do many things, for which they can assign no other reason than custom. They usually give themselves little or no trouble in thinking, or in examining their methods of culture, which have been handed down from father to son, from time immemorial.

In some countries, this practice answers tolerably well. It does best in old countries, where methods, which have not been found to answer well, have been gradually laid aside in a long course of years. But this customary culture has a very pernicious effect, when ignorant farmers remove to a different climate. They naturally continue in the ways to which they have been accustomed. Their crops often prove to be unsuitable to the region they inhabit. They plant, sow and harvest, at the wrong seasons. They sow seeds in unsuitable soils. The consequences are, that their labour is misapplied, their time is lost, they grow poor and disheartened. Perhaps they remove themselves to other places, hoping to mend their circumstances; and when they come thither, their habitual methods will answer still

still worse, rather than better, unless they go back to their first situation, or towards it.

CUTTINGS, or SLIPS, "in gardening, the branches or sprigs of trees, or plants, cut or slipped off, to set again, which is done in any moist fine earth. The best time for this operation, is from the middle of August to the middle of April; but when it is done, the sap ought not to be too much in the top; neither must it be very dry or scanty, for the sap in the branches assists it to strike roots. If done in the spring, let them not fail of having water in the summer. In providing them, such branches as have burs, knobs or joints, are to be cut off, &c. and the leaves are to be stripped off so far as they are placed in the earth, leaving no side branch. Small top sprigs, of two or three years growth, are the best for this operation." *Dict. of Arts.*

Cuttings of the grape vine, gooseberry, willow and currants, are easily made to strike root; those taken from the quince will commonly, and the apple tree will sometimes do so, if the earth be kept very moist. It is best to set them a good depth in the earth, not less than twelve or fifteen inches, or the greater part of their whole length. In this country, the best time that I have found to set them is in April. It should be done as soon as the frost is quite out of the ground.

CYON, or CION, a young sprig or sprout of a tree. Cyons, for grafting, should always be taken from the most thrifty trees, not from those especially which are old and decaying. The time to cut them is in February or March, just before the buds begin to swell, and appear fresh,

which will be earlier or later, according to the season and climate. They should be taken from the ends of limbs of the former year's growth, not from young suckers of an over quick growth; and kept moist in a cellar, with the lower ends inserted in moist clay, or mud, till the proper time for grafting. In such a position they will keep well for two months or more, before grafting. I have had good success in setting them, this present year, 1786, though it was almost three months after they were cut: But I ascribe my success partly to the unusual wetness of the season, which is always favourable to grafting.

D.

DAIRY, the occupation of making butter, cheese, &c. from milk.

"This is the most ticklish part of the farmer's business. Unless he has a very diligent and industrious wife, who sees minutely to her dairy, or a most honest, diligent, and careful housekeeper, to do it for him, he will assuredly lose money by his dairy. Trusted to common servants, it will never pay charges. The dairy maid must be up every morning by four o'clock, or she will be backward in her business. At six the cows must be milked, and there must be milkers enough to finish by seven. The same rule must be observed in the evening. Cleanliness is the great point in a dairy. The utensils should all be scalded every day; the pails, and whatever else are small enough, boiled in the copper daily." *Farmer's Kalendar.*

Dairies are often managed so poorly, that it would be as well,

or better, to feed swine with the milk as fast as it comes from the cows. This method has been tried, as I am informed, by a single man, somewhere about Newbury, who was convinced it was a better method than to hire help to carry on the dairy.

If milk turn sour before the cream be well risen; or, if maggots get into the cheeses, the profit of a dairy will not be much. See *Cheese*.

Butter is oftener well managed than cheese. But there are few who salt early made butter so that it will keep good and sweet. An ounce and a half, or more, of the strongest and best salt, very finely powdered, should be worked into a pound of butter, and so thoroughly mixed that every part may be equally salt. For if ever so small a part misses of being salted, it will turn rank, and communicate its ill taste to the remainder. It should then be put into tubs that are quite sweet, 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. The same should be done as often as any is taken out for use. The tubs, during summer and fall, should stand on the bottom of the coldest part of the cellar. When there is occasion to carry butter to any distance for sale, in hot weather, let not the tubs, or boxes, be exposed to the heat of a traveling horse, by lying against his sides. For by this practice it is known that a

great deal of butter is greatly damaged.

DAIRY, or DAIRY ROOM, a house or apartment where milk is kept, &c.

Our farmers and their wives seem to think it necessary, or highly convenient, to have a dairy room annexed to their dwelling house, partly above and partly below ground, that they may dry their cheeses in the upper part, and set milk and cream in the lower. This, in wooden houses, is certainly not the best practice, and occasions much loss. For such an apartment will be too hot in summer, and too cold in winter, to keep milk in it; neither will it be possible to keep it so sweet as it ought to be kept.

An apartment in a cellar is better on every account to keep milk in. As to drying of cheeses, they should never be kept to dry in the same room where milk is set; for they will undoubtedly communicate an acidity to the surrounding air, which will tend to turn all the milk sour that stands within the same enclosure. And a drier room would be better for the cheeses; only let it be kept dark, that the flies may not come at them. So that, instead of a place called a dairy, there should be a milk room, and a cheese room, in a farm house.

A room in a cellar may be kept so nearly of an equal coolness, by means of burning a few coals in it; when the weather is cold, that the milk will neither grow sour in summer, nor freeze in winter: So that nothing will obstruct the rising of all the cream. It is supposed that the warmth of the air in a milk room ought to be from 50 to 55 degrees on Fahrenheit's thermometer. But a few degrees over or under

under will produce no very disagreeable effects. The cellar should have such windows as will afford a sufficient quantity of light, and be on the most northern side; and they should be opened now and then to let in fresh air, particularly in the coolest of the mornings in summer. The room should be ceiled with plaister, to prevent the descent of dirt; and the top and sides white washed, to increase the light, and fill up chinks that harbour insects. Every part should be kept extremely clean and sweet, and nothing should enter into it which can corrupt the air. The floor should be made of stones, bricks or tiles, and be frequently washed in summer with the coldest water, to cool and sweeten the air in the room; and milk should not be suffered to stand in it till it becomes sour, lest the sourness be communicated to that which is sweet. For the same reason, cream which is put by for churning, ought not to be kept in that apartment which contains the milk. Because acidity in cream is expected, and necessary before butter will come.

Those who have large dairies, in hot climates, having a spring or brook near the dwelling house, might find it worth while to build a milk room over it, with a stone floor, and a channel in the floor to pass the water all round, near the insides of the walls. The pans may be set in the channels, and water let in at pleasure, to cool the milk in the hottest season. An arch of brick should be turned over the building. The windows, to let in light and air, should be on the northerly side, or end. To shelter the arch from the weather, a story of wood may be erected over it, for a cheese room. The

arch will be the cooler in summer and warmer in winter, as well as more durable, as it will be defended from rain, &c.

If rats and mice cannot enter the milk room, there will be no need of having shelves in it. The floor is the best place to set the vessels of milk on, it being coolest in summer, and perhaps warmest when the weather is frosty.

DARNEL, *Lolium*, a troublesome weed, which sometimes appears among grain, and is often so fruitful as to spoil a crop. The seeds of it resemble corns of blasted rye, but are more light and chaffy. These weeds should be pulled up before they go to seed. But grain for sowing may be mostly cleared of the seeds by swimming it in water.

DENSHIRING, see the article *Burn Baking*.

DIBBLE, among gardeners, the name of a tool, or forked stick, with which they set plants. *Dict. of Arts.*

DITCH, a narrow channel, or trench, of great use in agriculture. Ditches serve two purposes, to enclose grounds and to carry off superfluous water. When they are used for fences, they should be four feet wide, at least, at the surface. In England they make them wider. But four feet is enough, when the raised earth is laid all on one side. When they serve only as drains, they should be wider or narrower, in proportion to the quantity of water which is to pass through them. And the earth may be laid in heaps, instead of laying it in a continued bank. Thus the water will the better find its way into the ditch.

A ditch should be three times wider at the top than at the bottom, to prevent the falling in of the sides. Where there is a current

rent of water, the sides will sometimes be undermined by it. But in this country, the sides of ditches are often holed in by the severe frosts in winter. Nothing will so much prevent the filling up of ditches as strong rooted grasses, or other plants, growing plentifully on their margins.

DITCHING, the making of ditches. This work is most commonly performed in summer, or early in autumn. When this work is to be done in very low and wet land, a hot and dry season is best; that the water may not prove troublesome, neither by its quantity, nor by its coldness. When it is to be performed in a salt marsh, not only a dry and warm time should be chosen for the business, but it should be done also at a time when the tides are lowest. On high lands, ditches may be made at almost any season, when the ground is not frozen. But in the spring the digging will be easiest, the ground being softened by the preceding frosts. But as the ground is driest in autumn, then is the best time for ditching in most of our low lands. At least, the month of September is a good season. But farmers must be governed, as to the time, in some measure, by their own convenience. It must be done when no other business of greater importance demands the whole of their attention and exertion.

When bushy ground, full of strong roots, is to be ditched, the Rev. Mr. Eliot wisely recommends beginning the ditch in the winter, when the ground is frozen two or three inches deep. The surface may be chopped into pieces by a broad axe with a long helve, and the sods pulled out with an instrument made like a dung croom. The farmer may

probably hit upon a good time for this work in December, when there happens to be no snow, and when it will not interfere with other farming business. The lower part of the ditch may be done in the following summer, or autumn. In a free and firm soil, a ditch may be begun with a plough, drawn by an orderly team that will keep to the line. This saves labour.

To make a ditch straight, and equal in all its parts, it is recommended that the work be regulated by a frame of split deal, nailed together, to the exact size of the intended ditch. It may be a rod or more in length, and as wide as the intended ditch.

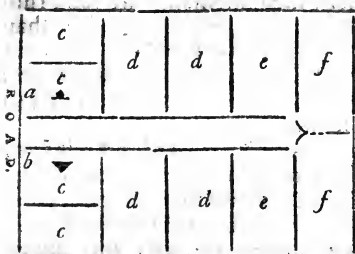
DIVISIONS, of a Farm, lots enclosed for the convenience of tillage, pasturing, mowing, &c.

The judicious dividing of a farm into lots, may save much labour, especially much travelling from one part to another. The more square lots are made, the more is saved in fencing. Crooked fences should if possible be avoided, not only to save expense, but to add beauty to a field, or plantation. All tillage lots, and especially small ones, should be nearly of equal dimensions on all sides; for if a lot be out of square, the labour of ploughing will be increased, as there must be a number of short furrows. If a lot be long and narrow, cross ploughing will be either prevented, or the labour of it much increased.

When it can conveniently be so ordered, the lots designed chiefly for tillage should be nearest to the house and barn, to save labour in carting manure, and to prevent loss in getting in the crops. The nearer grain is, the less it will shatter out in carting. The 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 contrived to be next, and the wood lots farthest of all the lots from the house, that so the view of the other lots may not be obstructed too much by trees.

Suppose a farm of one hundred acres, lying all on one side of the road, 100 rods wide on the road, and 160 rods deep; it may be well divided according to the following scheme:—



Where *a* is the farm house, *b* the barn; *c c c c* the tillage lots, of which one of the corner ones may contain the orchard, that it may not obstruct the view of the other parts of the farm. These lots are sometimes to be rested, by laying them to grafs; *d d d d* mowing lots, once in a while to be used as tillage; *e e* pasture lots; *f f* wood lots, to be used also as pastures. The front lots are five acres each, the rest ten, excepting what the lane takes up, which should not be very narrow, lest it be blocked up too much with snow in winter. The land it contains will be useful for pasturing; so that its wideness will be no loss.

On this plan, the labour of driving cattle out and in, morning and evening, will be saved, as the lane may be always in common with the pasture which is in present use, the gates of all the rest being shut.

If the lane pass through funk-en land, the owner had better be at the expense of a little causey-ing, than spoil the regularity of his lots by making it crooked. Or, sometimes a bog or a steep hill may be avoided, by making the lane a little on one side of the centre of the farm, but still parallel to the sides. If the lots destined for tillage be too low, or wet, it should be considered whether they may not be made sufficiently dry by draining. If so, there will be no need of causey-ing.

When a farm is more oblong shaped than I have here supposed, the lots may be lengthened the other way, or made smaller, as shall be found convenient. Small lots are generally the most profitable, in proportion to their quantity of land, especially when they are used as pastures.

If a farm be out of square, a lane, perhaps, may be had parallel to one of its sides; so that some square lots may be obtained for tillage. The shape of lots used only for other purposes, is not of so much consequence: Least of all those which are forests.

There are doubtless many farms so broken and irregular as to be quite incapable of the above regulation. But all I would contend for is, that when it is practicable, without too much expense, a farm should be so ordered. It will be of great advantage to the farmer, in saving time and labour.

DOOR DUNG, a manure taken from the back yards and doors of dwelling houses.

Though it may seem to be made up of chips, saw dust, and several other matters that appear unpromising, yet there are various substances intermixed with them, and

and soaked into them, which contain food for plants in abundance. A large proportion of the dung of swine and of fowls, which are excellent manures, are contained in the compost. It has, besides, the sweepings of the house, blood, small bones, shells, and other animal substances; also fuds, ashes, foot, urine, together with salt particles, which are some of the best of manures.

It is, therefore, no wonder if this filth is found to be very conducive to the growth of plants, as it really is.

Some think it best to let it lie year after year in the yard, that it may grow fine and mellow. But it is wasted by this practice, the sun, air, and rain, depriving it of its volatile, fine, and most fructifying particles. I choose to be rid of its putrid steams, and place it where it may do good and not hurt. I, therefore, have it scraped up clean every spring, clearing it of the largest and brightest chips; and after it has lain in a heap for a few days to ferment, apply it to the soil in the field, though it be not fine enough for the garden; or else add it to the compost dunghill. I find it to be a very proper manure for land that is stiff and clayey; and it will do great service in any soil.

Those farmers are certainly guilty of bad husbandry, who take no care to avail themselves of this excellent manure, of which they all have more or less; and that is commonly best, where the greatest number of swine are permitted to run.

DRAIN, a channel made in the soil to carry off superfluous water, or divert its course.

Drains are of the highest importance in agriculture: For, by means of them, lands that are so

wet and fenny as to be entirely usefess, may oftentimes become by far the most valuable part of a farm. It would be happy for this country, if the husbandmen were fully convinced of the vast utility of them. The real value of some estates might be doubled, by a small expence in draining.

Drains used in farming are of two kinds, open, and hollow, or covered. The open drains are mostly used, because more easily made. But if the first cost be less, the expence, in the long run, may not be less, but greater than that of covered drains. For they will be continually filling up; and, therefore, will often need to be mended.

Open drains are to be shaped like other ditches, wider at the surface than at the bottom. And, for a general rule, they should be carried through the lowest and wettest parts of the soil, though it should cause them to be crooked and unsightly. The water will be carried off more effectually; and some labour in digging will be saved; for if they pass through the higher parts, the ditch must be deeper, at least in some places. But where a plain is incommoded with too much water descending from an adjacent height, the water must be cut off by an open drain drawn along at the foot of the high ground, and the earth which is taken out should be laid on the side towards the plain.

Open drains serve well enough in swamps, if the soil be not too loose, so as to fill them up soon. In this case the covered drains are certainly best, especially where materials for making them are easily obtained.

The earth that is thrown out of open drains in swamps should not lie in banks by the side of them.

them. This will tend to prevent the water from passing freely into them, and conduce to their filling up the sooner. It should be spread over the surface of the drained land, which will make it drier, and sometimes answer as a good manure. And, in this operation, there will be often a mixing of soils, attended with considerable advantage.

To judge rightly, whether it will be worth while to attempt the draining of a swamp, it is first to be considered what will be the cost of digging at the outlet, where it will, in some cases, be necessary to go very deep. If large rocks should be found in the way, they may be blown to pieces with gun powder. But doing this is somewhat expensive. Also, the depth of the black soil in the swamp must be examined, and the stratum next under it. If the under stratum be clay, the swamp may be well worth draining, though no more than six inches of till or mud be above it; for the mud and clay mixed, will make an excellent soil. But if the under stratum be gravel, or white sand, it will not be best to undertake draining, unless the depth of black mud be as much as from fifteen to eighteen inches. For it is to be remembered that the soil will settle after draining, and be not so deep as it was before. If, after draining and hardening, there should be a sufficient depth for tillage, the soil will be most excellent; and will pay well for an expensive draining.

The manner of draining a swamp is as follows: Beginning at the outlet, pass a large ditch through it, so as mostly to cut the lowest parts. Then make another ditch quite round it, near to the border, to cut off the

springs which come from the upland, and to receive the water that runs down from the hills upon the surface, in great rains. These ditches are to be larger or smaller in some proportion to the bigness of the swamp, having a regular descent for the water, that not much of it may stand in them. If the swamp be large, it may be necessary that some smaller cross drains should be cut in several of the lowest parts. The bottom of the main ditches, when the soil is not of an extraordinary depth, must be lower than the bottom of the loose soil; otherwise the soil will never become sufficiently dry and firm. When the swamp comes to be sufficiently dry for tillage, such of the drains may be converted into hollow ones, as cannot profitably be kept open for fences. Thus the quantity of improveable land will be increased.

If a bridge over any of the drains should be wanted, the best way to make one will be by filling up a short piece of the drain with stones, or wood, that is, by making it hollow in that part. This will be less expensive than a common bridge, and answer the purpose better.

Those who are willing to be convinced of the amazing fruitfulness of drained swamps, should read Mr. Eliot on the subject. He represents them as producing turnips, clover, oats, &c. to great advantage; English hay, four tons per acre, and Indian corn at the rate of more than ninety bushels per acre, without manuring.

Such lands are highly advantageous, as they require no dung; and cannot be easily, if at all, worn out by cropping: Also, as they bear drought remarkably well. As this country very oft-

en has its crops greatly diminished by dry seasons, it would be well if every farmer had continually some of this kind of soil in tillage, or mowing, or in both.

Covered or hollow drains are more used for the drying of springy, wet and spongy uplands. They may be used with advantage on gentle declivities, where the soil appears spewy and cold, by means of springs. They will cause the soil above and below them, to be more dry and fruitful. But if the descent be very steep, or if the wetness of declivities be owing only to water running down on the surface, the open drains are to be preferred: For if they were covered, the water would pass over them, and the drain would be of little advantage.

To make a hollow drain, dig a channel between thirty and thirty six inches wide atop, and six inches, or the breadth of a spade, at the bottom, and three feet deep, giving it just descent enough to make the water run briskly. Fill it half full, or more, with small stones, thrown in at random, and cover them with a layer of straw, leaves, or the small branches of trees with the leaves on them; then fill it up to a level with the surface, with the earth that was thrown out. Such a drain, as it will not choke or fill up, will never need repairing. If the descent should be but just so much as to make the water run slowly, there may be some danger of its choking up, and ceasing to run at all. But this danger will be greater or less according to the difference of soils. There will be no danger of it, in a soil that does not easily dissolve in water.

If stones be scarce, long faggots, or fascines, laid in the

trench, will answer as well, so long as they last; which being secluded from the air, will not rot soon. Some say they have known them to answer well for forty years.

If a plain piece of ground be too wet to be made fit for tillage by ridge ploughing, it should be made drier by hollow drains. If no lower place be adjoining, where the drains may have an outlet, holes should be dug in some of the lowest parts of the plain, to examine what strata are under the soil. It is likely that a stratum of clay, or of some other earth not easily penetrated by water, is the real cause of the wetness of the soil. If you find it so, then dig through the stratum, and below it, till you come to loose gravel, sand, or something that will easily imbibe water: Fill up the hole with stones, and direct your hollow drains to it. It will serve for a perpetual outlet; and conduce much to the drying of the soil.

The peculiar advantages of hollow drains are, that they will not need repairing, as they do not fill up; that no soil is wasted, or rendered useless by them; that a plough may pass over them to as great a depth as is necessary in any kind of tillage; and carts and other carriages are not obstructed or incommoded by them. So that these drains may pass across roads without detriment, when the descent requires it. It is often necessary to hollow drain roads to lay them dry, and found to be of great advantage.

The draining of a marsh, or shaking meadow, which seems to be a soil floating on the water, is sometimes practicable. I shall give the reader the method of doing it in the words of the ingenious

genious Mr. Dickson.—“ To drain a marish,” says he, “ it is necessary, in the first place, to convey away all the stagnating water : And this water can be conveyed away in no other manner, than by a large open drain, with a sufficient fall. This fall must be such, as to carry off the water from the bottom of the marish ; otherwise little advantage is to be expected from it. By conveying away all the stagnating water, some land on each side will be gained : For the water being removed, the earth by degrees will subside, and become firm and solid. By this, likewise, the bottom will become firm ; which will allow the drain, by degrees, to be carried forward through the middle of the marish. If the springs, by which the marish is supplied, arise near the middle, this principal drain, with some branches cut from each side, where the springs are largest, or most numerous, will be sufficient. But if there are springs in all places, as is frequently the case, it will be necessary to make drains at the sides, as nearly parallel to the principal drain, as the situation of the marish will allow, to intercept the water that comes from the heights, and supplies the springs. It will be necessary, likewise, to make communications, by cross drains, betwixt the parallel drains at the sides, and the principal drain in the middle.” It is no wonder if the cost of draining a shaking meadow should be considerable, as it seems like a soil floating upon water. But there is no reason to doubt its becoming some of the best soil, when so drained as to give firmness to it.

DRAY, or *car*, a slight kind of carriage drawn by one horse. It consists of a pair of thills, con-

nected by two or three cross bars. The hinder ends of the thills slide along on the ground. It draws heavily on bare roads, but on grass land much more easily. The horse must carry much of the load on his back. In case of necessity, it is better than no carriage.

DRESSING, the application of dung, or other manures, to soils, to increase their fruitfulness. Dressing differs from manuring in general, only as it is chiefly intended for the increasing of one single crop. Not only are dressings necessary for poor and weak soils ; but they are profitably applied to those which are rich and strong ; especially when seeds are sown which need much nourishment, or will make good return for it.

There are four things chiefly to be regarded in dressing ; the suitability of the dressing to the soil, and to the crop ; and the manner and the season of applying it.

To light, warm, or sandy soils, the coldest manure should be applied ; such as the dung of hogs, cows, oxen, &c. Dung that is much mixed with straw does best in such a soil, as the straw soon rots and becomes food for plants. Cold and stiff soils should be dressed with the hottest and driest manures, as the dung of horses, sheep and fowls. Wet soils should have manures that have the greatest power of absorbing moisture. Lime, where it is cheap and plenty, may be used with great advantage ; ashes, coals, and saw dust, are also very proper.

Some kinds of dressing should be well mixed with the soil, by the plough and harrow ; especially such as are apt to lose their strength, by being exposed to the

the air. Of this sort are dungs in general, and some other manures. Dung is to be ploughed in with a light furrow. Composts, which consist of dung, earth, and other substances, need only to be harrowed. If dressings are laid too deep, as under deep furrows, they will be in a manner lost; the roots of most kinds of annual plants will scarcely reach them; and, before the next ploughing, the strength of them will be sunk still deeper into the earth.

There are other manures which should be used only as top dressings. Their exposure to the air takes away little or none of their virtue, being of an alkalious nature, such as ashes, lime, and the like. They are speedily settled into the soil by rains, and melting snows; and afford a more kindly nourishment to the roots of grass and grain, than if they were buried in the soil. Being laid lower than the surface, their strength would be more apt to be carried lower than the roots of plants commonly reach.

Some dressings are thought to be more successfully applied some time before sowing. Such a one lime is said to be, as being apt to burn, or too much heat the seed. But this, I think, can be only when it is laid on unslacked, and in large quantities.

Other dressings answer best at the time of sowing. This is the case as to most kinds of dung that are used, and of several other manures.

But those manures which exert all their strength suddenly, are allowed to be best, used only as top dressings, after the plants are up, such as foot, ashes, certain warm composts, and malt dust. If they are laid on winter grain in autumn, there will be

danger of their causing too rapid a growth: In consequence of which, the grain will be afterwards stunted, and languish, unless another and larger dressing be given it in the following spring, or summer. It is probably best to apply these dressings 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.

The adapting of dressings to the nature of plants will be found, in those parts of this work, where the most useful plants are treated of.

DRILL, "a name given to an instrument for sowing seeds in the new method of horse hoeing husbandry. It plants the corn in rows, makes the channels, sows the seeds in them, and covers them with earth when sown; and all this at the same time with great expedition. The principal parts of a drill are the seed box, the hopper, the plough and its harrow, of all which the seed box is the chief. It measures or rather numbers out the seeds, which it receives from the hopper, and is for this purpose as an artificial hand; but it delivers out the seed much more equally than can be done by a natural hand.

"Whoever is desirous of knowing more intimately the whole apparatus for this method of sowing, may see it fully described, and illustrated with figures, by Mr. Tull, in his *Horſe Hoeing Husbandry*." *Dict. of Arts*.

The drills which are described by European writers are very complicated and costly machines. But I have had barley, carrot, and some other seeds, evenly and expeditiously

expeditiously drilled by a hand drill, being only a light tin measure, with a hole through the bottom, and a broad headed spike in the hole. When this is used, channels on the ridges must be previously made with the head of a rake. But a drill, which I would rather recommend for use, on account of its lightness, and simple construction, is a drill upon small wheels, to be drawn by a man, or by one or two boys. To the hinder part of the axis is fastened a long shaped, tapering vessel, serving at once as a hopper, drill box, and hose. Below the middle is a partition, through which is a hole for the seeds to pass into the hose. The hole has a sliding cover, which stops and opens it two or three times in a second, by being fastened to a spring that is moved by one of the wheels. A coulter to open the channel may be made fast to the fore part of the axis, as much longer than the spokes of the wheels as the depth at which the seeds are to be buried: And this, as well as the box, may be fixed higher or lower on the axis at pleasure, according as the sowing is to be performed, on ridges or on a level; or according to the depths at which different seeds are to be sown. A small harrow, or rake, to cover the seeds, may as well follow this, as a drill of any other construction. I have seen a drill nearly of this construction in possession of the Rev. Mr. Little of Wells. And I cannot but prefer such a hand drill to a heavy complex one, drawn by a horse: For the tread of a horse makes such holes in the soil, as must needs render the operation of drilling less accurate, or more imperfect. Two boxes with coulters may as well be fixed on the machine I rec-

ommend as one; but it will increase the labour of drawing it.

DROUGHT, such a continuance of dry weather, that plants cannot draw a sufficiency of nourishment from the earth, to give them their full growth and perfection.

Some countries are much more liable to this inconvenience than others. Newengland, for instance, is oftener troubled with it than Greatbritain; one occasion of which is, the greater heat of our summers, by which lands grow dry faster here than there. Another cause may be our having a greater quantity of fair weather. And our being more liable to drought, makes it necessary that our methods of culture should be different from those practised in that country. Heating manures are generally more needful there than here; and ridge ploughing is a more proper kind of tillage for the English than for us—though it might be of great service in many of our fields. I have found considerable advantage from it in land that is flat and wet.

To plough our driest lands in ridges, would undoubtedly be lost labour, unless for certain particular crops, as it would cause a drought to be more hurtful to the crops, and there is no danger of too much wetness. And yet it may be, that when an over dryness of soil on the side of a hill, is owing to the rain's running off before it has time to soak into the soil, ploughing the land into ridges, and making the gutters nearly parallel with the horizon, may cause the soil to retain moisture the better. But as this would be difficult ploughing, perhaps ribbing the surface with furrows half a rod apart, might as well retard the escape of

of the rain water. This latter method would be proper for pasture grounds, which lie in such a situation.

It is in the power of the farmer in good measure to guard against the ill effects of drought. It is a matter that certainly ought to be attended to in this country, in which almost half of our summers are complained of by many, as being very dry. The best method is, to have more of our lowest lands under the best improvement in tillage. If this were the case, we should not so often hear of a scarcity caused by drought. If it were become customary to plant and sow on drained lands, and in those which are so low and wet as to need laying in ridges, possibly our dry summers would be as fruitful on the whole as our wet ones. But, as we manage our lands at present, the case is far otherwise. A great number of people are always reduced to a distressed condition by a dry summer. And they are too ready to consider the shortness of their crops in a dry year as a divine judgment, though they might have prevented it by a more prudent management.

Another way to guard against having our crops pinched by drought is, to have a variety of different crops on a farm each year, some that are least injured by a drought, and some that require the most rain. Thus, let a season happen as it will, we may hope to gain in one crop, what we lose in another; or at least that some of our crops will be very good, if others should fail.

Sometimes land is so shaped by nature, that the water of a rivulet, or of a plentiful spring, may be led by gutters, or narrow channels, to moisten places which

would otherwise suffer by drought. When it can be performed, without too much expence, it will be found to be an excellent piece of husbandry. In some cases it may be a double advantage, making a wet place drier, by diverting the water to places that need it. Deep tillage is also of very great importance to prevent the ill effects of a dry season. For the dryness of three or four inches in depth would scarcely alter the condition of the plants. But if the plough has gone only to this depth, a severe drought will be fatal to the crop.

It would greatly advantage the farmer, if he could foretel whether a season will be dry or wet. But as he knows this is impossible, he should so conduct his crops, and other matters, that he may be prepared for either extreme.

The earlier a drought begins, the more distressing it generally proves in this country. For, after the grass crops and English grain have nearly got their growth, a drought is less detrimental than before, because the Indian corn, by means of the tillage given while the plants are growing, bears it so well as to be seldom cut short by it: And Indian corn is the principal of our late crops.

Pasture grounds are often so dried up, that both the meat and drink of the cattle are cut off at once. This shews the propriety and necessity of having some low lands in pasture, when it is practicable. And a few trees, growing at proper distances in a pasture, will partially shade the soil, and prevent its drying so rapidly. The more grass will be produced; and the cattle will be refreshed by the shade; besides the

the advantage the farmer will gain in fewel and timber. In those parts of the country where trees have become scarce, the omission of planting quick growing trees in our pasture grounds is unpardonable. When a pasture is destitute of water, Mr. Eliot advises to dig a well on the side of some hill in the pasture, and having come to water, to dig a trench below, level with the bottom of the well, and bring the water through a hollow drain out to the surface, where it may be kept in a little basin, made in the soil, for a watering place.

DUNG, the excrement of animals, used to increase the fertility of land. Dung may be said to be almost of the same importance to the farmer, as stock in trade is to the merchant. There are but few lots, or pieces of lots, in this country, which can be tilled to any great profit, in the common way of culture, without manure; and dung is of all manures the most useful. The very best of soils, when dunged, will more than pay for it, by the increase of their crops, and the poorest will produce next to nothing without manure. Some think it more profitable to apply dung to their best soils than to their poorest, as they think the increase from it to be greater in the former case than in the latter. This opinion is probably founded in truth.

The sorts of dung which are, or may be used, are that of black cattle, sheep, horses, swine, goats, hens, pigeons, ducks, geese and rabbits, besides human ordure.

The dung of animals consists of oils, fixed and volatile salts, together with nitrous and earthy particles. But in different sorts of dung these principles are dif-

ferently compounded; so that the dung of one animal is a proper manure for one kind of soil, and that of another for another. And yet there is no kind of soil that may not be enriched, in some degree, by any kind of dung.

Mr. Dickson says, "Dung promotes vegetation, by increasing the vegetable food; it being compounded of the same principles of which the vegetable food itself is compounded. It promotes vegetation, by enlarging the pasture of plants: It attracts acids from the air and soil; and by raising a fermentation with them, separates the particles of the soil with which it is mixed. It promotes it, by communicating to the soil a power of attracting the vegetable food from the air; for the earth it contains, is of the absorbent kind, and attracts all the other principles of the vegetable food. And it likewise promotes vegetation, by preparing the vegetable food for the nourishment of plants; for, by the salts which it contains, and produces, it not only attracts oils, which is probably one of the principal ingredients of every plant we cultivate in the field, but dissolves them, and thereby makes them fit to mix with water, and to enter the roots of plants. But though it operates in all these ways, it is more than probable that it principally operates by increasing the food of plants: And this seems to be confirmed by experience; for when the virtues of dung are exhausted, the soil is no poorer than before it was laid on."

The dung of oxen and cows is a cool, mild and oily substance; and is, therefore, most suitable for warm, sandy, and gravelly soils. It tends to pre-

vent the soil's becoming too dry, and keeps the plants on it from being pinched for want of moisture:

The dung of sheep is more hot and fiery than that of black cattle; it ferments quicker; it is fitter, therefore, for cold, heavy lands. Perhaps the best way of applying the dung of sheep to land is by folding, in countries especially which are not greatly infested by wolves. For in this method their urine is all saved, as well as their dung. But it ought to be turned in with the plough as soon as possible, that the sun and air may not deprive the land of it.

In Flanders, it is the practice to house their sheep at night, under slight sheds, the ground being spread with dry sand, about four or five inches thick, laying on a little more fresh every night. This is cleared out once a week, and carried to a dunghill, or applied to the soil. This mixture of sand and hot dung, makes a very excellent dressing for cold and stiff land. For there is scarcely a richer manure than the dung and urine of sheep. M. Quintinie thinks it the greatest promoter of fruitfulness, in all sorts of ground. This method of folding sheep in a covered fold, and of mixing their dung with stiff earth or sand, according to the nature of the soil it is intended for, is, also, with much reason, recommended by Mr. Mortimer; who also says, "that he has known vast crops of rye upon barren lands, that have been old warrens, well dunged by rabbits, and large oak and ash trees upon the same, though the soil was very shallow."

Some have recommended the reducing of sheep dung to powder, by pounding it with mallets,

and using it as a top dressing for grain, perhaps half a dozen bushels on an acre. But this is a tedious piece of work, and of no lasting advantage: Whereas too much can hardly be said in praise of the Flanders method of using it. A prodigious quantity of good manure may be thus obtained from a flock of sheep, by housing them regularly every night.

If a light soil is intended to be manured with this compost; instead of sand, clay, pond mud, or the mud of flats, may be used, these substances having been first mellowed by the frosts of winter. The dung of goats is supposed to be nearly of the nature of sheep's dung.

Horse dung is a still hotter manure, as appears by its quick fermentation in heaps, even in cool weather. It is consequently fittest for hot beds, when it is new, and for nourishing those plants which require the greatest degrees of heat. The dung of horses that are fed on grain, is a richer manure than that of those fed only on grass and hay.

Great care should be taken that horse dung be not spoiled, by being overheated, or burnt in the heaps, before it is used. For, in this country, it is very commonly the case. When it has been so heated as to give it a white and mouldy appearance, the virtue of it is gone. It is difficult to give it age, without mixing it with other substances. 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 spoilt by overheating in the heaps. This manure, when used as an ingredient

in composts, has an excellent effect, as, by its quick and strong fermentation, it speedily dissolves other substances that are mixed with it.

Mr. Miller says he has frequently seen new horse dung buried as it came from the stable in very cold, moist land; and always observed that the crops have succeeded better than where the ground was dressed with very rotten dung.

The dung of swine is a very rich and fat manure, and so cool as to ferment very slowly. It is so rich and oily, as to be double in value to neats' dung. It will render the most dry and hungry soils exceedingly fruitful in a wettish season, as I have found by experience. It resists the ill effects of drought, and does most service in a hot country. By its steady and gradual supply of a rich nourishment, it is peculiarly adapted for the growing of hops, pumpions, running beans, and every plant which has long vines. Nothing can equal it for the growing of potatoes. It has produced me more than a peck in a hill on the poorest hungry sands. Or rather I might say, straw only a little impregnated with the dung of hogs has done it. This is so strong a manure, that it answers well, when mixed with a large proportion of earth, weeds, straw, or other bibulous substances. It is almost incredible how great a quantity of good manure may be obtained, by supplying a hogsty with rubbish to mix with the dung. I have heard of 40 loads of manure being made in a year by means of one hogsty. And I have no doubt of its being practicable.

The dung of ducks and geese, is deemed too hot and burning. But if the farmer would gather

it in a heap, and mix it with the dung of cattle, he would bring it to a temperate heat, and draw from it such advantage as would indemnify him for the pains he should take. The virtue of this method is known by experience. A farmer having abandoned a piece of ground to his geese for twelve years, afterwards turned them out to let the grass grow, and it rose so thick and strong that a sith would scarcely pass through it. Hen dung is recommended to be scattered in small quantities upon land intended to be sown, and on account of its heat it is never used, unless when rain is foreseen. It is an excellent manure for meadows. Pigeon's dung is much the same with that of poultry, the only difference being its superior heat." *Scots Farmer.*

I should think it better to mix the dung of poultry and pigeons with other substances, to allay their heat, before they are applied to the soil. And thus qualified, they would be an excellent top dressing for corn, especially in cold and wet lands. On old mowing grounds, I have found the grass abundantly increased, by a sprinkling of earth taken out of an apartment used as a hen house, though there was little or none of their dung visible amongst it.

"Human ordure is a very fat and hot manure, full of fertilizing salts and oils; and, therefore, extremely proper for all cold, sour soils; especially if it be mixed with other dung, straw, or earth, to give it a fermentation, and render it convenient for carriage. Some do not like the use of it, on account of its bad smell; and others imagine, that it gives a fetid taste to plants. But in this they seem to carry their delicacy

icacy too far. Mr. Bradley says, it is kept in pits made on purpose, in foreign countries, till it be one, two, three or four years old : That of four years old is accounted the best, that of three years tolerable. Perhaps it may owe great part of its richness to the urine with which it is mixed ; for though the human urine be destructive to vegetables, whilst it is new, by reason of its burning sal ammoniacal spirit, as Glauber terms it, yet time will digest the urine, and render it an extraordinary fertilizer of every kind of soil." *Complete Farmer.*

This kind of manure should be compounded with a large quantity of earth, and lie one or two summers at least, that it may be thoroughly mixed. The contents of an old vault would thus make a surprizing quantity of excellent manure.

As dung in general is so important a manure, every possible method should be taken to prevent its being wasted, as indeed a great proportion of it is, by the common management of our farmers. In no way is it more wasted, than by its being too much exposed to the sun, air, and rains. Mixing of dry earth, or other absorbent substances, with heaps of dung, will do much towards preventing this loss. Or slighty sheds may be made over them to prevent their strength being too much wasted by heavy rains ; and at the same time, to prevent a too great exhalation from them. Some cover them with turfs, when they choose to keep dung till it be old. This is not a bad practice ; for the turfs in that situation will become good manure. I would hope farmers need not be told, that the grassy side should be laid

on the dung. Otherwise, instead of consuming, it will produce a crop of grass.

It would be a good method, if barns were built with the roof hanging over about ten feet, on the side or sides, where the dung is to be thrown out. This would greatly prevent its being robbed of its richness. But if this be neglected, and the heaps are at the ends, it is best to build sheds or leantoos over them. If the heaps lie at the sides of barns or under the eaves, the least that should be done to prevent the wasting of the dung, is to put up gutters, that the heaps may not be washed with the streams from the eaves. And besides, some loose boards should be set against the sides of the barn, in such a manner as to prevent the greatest part of the rain from falling on the heaps of dung.

Or, if these things are neglected, through indolence or an unreasonable parsimony ; at least let the farmer lay a ridge of earth along in the back side of his cow and ox houses, and stables, that the dung may be mixed with the earth by degrees, and the stale absorbed. If the dung is to be laid on a light soil, clay and turfs should be used, if on a heavy one, sand is better. A very considerable saving may be made in this way, especially where the house is not too narrow. I have practised this method with advantage for several years past.

Some build cellars under their barns, and throw the dung through scuttles down into them, to keep it from the weather. This is a far more expensive method than what I have above recommended. For it is necessary, in order to save the manure, that the cellar wall be well pointed ; and also that a hard
under

under stratum form the floor, or that a tight artificial floor be made. The dung in this situation will mellow the faster, by its not being exposed to any severe frost. And a cellar may be so contrived, that a cart may be driven in at one end, and out at the other, which may render the removing it easy. I wish not to discourage any who are willing to put themselves to the expense that attends this method. For I am fully convinced that the expense will be more than repaid in a course of years.

Some caution should be observed, that the strength of dung may not be diminished by shoveling and carting it in weather that is hot, dry, or windy. If it be performed when the weather is calm and cloudy, its volatile parts will not evaporate, in any considerable degree.

When it needs fermenting in the field before spreading, or putting into holes, which is often the case of new dung carted from large heaps, and sometimes containing ice and snow; the small heaps in the field should be thinly covered with a little earth. It will not hinder the fermentation, but will prevent evaporation.

When the farmer has carted his dung heaps away from the sides of his barn, he should take up an inch or two of the surface of the ground beneath; because much of the strength of the dung and stale has passed into it, and made it a good manure.

When dung is applied to tillage land by folding, it should be mixed with the soil, by the plough or the harrow, every two or three days, if the weather be dry. Or it may be done with the hoe or shovel. In cloudy or rainy weather, it will not need

mixing so often. If this method be observed, much will be saved: And half the time that yards are commonly folded, will, if I mistake not, be sufficient to fit them to produce a good crop. See the article *Folding*.

Our farmers, in general, seem to think it a matter of great importance to put dung in holes under the feed, especially to produce a crop of Indian corn. Nothing makes this tedious and laborious method needful, unless it be a scarcity of manure, as less of it will answer for one single crop, than is required in the other way. The corn does not commonly come up so well, and it is more in danger of being destroyed by worms. If six or eight loads of dung will cause an acre to produce more corn when put in holes, than if it were ploughed in, as it undoubtedly will; yet it should be remembered, the land will not be in so good heart the year following, will not produce so good a crop of grain, nor be in so good order to lay down to grass. So that, perhaps, in a course of crops, it may be found that the labour of dunging in the holes may be spared; excepting, perhaps, in green sward ground. If so, the farmer might redeem time by it, and at a season when his hurry of business is greatest.

I may add, that new dung is not so suitable to put in holes, as that which has lain a year in heaps. But it has more virtue, and will add more strength to the soil; for it is next to impossible to keep dung till it is old without some waitage. And this may afford another good reason for laying aside the practice of dunging in holes. For the newest dung will answer well for spreading, and ploughing into the soil.

DUNGHILLS.

DUNGHILLS, heaps of manure laid up to ferment, consisting of dung and earth, together with lime, or marle, and any animal or vegetable substances, which easily putrefy and consume.

It would be well if every farmer had some of them preparing, to be carted out in autumn, or to lie two summers, when it is found convenient. He would avail himself of much manure that might be collected between spring and fall; for, in the summer, the crops on the ground must prevent carting it; so that it should be preserved in the best manner to prevent waste. And this can in no way be so well prevented, as by mixing it with other substances.

Farmers should have such dunghills, some at their barns, or cow yards, one at a hogsty, when swine are shut up, and another not too far from the back door of a house. They may be tended, and augmented at odd times, when no other business stands in the way. That at the back door, especially, may be very easily made up, of a variety of rich and fertilizing ingredients, besides dung; such as the scrapings of the yard after rain; foot and ashes; shells, lime and bones; the sweepings of the kitchen; oil dregs, and any fat things; woollen rags; bloody water, in which meat or fish has been washed; greasy water; suds; ashes, although the lie has been drawn from them; old useless brine; urine; and, in short, any animal or even vegetable substance, that has not too much acid. Or, even acids, if they be overbalanced by plenty of alkaline substances.

To prevent the heaps being too much torn and spread about

by swine, or by the scratching of dunghill fowls, the heaps may be included in pens made with wide boards; or some rocks may be laid round them. Turfs may be laid over them, to prevent their evaporating; as well as under them, to prevent their soaking into the earth.

The heaps should have such a degree of moisture as best promotes fermentation and corruption. A cavity may be made close to the lower side of the heap, to receive the superfluous moisture as it runs from it after rain; and this liquid, highly impregnated with the strength of the manure, should be thrown, from time to time, on the top of the heaps, with a scooping shovel. In a wet season, the heaps will need some slight sheds over them. Indeed it would be best to cover them in all seasons, and to apply water to them when they need it.

Heaps about the barn or cow yard, may be augmented with some of the nearest earth, swamp mud, straw, weeds, &c. those at the hogsty with the same, together with the dung of fowls, or other hot manures, as the dung of swine is naturally cold. But the farmer should acquaint himself with the nature of different manures; and always let that ingredient in his heaps be predominant, which is best adapted to correct and meliorate the soil on which it is to be laid. If it be destined for a sandy soil, clay will be an excellent ingredient in the composition of the heaps. If it be designed to lay on a clayey soil, sand is proper.

The heaps will not ferment so fast as they ought, unless they be shoveled over once or twice in a summer. By such operations they will be more thoroughly mixed

mixed and mellowed, and the sooner be fit for use. The seeds of weeds in them will vegetate, and be destroyed, which is no inconsiderable advantage; especially if the manure is to be applied to unhoed tillage crops.

DUNG MEERS, "places where soils and dungs are mixed and digested together. For this purpose, it is usual to dig a pit sufficient to hold the stock of soil the husbandman is capable of making; and to prepare it at the bottom with stone and clay, that it may hold water, or the moisture of the dung; and besides, it should be so situated that the sinks and drips of the houses and barns may run into it. Into this pit they cast refuse fodder, litter, dung, weeds, &c. where they lie and rot together, till the farmer have occasion for it." *Dict. of Arts.*

These pits answer nearly the same end as dunghills. But they are attended with more expense and labour; and are more apt to suffer with wetness in a rainy season, unless a shed be built over them. If this be done, and the right proportion of water applied, there can be no better method of making compost. I know a gentleman in the county of Bristol, who has a small cellar under cover, adjoining to his stable, in which he lodges only one horse; and who makes in it 20 loads yearly of compost, far superiour in strength to any unmixed barn dung. In summer he has it filled with weeds and various vegetable matters: In autumn two or three swine are fattened in the apartment. In winter a very small flock of sheep lodge there: The dung of one horse is gradually thrown in as fast as it is made; and a few fowls roost over it. The whole

is watered occasionally by a spout turned inwards. The crops he raises from this manure are surprisingly large and good.

DUTCH HOE, sometimes called a *Scuffle*; an iron instrument, with a sharp fleeced edge, nearly in the shape of the letter D. with a shank from the rounding part, five or six inches long, which passes into a handle of about six feet in length. It is of use to clean walks and avenues in gardens. No gardener should be without one of these instruments.

DYKE, or DIKE, a sort of dam, constructed of earth, timber, fascines, &c. to oppose the entrance of water from rivers and from the sea.

Dykes made to exclude the sea from marshes, are built with fods cut out of the marsh, so as to make a ditch near the dyke, or else a ditch on each side. The fods are laid as a wall sloping on both sides; they should be laid very close, that the water may not enter; and some slender bushes should be laid between them, that the work may hold together the better. Some of the bushes should have roots to them, that they may grow, and more strongly bind the fods together. Shrubs without roots will not live placed in the dykes at midsummer, the time when dykes should be built. But they may be inserted afterwards, at a proper season.

A dyke, seven or eight feet wide at bottom, and three atop, and made a little higher than the highest spring tides rise, will be sufficient on high marsh. When a dyke passes through a low place, or through a creek, it must be wider at bottom in proportion to the depth of the hollow, or creek, so that the sides of the dyke may be perfect inclined planes.

planes. Though this will make it very thick at bottom, it is necessary, that it may resist the greater pressure of water against that part.

When we build on an oozy, soft spot, it is best to fill the mud with piles, driven as deep as they will easily go, and then cut off even with the surface or a little above it. This will give stability to the foundation, and prevent the water's undermining the dyke. On a sideling place, stakes should be driven through the dyke into the marsh, to hold the fods in their places. There should be many of them, and they should be strong.

In the creek, or creeks, there must be sluices, larger or smaller in proportion to the quantity of fresh water that will need to pass out. See *Sluice*.

E.

EARTH, the soil, or land, in which the roots of plants find nourishment. There are several simple kinds of earth, considered only with respect to husbandry; as clay, marle, loam, gravel, sand, peat, and black mould. Perhaps these are nearly all the simple soils that are found on or near the surface of the earth, in this country; though others, distinct from them all, are found by digging deep. 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. Though the original soils are so few, they are so variously compounded in different places, as to present us with an endless variety of soils, some or other of which are most suitable

to nourish every different plant. But for most of the purposes of husbandry a sandy loam is as good as any.

Good earth for the general purposes of husbandry, is most commonly of a dark colour, or quite black, unctuous to the touch, easily ploughed, on a due medium betwixt dry and wet, not compact, nor too loose and open, and easily made to ferment.

To find whether land be good, some recommend the following experiment: Dig a hole, and return the earth into the hole. If there be more than enough to fill the hole, say they, the land is good; if just enough to fill it, indifferent; but if there be not enough, the land is bad. Doubtless, in warm weather, good earth exposed to the sun will immediately swell by fermenting; so that such earth will more than fill the hole it is taken out of, unless it be forcibly rammed.

Mortimer observes, "That mixed soils are best; especially where the mixtures happen to be of the right kind, as those of the hot and dry soils, blended with the cold and the moist. All sands are hot, and all clays are cold, and, therefore, laying sand on clayey lands, or clay upon sandy lands, is the best of all manner for both. This alters and changes for the better, the very nature of the land itself, whereas dung only improves it for a time, and after that leaves it nearly as bad as it was before. It is not only the nature of the soil we are to consider, but the depth of it, and what kind of earth is underneath; for the richest soil, if it be only eight or ten inches deep, and lies upon a cold clay, or upon a quarry of stone, will not be so fruitful, or advantageous

advantageous to the farmer, as the leaner soil that lies upon better under strata."

But an under stratum of clay, not too near to the surface, and where the ground has not too much wetness, is found to be good, as the strength of manures does not escape through it. A stratum of clayey gravel, or mere clay, or almost any that is not too easily penetrated, is good: But one of loose sand or gravel must necessarily be bad, as the soil above it will not hold its manure.

EDDISH, or **EADISH**, "the latter pasture or grass that comes after mowing or reaping; otherwise called eagrass, earsh, and etch." *Dict. of Arts.*

EFFLUVIUM, an invisible vapour, consisting of minute particles, which exhales from bodies of almost every kind. A copious effluvium arises from all plants while they are growing; but more while drying after they are cut down, as appears from the strong and agreeable scent of mown grass. The exhalation of some plants while growing, is very sensible to the smell; and the flowers of most of them send forth a perceptible odour. That of clover fields, and of orchards in full bloom, is grateful and refreshing. See *Perspiration of Plants*.

The effluvia of rotten substances are supposed to breed diseases: The farmer, therefore, should be cautious that he do not breathe in the steams of his old dunghills more than is necessary, especially when they have a very disagreeable stench.

ELDER, *Sambucus nigra*, an ill smelling shrub, which grows plentifully in most parts of this country, produces a black berry, and is too well known to need

describing. I mention it, because it is believed to be an excellent antidote against destructive insects. But as I have not yet sufficiently proved it by experiments, not making any trial till rather late in last summer; I shall give the reader a brief account of some experiments which were communicated to the Royal Society, by Christopher Gullet, Esquire.

He whipt cabbages gently with green boughs of elder, just at the time when the butterflies appeared, after which, though they hovered over them, they were never observed to touch them. He whipt the limbs of a plumb tree as high as he could reach. That part remained green and flourishing; but all above shriveled up, and was full of worms. He concluded that, if a tree were sprinkled with an infusion of elder, once a week or fortnight, it would effectually preserve it, without injuring the tree, or the fruit. He prevented the yellows in wheat, which is caused by an insect, by brushing the wheat with elder; and preserved a bed of young colliflowers. He prefers the dwarf elder, as it emits a more offensive effluvium.

Perhaps it may be found, as this writer suggests, to preserve turnips from the fly, and these and other plants from grasshoppers, and all other insects. Nothing is easier than to make a thorough trial of it.

ELFSHOT, or **ELFSHOT-TEN**, a disease in horned cattle, the symptoms or concomitants of which are sluggishness and loss of appetite. The original of the name seems to have been a superstitious opinion, that cattle were shotten and wounded by elves, or fairies. The disease, however, is not imaginary. It is believed to be an opening in

the peritonæum, or film of the belly, caused by relaxation: It resembles a hole made by a bullet, and may be felt through the skin which remains unhurt. These openings are closed, and the animals cured, by rubbing the part with salt and water. It should be repeated two or three times in the course of a day.

ELM, *Ulmus Americana*, a tree that is commonly found in our forests. It is tall and beautiful, longlived, and grows to a large size. The wood is not apt to split, or crack; and is very fit for the naves of wheels for carriages. Of this tree there are said to be two varieties, the white and the red. The Elm is a proper tree to plant in groves. It is fightly and durable; and not apt to be broken by high winds.

EMPLOYMENT, business which takes time, and is an exercise of abilities: No one that considers the condition of a farmer, can doubt of his having sufficient employment. He has so many objects to attend to, that his life must be filled up with carefulness or exercise. If he grow remiss, he will soon find that he has lost something through neglect, or failed of availing himself of some advantage.

In our climate, besides care, the farmers are necessarily hurried with their business during much the greater part of the year, that is, from April to November inclusive. But in the winter, they may be in some danger of spending some of their time idly, if they do not take some care to prevent it. Feeding and tending their cattle, if they do it faithfully, will take some considerable part of each day, if the stock be large. The dressing of hemp and flax re-

quires some time, and ought to be done in winter. Getting home fuel for maintaining fires through the year, and hauling stuff and fitting it for the building and repairing of fences; threshing and cleaning of corn and grain; and preparing farming implements, may all be done at this season. And these things ought to be done at this time of the year, to prevent hurry at a more busy season. So that, though our farmers cannot plough, or do any thing to the soil in winter, unless it be sometimes in part of December, they need not be idle. In maritime places they may employ themselves and their teams in getting manure from flats and creeks, and drawing it to their hungry high lands. This will turn to very good account, and pay them well for their labour. Holes may be dug in the ice over flats, from whence rich mud may be taken, and drawn upon sleds to the high parts of a farm. And this will be found to be a profitable employment.

ENCLOSURE, a piece of ground fenced by itself, to prevent the entrance of cattle, &c. In some places men farm in common fields. But this method, pasturing excepted, is not eligible. Some lose more by it than enough to pay for enclosing. And it is too often the occasion of quarrels, and endless uneasiness among neighbours.

EWES, the females of sheep. That they may be profitably managed, we should keep none for breeders that have not long and fine fleeces. The rest should be killed off during the first year. Otherwise the flock will degenerate; and a large proportion of their wool will be coarse, or too short, and of little value.

From the first of October, to the twentieth of November, the rams should be kept from them; that so their lambs may not come till the twentieth of April, when the ground is most commonly bare, and the grass begins to spring in many places.

For a few days, or weeks, before weaning time, they should be more generously fed. Some juicy food, which they are fond of, should be given them, such as turnips, potatoes, &c. that they may have plenty of milk for their lambs: For it is the opinion of careful observers, that want of milk is the cause of the dying of so many lambs in the first stage of their existence.

From their first going to pasture to the last of June, or the middle of July, the ewes should have plenty of feed, by means of which the lambs will come forward rapidly in their growth, so as to be fit for weaning. Nor will the ewes become so lean, but that they may be fattened in autumn; which would be otherwise, were the lambs to suck them as long as they are permitted to do in this country.

As to the advantage of the milking of ewes, after the lambs are weaned; as it has not yet been much practised among us, I can only testify, that the best cheeses I ever tasted, made in this country, had a mixture of this milk in them. But a writer in the *Scots Farmer* declares, from his own experience, it is of great advantage to the owner. He thinks they should not be milked more than eight weeks at the farthest;—says they ought to have good pasture; and that the lambs they bring the year following will not be the worse for their having been milked.

EXCREMENT, that which is thrown out of the body as useless after digestion. See *Dung, Urine, &c.*

EXPERIENCE, practice, or continued use. Perhaps no man ever attained to a thorough knowledge of husbandry merely by books, or by oral information. Experience is needful to fix the knowledge of the multifarious branches of it in our minds. It is needful, also, to teach us the easiest methods of performing a thousand things, which depend on circumstances so minute, that they were never committed to paper, and scarcely are thought to be worth mentioning.

But experience, however necessary, is not all that is needful to make an accomplished farmer. Observation is equally necessary. And without argumentation, none will be fit for any thing greater than going on in the most beaten tracks. None ought to conclude from their having had the longest experience, that they have the greatest degree of knowledge: For some will learn more by experience in one year, than others will in forty. Theory and practice should certainly concur, to render persons skilful in husbandry, or in any other profession. An early apprenticeship is as necessary to the attainment of this art, as any other; as some have been convinced, who have entered on farming when they were past the meridian of life.

EXPERIMENTS, trials of practice in husbandry. It is greatly to be wished, that more of these were made in this young country, where the knowledge of agriculture is yet in its infancy. Experiments made in other countries are not to be relied

lied on, as proofs of the utility of one mode of culture in preference to another, in this country. Therefore, we should not trust to the experiments of Europeans, but make experiments for ourselves. Till this is done, we are not to look for great improvements in husbandry.

It may be true, that he who makes a new experiment is in some hazzard of losing more or less by it. Therefore, I would not press it upon farmers in indigent or low circumstances, to venture upon any thing of the kind, unless it be in very small matters, or on a small scale; for the failure of one year's crop would almost reduce them to beggary. They would do well, however, to compare the profit of one crop with another, reckoning the cost laid out upon each; and of one course of crops with another; and the success of different manures on the same, or on different soils. Thus they may find which of the old methods is to be preferred, by a small degree of attention, without any risk, which is a matter of some consequence. For we need to learn what methods to drop, or discontinue, as well as what to adopt or bring into use.

Gentlemen of large estates, who can bear some considerable loss without feeling it, in case they fail of success, are the persons that should try new crops; or new ways of raising old ones. Love of their country should prompt them to it; for there is no reason to doubt but that our husbandry may admit of a variety of important improvements. It is wished that an enterprising spirit were more excited, that we might have reason to hope for great improvements in husbandry. There is an extensive field

for experiments; and making them might be a good and laudable amusement to persons who have leisure. Trench ploughing, which has never yet been attempted in this country, ought to be tried, at least by those who have deep soils, clear of rocks and other obstacles. Trials should be made of the advantage of ploughing flat land in ridges; and whether ridge ploughing will not secure grain from destruction by winter frosts. Attempts should be more extensively made to raise winter wheat, which is the most valuable of all grain. We should endeavour to find out the best seeds for grain and other seeds, to quicken their vegetation, and to secure them against insects and smut;—what are the best quantities of seed for sowing in different grounds;—whether sowing seeds with a drill be not the best method when horse hoeing is not applied;—when is the best time for sowing of winter grain;—whether good peat and marle be not to be found in plenty in various parts of the country, and the advantage of marling, and sowing peat ashes;—whether drained swamps are not the most profitable of all our lands;—whether new dung or old will produce the best crop, and whether compost will not do better than either;—how lime will answer as a manure in our hot summers—on what kind of soil it is most serviceable, &c. &c.

But, in making experiments, great care should be taken that we do not draw a conclusion too hastily; certainly we must not do it from one single trial. For a thing may answer well at one time, owing to the peculiarity of a season, or to some indiscernible circumstances, which will not at another. If men allow them-

elves

elves to be too sanguine and sudden in their conclusions from single experiments, they will rather embarrass and mislead, than increase agricultural knowledge.

But if improvements be wished for, experiments should be carefully recorded. If this be neglected, husbandry must be expected to remain in its present low state. For want of such records, a great deal of useful knowledge has been already lost. Though many have made experiments, by which they have satisfied themselves, but few have recorded them. The experimenters themselves have forgotten them, to such a degree, that they are apt to misrepresent them, when they attempt to relate them. And too many suffer useful discoveries to die with them. To prevent these evils, the forming of societies in various parts of the country might be of great use.

F.

FAGGOT, a bunch of bushes, or limbs of trees, bound together by a withe. Faggots for fuel are cut to the length of about two feet. In many parts of this country, the scarcity of fire wood makes it expedient that farmers should no longer go on in the practice of burning such materials on the ground. They should preserve them in faggots for fuel in their houses. They will serve to heat stoves; and for heating ovens there is no better wood.

FALL, autumn, that quarter of the year which includes September, October, and November. It is so called, because the leaves of deciduous trees fall off in that season. In this quarter of the year, the farmer finishes his har-

vesting, and lays in his stores for winter.

In a country where the springs are backward, as in the northern parts of Newengland, farmers should do all they can in autumn, to diminish or lighten the labours of the following spring, when they will have much work to perform in a short time. Summer dung and composts should be carted out at this season. Fences should be built or repaired, not only to prevent having them to do in the spring, but to keep cattle from injuring the lands with their feet. All the ground should be ploughed in the fall, that is to be seeded the following spring. That which is intended for spring wheat should be ploughed twice. Though all that is ploughed in the fall, for spring tillage, must be ploughed again before seeding, the fall ploughing saves labour, as one ploughing may answer in the spring where two would be otherwise needful. It is saving labour at a time when teams are most apt to be faint and feeble, and when there is too often a scarcity of food for them. But ploughing in autumn is of great importance in a clay soil, as, by exposing it to the frost, the cohesion of its parts is much broken.

The transplanting of trees out of nurseries may, to redeem time, be performed in the fall; though, on other accounts, I should prefer doing it in the spring.

FALLOWING of land, letting it rest from one crop, or more, being ploughed without seeding.

When land has two ploughings, in the fallow year, it is said, in the language of English farmers, to be twyfallowed.

When

When it has three, as indeed it always should have, it is said to be trifallowed. The first ploughing is shallow; the second a little deeper than the first; and the third a little deeper than the second. But if the land be cold and stiff, and need much warming by the sun, they go to the full depth at the first ploughing.

Nothing can be better than fallowing, to recruit land that is too much exhausted by cropping. The oftener it is ploughed, the more it is enriched. Some have ploughed their fallow land no less than a dozen times; and, if I am not misinformed, have, by doing so, changed some of the poorest spots, so as to make them too rich for a crop of wheat.

If new dung be laid on fallows to recruit the soil, it should be done early in the year; that the ploughings may more thoroughly mix it with the earth; and that the seed of weeds contained in the dung may be killed. But when old dung, or compost, is laid on to help the next crop, the right time to do it is just before the last ploughing. It should be turned in with the plough without delay, to prevent evaporation.

But if dung cannot be had, the want of it may be supplied by more frequent ploughings.—By fallowing, the weeds are most effectually killed, and converted to manure. The land is finely pulverized, so that the pasture of plants is greatly increased: And a new surface by each ploughing is exposed to the influences of the atmosphere; so that the soil is deeply penetrated, or even saturated with fertilizing particles, which are wafted by the air.

“The farmer cannot wish,” says one, “for any thing more beneficial to his husbandry, than

moderate showers after each fallow, to bring the seeds of every weed to vegetate, in order that, being turned down by several ploughings, they may be the more effectually destroyed.”—I may add, that the more the land is ploughed when the dew is on it, the more it will be enriched. Too much of this work, therefore, cannot be done early in the morning, especially if the ground be dry: And when it is so wet as not to crumble, but turn up in clods or potch like mortar, it should not be ploughed, or meddled with at all.

Summer fallowing, however, is not so much in use among European farmers at present, as it has been. For they have found that there are certain crops which do not impoverish the soil, but rather improve it. Such crops, for instance, as pease, and other things which form a close shade over the ground, which kill weeds, and increase the putrefaction in the soil. Therefore, many choose to avail themselves of the advantage of improving crops, as they are called, rather than lose a year in fallowing.

But winter fallowing is always allowed to be profitable; and I have found it to be so by experience. The advantage of it is most visible in stiff soils; for the frost and winds in winter will do much towards making them mellow and fine. One ploughing in the fall, and another in the spring, will put the land into better order for seeding, than two ploughings in the spring. Land that is apt to be wet may be ploughed the earlier in the spring, for having been winter fallowed. The seed may be got in the sooner, as the land will be drier, which, in some crops, is a great advantage.

Green sward land should always be broken up in the fall, if it be only for pease or potatoes, and the earlier in fall the better. For either of these crops, nothing more will be needful in the spring, than a harrowing with a heavy drag. On half an acre of poor ground thus managed, and without any manure, I once raised a hundred bushels of potatoes.

FALSE QUARTER, a rift or chink in the quarter of the hoof of a horse, from top to bottom. It happens generally on the inside, that being the weakest and thinnest; and proceeds from the dryness of the hoof, but especially when a horse is ridden in dry, sandy, or stony ground, in hot weather, or in frosty weather, when the ways are flinty and hard. It is, likewise, caused by bad shoeing, and all other accidents whereby a horse becomes hoof bound: For the narrowness of the heels, and brittleness of the quarters, continually expose a horse to all the said accidents.

“This accident is both dangerous and painful; for as often as a horse sets his foot to the ground, the chink widens; and when he lifts it up, the sharp edges of the divided hoof wound the tender flesh that covers the coffin bone, which is for the most part followed with blood; and it must of course be apt to render a horse lame, as it is very difficult to form a reunion. To remedy this imperfection, First, draw the whole length of the cleft with your drawing iron, then anoint the hoof with tar, honey, and suet, molten together; for nothing can be more proper for the hoof; and lay a thin pledgit dipt in the same along the cleft. After this, take rope yarn, such as the sailors

use, which is no other than hemp moistened in melted tar, and spun loose: Apply the yarn all down the hoof, beginning at the coronet and descending downwards, one lay after another, as close as the binding of the hoops of wine casks, laying a smooth pledgit of flax behind, to keep it from fretting the heel. This should be opened once in three or four days, that the cleft may be dressed. And to prevent any inconvenience that may happen by the opening, a thin staple may be also contrived with points like horse shoe nails, cast off obliquely, to take a slender hold, the plate of it crossing the cleft, where part of the shoe is cut off (as it must be under the cleft) and the nails coming out on each side of the cleft, on the upper part, to be clinched as the other nails. By this method a cleft in any part of the hoof may be easily cured, if the horse be not very old, or diseased.” *Gibson's Farriery.*

FAN, an instrument used in separating corn from its chaff. Of late the fan is almost out of use. See *Riddle, Winnowing Mill.*

FARCY, a disease in horses, similar to the scurvy in men, and arising from a similar cause. The farcy is caused in horses from their being for a long time confined to dry meal. And as the scurvy in men is cured by a diet of green vegetables; so the farcy in horses may be cured by turning them into a good fresh pasture. But it is only in the beginning of the disease that it can be so easily cured. *Gibson* prescribes bleeding, and moderate purging; and afterwards doses of antimony. See *his Farriery.* *Mr. Mills* calls it a cording of the veins, and the appearance

appearance of small tumours in several parts of the body. Mr. Bartlet deems this distemper easy of cure, when it appears on the head only. Mr. Bourgelat says, a decoction of the woods, antimony, powder of vipery; with some mercurial preparations, are looked upon as so many specifics in this disease—and that hemlock will cure it.

FARM, a tract, or piece of land, under improvement, fit for a farmer to live on, or one that is adapted to serve the general purposes of a husbandman.

That a farm may be convenient, it should be compact and regularly shaped; well watered with rivulets or springs; and contain a variety of soils, fit for the growing of all sorts of plants that are needful to those who live a country life. It should contain high and low lands, dry and moist; lands that are fit for tillage, orchard, mowing, pasturing and wood land. And a farm, with some rocky land in it, is not the worse. Those farms will, in the long run, be the most profitable, which contain stones enough to make a wall round them; if not to enclose them in lots. Farms that have a southern exposure are generally preferred; but a northern exposure is best in a dry season, in particular for grass, and some other vegetables, which require no great degree of heat. Flat land is not so good as land lying in gentle declivities. Flat land is commonly too much incommoded with water.

In some countries men choose to hold large farms. But in places where labour is dear, as in this country, small farms are to be preferred. One hundred acres of good land may be enough

for a man, whose work is mostly done by himself and family. Near to a market town, a much less quantity may be sufficient; and, all things considered, equally profitable.

They who hire farms should consider, and be well satisfied what they will produce, before they bind themselves to be tenants. Otherwise they may repent when it is too late. It is a kind of rule in England, that a farm should produce the value of three rents; one for the landlord; one for the charges of cultivating, &c. and the third for the farmer and his family to live on. So that a farm will not rent for 100 unless its produce, *communibus annis*, be worth 300 pounds. But farming must be better understood and practised, before farms with us will pay for three times the labour done on them, or labour must grow cheaper; or both these causes must concur.

Perhaps 100 acres produces 40 tons of hay, which,	
<i>communibus annis</i> ,	l. s. d.
may be worth,	60 0 0
100 bushels of Indian corn,	20 0 0
100 weight of flax,	4 0 0
50 bushels of rye,	10 0 0
30 bushels of wheat,	9 0 0
100 bushels of potatoes,	6 0 0
pasture for 10 cows, one horse, and 2 oxen,	11 0 0

Total, 120 0 0

The third part of this sum is 40l. But I know of no farm of this size which brings so high a rent. I suppose it must be partly owing to the dearness of labour, and partly to the want of better management of farms. The higher the price of labour is, the lower rents ought to be. Forty pounds will by no means purchase the labour that must be done on such a farm.

FARMER,

FARMER, one who cultivates a farm. His addition is *Husbandman*. In England, the word gives the idea of one who hires a farm to cultivate; as in a manner all the farmers are tenants. But, thanks to good Providence, the farmers with us are mostly landlords. One would think this must conduce to the better cultivation of our lands in general. A tenant does not interest himself in the improvement of the farm: He aims to do what will be most profitable to himself. If he can answer his own ends, he cares little how much the lands are exhausted when he leaves the farm.

FEN, land which abounds with water, as swamps, or is full of bogs, or miry places. The only way to make fenney lands good, either for tillage or grass, is by draining. See *Bog* and *Draining*.

FENCE, a hedge, wall, ditch, or other inclosing made about farms, or parts of farms, to exclude cattle, or include them. Fencing is a matter of great consequence with farmers; and, as it is managed in most parts of this country, is a great drawback upon their profits. But however costly fencing may be, it is good economy to make fences strong and fully sufficient to answer their purpose. It would be folly to save a trifle by making a fence too slightly, and be liable to lose a whole crop, by the breaking of cattle through it.

The kinds of fence, and manner of fencing, should vary according to the difference of soils; and according as one kind of materials for fencing is more plenty and cheap than another.

In the new plantations of this country, log fences are most used; as they certainly ought to

be; because the wood is of little or no value. To build these fences with, the best wood that I am acquainted with is white pine. A fence built with logs of this kind will stand twenty years, with little or no repairing.

But if this kind of wood be not at hand, and other sorts be plenty and near, it may be as well to make use of some other kinds: Such, for instance, as pitch pine, norway pine, hemlock, ash, oak, and white maple. Several, or almost any of these kinds, if they do not lie too near to the ground, will last for a considerable time. If a fence be made partly of white pine, and partly of other wood, the former should be laid nearest to the ground.

But let farmers beware of building their log fences of bass wood, poplar, birch, beach, or rock maple, unless in cases of necessity; for as they will be soon rotten, the labour of building them is in a manner lost. If logs are peeled they will last the longer in fences. The largest logs should lie lowest in a fence, both for strength and durableness. The lowest are soonest rotten, when all are of the same size; and the largest logs will last longest.

Log fences should always be braced with strong stakes across; and heavy riders add strength to a fence.

When ground is wholly subdued, and the stumps of its original growth of trees quite rotted out, if stones can be had without carrying too far, stone walls are the fences that ought to be made. Though the cost may be greater at first than that of some other fences, they will prove to be the cheapest in the end. Building stone walls is not only the way to clear ground of a bad incumbrance; but when the fence is made,

made, it is certainly the best of all fences. On a hard, sandy, or gravelly bottom, if built with good stones, a wall will stand many years without any repairing. And it will stand well on any soil, clay and mire only excepted. On a clay soil it will stand, if the foundation be laid in a trench, near as low as the earth commonly freezes in winter. But a wall of flat or square shaped stones, will stand tolerably well on any soil, laid only on the surface.

It is true that walls will gradually settle into the ground, where the soil is at all mellow, and heaves with the frost; so that it may be necessary, in a century or two, to dig them up and rebuild them. I find some of this work has already been done in some of our oldest towns. But this is a slight objection against the utility of this kind of fence. For future generations will bless themselves, if they have materials on the spot to build fences with; when wooden materials must unavoidably be scarce in most places, and very costly.

I am aware it will be objected, that stone walls are not sufficient fences against sheep. But it is easy to make them so. A row of flat stones laid on the top, and jutting over, will make a wall sufficient for this purpose: Or some of the slightest riders will do it. Riders with some of the limbs on them are best for this purpose.

Farmers need not fear that they shall impoverish their land by clearing it of stones. For, after all they can do to a soil that is naturally stony, there will be stones enough remaining, a little way below the surface, to render the ground moist and warm.

In those parts of the country where boards are plenty and

cheap, many think it worth while to build fences to their fields and pastures with boards. Such fences abound in the counties of York and Cumberland, in the state of Massachusetts. Refuse boards, which are most commonly used for this purpose, may be had at the mills for two dollars per thousand; and a thousand will serve for about sixteen rods of fence. So that I suppose such fence may be made, at least in the neighbourhood of mills, and in a slight manner, for about one shilling per rod. If the boards must be carted to any considerable distance, the cost of the fence is much increased. Such fence, however, may be accounted cheap, considering the durability of the boards. I have board fences now, which have stood twenty years, which will last perhaps ten years more, with the addition of here and there a board.

When the boards are of common width, they may be so fortified together, that three boards one above another, will make a fence of convenient height.

Board fences are of two kinds: They are built either with posts and spikes, or with slender stakes and withes. In making the former sort, some lap the ends of the boards one on another against the posts. This makes the strongest work, and is best for open fence. For field fence the edges of the boards may be put three or four inches apart. The strong winds will not be so apt to injure it, as if it were made close.

To make handsomer fences, about gardens, yards, and small inclosures, the ends of the boards, being cut square, should meet against the centre of the post. There must be a post at the middle, as well as at each end of a board, supposing the boards to be

not much over nor under twenty feet in length. The post should go into the ground at least thirty inches. Three feet will not be too much in clayey ground: For in such soil the posts are apt to be raised by severe frosts.

The other kind of board fence is more easily built. The ends of the lowermost boards should be a little raised from the ground with flat stones or pieces of wood. The boards will last the longer, and it is no hurt to the fence. But the withes will not last more than two years at longest. So that the fence must be rebuilt once in two years. It should not be neglected longer, lest the boards fall and get broken before the fence is rebuilt. I will add one thing, which is not generally attended to, in making board fences of either kind. When the fence does not stand due north and south, or on a meridional line, care must be taken to place that side of a board which is nearest the heart, towards the south, or on the southerly side of the fence. This will serve to keep a board from warping; and the fence will last the longer; for they sometimes warp so much as to make them split.

Rail fence is perhaps as much used as any. The timber for posts and rails should be felled in the winter. To sharpen rails before they are dried saves labour: And posts should be mortised while they are green. Rails are cut twelve feet long. Posts should be six feet and a half, or seven feet. The best timber for rails is cedar: It is easy to split, light to carry and to handle, sufficiently strong, and the most durable of any. A rail of cedar will last an age. Next to cedar, rails of chefnut, white pine and ash are best. But, for want of better,

some use rails of oak. Cedar is also best for the post, in this and in board fence. The locust tree is said to be excellent. But posts of white oak, which in most places are more easily got, will last about fifteen or twenty years. If the lower ends of posts be scorched in a hot flame, before they are put into the ground, they will last the longer. Also soaking them in sea water will tend to keep them from rotting. Juniper, the larch, is much used for posts in this part of the country. They will last about eight or ten years.

In some places it is best to make hedge fences. There are two kinds of fence that go by this name, dead hedge and quickset hedge.

To make a good dead hedge, take stakes about six feet long, and set them fast in the ground, upon the line of your fence, about four feet apart, or a less distance if your bushes be short. Then interweave bushes, young trees, or small slender limbs of trees. This fence will answer with a yearly repairing until the stakes fail.

But quickset hedge is much better, as it is a perpetual fence. It must be made with different sets in different grounds. English willows will answer well in low and moist land. They grow very rapidly, though set without roots. On high land, hawthorn, prim, pear tree, or crab tree hedges will do better. Sometimes a hedge is made in the bank of a ditch, and sometimes without a ditch. The latter sort may be planted close to another fence, which should stand until the hedge is grown up. When a fence is made without a ditch it ought to be fenced on both sides.

Mortimer directs, "That if the hedge have a ditch, it should be three feet wide atop, one at bottom, and two feet deep: That if it be without a bank, or ditch, the sets be in two rows, almost perpendicular, and at a foot distance; and, that at every thirty foot distance, a young oak, elm, crab, or the like, be placed: That when a hedge is grown tall, it may be plashed, by giving the shoots a cut half through, and weaving them between the stakes, trimming off the superfluous branches."

Mr. Miller says, "It will be proper, before planting a hedge, to consider the nature of the soil, and what sort of plants will thrive best in it; and also what the soil is from whence the plants are to be taken: That when the bank at the side of a ditch is to be planted with quicks, the sets ought to be about the size of a goosequill, and their tops should be cut off within four or five inches of the ground: That they should be fresh taken up, straight, smooth, and well rooted. Part of the turf taken off the surface of the ground, where the ditch is to be dug, should be laid with the grassy side downward, on the side of the ditch where the bank is intended to be made, and some of the best mould should be laid upon it to bed the quick. The sets of quick are then to be laid upon that mould, a foot asunder, with their cut ends somewhat sloping upwards. When the first row of quick is thus laid, it must be covered with mould: Some of the remaining turf must be laid upon that mould, with the grass side downwards, as before; and more mould must be laid upon the turf. When the bank has been thus raised about a foot high, a second row of sets

should be laid in the spaces between the lower quick, and with their ends turned the opposite way, in order to thicken the bottom of the hedge. These are then to be covered in the same manner as the former. The bank is to be topped with the bottom of the ditch; and a dry or dead hedge must be made on the other side, to defend the young plantation from cattle. The quick must be constantly weeded; and in February it should be cut to within an inch of the ground; for this will make it shoot strong, and greatly help its growth. When a hedge of this kind is about eight or nine years old, it will be proper to plash it. The best time is in October or February. After it has stood twenty or thirty years, and there is in it old stubs, as well as new shoots, those stubs should be cut sloping off, within two or three inches of the ground."

It takes time to make these hedges. But, on the whole, they are cheap fences, as they require but little repairing, besides trimming and pruning, to prevent their growing so high as to cast too great a shadow. It is greatly to be wished that farmers in many parts of this country, where materials for other fences are scarce and dear, would go into this method of fencing. The cost of making the ditch and bank, would be no more than two shillings a rod, exclusive of the quicks. And when such a fence is intended, the farmer should have a nursery of quicks prepared. For though slips and cuttings may live, quicks with roots are more certain. And it is better to make a good hedge at first than to have it to mend afterwards. The best times to place these quicks in the fence in

this country are April or May, and October.

There is a Virginia fence, so called from its being much used in Virginia. It is made by lapping the ends of rails or poles on each other, turning alternately to the right and left. There must be stakes across under the uppermost rails, to make the fence steady, and prevent its falling. As it is easily made, and soon taken up, it may do best where a fence is wanted only for a short time: But it takes up too much room, and has not an agreeable appearance.

Another kind of fence is made with rails, or poles, with every but end on the ground, and every rail supported by a pair of stakes crossed. It may be built exactly on a line, and be put up with great expedition. Cattle seem afraid to attempt to leap over it, nor can they push it down, nor remove any of the parts of it with their horns. It is not to be coveted for the beauty of its appearance. At a small distance it might be mistaken for a *Chevaux de Frise*.

Bush fences are sometimes made by piling bushes, or small trees with the limbs on them; finished with cross stakes and riders. It will be continually settling; and therefore must be made higher each year. It poorly pays for the labour of making it; and should never be made, but where suitable materials for better fences are not easily to be had.

Some make a compound fence, with two or three rails above, and stones beneath. Posts that have stood in a rail fence till the bottoms are rotted off, will answer to hold the rails in this kind of fence, if care be taken to support them with heavy stones

against their sides. But if the wall be not made with stones that are somewhat large, swine will be apt to displace them, and make breaches to pass through.

Fences for some inclosures may be made with two rails or three, and open below. For division fences on a farm, such fences will be fully sufficient, where neither sheep nor hogs are to be opposed. They are convenient also, and preferable to almost any other, on account of the facility of shifting them from place to place, as a farmer may often find occasion to do. For the posts being pointed in the manner of stakes, the holes may be made with an iron bar, and the posts driven into the ground with a beetle, so as to stand sufficiently strong. In some parts of the country, where neither sheep nor swine are permitted to go at large, these open fences are used against roads. And it is not amiss to adopt the cheapest ways of fencing that will answer the purpose.

A sort of fence is made of the stumps and roots of white pine trees. In a soft soil the roots run deep: But the stumps on a soil of clay may be taken up without much labour. The method of doing it is, to cut off the roots all round, about two feet from the body of the stumps: Or nearer the side of the stump which is to lie on the ground, and farther on the other: Then heave at them with a long lever, till they are so loosened that they may be pulled up by oxen. Lay them in a range where you want your fence, mending the gaps with the smaller roots; they will be a good fence for two or three generations. Besides durability, the fence has these things to recommend it: It clears the land

land of a bad incumbrance, and will stand well on a clay soil, which is bad for other fences in general.

For ditch fences, see *Ditch*.

FERMENTATION, an internal motion excited in substances, by which the cohesion of their parts is destroyed, and their nature changed. But, that a fermentation may take place, it is necessary that some particles in the fermenting body be fluid; or that the body be moist. Bodies perfectly dry can have no degree of fermentation in them.

Fermentation does much towards the production and growth of plants. It is therefore a thing of much consequence to the farmer; and he ought to know by what means he may increase it in his ground.

The pasture of plants is increased by fermentation, as it loosens the soils, so that their roots do more easily find their food. All rich soils contain the principles of the food of plants in abundance: And a fermentation is produced among them by any thing that alters the arrangement of their particles. A fermentation is produced by heat from the sun, and by rain: But when the soil is too much filled with water, the fermentation is abated, or destroyed. Ploughing, and otherwise stirring the ground, is a principal cause of fermentation in the soil. The plough not only increases the pasture of plants by pulverizing the soil, but by mixing the salts and oils contained in it, so as to bring on a degree of fermentation, if the soil have neither too much, nor too little water in it at the time of ploughing.

I suspect that our severe frosts in winter may have a tendency to excite a degree of fermenta-

tion, which takes place after the ground is thawed. For the heaving and settling of the soil will make some alteration in the disposition of its particles, and conduces to its imbibing more freely, snow water and rains, which contain food of plants.

But dung, and other strong manures, are perhaps the chief causes of the fermentation of soils. Dung is no sooner mixed with the soil, when there is a proper degree of warmth in the earth, than it strongly ferments in itself, and brings on a new fermentation in the earth which is in contact with it, which is communicated to remoter earth: By all which the cohesion of the parts of the soil is broken, the soil highly pulverized, and the pasture of plants proportionably increased, so that their roots can freely extend themselves in quest of their food.

By the same fermentation, the food or nourishment of plants is increased; because the dung itself is dissolved, its salts and oils mixed, its fine earthy particles set at liberty, the vegetable substances, such as roots, weeds, &c. corrupted and dissolved: All which conspire to increase the food of plants, and prepare it to enter the minute pores of their roots.

That plants may flourish, it is thought to be needful that a fermentation of the soil be continued during their growth. Otherwise a sufficient quantity of steam will not arise to their roots; a probable consequence is, that they will be stunted in their growth. It may be for this reason that tillage, during the growing of plants, is found to be so very advantageous to them; especially when they are hoed to a good depth, by which the fermentation

mentation of the soil among the roots is increased.

FERN, or BRAKES, *Polypodium*, a well known sort of weeds, that is often troublesome to such of our cleared, or partially subdued lands, as have not been tilled. They are so full of salts, that they should be cut green, and laid in our barn yards to putrefy, and mix with dung. Perhaps there is scarcely any better method of increasing manure. Pasturing the land where they grow, especially with hungry cattle, that will eat them as fast as they come up, will help to subdue them. Folding will kill them; for there is nothing so fatal to them as urine: But not less than two or three year's tillage will subdue them. They are hardest to subdue in deep soils. Plentiful dunging, with tillage, will be effectual; but a most certain remedy is urine; this they get in plenty by folding.

"Fern, cut while the sap is in it, and left to rot on the ground, is a very great improver of land; for if burnt when so cut, its ashes will yield double the quantity of salt that any other vegetable can do. In several places in the north parts of Europe, the inhabitants mow it green, and burning it to ashes, make those ashes up into balls, with a little water, which they dry in the sun, and make use of them to wash their linen with; looking upon it to be near as good as soap for that purpose." *Dict. of Arts.*

In the *Farmer's Calendar* you may read, under September, "Now is the proper time to cut fern, called in some places brakes. This is most profitable work, and should never be neglected. Carry it into your farm yard, and build large stacks of it for cut-

ting down through the winter, as fast as the cattle will tread it into dung; also for littering the stables, ox houses, cow houses, hogsties, &c. By having great plenty of it, you will be able to raise immense quantities of dung, which is the foundation of all good husbandry; and it is well known that no vegetable yields such a quantity of salts as fern; from which we are to conclude, that it is best adapted to the making manure."

It is a lamentable thing that we should hitherto be so inattentive to our own welfare, as to suffer this weed to render our lands in a manner useless, when it might be turned to so great profit. It is a double advantage to cut brakes, as they not only make plenty of good manure, but every cutting helps to destroy them. The work may be done after the hurry of hay making is over; and perhaps no labour on a farm can turn to better account.

FESCUE, the name of a genus of grass, of which there are several species.

FIELD, a piece of cultivated land, whether for tillage, pasture, or mowing.

FISH, animals that live in water. All the parts of fish, shell fish and all other, are excellent manures. They may be used, either salted or fresh; salted fish are said to be best. The offals of fish, and fish that are spoilt for eating, may be converted to this use: But I should prefer using them as an ingredient in compost. They are so strong a manure, that it has been said, one single alewife will answer as well as a shovel full of the best dung, in producing Indian corn. But they cause land to exert itself so much, that it will

will be apt to grow poor, unless care be taken to prevent it.

FLAIL, an instrument for threshing. A flail consists of the handstaff, the swiple or flyer, the caps or caplins, the string or band. The staff should be of the lightest timber, such as ash, and made perfectly straight; the flyer should be of a heavy kind of wood, as walnut, elm, or beetle wood. Some make the caps of wood, but stiff soal leather is better. The string or thong, which connects the cap with the flyer, may be of the neck of deer skin. But the skin of an eel will last much longer than any other string I have met with.

FLANDERS GRASS, a name given to clover, denoting the country from whence it first came into England.

FLAX, or **LINT**, *Linum*, one of the most important of all plants, the culture of which is a needful, if not a profitable piece of husbandry. But I suspect the true cause of its being thought unprofitable by many, is their poor management of it. It is a crop that perhaps requires the most care, and the nicest culture, of any that we are concerned with. But this may be said in its favour, it is so ill tasted a plant, that it is seldom destroyed, or hurt by insects. It should never be sowed on a soil that is not rich, and well wrought; for if the crop be not good, and do not get a good length, and a strong coat, it will not pay for the labour, but be worse than nothing, which is too often the case.

Sandy and gravelly soils are by no means suitable for flax. It is not a plant that requires much heat; therefore it answers well in cold latitudes. The cooler kinds of soil, such as clay

and loam, and the black earth of drained lands, are suitable for it. But they should be well pulverized and manured. In wet seasons it commonly does better than in dry ones: So that though it may sometimes do well upon high land, it is best not to run the risk of it, but rather choose a soil that is naturally low and moist. If it be too wet, some little trenches may be made, thirty or forty feet asunder, to drain off the water. The land must be in good heart, either naturally, or by the help of manures. But new dung should not be laid on it at the time of sowing; nor any thing else that will make weeds increase; for in no crop are weeds more pernicious than in flax. It is often found that they entirely kill most of the plants; and the remaining ones will be bushy and misshapen, and have a weak coat on them, being too much deprived of the rays of the sun.

The manure for flax ground should rather abound with oils than otherwise, and be rather cooling than hot. The old rotten dung of black cattle and swine is most suitable, or a compost in which these dungs are the principal parts. A top dressing of sea weeds, after the flax is come up, is greatly recommended. But I rather choose to enrich the ground a year before, than when the flax is sowed. A crop of potatoes is good to precede one of flax. I plough up green sward land, dung it well with such manures as are suitable for flax, and plant it with potatoes. This crop does not abate the strength of the soil, but rather increases it. It makes the ground mellow, and does not encourage weeds: It is therefore in fine order for flax the year following.

Green sward will sometimes do well the first year; but it must be a fat deep soil, such as some intervales are, and should have a dressing of old dung, well pulverized, and mixed with the soil by harrowing: For if it be not well mixed, the crop will be of various lengths, which is inconvenient, and occasions loss.

In England they sow two bushels of imported seed on an acre. When they sow seed of their own growing, they allow more. In this country some afford but one bushel. The best quantity may be about six or seven pecks, or a little more or less, according to the strength of the soil. For it is not with this crop as some say it is with grain. Of grain, rich land requires, they say, less seed; because what is wanting in seed, is made up in stooling. But however this may be, it is most certain that the stooling of flax will be hurtful. That is the best flax, where a root bears but one spire, or stalk. It will be straighter and taller, as well as more soft and pliant. The ground should be ploughed in the fall, and again in the spring, the clods broken, and the stones taken out.

Flax should be sowed early, unless the soil be too wet. A small degree of frost, happening after it is up, will not kill it. That which is sowed early, has the strongest coat, as it is slower in its growth.

A calm time should be taken to sow the seeds: Otherwise it cannot be sowed even, it being more difficult to sow than most other seeds.

Flax seed should be changed once in two or three years, or it will so degenerate, as to be unfit for sowing. It is worth while to change it every year. It is cer-

tain, that seed from less than a hundred miles distance, has been known to make a crop more than double in value. It has done so in this country. After the seed is sown, it should be covered, either by bush harrowing or by rolling, or both.

When flax comes to be about four inches high, if weed appears among it, they should be pulled up by careful hands: And to prevent wounding the flax, the weeders should be barefooted. If they should tread it down at this age, it will soon rise up again. The weed, commonly known by the name of false flax, is not in blossom till the flax is nine inches, or a foot high. At this time the weed is easily found by its yellow blossoms; and what escaped at the first weeding, should at this time be carefully eradicated. Otherwise it will be troublesome in spreading the flax, and in dressing it, and the seed will be foul.

The next operation in the culture of flax, is pulling it: In doing which, care should be taken not to mix long and short together in the same hands: But to keep all of the same length by itself. The reason of which caution is so obvious, that I need not mention it.

The time of pulling flax depends upon its growth and ripeness, and upon the proposed method of managing it afterwards:

That which is to be watered, should be pulled as soon as the blossoms are generally fallen off. Some think the harl is stronger at this time than afterwards, as none of the oily particles are yet passed up into the seed: It is undoubtedly better for the soil, that it be pulled at this time, than when the seed is ripe. The longer it stands to ripen, the

more oily particles it will draw from the earth.

Being pulled, and tied up in hands, the flax should be put into the water without delay. A pond is preferable to running water, both as it is warmer, and not so apt to deprive the flax of its oily and glutinous substance. In four or five days, according to the warmth of the water, it will be time to take it out. But that the true time may not be missed, it must be carefully watched, and trials made by drying and breaking a little of it, that so the harl may not get too much weakened by steeping.

After it is taken out and has lain dripping a few hours, it must be spread on a grassy spot, and dried. If it should happen to be not watered enough, the want may be made up by letting it lie in the dews for a few nights; and if a gentle rain happen to fall on it, it will be the whiter and cleaner.

The flax that goes to seed should not stand till it appears brown, nor till the seed be quite ripe. It is not necessary on account of the seed; because it will ripen after pulling. When the leaves are falling from the stalks, and the stalks begin to have a bright yellow colour, the bolls just beginning to have a brownish cast, is the right time for pulling.

The rind is to be loosened from the stalks, not by watering; lest it be too harsh, but by spreading it on the grass to receive the nightly dews. When it is done enough, the rind will appear separated from the stalk at the slender branching parts near the top ends. When it is almost done enough, it should be turned over once or twice.

It was formerly the practice, after drying the flax in the field,

to house it till some time in September; and then to beat off the seed and spread the flax. But this often interfered with fall feeding: And it was necessary it should lie the longer, the weather being cool. Sometimes it has been overtaken by snows.

I prefer the method I have lately gone into, as it saves labour; which is, to spread the flax as soon as it is pulled. I do it on a spot where the grass is not very short, which prevents sun burning. And I avoid an evil which I once experienced. In a wet season the flax was spoilt in the field after pulling, before I could get it dry. As the weather is hot, it will be done in about ten days or a fortnight. I then take it up, bind it in small bundles, beat the seed off, and lay it up in a dry place till winter. While it lies on the ground, most of the false seed will shell out, which is a considerable advantage. It will be the fitter for market: But the seed reserved for sowing must be cleaned with a proper sieve.

In the most frosty clear weather, flax will dress easily without roasting it before a fire, or baking it in an oven. These practices are not approved, as they make the flax too brittle; and cause it to waste a great deal in the dressing. They are needless in this country, whatever they may be in some parts of Europe, where there is a great deal of moist, dull weather.

If the above directions were strictly followed, I have no doubt but an acre of good land would, in a favourable season, produce four hundred weight of flax. On this supposition, we may consider what the profit of the crop will be.

One third of the flax will pay for the dressing. The other two thirds, at nine pence per pound, will come to

l. s. d.
10 0 0

Deduct two ploughings of potatoe ground,	}	1	8	0
Six loads of dung laid on the year before,		1	4	0
Harrowing and sowing,		0	4	0
Bushing, or rolling,		0	4	0
Weeding, perhaps,		0	4	0
Pulling and spreading,		1	4	0
Taking up and securing it,	}	0	12	0

Whole expense,		5	0	0
The profit of the acre then is	}	5	0	0
To which I might add for the seed, over and above the quantity sown,		1	0	0

Whole profit, 6 0 0

I believe there are but few single acres, in this country, which bring a greater profit than this would be.

To prevent the ill effect of so severe a crop as flax is to the soil, it should be ploughed without delay, after the crop is taken off. As flax is pulled early, the ground thus gets a kind of summer fallow, which will do much towards recruiting it; and weeds are prevented from going to seed, at the same time that they serve as a green dressing.

FLAX BRAKE, a machine used in dressing flax. New improvements of it are, placing the teeth so as to converge towards the fore part, and laying the upper teeth higher at the hinder part. That this machine may last for any considerable time, care should be taken that it be not exposed to the injuries of the weather.

Brakes may be constructed to go by water. Either a mill may be built for that purpose; or, which is attended with less expense, the machinery may be an appendage to some larger mill, and moved without a distinct water wheel. But such brakes are attended with sundry inconveniences, besides extra cost in building them, and wasting of the flax: Though it cannot be denied that the work may be performed with much greater expedition.

Not only brakes, but scutchers, or swingling mills, have been invented, to be moved by the foot. Part of the exertion of the labourer may undoubtedly be saved by them. At least, when they are used by way of change, the work may be lightened on the whole. They who think it expedient to have these machines, may find them described, with cuts annexed, in the *Complete Farmer*.

FLOODING, FLOATING, or DROWNING, covering of low lands with water, when a rivulet passes through them, by making a dam at the outlet. When there is a sufficiency of water, and a short dam will answer, this is a piece of husbandry that ought not to be neglected. Oftentimes it may be of great advantage.

Sometimes it is done for the purpose of destroying the natural growth of trees, bushes, &c. The water not only makes an essential alteration in their food, but also excludes them from the free air, which is essentially necessary to vegetation. It is no wonder, therefore, that it proves their destruction.

The flowing of two summers is found sufficient to kill every plant of the woody kind, so that

it will not sprout any more.— But some advise to drawing off the water in August, that the ground may be, for a few days, heated by the sun. The plants thus suddenly pass from one extreme to another, which will doubtless tend to destroy them the sooner. But when the season is so dry that another pond of water could not be immediately raised, the drawing off had better be omitted.

Another intention of flooding is, to enrich the soil. Some lay their low grass lands under water during the whole of the winter. This may be a good method for lands which are so low and wet, that none of the best grasses can be made to grow on them. The poor water grasses will grow the faster; and the crops of hay, such as it is, will be the larger.

But places where clover, or herds grass, or red top will flourish, should not be flowed during the winter: Because the winter frosts are known to be necessary to the production of these grasses.

Flooded lands should always be laid bare early in the spring, that the growth of the grass be not prevented: Or that the ground may be dried so early as to be fit for tillage crops. And ditching of flooded lands, at least round the borders, will be necessary to lay them dry enough for tillage.

As standing water catches dust from the atmosphere, and always contains more or less of the finest particles of soil, it deposits a rich sediment; a fat slime, therefore, will remain on the surface after the water is removed. And a time should be chosen for drawing it off, when the air is calm, and the water clearest, that as little a quantity as possible of the

food of plants may pass off with it. Such land is no more liable to suffer by drought than the fertile land of Egypt, which is yearly enriched by the overflowing of the Nile.

Though winter flooding do not suit the nature of good grasses, a few days flooding in the spring and fall will not hurt them; but will enrich the soil, and so promote their growth. The soil will have the same advantage as intervale land, which is made rich and fruitful by occasional flooding: Yea, a greater advantage, as the water may be applied and removed at pleasure.

FLOUR, the edible part of corn. The name is chiefly given to the meal of wheat corn, after it is cleared from the bran, by sifting or bolting. The flour of wheat is the best substance for making bread that is known in the world.

That flour may continue good and fit for use, it should be put into dry casks, and then kept in a place that is cold and dry. Otherwise it will be apt soon to turn sour. And if it be passed through a sieve once in a while, it will keep good the longer.

It is greatly to be regretted that this country does not produce flour in greater plenty. That it may do so, I should think nothing is necessary besides the following things: 1. To procure new seed of wheat from some remote place, once in three or four years; and from the northward, that it may ripen the earlier: 2. To give the land three or four ploughings before sowing, so as to make it very mellow and fine, like garden mould: 3. To prepare the seed in such a manner as to prevent smut. See *Smut*.

FLOWER, or BLOSSOM, the most beautiful part of a plant,
many

many of which have an agreeable flavour.

The flower contains the organs of generation, the *farina secundans*, which is necessary to fruitfulness, and the rudiments of the fruit itself containing the seed of a future plant.

FLY, an insect that eats, corrupts and destroys young plants. See *Insect*.

FOAL, a colt. "Foals are usually foaled about the beginning of summer, and it is the custom to let them run till michaelmas with the mare, at which time they are to be weaned.—When first weaned they must be kept in a convenient house, with a low rack and manger for hay and oats; the hay must be very sweet and fine, especially at first, and a little wheat bran should be mixed with their oats, in order to keep their bodies open, and make them eat and drink freely. When the winter is spent, they should be turned into some dry ground, where the grass is sweet and short, and where there is good water, that they may drink at pleasure. The winter after this, they may be kept in the stable, without any further care than that which is taken of other horses: But after the first year, the mare foals and horse foals are not to be kept together. There is no difficulty to know the shape a foal is like to be of; for the same shape he carries at a month, he will carry at six years old, if he be not abused in after keeping."

We often hear it lamented, that our breed of horses is so bad. But I am convinced that, as our colts are managed, if we had any other breed, we should soon make it appear to be as mean as our own, if not worse. The abusing of colts in the first winter, is the

principal cause of their proving so bad. For our farmers seldom allow their weaned colts any food besides hay, and that is not always of the best kind. So that they seldom fail of being stunted in their growth, in the first winter, to such a degree that they never get the better of it. A colt that is foaled late, should not be weaned till February or March, and should have oats during the whole of the winter. In some countries they allow a young colt fifteen bushels. We need not grudge to feed them with meal, oats and bran, besides the best of clover hay; for they will pay for it in their growth. After the first winter, they will need no extraordinary feeding till they are grown up.—Were the above directions observed, we should soon see an improvement of our breed of horses.—They would be capable of doing much greater service, and be likely to hold out to a greater age.

FODDER, dry food for horses and other cattle. The term includes corn or grain, hay and straw, the stalks and leaves of Indian corn, the haulm of peas and beans, &c. Dried weeds, and leaves of trees, may also serve as fodder for hungry and hardy cattle.

Mr. Lisle recommends elm leaves, dried on the small branches, as a great relief to cattle in winter. He says the cattle will eat it before oats, and thrive exceedingly with it. Also, the chaff of all kinds of grain, in the old countries, is reserved for fodder, and made more account of than the straw. In this country it is suffered to be driven away by winds. This is an instance of our want of economy.

In such a country as ours, where the winters are long and cold,

cold, and where grass does not serve for the cattle so much as half the year, providing fodder, and preserving it, are matters of high consequence. In this business, a great part of the farmer's care and strength is employed. For there is not more than two months in a year, in which farmers are not either preparing, and laying up fodder for their stock, or else dealing it out to them.— But this need not discourage the Newengland farmer. For the case is very much the same in most parts of Greatbritain, where the nation has become rich by husbandry, and where lands will bear a high rent. One guinea per acre per annum, is not accounted high rent for good land, in tillage or grass, in that country. Lands that lie near to great towns and cities are rented much higher.

The ways to increase the quantity of fodder, will be found under other articles. The ways to preserve it, so as to make the greatest advantage from it, may be here considered.

One important caution to be observed is, that hay, which is the principal fodder, should not be so much dried as to occasion its wasting. When it has been properly made, it should not be carted in, if it can be avoided, at a time when the weather is dry and windy, nor in the hottest part of the day. Mornings and evenings are the best times for removing it, as there is a dampness in the air which prevents its being too crispy. The leaves will not crumble, nor the seeds shatter out. The best parts of the hay are often lost by not observing this caution; or at least much diminished.

The hay which is to be stored in small or narrow mows, and on scaffolds, will keep well with lit-

tle drying. That which goes into a large mow, will need to be dryer, as the air will not penetrate so near to the centre of it.

To prevent the hay from taking damage, by overheating in a large mow, some recommend a barrel, basket, or a stuffed sack, to be placed in the centre, and gradually raised as the mow rises. This forms a kind of chimney, which takes away the steam of the hay when it is overhot, supplies fresh air to the hottest part, and keeps the hay from turning mouldy. But as good a method may be to pitch some of the driest hay in each load, into the centre, and the greenest round the sides. In this way no room will be lost.

In disposing of the different kinds of hay and other fodder, some regard should be had to the places, or parts of the barn, in which the different sorts of cattle are kept. The clover hay, for instance, should be laid up near to the stable where horses are kept, as this is the most suitable fodder for them. The good hay of other kinds, should be put where it can be handily given to the calves, milch cows, and working oxen. The meanest fodder nearest to the apartment of the growing young stock, on which it is commonly bestowed, and which is more proper for them than for the rest.

In those parts of the country where salt hay cannot be had, it is a good method to apply salt to hay that has been damaged in making, and to straw, and hay of low meadows, as it is put into the mow. The salt will make it more palatable both to horses, and neat cattle. One peck of salt is enough for a ton of hay.

Some choose that a barn should have large gaps between the boards

boards on the sides, that the hay, &c. may have air. This is surely a mistaken notion; for the hay that is nearest to the gaps will lose its sweetness. The roof of a barn should also be kept very tight; and none of the hay should be laid very near to the ground.

I do not approve of stacking any kind of fodder, excepting in case of necessity. For some inches of the outside of a stack is certainly spoiled by the weather. It is well if the rest happen to be well saved. It often proves otherwise.

When a farmer has more hay than his barn will hold, let him stack it near to the barn; and, as soon as he has made room, in some damp or calm day take it in. There will be the less danger of its getting damage.

Farmers, who mean to keep good their flocks, and to have plenty of manure, should not be fond of felling hay. If they should have some left in the spring, it will not grow worse, but some sorts will be better, by keeping. And if a short crop should happen, they will be glad they have kept it.

Straw that is reserved for fodder, may help to preserve the husks and bottom stalks of Indian corn, which commonly have too much sap in them to be mowed by themselves. If they are mowed together, in alternate thin layers, the straw will preserve the corn stalks, and the stalks will impregnate the straw with their sweetness, so that the cattle will eat them together with a good relish, and be well nourished by them.

Another method of managing straw, which I have found to be of singular advantage, is to mix it with salt hay which is not more than half dried. The hay is thus kept from heating, and the

straw is so tinctured with the salt and sap of the hay, as to be rendered an agreeable fodder for cattle.

It is well known that cattle prefer short straw to that which is long: Therefore some farmers cut their straw as short as oats, and to tempt the horses to eat it, mix some oats or barley among it.

FODDERING, feeding cattle with dry food. We have occasion to begin to fodder, most commonly, about the beginning of November; and to continue doing it till the middle of May, and sometimes later.

We should take care not to begin to fodder till it is really necessary: Because cattle that are foddered, will not graze so diligently. When it is once begun, the cattle will expect it, and it must be continued. When we first begin, we should fodder early in the morning only; for at that time of the day the frost is usually on the grass; so that the cattle will not graze. They should not yet be housed, horses excepted: But in wet weather the whole stock should be housed; for they bear cold better than wetness. Or if not put into the barn, they should have a shed in the yard, under which they may shelter themselves.

The meanest fodder should not be dealt out first of all. The husks and stalks of Indian corn are suitable for this season. The straw and the worst hay should be reserved to give them in the coldest weather; for it is then that they have the keenest appetites. The hay of low ground, straw and haulm, if salt hay be not to be had, may be sprinkled with salted water, if salting it in the mow has been neglected. They will not only eat it heartily, but live well upon it.

Wild grass hay is not fit for horses, nor any of the water grasses. They will need some grain, if they be fed on any other hay besides clover. They should have a small window against their rack, to let in fresh air to their fodder, and at the same time give them light. They will eat snow with their hay, if you set it by them: They will take a mouthful of each alternately; and the snow seems to increase their appetite. If horses have not grain through the winter, they should have it at least in the fore part of winter; for the coming on of winter is the most trying season for them. If they be fed with Indian corn, it should be well soaked and swelled; it will give them the more nourishment.

Neat cattle and horses should not have so much hay laid before them at once, as will quite serve to fill them. The hay they have breathed on much, they will not eat up clean, unless when they are very hungry. It is best, therefore, to fodder them twice at night, and twice in the morning. Let neat cattle as well as horses have both light and fresh air let in upon their fodder, when the weather is not too cold, or stormy, to allow the windows to be open. What one sort of cattle leave, should be thrown to another sort. Those that chew the cud will eat the leavings of those that do not, and *vice versa*.

It is also well known to farmers, that what cattle leave in the barn, they will eat abroad in the open air; and most freely when it is laid upon clean snow. Not only this, but the meanest of straw should be given them in this way. What is left will help to increase the manure in the yard.

But some of the young and hardy of the stock should be kept wholly on straw, when a farmer has great plenty of it, and not be suffered to taste any other fodder during the whole winter. For their getting a taste of other fodder will spoil their appetite for straw. But if they be kept entirely to it, it is said by farmers of great experience, that they will winter very well. If this be attempted, there must be a distinct yard for them.

Every farm yard, where any considerable stock is kept, should be furnished with a large shed, and a rack under it. For where there is no clean snow to lay the straw, and other mean fodder upon, it should be put into the rack. A larger proportion of the dung will be dropped under the shed, than in any other part of the yard. And this dung will be better than the rest, as it will not be washed by rains, nor so much dried by the wind and sun.

Sheep, when they are under cover, should draw their hay through a rack, made so close as just to admit their noses. They should have good hay, and a cool and dry house. Beans is a sort of food they eat very greedily, and even the straw. But it is said, that ewes with young should not be allowed to eat many beans; as it will make their lambs grow too large within them. Neither should they be fed too generously, nor to the full, till near the time of lambing.

When a farmer thinks that he has too much stock for his fodder, as will sometimes be the case, it is not best to pinch them in their allowance so much in the fore part of winter as in the latter part. For the cattle are more liable to be pinched with the cold, in December and January,

tiary than afterwards. And no man knows how favourable the latter part of winter may be. Advantage also may be made of browsing in the latter more than in the former part of winter, as the buds then begin to swell, and the twigs have more sap in them than before.

When browsing is depended on, the farmer who has salt hay, should preserve a sufficient quantity of it to the latter part of winter. It will give the cattle a high relish for browse. If they have no salt hay, they should have salt, to increase their appetite.

Cows that are near calving, should not be driven out after the browse, for fear of accidents. They should be kept on the best fodder: Not be tied up with the other cattle; but each one should be fed in an apartment by herself, without tying.

FOG, FOGGE, or FOG-AGE, long grass and stumps of grass, remaining in mowing grounds and pastures till winter.

This is accounted in general a benefit to the land; especially when the grass is not of a bad and sour kind. The snow presses it down close to the surface, where it shelters the roots of the grass, corrupts it, and turns it to manure. But when mowing grounds are fed very close in the fall, the ensuing crop is poorer, the roots being more injured by the feet and teeth of cattle, and more exposed to the weather. The dung they drop, though it be considerable, will not wholly repair the damage of close feeding and trampling.

But fog is most essentially serviceable on a soil of the clay kind. It forms a cover which retains the rains and dews, in the following spring and summer, fo

as to give the surface a more equable and constant moisture; and prevents the binding and cracking of the surface by the heat of the sun. Nothing can better oppose the ill effects of a dry season on such a soil.

FOLDING of land, confining sheep, or other cattle, nightly, in a small lot or yard, for the purpose of enriching the soil. The benefit arising from this is so great, that it ought not to be neglected, especially in those parts of the country, where the wolves do not come.

Some turn in their other cattle with the sheep. This is good conduct, when the soil is warm sand or gravel; and not bad when it is loamy. But it may be better to yard the black cattle without sheep, on a very dry soil; such as hungry sand or gravel; and the sheep without the black cattle, on a soil that is heavy and cold. Thus both these kinds of manure will be applied to the soil which will be most helped by them.

Folding is a much better method than carrying dung from the barn yard, when the season is suitable for doing it. One great advantage of it is, that none of the stale is wasted, but every drop of it instantly absorbed by the soil that needs it, and will make a good return for it.

Folding, or yarding, is but little attended to in this country; and not half the advantage is made from it that might be, when it is attempted. It is said that one hundred sheep in a summer will enrich eight acres, so as to need no other manuring for six years.

This matter is certainly mis-conducted, when a farmer, either to save the labour of fencing, or through ignorance of the advantage

tage of folding, makes his inclosures too small, and folds the land too much for his own profit.

Let a spot of half an acre be ploughed and fenced. Turn in, each night, a dozen head of neat cattle, and fifty sheep. Continue to do it for three weeks, harrowing the surface once in three days, to mix the excrements with the soil. The ground will be sufficiently folded to produce a fine crop of turnips, or almost any other good crop. It is reckoned by some that a sheep will fold one yard square in a night; or rather one rod square in about a fortnight.

A yard for cabbages or turnips, may be begun about the middle of May; or when the cattle first go to grass. About a month after will be nearly the right time to transplant cabbages; and six weeks or about two months after, to sow turnips. And, for a general rule, it is best that a crop should succeed the manuring as soon as possible.

When a crop of wheat is wanted, the ground may be folded in July, as the seed is to be sown in August. And frequent ploughing and harrowing for this crop should not be neglected. If the land be wettish, do it in the middle of the day; if dry, in the morning before the dew is off.

Low grass grounds, which are cold and sour, and produce bad hay, may be surprisingly meliorated by a little folding. It kills fern and mosses, and roots out the wild and watery grasses, even without breaking up the soil. At the same time it encourages the growth of better kinds of grasses. This may be done at certain seasons that are unsuitable for the folding of ploughed lands, they being too wet and dirty for the sheep to lie upon, as in October,

November, March and April. Sheep are more proper for this sort of folding than larger cattle, as their excrements are hotter.

FOOD of plants, the matter which enters into them, and gives them their nourishment and growth.

It has been much disputed among naturalists, what the food of plants consists of. It is agreed, that the food enters the pores of plants in a liquid form. But of what kind of matter this fluid is composed, is the question.

I shall pass over, for the sake of brevity, the arguments of those who have supposed this food wholly to consist of air, of earth, or of water; or of any one unmixed substance whatever. And I shall not trouble my readers with an account of any of the futile experiments, by which they imagined they had proved their hypotheses. For I believe they have all been wide of the truth, and their experiments imperfect and fallacious.

I should think there cannot be a more likely way to ascertain the nature of this aliment, than to examine what plants contain, or what they are made up of. For they almost entirely consist of what passes into them during their growth. The seed is so small, that the substance contained in that can make but little alteration in the nature of the whole plant produced from it. Or, if it did, seeds may be reduced to their first principles, as easily as the plant that bears them.

Plants have been found by chymical analyses to contain air, water, earth, salt, and oil. But any one may convince himself of it, without the aid of a chymical process. If we take notice of wood that is burning, we shall find

find, by its hissing and snapping, that it discharges no small quantity of air : Water is seen passing out at the ends of the sticks on the fire : The flame proves the existence of the oily part : And salts are easily produced from the ashes, by extracting the lie, and boiling it. The ashes that remain are the *caput mortuum*, or earth. It is natural to suppose that the food of plants is made up of these ingredients, to which plants are so easily reduced. For it seems irrational to think, that the nature of the food is totally changed in a plant, or by concoction changed into a substance of a quite different nature. If it were so, rotten vegetables would not give such good nourishment to growing plants as we find they do.

But then it is found that the substances of which plants are composed, are variously combined in different plants. Some plants abound most with oil, some with salt, &c. And this variation is sufficient to constitute an almost endless variety in the natures of plants ; although there were no different concoctions in plants, after the entrance of the ingredients of their food, which assimilates them to their particular natures.

The food of plants is provided by nature, in a greater or less degree, in every part of the earth, near the surface. In places where it is found to be scarce, the defect may be supplied by tillage, dung, and other manures. Tillage adds to the food of plants, by opening the pores of the earth, and disposing it to absorb, and retain the vegetable food that floats in the atmosphere ; and also, by mixing the ingredients, and causing a fermentation, which prepares the ingredients to enter

the pores in the roots of plants. Dung, and many other manures, increase the food, as they contain it in greater plenty than the earth does. Some of the manures do almost entirely consist of it.

The question has been much contested, whether the food of all plants be the same. It seems to be, in general, nearly the same : 1. Because all plants contain more or less of each of the ingredients : 2. Because most kinds of plants will flourish on any piece of ground that is well cultivated, when it has the degree of moisture that suits them : 3. Because almost, or quite, every plant will rob all others of their food, which stand near it ; and one of its own kind not perceptibly more than one of another kind.

But it may reasonably be suspected, that the orifices in the roots will not so readily admit any particles which do not suit the nature of the plants, as those that do. For the flavour of the root is often very different from that of the earth nearest to it. But if, on the contrary, we suppose the roots to take in all the ingredients of vegetable food promiscuously, as they are presented, they are not all equally retained. On this supposition, a plant must have the power of sending out, by perspiration, or excretion, a greater proportion of one kind of ingredient of its food than another, that the remaining sap may be more suitable to the nature of the plant.

Which of these hypotheses is nearest the truth, I will not undertake at present to determine. But there is a remarkable analogy betwixt animals and plants, so far as their natures are investigated. Therefore, as animals have different appetites, why may we not

not suppose something similar in plants? Or, that some roots may reject one kind of particles in the general food that nature provides, and other roots reject other particles. A flag, for instance, may imbibe more water, than a bush of the whortleberry of the same bulk. Why may we not suppose further, that as some animals feed on almost any thing that comes in their way, so some plants may be destitute of any niceness of appetite, and admit all food promiscuously? But whether the disagreeable particles are rejected, without entering the roots, or expelled after they have entered; yet the real nourishment of different plants, as well as of different parts of the same plant, must needs be somewhat different. For that which nourishes a plant, must be made up of nearly the same particles of matter, that the plant is when it is grown. As there is a real difference in the latter, there must be also in the former. So that there is a real difference in their nourishment; though not so great a difference, but that the food of all plants may be considered, in general, as being much the same. So a company of men are said in general to feed alike, when they all eat of the same number of dishes at one table, though one take a greater proportion of his meal from one dish, and another from another: Or though, taking equally of all, one stomach digests that which another does not, but throws it off as unsuitable aliment.

If the above representation be agreeable to truth, it will follow, that as all soils do not contain the ingredients of vegetable food in the same proportions, some soils must be fitter to nourish one

kind of plants, and others another kind; and the same may be said of manures. And as experience proves that this is so, it is favourable to my theory. But still the food of plants is, in general, nearly the same. In confirmation of this opinion, it may be observed that fallowing always enriches a soil; and, for ought that appears to the contrary, makes it more fit to produce all sorts of crops. But the food which enters into fallowed land from the air must be, in general, nearly the same.

It has been asked, whether a piece of ground, which has borne the same crops, year after year, till it will bear the same no longer, may not be in a good condition for bearing some other crop that requires equal strength in the soil? I think it doubtful whether this has ever appeared to be the case in fact. But have observed, that a piece of ground, tired of producing white crops, as they are called, which require much nourishment from the soil, may be in a fit condition for crops that require little: Not because the food of different plants is essentially different, but because the latter takes from the air a greater proportion of its nourishment than the former. Thus land which appears to be exhausted by cropping with wheat or oats, may be sufficiently rich for pease or potatoes. And again, as some plants draw their nourishment from a greater depth in the soil than others, a spot that seems to be exhausted by fibrous rooted crops may be in a condition for tap rooted ones. And this is perfectly consistent with the opinion that the food of both kinds may be nearly the same. And on the whole it appears, that there may be sufficient

cient reason for a rotation of crops, though the food of all plants were the same, or nearly so, as I suppose them to be.

FOREST, a tract of ground producing wood. Each farm of any considerable bigness, should have a forest to afford a supply of fuel and timber. In clearing farms in a new country, due regard should be had to preserving a perpetual forest. Some have mistaken their interest so much, as not to leave a sufficient quantity of land uncleared. So that they are put to the disagreeable necessity, either of buying their fire wood, or else of going some miles after it. That part of a farm should be set apart for this purpose, which is least adapted by nature for tillage, or grass. Land which is swampy, with a very thin soil over a sandy bottom; land that is rocky and mountainous, or which will but poorly bear a dry season, or even the most sandy, or gravelly heights, or steep declivities which cannot be ploughed, may answer well for a forest. Forest trees, having long roots, some of which penetrate deeply, will find sufficient nourishment, in places where corn and grass cannot be cultivated to advantage. So that it is very bad economy to suffer any such places to be destitute of growing trees. For if they do not produce wood they are in a manner useless. Or if they produce any grass, trees will not hurt them for pasturage, but in some cases make them better.

The quantity of ground that should be set apart for this use, must vary according to the largeness of the farm it belongs to, and according to the demand for wood, the quality of the soil, and the nature of the climate. If the

climate be hot, the forest may be smaller.

A small farm cannot so well admit of a large lot for wood as a larger one. Some intelligent farmers in this country have thought they could make a lot of ten or a dozen acres answer the purpose of supporting one constant kitchen fire. But it certainly will not, unless the soil be uncommonly fruitful, and the trees such as are of the quickest growth. If land be poor and dry, it will require twenty acres or more, to supply one single fire, and keep the stock of trees undiminished.

To thicken a forest, or to prevent its becoming too thin, cattle should be kept out at all seasons, that all the trees which spring out of the ground may live, and grow up to maturity. And when it is found needful, acorns, or other seeds, should be planted, so that none of the ground may continue unoccupied.

In our most southern climates, I find that hard wood is more rapid in its growth than in the northern. And sprouts oftener grow up from stumps of trees that are felled. The trees that grow up quickest in general should be most cultivated.—Those of these kinds should be more generally left standing than others; such, for instance, as the red and grey oaks, ash, white maple, &c.

That a forest may be preserved from waste, as few trees as possible should be felled in summer, or spring; not only because the wood and timber is of less value, but because no suckers will be so apt to come up from their roots. It is a frugal method to fell all wood, and timber trees, in December and January, or a little before and after those months. The wood will last longer,

longer, will be more durable on the fire, and burn better: And the timber will be more lasting. When a number of suckers spring up from a stump, all, excepting one or two, should be taken away as early as possible; then the remaining ones will grow with rapidity. Those are to be left which are tallest, and most rapid in their growth.

When a farm is quite destitute of a forest, some spot, or spots, the most barren of any part of the farm, should be converted to this use, and be planted with such trees as may be expected to thrive best.

If these spots be tillable, "cattle of all kinds, and swine should be fenced out; and the ground well ploughed and harrowed, and made mellow. Acorns may be put in, in rows four feet asunder, two inches apart, and two inches deep. The intervals may bear some hoed crops, while the trees are small. They should be hoed the first year with the hand hoe; the second with the horse hoe, and so on afterwards. When they are a year old begin to thin them. When they are, by repeated thinnings, as they grow larger, reduced to the distance of eight feet, all the rest may stand for timber, till some of them are fit for some uses. But the final distance for large timber trees, is from twenty to thirty feet."—*Complete Farmer*.

But if places designed for forests cannot conveniently be tilled, the trees should be raised in a nursery, and transplanted into such places. The cost of doing it will be trifling, to compare with the advantage to be obtained by doing it, especially in those parts of the country where wood is become a scarce article. Small clumps of trees on little emi-

nences, have an excellent effect on the beauty of a country.

FOUNDERSHIP, a very painful disease in the feet of horses. A horse affected with this disease draws himself up in a heap, and is loth to move. It is said to be occasioned by bruises on the legs, by bad shoeing, by standing in cold water after being heated with exercise; or even by standing still in the stable for several days. As the disorder is in the feet, covered by the hoofs and soles, it is difficult to make application to the parts affected. But drawing out the sole Mr. Snape does not approve of, without paring the hoof. Something must be done without delay, lest imposthumations come on in the feet, by which the hoofs will be cast off: In which case, the horse must lie by useles for a number of weeks before the new hoofs will be grown. The same writer directs that the hoofs be razed from the coronet or top to the bottom, quite through the hoofs to the quick, so as to make the blood run. These channels in the hoofs may be readily made with a common marking iron.

To cure the wounds made in the hoofs, apply to them tar, turpentine and honey, melted together, with a fourth part of spirit of wine, soaking pledgits of clean flax, or tow, in this mixture, and laying them upon the chinks, not opening them till two days after the first dressing; afterwards making fresh applications every day, till the channels in the hoofs are grown up.

The same applications must be made to the sole, if that has been drawn. But similar channels in that, as I apprehend, may answer well enough, and paring the sole thin. They must, however, have the same dressings as the

the hoofs. A piece of leather should be laid over the sole, and the whole foot so bound up with strong bandages, that the applications may not get displaced. See *Gibson's Farriery*.

FREEZING, or congelation, the fixing of fluids, or turning them into ice, by their being exposed to very cold air.

"Philosophers are by no means agreed as to the cause of this phenomenon. The Cartesians account for it by the recess, or going out of the ethereal matter from the pores of the water.—The Corpuscularians, on the other hand, attribute it to the ingress of frigorifick particles, as they call them. Hobbes asserts, that these particles are nothing else but common air, which, entangling itself with the particles of water, prevents their motion. Others will have a kind of nitrous salt to be the cause of congelation, by insinuating itself between the particles of water, and fixing them together like nails. And indeed it seems probable, that cold and freezing do arise from some substances of a saline nature, floating in the air; since all salts, and particularly nitrous ones, when mixed with ice and snow, greatly increase their cold, and even bulk." *Dict. of Arts.*

The freezing of the ground is that in which the farmer is chiefly interested. But when we say the ground freezes, we mean that the watery and moist particles in the ground are turned to ice, by which the particles of the soil are so strongly bound together, that the ground is harder to penetrate than ice itself. As to the ground itself, it would be incapable of congelation, if wholly divested of moisture. We see no signs of frost in the sands of

an hour glass, however exposed to cold. When the ground is bare, it commonly freezes to as great a depth as water does, which, in this country, is sometimes not less than 30 inches. But in Britain, the greatest depth to which Mr. Boyle ever could find the ground frozen in any situation, was only 14 inches.

The farmer is in some respects, greatly benefited, and in other respects, seems not a little injured, by frosts.

He is certainly benefited by the winter frosts, as they are the means of the growth of his best grasses. Such is their nature, that the action of frost upon the soil, is needful to fit it to nourish them. Thus Providence has wisely and mercifully contrived, that the best grasses shall be produced in cold countries, where they are most needed, for the support of beasts in the winter.

Frosts serve to open and soften the soil, and so serve to increase the pasture of plants, making it more easy for the roots of grasses and other plants to extend themselves in quest of their food.—At the same time they make it more easy to pulverize by the plough and the harrow; and consequently fitter for tillage.—And perhaps where the ground freezes so much as it does in this country, less labour may be requisite in tillage, than in countries where the winters are milder. But this will not wholly excuse the negligence in culture of which our farmers in general are guilty.

As it appears very probable that freezing is caused by saline particles, which abound more in cold northwardly winds, than in any other, these particles penetrate the soil in winter, some of which get entangled in it, so as

not to escape out by thawing, but, remaining in the soil, increase the food of plants. Accordingly, it has long been observed, that the more land is exposed to the action of frost in winter, the more fruitful it becomes. Hence the practice has become general in some parts of Europe, to lay the soil up in ridges, and make it as rough and uneven as possible, during the winter, that the frost may penetrate the deeper; and not only pulverize it the more, but fill it the more with nitrous salt.

Another advantage we have from the freezing of the ground is, that it helps to kill weeds; and especially when their roots are turned up to the surface by autumnal ploughing. Many weeds that in other countries are perennial, in this, by means of our great frosts, are only annual. They are only propagated by the seed; and, therefore, are the more easy to subdue.

But, on the other hand, the abounding of frost in this country, is detrimental to the farmer, by preventing his working the soil for the space of almost four months successively, that is, from the beginning, or middle, of December, to the latter end of March. During this long frost, the farmer has often but little employment for himself and his domesticks, and still less for his working cattle; the necessary consequence of which is, that both man and beast must be more hurried, and fatigued, in the other parts of the year.

The British farmers seem to have greatly the advantage of us in this respect, as their ploughs may be going some part of each month in the winter, which has rarely, if ever, happened to be possible in any part of Neweng-

land. But whether the increasing mildness of our winter, as the back wilderness is more cleared and cultivated, will not remove this inconvenience, I undertake not to determine.

Another inconvenience of severe frost, is the destruction of our winter grain, which we have not yet found out any sure way to prevent. Sudden and violent freezing, when the ground is bare and very wet, causes a quick and violent expansion of the soil, which snaps the tender roots of the corn to pieces. This happens ofteneft in our stiff loams and clays, soils which expand most by the frost.

Our long continued frost seems to be against us also, as our manures remain unaltered, during the whole winter. Nothing can be done to mix, shorten or pulverize them. The cattle can do them no good by trampling: There is no fermentation, nor corruption, going forward in them. So that we are under no small disadvantage as to making and increasing manures. But this, by the way, should serve to excite us to be the more careful and industrious in this business, in those months which are favourable. Perhaps we shall find this last inconvenience in some measure balanced by the great heat of our summers, so favourable to the putrefaction of manures. And, to avail ourselves of this advantage, we should never fail in summer to have manures rotting in dunghills, or in yards, &c. The greater plenty of them the better.

I may add, that what we call untimely frosts, are often hurtful to us, either by killing our tender plants in the spring, or the blossoms on our fruit trees; or by corrupting our unripe crops

early

early in autumn, or even before summer is ended. The truth is, that though our summers are hot, there is but one month in the year, that is, July, in which we can depend upon being unmo-
lest by frost. Such is the un-
evenness of our climate.

On the whole, I rather think the inconveniences of our severe frosts, more of which I might have mentioned, are much more than a balance for the advantages of them. But the gifts of Providence, on the whole, are dealt out more equally to the people of each habitable country on this globe, than some are ready to imagine. What makes the difference appear the greater, to a cursory observer, may be, that the people of one country do not so well improve natural advantages, as those of another.

FRUIT TREES. The sorts which are most common in this country, are apple, pear, peach, plum and cherry. And perhaps there are no others that would be more profitable. But a greater variety might be easily had; and would be a real improvement.

The apple tree I mention first, as being of the most importance of all our fruit trees. In about five or six years after the seeds are sown in the nursery, the young trees may be fit for transplanting into the orchard. Mr. Donaldson advises that they be planted thirty feet apart. But I have known orchards answer very well, that were planted as close as twenty five feet. No stated rule, however, should be assigned for the distance of the trees, unless it be this general one, that the distance should be such, that the trees which are largest should not crowd each other, when they are full grown;

nor, on the other hand, that any of the ground in an orchard should be unoccupied. For I think it is better that a spot of ground be well covered with trees, when they have got to their largest growth, than to have a larger spot spoiled for tillage, by trees that are too far asunder. As some species of apple trees are apt to grow larger than others, a due regard should be had to this in planting an orchard. And a conjecture may be formed from the soil to what size trees will grow. If apple trees were to grow to such a size as they commonly did at the first settlement of this country, when the seeds, or the young trees, were newly imported from Europe, it might be proper to set them as far apart as from thirty to forty five feet. But the size to which they usually grow of late, will not require more than twenty five feet, in common soils. But some soils being peculiarly favourable to the growth of this kind of trees, the distance in them may be greater, as it may be expected the trees will grow large. The most suitable soil is allowed to be that which is rocky and moist, consisting of sandy or gravelly loam.

In transplanting of trees, the large roots must of necessity be shortened, and the small fibrous roots should be mostly or wholly cut off. For if they are left on, they will probably be dead and dry before the tree is planted, especially if it is carried to any distance, or exposed at all to the sun or air: But the mouths where they are cut off will receive some sap from the earth, though the dried fibres would not. But if trees are planted without any delay, it is next to impossible to prevent these slender

der roots from being twisted or turned out of their natural position, and if this should be the case they would neither inhale nor convey sap to the tree. There must be some loss of roots. Therefore, to balance the loss of nourishment by the roots, when the head is large, a proportionable part of the limbs should be taken away. The trees may be transplanted in spring or autumn. I have generally had the best success in the spring, and rather prefer that season. I do it at the time when the buds are just beginning to open into leaves. The holes should be made so broad as to allow the roots to have their natural situation, without contortion. And if dead earth be thrown out, rich earth from the surface should supply its place. If the earth be not rich, a little old dung may be mixed with it. But dung unmixed will be hurtful. Trees are sometimes killed by having dung heaps lying near to their roots; which shews that they ought to be dunged sparingly, and with caution.

If the trees be planted in a situation much exposed to winds, they should be made steady with stakes during the first year, that the roots may not be loosened, and the air let into them, by the motion of the tops. And some woollen, or other soft substance, should be put between the stake and the tree, to prevent galling of the tree.

Pear trees require much the same management as apple trees. But as their tops are more conical shaped, and not so broad, they may be set rather nearer together. Perhaps twenty feet or less may be sufficient in a soil that is not rich. One thing that recommends them is, that they will thrive well in some of the

most unpromising soils, and even in a stiff clay. The most crabbed natural fruit is valuable, as from it may be made the agreeable liquor called perry. But for eating they must be grafted. See *Pear Trees*.

When apple and pear trees need pruning, it should be done before the middle of winter, in November or December. A gradual pruning, from year to year, is generally better than greatly diminishing their tops at once. But suckers that grow rapidly should be taken off at any season, as fast as they appear; or they will bring on sterility, either partial or total, and a speedy decay of the tree. In pruning, every dead and decaying limb should be removed, and cut off close to the trunk, or where it originates. It is recommended that wounds made by large amputations should be made smooth, and smeared with clay mortar. It would be better still to smear the wounds with a little melted pitch, which would form a coat impenetrable by the weather.

With regard to stone fruits, as plums, peaches and cherries, they do not well bear much pruning. They should, however, be cleared of their suckers, both round the roots, on the stems, and in the tops. See *Peach Trees, &c.*

Cherry trees grow luxuriantly in this country, and are apt to live long. But peach trees are soon past bearing, and on the decay. The early decay of peach trees is supposed to be partly owing to worms in their roots. For it is a certain fact, that a tree, apparently past bearing, has been speedily recovered, by removing the earth from above its roots, and laying on ashes and earth over them.

Plum trees of the damascene kind, will bear no fruit, if the ground about them be swarved, unless it be in a wet, springy soil. Perhaps this may be the case with all the other kinds of plum trees; unless when they are planted in a soil that is both rich and loose, with the right degree of humidity.

FURROW, the trench made by a plough in going, also the earth thrown out of the trench. The European writers often use the word furrow, to signify a ploughing. They tell of sowing on one furrow, that is, after only one ploughing; on the second furrow, or on two furrows, that is, after two ploughings, &c. Though I see no need of our adopting this way of speaking, I think it not amiss to mention it, to prepare readers to understand those writers the better, when it falls in their way to peruse them.

FURROWING, in this country, is understood to mean marking ground into little squares with a horse plough, in order to plant Indian corn, or any other plant that requires the like culture. The goodness of this operation consists in making the furrows straight, equidistant, and at right angles; neither too deep nor too shallow; that the dung and seed may lie neither too low nor too high. When dung is to be laid in the furrows, they should be deeper; when ground is to be seeded without putting dung in the furrows, or holes, the furrows should be very shallow. The nearer the time of planting this work is done, the better. If a rain fall between furrowing and planting, it is detrimental. It soddens the ground, or makes it more heavy and compact, and causes the furrows to be less visible,

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GARDEN, "a piece of ground cultivated and properly ornamented with a variety of plants, flowers, fruit trees, &c. Gardens are usually distinguished into flower garden, fruit garden, and kitchen garden: The first of which, being designed for ornament, is to be placed in the most conspicuous part, that is, next to the back front of the house; and the second and third, being designed for use, should be placed less in sight." *Dict. of Arts.*

I consider the kitchen garden as of very considerable importance, as pot herbs, sallads, and roots of various kinds, are useful in housekeeping. Having a plenty of them at hand, a family will not be so likely to run into the error, which is too common in this country, of eating flesh in too great a proportion for health. Farmers, as well as others, should have kitchen gardens: And they need not grudge the labour of tending them, which may be done at odd intervals of time, which may otherwise chance to be consumed in needless loitering.

It is best that a garden should be on a declivity. If it be very steep, it may be thrown into banks, and level plats. There is commonly a variety of soils on a declivity of any considerable extent. This will give a material advantage to a garden, as a variety of different plants may have each the soil that best suits them.

A kitchen garden should not be situated at any great distance from the house, lest being too much out of sight, it should be out of mind, and the necessary culture of it too much neglected.

A garden should have a close fence, that the winds may not drive seeds of weeds into it. The fence should be at least seven feet high, and picketed, to prevent the entrance of thieves. The height and closeness of the fence, will increase the vegetation by increasing the warmth of the air in the garden, excepting perhaps in the parts which are shaded by the fences. The rage of high winds will be so opposed as to prevent the tearing and distorting of tender plants; and fowls may be the more easily kept out.

A garden should have a border of about three feet, and next to the border a walk of the same width or one foot wider. The walk through the middle may be from six to eight feet as the owner pleases. This may be crossed by one, two, or three narrower ones, if the shape of the ground requires it; or if it is half as long again the one way as the other, which is more elegant than an equilateral square. On these cross walks may be espaliers for grapes. Trees should not be in the outer border, but on the opposite sides of the outer walks; not two many of them; perhaps one of the dwarf kind in 20 or 30 feet.— Standard trees in gardens give too much shade. Dwarfs are commonly cut into espaliers.— But this torturing of trees makes them less fruitful, and shorter lived. Those who prefer it may make this sacrifice to elegance and beauty. In fruit trees which need much heat, and placed against northern walls, I object not to it.

GARDENING, a kind of agriculture, usually called horticulture. It may be considered as farming in miniature. It is conversant in preparing ground

for different kinds of seeds, and in treating them properly during their growth. The garden is the fittest place to make the first experiments in, with exotick roots and seeds, as the loss is incon siderable, if they should not prove agreeable to the climate. If they prosper well in the garden, they should afterwards be tried in the field: And even then not at first on a very large scale.

He who would make his gardening profitable, should have his kitchen garden near to the dunghills, that the manure may be applied without too much labour. Dung that is old, and destitute of seeds, should be used, that too many weeds may not be propagated. And that a garden may be kept clean, not one weed should be suffered to have its seeds ripened in it: And every root weed that appears in autumn, should be extirpated in such a manner that, if possible, no parts of its root may remain in the ground. The seeds of many weeds may also be destroyed, by laying the ground in high ridges during the winter. At the same time, it will help to enrich the soil; and many of certain kinds of insects, or their eggs, will be destroyed: Especially if the ridging be performed about the last of November, or the beginning of December. Ground that is so managed, will be dried the earlier in the spring, to such a degree, as to be fit for digging and seeding. It is of more advantage in land that is apt to be too wet, than in that which is sandy and dry.

GARGET, a disease in cattle. Cows sometimes have their udders greatly distended, and indurated, with this distemper; of which they will pine away and die, unless a remedy be speedily applied.

applied. The method of cure is, to make an opening in the dewlap, and insert into it a piece of the root of mechoacan, as big as a nutmeg, with a string made fast to it, that it may be drawn out when the cure is effected. The humour, in about twenty four hours, will be revulsed from the udder to the dewlap, and soon discharge itself at the orifice, which completes the cure.

GIGS, little tumours or bladders in the mouths of horses. To cure slit them open to discharge the matter; and wash them with salt and vinegar.

GLANDERS, a very foul and often fatal disease in horses. It is always accompanied with a copious discharge of mucus from the nostrils, and swelling of the glands under the throat and tongue. In its advanced stages the discharge becomes purulent. And when the bones become carious, the disease is attended with an intolerable stench, and may be pronounced incurable.

In the first and second stages, Gibson directs to purges, diaphoreticks, and rowelling in the hinder parts by way of revulsion. To clear his nostrils, burn brimstone, feathers and bits of leather under his nose, passing the fumes into his nostrils, through a funnel. And when much matter is discharged by sneezing, syringe the nostrils with brandy, or red wine. Afterwards a small quantity Unguentum Egyptiacum, dissolved in oil of turpentine, may be injected through a large pipe, which will be helpful towards cleansing the ulcerated parts. See *W. Gibson on Farriery*.

GOATS, a well known tame kind of animal, remarkable for climbing. The ewes often bear

twins. They are hardy, not subject to many diseases, but the kids are apt to poison themselves by eating laurel, or lamb poison, as it is often called. The cost of feeding goats is next to nothing in a new country, as they prefer moss, leaves, twigs and bark of trees, to all other food. But they may be easily made very fat with corn.

They would be a profitable animal to keep, especially in a new country, were it not that no fence of a common height will confine them. The kids are excellent for the table; and the old ones are eatable, and apt to be well filled with tallow of an excellent quality. Their milk is extremely nourishing, good to mix with cow's milk in cheese; an excellent restorative, highly valued in consumptive cases. They give a greater quantity of milk than any other animal of their size. And their skins make a much stronger leather than those of sheep: It is nearly of the same strength as deer's skin.

They may be made greatly useful in subduing new land. The method of managing them for this purpose, is as follows. When the large trees are all felled, let ten acres be enclosed for thirty goats, or in that proportion. The fence should be seven feet high, and leaning a little inwards towards the top. This pasture will feed, and even fatten them the first year; for they will eat the bushes and girdle the small trees; and in three years every small tree, bush and plant, of the woody kind, will be totally killed. After which, when sufficient time has been allowed for the roots to decay, the land may be ploughed with as small a team as is used for ploughing of common green sward; and

and it will be in excellent heart. The shrub oak land is very proper for them, and difficult to subdue without them.

In winter, goats should be driven into a thick wood, somewhat distant from inhabitants, and a slight shelter made for them, about which they will haunt, and live well upon the moss of trees and browse; till spring. Or, they may be kept in a pen at home, and fed with the meanest fodder. The kids will be apt to die if they come too early; therefore, the ram should be kept from the ewes till the last of November.

GOOSE, a well known bird. The tame kind are some of them entirely white, but they are mostly particoloured, grey and white. The belly and wing feathers are white, even in those that have most of the grey colour.

Geese are more profitable than most other tame fowls, on account of the cheapness of their feeding, and the value of their flesh and their feathers, besides their grease and quills. Some strip them of most of their feathers twice a year. But this hurts the animals, and is on the whole, no profit to the owner. Moulting time is the right season for plucking them; for then the feathers are loose, and begin to fall off of themselves. Geese begin to lay their eggs in March; and begin to sit on them in March or April. The time of incubation is four weeks.

GRAFTING, or ENGRAFTING, the taking a shoot from one tree, and inserting it into another, in such a manner, that both may unite and become one tree.

Trees which are of the same genus will unite. Nut trees will take on each other. Apple and pear will sometimes unite; the

latter will grow on the common thorn. Plumb, peach, almond, nectarine, and apricot will unite. But peach and nectarine should be inoculated. The general rule of grafting is, stone fruit on stone fruit, and seed fruit on seed fruit.

The methods of grafting are various; as grafting in the rind, or crown grafting—whip grafting, or tongue grafting—root grafting—inarching, or grafting by approach—and cleft grafting. The last is most commonly practised in this country, and is attended with success. It is done on the stocks, in a nursery, or on the small limbs of trees, in an orchard, or garden. The latter part of April, or beginning of May, is the season for doing it, before the leaves open, and when the sap flows upwards in abundance. The head of the stock, or branch, must be cut off sloping, and a slit made the contrary way in the top of the slope, deep enough to receive the cion, which should be cut like a wedge, with a very sharp knife, the outside of the wedge being much thicker than the other. The rind of the cion must exactly join to the rind of the stock. The slit should be opened by a wedge of hard wood, that the cion may be gently put in its place. The whole should be closely covered with clay, or with a mortar of stiff loam and horse dung, so as to keep out the air from the joint for several months. It should be confined with rags or tow, to guard it against rain and winds. Two buds of the cion, at least, should be left above the mortar. For a more particular account of grafting, see *Diſt. of Arts*.

GRAIN, a general name for all sorts of corn, as wheat, rye, maize, barley, oats, millet, &c.

GRANARY,

GRANARY, a store house for threshed corn. A granary should be so constructed, that corn may be kept free from dampness, insects, and vermine. To avoid the last of these evils, its being mounted on blocks, capped with flat stones, like some of the houses for Indian corn, is no ill expedient. But for large granaries this will not be convenient.

In granaries, where corn is intended to be kept for years, a very particular care should be taken in their construction. The roof should be made perfectly tight, that no rain nor snow may enter. The stories should be low, that too much room may not be unoccupied. Each floor should be covered with boxes about four feet square, leaving a passage all round between them and the outward walls, for the convenience of coming at the windows, and to prevent any wet from penetrating to the boxes.—The shifting and tossing of grain from one box to another, will help to prevent or cure dampness. In England, where they are wont to keep grain in sacks for a long time, they turn the sacks bottom upwards, which answers the end of shifting, as it gives a new situation to every kernel contained in them.

To prevent the heating of corn in granaries, the windows should be opened when the air is dry, and the weather windy, but closed at other times. The grain should be laid thin at first, not more than three inches deep, and frequently stirred. After it is well dried, it may be laid in thicker heaps; or put up in casks, or sacks, as may be found convenient. But if it lie long in large bodies, it should be frequently attended to, that it may not be suffered to heat, and take

damage. To find whether the bottom or centre of a heap be hot, push a lath, or other stick, into it, and let it remain a few minutes. If there be heat in the grain, it will be communicated to the lath. If it be found to be hot, it should be shifted and laid thin, or ventilated. When the degree of heat is small, ventilating may be sufficient to cool it. See *Ventilator*.

“They have, near Grand Cairo, a magazine, or granary, defended with good walls, and called Joseph’s granaries. Many parts of Africa abound with granaries of this kind. They are so many deep pits made in the solid rock. The descent into them is but just large enough for a man to go down into them; but they grow larger as you descend, and are usually square, from 20 to 40 feet in diameter. In these the great men of the country preserve their corn. They first strew over the floor with straw, then they lay on their corn, still as the heap rises placing a thin bed of straw between the corn and the sides, as they did at the bottom. In this manner they proceed, till the whole cavity is filled. When this is done, they cover the mouth of the entrance with a sort of hurdle of green boughs of trees, interwoven one with another. This they cover with about two feet thickness of sand; and over this raise a ridge of earth, well beat together, in order to throw off the rain both ways, that none may settle on the place, and soak into the magazine. The corn thus stored, keeps three, four, or more years. All the care they take with regard to the corn is, to expose it two or three days to the sun’s heat, to dry it thoroughly before they

they put it into the magazine. Great care is to be taken in opening these store rooms; for if people descend into them before they have had sufficient communication with the fresh air, they are killed by the damp."

Complete Farmer.

GRASS, a general name for most of those plants which are used in feeding cattle, both in their green and dry state.

"The land, on which grass seed is intended to be sown, should be well ploughed, and cleared from the roots of noxious weeds. Before the seed is sown, the surface of the ground should be made level and fine: Otherwise the seeds will be buried unequally. When the seed is sown, it should be gently harrowed in, and the ground rolled with a wooden roller, which will make the surface even, and prevent the seed being blown into patches. It is the common way of proceeding; if a farmer wants to lay down his land to grass, he either takes his seeds indiscriminately from his own hay rick, or sends to his neighbour for a supply. By this means, besides a certain mixture of rubbish, which must necessarily happen, it is not unlikely but that which he intends for dry land, may have come from moist, where it grew naturally, and so on the contrary: And the consequence of this slovenly method frequently is, that the ground, instead of being covered in one year with a good seed, is filled with weeds, not natural to it, which would never have sprung up, if they had not been brought thither.

"Some say that if you manure your ground well, good grasses will come in of themselves. I own they will. But the question is, how long will it

be before that happens? And why will you be at the expense of sowing what you must afterwards try to kill? Which must be the case, so long as people sow all kinds of rubbish under the name of hay seeds. Others say it will be better to have a mixture of different seeds. I suppose this to be true. But cannot a mixture be had, though the seeds be gathered and separated? And is not a mixture by choice more likely to be proper than one by chance? Especially after sufficient experience has been had of the particular virtues of each sort, and of the different grounds where they will thrive best?

"It is said by some, that weeds will come up along with the grass, though what is called clean seed be sowed. No doubt of it. Can any one imagine that grass seeds should be exempted from what happens to every other kind of seed? But I will venture to say, that not near the quantity of weeds will spring up which they imagine, if the grass be sown thick." *Stillingfleet.*

It is undoubtedly best to sow clean seed, which is known to be suitable to the soil, when land is laid down to grass. 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.

Of profitable grasses there are many sorts, some of which thrive best in one country, and some in another. The grasses which are most useful in this country, besides red clover and bird grass, which have been mentioned in their places, are herds grass, red top,

top, or what is called English grass, honeyfuckle, or white clover, and wire grass. There are several other grasses produced in this country, as quich grass, dogs grass, and scratch grass, resembling arsmart, on the uplands; and in low places, blue joint grass, *Alopecurus geniculatus*, and goose grass, *Galium*, which are accounted good fodder, beside many other kinds of less value, which deserve not a particular mention.

The herds grass, or fox tail, *Allopecurus pratensis*, is a native of this country, and is perhaps as valuable as any that we cultivate. The cattle are fond of it both green and dry. It is easily managed, and makes a nourishing kind of hay. It often grows very tall, and commonly produces a larger crop than grass of any other kind. It is not apt to lodge when it grows rank, and it thrives well on any kind of soil, except hungry sand and gravel; more especially in the northern parts of Newengland.

In some soils it does well to mix this grass with clover. For it will be found that, as the latter diminishes from year to year, this will increase, so that the crops will not fail for a considerable number of years. The time to cut herds grass, is when it is just out of blossom; but when it is mixed with clover, which ripens earlier, it must be cut a little sooner.

The red top grass, *Poa trivialis et pratensis*, is so natural to every soil in this country, that all our old fields, which have lain long, are full of it, as well as our pastures. It makes a profitable hay for spending, though the crop is seldom so large as that of herds grass. It is more certain and durable, and bears the un-

venness of our climate better than almost any other grass. In pastures it should be fed close; for when it is run up to seed, the cattle are not fond of eating it.

White clover, or honeyfuckle, so called for the remarkable sweetness of its taste, *Trifolium repens*. It blossoms in June, and is ripe early. It is good feeding in pastures in the beginning of summer. But when it grows by itself, it does not usually rise to a height sufficient for mowing.

Wire grass, *Poa compressa*, is of a bluish colour, and shaped much like the red top grass; but is more solid and heavy, having scarcely any cavity in the stalk. It would be highly prized, could it be made to produce largely.— It grows best where the ground is baked, or hard trodden, and where the soil is not deep, as in a thin sward over a flat rock; and it bears drought to admiration.

Rhodeisland Bent, *Agrostis interrupta*, is allowed to make a very excellent hay.

Lucern and St. Foin, have been tried a little in this country; but it seems they will not prosper well in our climate, as our winter frosts are too hard for them; though they do extremely well in some countries that are in the same latitude.

The burnet, which is now upon trial, will be found to answer, I think, very well.

GRAVEL, earth of the same nature with sand, only more coarse and harsh. Both seem to consist wholly of minute pebbles. Gravel is useful in mending roads, in making dams, and for walks in gardens, &c.

A soil of mere gravel is the meanest of all soils; and will produce next to nothing, till it be mended with something mixed with it; and even then it

will need a wet season, unless it be in a wet situation, as at the foot of a hill, or watered with springs.

The best manures for this sort of land in general, are marl, clay, the mud of swamps, ponds, rivers and creeks. If applied in large quantities, they will meliorate it for a long time. The best yearly dressings are the dung of cows and swine, sea weeds, straw partly rotted, bits of leather, woollen rags, and almost any spongy substances which retain moisture for some time.

This kind of soil, well manured, sometimes produces good crops of such plants as require much heat, as Indian corn and tobacco. And it does well in a good season, for rye, clover, beans, pease and potatoes.

GREASE, a distemper so denominated, is a swelling and gourdiness of the legs of horses, which frequently happens to them after a journey. Most people have believed their grease to be melted by hard riding, and fallen into their legs: And that which may have given encouragement to this opinion, is the colour of the matter issuing from the chinks and fores in those parts, when they come to break, somewhat resembling grease.—The distemper may arise from various causes. If the grease be an attendant on some other distemper, the cure will be the more difficult, and it will be in vain to expect a recovery, until the disease is removed which occasioned it. Therefore, methods for the cure of those distempers must be followed, and applications made outwardly for this. But if it be an original disorder, and if the horse have been pampered, or well fed, the cure ought to be begun by bleeding and purging; to lessen the redundancy of hu-

mours. Neither should these be too often repeated: But what is wanting in that way had much better be effectuated by a more spare diet, with daily exercise. After moderate evacuations, a rowel may be made on the inside of the thigh, or on the belly; which may be continued for a month, or longer if necessary. In the mean time the cinaber or anti-monial balls ought to be constantly given. And while these things are doing internally, the legs should be frequently rubbed, not with hard instruments, but with a good wisp of hay, or a brush. Baths and fomentations, such as may cause the humours to go off by perspiration, or render them fit to return in the circulations, are also to be made use of. For this purpose the following is recommended.

Take wormwood eight handfuls, John's wort, centaury, camomile, of each four handfuls, elder flowers two handfuls, bayberries half a pound: Boil them in two gallons of water till one third is consumed, and make a fomentation.

The horse's legs are to be bathed three or four times a day, with woollen cloths wrung out of the liquor, and applied as hot as he can bear them, adding a little of the spirit of wine or brandy. And if they be much inflamed, as happens when the sinews are affected, a good quantity of the ashes of the green twigs of vines, walnut or oak, may be boiled in the decoction, adding more water, when the other ingredients are easily to be had.

The lees of wine, with a mixture of soap, are also very proper to be applied warm: As also cow's dung boiled in vinegar.

Suitable cataplasms in bad cases are proper. The camphorated spirit

spirit of wine alone is good, viz. an ounce of camphire to a pint of spirit. Frequently used, it will answer well when the swelling is new. See *Gibson's Farriery*.

GREEN DRESSING, turning a crop of green plants into the ground in summer, to enrich the soil, and fit it to produce a good crop of wheat. By repeating this culture, poor or worn out land may be brought to any degree of richness that is desired, without any other manure. Buck wheat, rye, pease or oats, may be sowed in the spring, and in June ploughed in, when they are fullest of sap, and most easily rotted. The ground should be again ploughed in the fall, sowed with winter grain, and well harrowed. The cost of ploughing and seed, is not so much as that of dung, when it can be had, and carting it. This management, therefore, may often appear eligible, especially in places where manures are not plenty. On account of the cheapness of the feed, Mr. Eliot recommends millet as a most suitable crop for green dressing; and some have used clover and rye grass. In Britain, buck wheat is much used, as the stalks, when green, are very large and juicy, and as they require but a short time to rot. It is asserted, that about ten days are sufficient for it to lie under the furrows.

The chief difficulty I can think of, which tends to discourage this practice, is, the choking of the plough in going among a tall growth of plants. It may be needful for a boy to tend it. But in Britain, to prevent choking, they recommend to pass a roller over the crop to be turned in, which lays it flat, and in the same direction that the plough is to pass.

GREENS, the general name of those pot herbs which are boiled for food when they are young and tender. Some of the most useful of them known in this country, are spinage, kale, French turnips, dandelion, purslain, white and black mustard. There is a Scotch kale which may be reared earlier than almost any other greens, and is equal in goodness to any. To have greens early, let kale and French turnips be sowed in October, and the young plant covered closely with eel grass, or straw, during the winter, and till the influence of the sun be sufficient to renew their vegetation.

GREEN SCOURING, "a disease to which sheep and bullocks are often subject. The best remedy for this distemper is verjuice: A wine glass full is enough for a sheep, and a pint for a bullock." *Complete Farmer*.

GRIPES, or *cholick pains*. Horses are very subject to griping, or cholick pains. They may proceed from flatulencies, or wind pent up in the stomach and bowels, from inflammation of the coats of the stomach and intestines, or from worms, spasms, &c. In such case it is very wrong to give him heating things by the mouth, as is too commonly practised. Bleeding should be the first thing in these cases, if the disorder be violent, which may be known by the creature's motions, frequency of lying down, and starting up again, &c. As horses are costive in these cases, the rectum should be cleared of the hard dung, by *back racking*, as it is called, that is, it should be taken out by a hand, which gives a horse great relief. For the pressure on the neck of the bladder being thus removed, he will be able to stale. Emolli-

ent clysters are then of great advantage, as they not only bring away the excrements, which affords a passage for the wind backwards; but they act as an internal fomentation, to remove spasms from the bowels. They may be frequently repeated, till the confined air finds a passage backwards. If it should be found necessary, a spoonful of laudanum may be given in a pint of watergruel, either by the anus in a clyster, or by the mouth. See *Clark's Farriery*. Nearly the same treatment is proper for horned cattle under the same disorders.

GROUND, a general name for land, be the soil what it may. Ground that is fit to produce crops is neither too soft nor too hard; neither too wet nor too dry. It is light and easily pulverized. It is not so tenacious as to cleave to the spade, which enters easily. That is the best mould which cuts like butter, and yet easily crumbles, and has no ill smell. It does not crack in dry weather. It is dark coloured, or quite black; does not soon poach with wetness. It shines after the plough: Flocks of crows follow the ploughman, and, as Pliny expresses it, peck at his heels.

GROVE, a row or walk of trees, planted close or a little open, for ornament and shade.

Formerly a grove made in regular lines, was considered as most ornamental. But modern improvers are rather disgusted with the uniformity of a grove, and prefer those which appear as if they were the work of nature or chance. As taste alters from time to time, I shall not undertake to determine which are most grand or beautiful. As my great object is real improvement and ad-

vantage, I shall here only attend to groves in regular lines.

Groves in gardens are both ornamental and useful, if the trees be not too large. They shade the walks in the borders; so that we may walk in gardens with pleasure, in the hottest part of the day. It is scarcely needful to say these garden groves should consist of fruit trees; and they should be of the smaller kinds, if in a garden of a small or middling size. A double row has the best effect, as it respects shade, one near the wall, the other on the opposite side of the walk. But this on the whole I do not recommend, unless it be in gardens uncommonly large.

In other situations groves of larger trees are preferred. Lanes and avenues, leading to mansion houses and other buildings, may be ornamented with rows of trees, either on one, or on both sides: If only on one, it should be the southernmost, on account of the advantage of shade in the lane. Such trees are best, the limbs of which are not apt to be low; such as elm, ash, maple, poplar, &c.

Lots and enclosures should be bordered with rows of trees, either fruit trees or timber trees, in close order. They will do better a yard or more from the fence, than in hedges according to the English method, as recommended by Mortimer. But such trees should be chosen, as are not apt to propagate and multiply, lest the borders be soon filled with shrubs.

It would be advantageous to the publick, as well as to the owners of adjoining farms, if all our roads were lined with groves, of barren or timber trees. They might be either within or without the fences. In the latter case,

government might interpose, and secure to the planters those which stood in the roads against their lands; and oblige farmers to plant in the roads against their own lands. I should prefer this to planting within the fences, especially where the roads have a good width. But the trees should be so tall when planted, as to be above the reach of cattle; and be staked, or otherwise secured, till they arrive to a certain bigness. The expense of thus securing them need not amount to much, when compared to the advantages arising from such groves.

Or, if they were planted along the southerly sides of roads only, the advantage to the publick would be great. Besides providing a stock of wood and timber for future generations, the present would receive the benefit of their shadow, cast into the roads in the hottest part of our summer days. This would be extremely refreshing to travellers, to teams that pass under them, and to many tame animals that live in the roads. In this case, the adjoining lots would not be injured with the shade; but for the beauty of their appearance, trees on both sides of the road would be best.

If the country were well stocked with these groves, their perspiration would help to abate the scorching heat of the sun, in a dry season, by moistening the atmosphere. They would serve to impede the force of high, driving winds and storms in summer, which often tear our tender vegetables, or lay our crops flat to the ground. Our buildings would be also in less danger from them. The winds in winter would not be so keen and violent. The force of sea winds

on our fruit trees would be abated. The snows that fall would be laid more even on the ground. Roads would be less blocked up, and seldom rendered impassable by them. But for these last purposes, groves of evergreens will have the greatest effect.

Groves should be planted thick at first, that the above advantages may be had from them while young. When the trees become so large as to be crowded, they should be thinned. And thus a considerable quantity of fuel and timber may be soon realized by the proprietors.

The increasing scarcity and dearth of wood, especially in the oldest settlements in this country, affords an unanswerable argument in favour of such a piece of good husbandry.

GRUB, "the name of a large maggot produced from the eggs of a certain species of butterfly. It is of a large size, and often does great injury to the corn by undermining it, and preying on its roots. It produces the beetle, and is by some called the rook worm, because rooks are particularly fond of it. The best way to destroy the grub, is good and frequent ploughing, which will clear the ground, however infested with this insect, for some years at least." *Complete Farmer.*

H.

HARROW, a kind of drag used in tillage. By drawing a harrow over ploughed ground, the clods which remain after ploughing, are broken, and the ground made mellow and fine. It serves also to destroy weeds, by pulling out their roots, and exposing them to the sun and wind. And it is used to cove-

seeds newly sown. The wood of a harrow should be the strongest and best seasoned white oak.

There are two kinds of harrows commonly used; the square harrow, and the bifurcate harrow; the former is for old and clear ground, the latter for land that abounds with stumps of trees and other obstacles. The square harrow is armed with sixteen, or with twenty five tushes, or teeth. The sharper these teeth are, the more they will pulverize the soil. If they be steeled at the points, they will hold their sharpness the longer, and stir the ground more effectually. And the cost of doing it is so little, that it is surprising to see that it is so generally neglected by our farmers.

It has been the common practice in this country to place the teeth in the joints of the square harrow. But this has a tendency to weaken the joints, and the teeth are more apt to become loose. They should be placed in the solid parts between the joints. The best way to fasten them is, with shoulders under the harrow, and nuts screwed on above.

Some use harrows with wooden teeth, but they are of so little advantage to the land, unless it be merely for covering seeds, that they may be considered as unfit to be used at all. The treading of the cattle that draw them, will harden the soil more, perhaps, than these harrows will soften it.

The bifurcate, or triangular harrow, is either a fork of natural growth, or else made artificially. The artificial one is commonly strongest, when well made, as timber may be chosen which is sufficiently tough and strong. The two legs may either be lap-
 P^ded together at the angle, or else

framed together like a pair of rafters, excepting that the butt ends, being toughest, and strongest, must be put together. But the joint must be strengthened by a good iron hoop smartly driven on to the nose, after the wood is thoroughly dry, and fastened with strong nails; and further strengthened with a brace from one leg to the other, framed in, about two feet from the juncture of the legs.

The angle may be more or less acute, according to the state of the land in which the harrow is mostly to be used. For the roughest ground the angle must be more acute; but for well cleared ground, the angle may be of 45 degrees, or more. The more obtuse the angle is, the more near together the teeth must be placed. In this kind of harrow some put 9, some 11, and some 13 teeth, or even 15. The rougher and harder the land, the fewer the teeth; and the fewer they are, the longer and stronger they should be. Twelve inches clear of the wood is not too long, nor three pounds too heavy for a tooth in the strongest harrows.

To prevent this machine from fastening itself often in immovable stumps and roots, the teeth may be set leaning a little backwards. But where there are no obstacles, they should rather incline the contrary way, or at least they should be perpendicular.

Some make use of a horse harrow of the forked kind, and very narrow, to mellow the ground and kill weeds, betwixt rows of Indian corn. But the horse plough answers the purpose better in general, unless it be upon green sward ground, in which the horse plough will not answer at all. The stiffness of the old

old furrows will prevent its regular going. Lord Kaimes recommends what he calls a cleaning harrow with no less than 56 teeth, which teeth are no more than six inches apart. The use of it is to clear land of roots, in an expeditious and effectual manner. The weight of a tooth is one pound only. If they are set raking forward they will penetrate the deeper, and have a better effect.

HARROWING, working the soil with a harrow. A team that travels quick, is best for harrowing; unless the land be too full of obstacles. Horses, therefore, are better for this work than oxen, because their motion is quicker. The faster the harrow moves, and the more it jumps, the more the hard clods are broken, and the turfs torn. The teeth will also keep cleaner and go deeper; so that the land will be more mixed and mellowed. But clayey land is so apt to be cloddy, that it is often necessary to follow the harrow with a maul, or a hoe, to break the remaining clods.

Besides pulverizing the soil, covering seeds, and drawing out the roots of weeds, the designs of harrowing are to make the land level, or smooth; and, on fallows, to cause the seeds of weeds to vegetate by exposing them to the air, in order that they may be destroyed by after operations, either with the plough or the harrow.

When land is wet and poachy, or at all muddy, it can be of no service to harrow it. It will rather do damage, as it will make it more compact and stiff.

Land that is too light and puffy, as drained swamps often are, cannot easily be too much harrowed. The more it is har-

rowed, the more compact it will be; and this is what it wants.

The harrowing of new ground for seeding, without ploughing, may be performed in almost any weather, if the ground be only dry enough to be mellowed by the harrow. And the sooner, after burning, this work is done, so much the better, as it will prevent the ashes being blown away by high winds, and as it will spread it more equally, and more effectually mix it with the soil. Here the strongest harrow must be used; and it ought to be heavy, in order to make any considerable impression on the soil. It is often necessary that the harrow pass several times in the same place, in order to raise a sufficient quantity of mould. There is no reason to fear its being lost labour. The more such ground is harrowed, the better crop may be rationally expected.

On furrows of green sward newly ploughed, the harrow should pass the same way that the plough did: Otherwise, some of the furrows, which lie a little higher than the rest, will be turned back again, grass upwards. This sort of land requires a heavy harrow, or one made so by loading it. A light one will sink into the furrows but little, and be of little service.

On old ground, ploughed plain, the harrow should pass, the first time, across the furrows, as the teeth will better take hold of the roots of weeds, and more deeply penetrate the soil. It will also do more towards leveling the ground. Afterwards it should be harrowed the other way, lengthwise of the furrows.

Harrowing commonly does the most service immediately after ground is ploughed, as the

teeth go deeper and raise the more mould. If it be neglected at this juncture, a time should be chosen when the soil is not too dry. After a gentle rain the clods will crumble the more easily; and the soil underneath being drier, will not be hardened by the treading of cattle.

In light sandy, or gravelly soils, or where there is occasion for harrowing land which is excessively dry, or in danger of soon becoming so, it should be done when the dew is on the ground, early in a morning. This will increase, rather than diminish the moistness of the soil. And on the contrary, land which is apt to be too wet, should be harrowed at a time when it is driest, as in the middle of a fair day. The first scratching will cause it to dry fast, and so prepare it to be made fine and mellow by the second.

The European farmers recommend harrowing ground once over before corn is sowed, and then to harrow in the seed the contrary way. The grain will be the more even, and not appear so much in rows, as if it were sowed upon the furrows; but it will not be so deeply covered. Perhaps sowing upon furrows, both winter and summer grain, may be generally the better method in this country, which is so much more liable to suffer by severe frosts and droughts. Some of our farmers even think it best to plough in the seed with a shallow furrow. The roots will lie the deeper, and be less exposed to suffer by frost and drought.

Harrowing fallows is doubtless a beneficial operation. If it be done two or three times between ploughings, the seeds of weeds will be encouraged to vegetate, and consequently will be

killed at the next ploughing or harrowing. Thus the land will become very clean after a year of fallow; and the food and pasture of plants will be more increased than it could be by ploughing only. For every weed that consumes in the soil is of some advantage.

Some have found their account in harrowing mowing grounds, when they have become bound and stiff. Though the roots of the grass are much torn and mangled by harrowing, the soil will be loosened at the surface, and the vegetation of the grass so much increased, that the excess of the next crop will more than compensate the labour of harrowing. It should be done in autumn, and before heavy rains fall, but after a gentle one, when the surface is a little moistened. It would be best, before harrowing, to afford the land a sprinkling of old dung, or compost: Or else immediately after, and bush it in. Its fruitfulness will thus be greatly increased.

The harrowing of land that is ploughed in ridges, should be performed lengthwise, and by two harrows abreast, or three, if the breadth of the ridges require them, that the trenches may not be too much filled. The second harrowing may be across, if the land needs to be laid even for mowing. But then the trenches should be cleared out with a shovel or plough, if the land be so flat and wet as to make it proper or necessary to lay it down in ridges.

Harrowing of winter grain, in the spring, is approved of beyond the Atlantick. When the roots are well set, and in sufficient plenty, I think this may be a laudable piece of husbandry. The harrow will destroy

but

but a few of the plants ; and the loss of them will be more than made up in the increased growth of the rest. But, in order to make the loosened plants take rooting, Mr. Lisle advises to drive a flock of sheep about over the field. Others advise to rolling the ground, which appears more rational.

HARVEST, the season when corn is cut down, and secured.

In this country, there are two seasons which are called harvest : English harvest and Indian harvest. The former is about the end of July or beginning of August, the latter in October or November.

Wheat and rye are harvested in much the same manner. Both are reaped and bound in sheaves. It is usual to cut rye rather greener than wheat, that the flour may be the whiter.

When a severe blight or rust has struck the stems of wheat, or rye, it answers no purpose to let it stand longer to ripen, or grow hard. It is agreed that it should be cut though full in milk. And afterwards it may lie on the ground, exposed to the sun and weather, till the grain is hardened. But the heads should lie so as not to touch the ground ; which may be easily done, if the reapers will only take care to lay the top end of each handful on the lower end of the preceding one. Some say it will answer to cut it three weeks before the usual time, and before the stems are turned yellow.

If grass or weeds grow among grain, it should be cut high, that so the less quantity of trash may be bound up in the sheaves. And when taking weeds with the grain cannot be avoided, it should be reaped a little the earlier, that it may have time to lie

in the field, till the weeds are well dried, without danger of scattering the corn by its being over dried.

The bands should be made in a morning early, when the dew is greatest, and the straw most supple. But the best time to bind the sheaves, is when the air begins to be damp towards evening, as the least degree of moisture will toughen the straw and prevent the scattering of the grain : And there is some degree of dampness in the air, for an hour or two before sunset.

A late writer advises to make the sheaves with only one length of straw.

After binding, it should be made up into shocks without delay, or after standing in sheaves one day, if the weather be settled and dry ; where it is to stand in the field till not only the straw, but the grain, be thoroughly dried ; and till a suitable opportunity present for carting it in. It should be done when the air has a small degree of dampness, to prevent the scattering of the grain.

It would be best on some accounts, that grain should be thrashed as soon as it is carted in. But as it is usually a hurrying season, it is but seldom that the farmer can spare time for it. It must, therefore, be stored most commonly.

The best method of storing it, is, to lay the sheaves up in the barn. But if want of room require them to be stacked, care should be taken that the grain may not draw moisture from the ground, by laying boards, straw, or rubbish under the stack. A better way still is to have a tight floor of boards mounted on four blocks, set in the ground, and so high from the ground 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. No fowls nor birds can then come at the grain; and the rain that falls on the straw ends will run off, and not pass towards the centre. The stack should be well topped with straw, that the rain may be completely turned off. As to the harvesting of barley, oats and pease, see those articles.

With respect to harvesting Indian corn, I would observe, that many do it much too early, to their own damage and loss. As long as there is any greenness, or sap, remaining in the whole length of the stalk, below the ear, or even in the cob; so long the corn improves by standing. For the sap will continue to discharge itself into the grain. Though a crop harvested earlier may measure as much in ears, or more, when it is newly husked, it will shrink a great deal, sometimes so much that not two ears on an ear will touch each other. Besides, there will be the greater difficulty in drying and keeping it. Corn that is harvested early, will not be fit to store in out door cribs, nor in our common corn houses, unless it be first spread thin on floors, and dried. And this is troublesome, at least, if not impracticable.

Squirrels, and rapacious birds, disorderly cattle and bad fences, drive persons to harvesting early. But there is commonly more lost than saved by it. When the corn stands tolerably secure, and is in no danger from frost, nor from thieves, harvesting early is an error. I should not think the beginning of November at all too late.

It is not safe to let it lie long in the husks after it is gather-

ed, lest it should heat, or contract dampness. One unripe ear or green stalk, in a heap, may damage many. The common practice of collecting large companies to husk the corn as soon as it is gathered, is a laudable one. And after it is husked, it should have a dry place, and so much benefit of the air, that it may be sure not to grow warm, let the air prove to be ever so moist.

Sometimes a severe early frost drives the farmer to harvesting, as he knows the frostbitten corn is apt to rot in the husks. But in such a case, or when corn holds its greenness uncommonly late, an approved method is, to cut it up close to the ground, bind it in small bundles, and set it up in small shocks in the field. It will ripen kindly, and take no damage. By this method the grain has the benefit of all the sap contained in the stalks, to bring it nearer to maturity.

I have heard of some persons in the county of Lincoln, who, finding their Indian corn very green at harvesting, have boiled it in the ears after husking: By which expedient they were able to dry it in the ears, without its rotting, or moulding. This may be no ill method at a pinch. But rather than be obliged to do it yearly, I should think they had better lay aside the culture of this plant, or else use no seed but from the northward, which will ripen in season.

HATCHEL, an instrument called sometimes a comb, full of long pins of iron or steel for teeth, with which flax and hemp are combed. They who manufacture these articles, as perhaps all the families of farmers should, ought to be provided with several hatchels of different finenesses. Where only flax is manufactur-

ed, two combs, one coarse, and the other fine, will be sufficient.

HAY, dried grass.

HAYHOOK, an instrument to pull hay out of a mow, or stack. This instrument is often made of wood; but an iron one is far preferable. It should be sharp pointed, armed with a fluke, and have a socket to receive the wooden handle. The handle should have a turn at the end for the ease of pulling. There can be no better handle than the half of an old ox bow: Or a little more than half. But this instrument will waste the hay, and divest it of much of the seed. A better way is, to cut off slices of two or three feet in thickness, from a mow or stack, as it is wanted for use.

HAYMAKING, the curing, or drying of grass for fodder. The first thing to be considered about haymaking, is the time of cutting the grass. It should not be cut too early, or before it has got its growth: For this will cause it to shrink too much in drying. On the contrary, it should not stand too late, or till the seed be quite ripe. It is not only harder to cut, but the ripeness of the seed will cause it to shatter out while drying, which will be a considerable loss, as the seed is the most rich and nourishing part; and the soil will be the more exhausted by nourishing the seed till it come to maturity, and the next succeeding crop will be the poorer. There never can be any advantage in mowing late, unless it be thickening the grass roots, by scattering some of the seed, where they were before too thin. He that mows early has the advantage of longer days for drying his hay; and of shorter nights,

when the dews are less detrimental to haymaking.

The right time for cutting clover is when half the heads begin to lose their bright colour, and turn brownish by ripeness. A general rule for other grasses is, to cut them soon after they have blossomed, or as soon as the seeds are formed. The grass is then in its perfection, as it is full of juices, and the juices will not evaporate nor the straw shrink too much in drying. Four pounds of green grass will, commonly, make one pound of dry hay.

But the farmer who has many acres of the same kind of grass, cannot always expect to cut the whole of it in exactly the right season. That he may approach as near to right as possible, he should cut the thickest grass first of all; especially if it be in danger of lodging, or so thick that the lowest leaves perish, or the bottoms of the stalks turn yellow. The thinnest of his grass should be cut next, which is apt to be ripe soonest: And last of all, the middling sized grass, or that which is on a medium between thick and thin.

Where a second crop is expected the same year, thick grass should be cut a little the earlier, that the roots may not be injured so much as to prevent their speedy recovery, by being closely covered too long by the first crop.

Some regard should be had to the weather, when the time of cutting is in contemplation. Those, especially, should regard it, who are able to call in as much assistance as they please in haymaking. It would be best for them not to cut any grass just before the full or change of the moon, as falling weather is to be looked for at these times
more

more especially : Though in fact it does not always so happen.

Grass, which has not been washed by rain for several days, has a kind of gum on it, which is known by its adhering to the sithe. This gum is thought to be a benefit to the hay ; and farmers are fond of mowing their grass when this gum appears, rather than just after the grass has been washed by rain.

As to the drying of hay, or the manner of making it, I know there are a variety of opinions. The right way is to do it in such a manner that as much of the sap as possible may be retained, and in the best state that is possible. In this I should think all would agree. All persons will allow that too much drying is hurtful. It is certainly a loss to rake it, or stir it at all, when it is so dry that the leaves will crumble. And doubtless as much of the sap should be retained as is consistent with its being kept in good order for fodder, and for long keeping.

Some grasses will keep well with less drying than is needful for others. The Rhodeisland bent, as it is called, or red top grass, will do with less drying than some other grasses. It has been much practised to put it up with so little drying that it heats in the mow to so great a degree, as to make it turn brown like tobacco ; and it is known that cattle will eat it well, and thrive on it. But the mow will certainly send out part of the virtue of the hay in steams. I cannot but think that all grasses should be so much dried, that mows and stacks, though they have a degree of heat, should not emit any sensible steam ; and I would not wish to have hay made brown

by mow burning. It surely does not appear to so good advantage at market.

Were it not for the labour and cost, a good way of haymaking would be, for the haymakers to follow at the heels of the mowers, at least as soon as the dew is off, and spread the swarths evenly ; turn the grass about the middle of the same day ; make it up into cocks before night ; open the hay, and turn it the next day ; and so on till it be sufficiently dried, doubling the cocks if signs of rain appear. It will not commonly take more than two or three days to dry it, unless it be very green, or uncommonly thick and rank. A person who has but little hay to make, need not be much blamed, if he do it in this way ; especially if the weather do not appear to be settled.

But a method which I have generally found to answer well in settled good weather, and which saves so much labour as to recommend it, is as follows. If the grass be thick, the swarths mowed in the morning I turn bottom upwards at evening, which prevents the hay being browned and hurt by imbibing the dew of the approaching night, the part that is dried being not exposed. These swarths, together with those mowed in the afternoon, I spread the next morning, as soon as the dew is nearly exhaled. I rake the hay in the after part of the day, in such a manner that the raking serves to promote its drying, flinging some of it inwards, exposing the greenest locks as much as possible to the sun, raking alternately on one windrow and another, till all are closed. Then I make them up into cocks of a moderate size. After this, if the weather

er continue fair, I stir the hay no more for two or three days, and then cart it in. It will sweat so much in the cocks, that there will be no danger of its mow burning afterwards.

But if the weather be unsettled, or if showers be frequent, it may be better to spread grass well, as soon as it is mowed, stir it often, cock it the same day it is mowed, open it the next fair day when the dew is off, let it sweat a little in cock, and house it as soon as it is dry enough. It will bear to be laid greener on a scaffold, than in a ground mow; and in a narrow mow greener than in a broad one. And that which is least of all made should be put upon a scaffold.

When grass is very thin, and not full of sap, having stood beyond the right time of cutting; it may be cut in the forenoon, and raked in the afternoon, of the same day; and then dry sufficiently in cocks, in two or three days. But if a heavy rain fall, it will need to be opened, and exposed to the sun for a few hours. If there be only a small quantity of rain, it may be sufficient to pull out some of the hay round the bottoms of the cocks, or only on that side which was windward when the rain fell, and lay it on the tops. If the cocks are so situated that the water has run much under their bottoms, they should be turned bottom upwards, and trimmed at least; but it will most commonly be necessary to spread them abroad.

Sometimes hay will become too dry, notwithstanding every precaution to prevent it: For it will dry twice as fast in some fair days as in others, because of the different dryness of the air. When this is the case, it should be removed to the barn only in

the evening, or morning, when the air is damp. And it is good to have some greener hay to mix with it.

Some think that mown grass should never be exposed to the full influence of the sun, lest it be robbed of too much of its sap, while it is in its most fluid state. A very ingenious gentleman, of my acquaintance, does not permit his grass to lie in swarth, but for an hour or two after it is cut; or no longer than till its wetness be gone, and it just begins to appear withered: He then gathers it into very small parcels, which he calls grass cocks, not more than a good forkful in each: Turns them over once in a while, about sunset is the best time: Doubles them as they grow drier: And when the hay is almost dried enough, makes up the whole into large cocks. Grass that is thus dried, will not waste at all by crumbling; nor will much of its juices evaporate. I have seen his hay, the flavour of which excelled almost any other that I have met with. The colour of it, indeed, was rather yellowish than green: But that is a matter of no consequence to the farmer who does not send his hay to market. I cannot but think that, in dry settled weather, this is an excellent method of haymaking. But in catching weather, perhaps a method which takes less time is to be preferred. From the above Mr. Anderson's method is not much different. "Instead," says he, "of allowing the hay to lie, as usual in most places, for some days in the swarth, after it is cut, and afterwards putting it up into cocks, and spreading it out, and tending it in the sun, which tends greatly to bleach the hay, exhales its natural juices,

and

and subjects it very much to the danger of getting rain, and thus runs a great risk of being good for little, I make it a general rule, if possible, never to cut my hay but when the grass is quite dry; and then make the gatherers follow close upon the cutters, putting it up immediately into small cocks, about three feet high each when new put up; always giving each of them a slight kind of thatching, by drawing a few handfuls of the hay from the bottom of the cock all around, and laying it lightly on the top, with one of the ends hanging downwards. This is done with the utmost ease and expedition; and when it is once in that state, I consider my hay as in a great measure out of danger; for unless a violent wind should arise, immediately after the cocks are put up, so as to overturn them, nothing else can hurt the hay; as I have often experienced that no rain, however violent, ever penetrates into these cocks but for a very little way. And, if they are dry put up, they never fit together so closely as to heat; although they acquire in a day or two, such a degree of firmness, as to be in no danger of being overturned by wind after that time, unless it blows a hurricane.

“In these cocks I allow the hay to remain, until, upon inspection, I judge that it will keep in pretty large tramp cocks, &c. The advantages that attend this method are, that it greatly abridges the labour, that it allows the hay to continue almost as green as when it is cut, and preserves its natural juices in the greatest perfection. For it is dried in the most slow and equal manner that can be desired. Lastly, that it is thus in a great mea-

sure secured from almost the possibility of being damaged by rain.” *Essays on Agriculture.*

Clover is a sort of hay that requires a critical attention in curing: Because, though the stalks need much drying, the leaves and heads will bear but little without wasting. It is best to rake it towards night, when the dampness of evening begins to come on; open it the next day, and never stir it much when there is danger of its crumbling.

Salt hay, in this country, has usually been hurt by lying too long in the swarths. The method in which I have treated it for several years, is, to cock it the next day after it is cut, and carry it in, without delaying more than one day, and put a layer of some kind of dry straw between load and load of it, in the mow, to prevent its taking damage by overheating. The straw contracts so much of its moisture and saltness, that the cattle will eat it very freely; and the hay is far better than that made in the common way.

If this hay be permitted to lie out in rains, the saltness of it will be diminished, which they who have but little other fodder may be apt to consider as an advantage. But it will contract no virtue, while it loses its saltness. The fresh water will damage it; especially for those who have plenty of other fodder, or even straw to mix with it.

Salt hay should not be cut when the full or change of the moon is approaching, lest the tides should be high, before it can be got off from the marsh.

HEMP, a plant with a tough fibrous coat, which answers the same purposes as flax, but is coarser and stronger.

The

The plant is tap rooted, and therefore does best in a deep and free soil. It is luxuriant, and quick in its growth, and therefore requires a rich, and well prepared soil. The soils which have been found to suit it best, are a rich gravelly loam, or a loose black mould, which is dry and deep. It is an error to think that it needs a wet soil, for it bears drought almost equally with any plant that we cultivate.

Mr. Eliot found by experiment, that it answered very well on a drained swamp: And he tells of a man in the Jerseys, who raised as much hemp yearly, on half an acre of such land, as brought him fifty pounds York money. It is not uncommon for one acre to yield half a ton, which will sell for twenty pounds in cash, at the lowest. And I am told by one who is much acquainted with it, that it is more easily broken and swingled than flax; and that, oftentimes, the brake will do all that is necessary in cleaning it.

To prepare land for a crop of hemp, the land should be ploughed to a good depth in the fall of the year preceding. If it be green sward land, it should be ploughed as early as August or September, that the sward may be perfectly rotten. And if it were ploughed in ridges it would be the better, and fit for sowing the earlier. And by cross ploughing and harrowing in the spring, it should be made extremely fine and mellow. A little dung should be applied, if the land be not in the best heart; and the fall is the best time to apply it. But if composts are used, they should be laid on just before sowing.

The time of sowing the seed is as early in the spring as the

soil can be got into good order, as it is a plant that is not easily injured by frost; but the middle of May will not be too late.

The seed for sowing should be of the last year's growth, as older seed is not wont to come up at all. I once sowed seed which was brought from England. It looked as well as any I ever saw; but not one in ten thousand ever sprouted. The quantity of seed for an acre, in the broad cast way, is three bushels; but half that quantity, in the drill method, will be enough. If the land be poor, a smaller quantity of seed will serve. The ground should be watched after sowing, that birds do not take away the feeds.

The drill method is on some accounts preferable to the other. For though in the first crop it will fall short, it exhausts the land less; and, therefore, in the long run, it may be more profitable. But in this way it produces more seed, and this method is certainly advantageous on account of the more convenient pulling of the hemp. If sown on narrow ridges, or beds, and the trenches shoveled out after sowing and harrowing, I suspect the broad cast way would have the preference. But of this I have had no experience.

As the correspondent parts of generation are on different plants, they are of two distinct sexes, male and female, and require different treatment. I will venture to assert, contrary to M. Mercandier, that the male is the plant which bears the flowers, and the female that which bears the fruit, or seed.

That which bears the flowers, will be fit for pulling about the end of July. Its ripeness is known by its growing yellow at

the top, and white at the root, by the falling of the flowers, and the withering of the leaves. If care be taken in pulling, not to hurt those plants which are left, they will thrive the better after it, as they will have more room, and as the earth will be stirred about their roots. And the drill method is favourable to this work; as the pullers need not tread among the thickest of the hemp. And sowing in beds has the same advantage.

After pulling, it must be put into the water without delay, to steep. Ponds and still waters are best. It will not take more than four or five days to water it enough. But it must be watched, lest it should be overdone. After watering, it must be spread and dried in the sun.

The fruitful kind does not ripen till about five or six weeks later. Its ripeness is known by the seed's turning brown. After it is well dried, and the seed taken off by a kind of coarse comb, it must be watered. It will take almost three times as much watering as the first kind. The one kind is more fit to be manufactured into thread and cloth, the other more suitable for rigging of ships, and ropes. But the latest kind may be made pliable and fine, if labour enough be bestowed upon it. Instead of steeping, spreading hemp in the dew will answer, as I have found by experience; and this method is practised in England.

The dressing of hemp may be performed in the same manner as that of flax, if it be not uncommonly large and long. A person, who is well acquainted with the culture and manufacture of hemp, assured me, that when his neighbour raised it on a drained swamp, he had it twelve

feet long; and, that he might manage it easily in dressing, he cut it in the middle. It was then as long as ordinary hemp, and as strong for every purpose.

If some of the stalks of hemp should be too large and stubborn for the brake, they may be put by themselves to be peeled by hand. The doing of it may be an amusement for children and invalids.

But to facilitate the dressing of hemp, mills should be erected for doing it. Or the machinery may be an appendage to some other mill. Two brakes should be moved together, a coarser and a finer, placed head to head, that the handfals may be easily shifted from one to the other. It is light work for two boys to tend them. But the breaking of large hemp by hand, is severe labour for the strongest men.

If no convenient stream be at hand, a mill may be constructed to be worked by a horse.

It was formerly the custom to beat hemp abundantly with mallets, or with pestles in large mortars, or in fulling mills, to make it soft, and fit for spinning. But M. Mercandier has shewn how it may be more easily done, by steeping it in warm water, or in lie, and washing it. See his *Treatise on Hemp*.

The great profit of a crop of hemp, and its being an article that will readily command cash, should recommend the culture of it to all our farmers. Besides the hemp itself, of the value of twenty pounds per acre, after it is dressed, the seed of an acre must be allowed to be of considerable value. Persons need not fear their crops will lie upon their hands, when they consider the vast sums of money which are yearly sent to other countries for

for this article, almost enough to deprive the country of a medium, and how naturally the demand for it will increase as it becomes more plenty. There is no reason to doubt of success in raising hemp, if the soil be suitable, and well prepared; for it is liable to no distemper; cattle will not destroy it, unless it be with their feet; and it is an antidote to all sorts of devouring insects. Neither is the plant difficult as to climate. Though the hottest climates do not suit it, temperate and cool ones do; and it has been found, by the small trials that have been made, to thrive well in the various parts of Newengland. The most northern parts are very suitable for the growing of hemp. The southern are equally so.

HENTING FURROWS, those which are turned from each other, being contiguous at bottom, as the two last furrows in ploughing a land, or between ridges.

HERD'S GRASS, or Fox Tail, *Alopecurus pratensis*. This grass is a native of Newengland. Mr. Eliot says it was first found at Piscataqua in Newhampshire, by one Herd, who propagated it, whence the name. It is cultivated in our improved fields for hay. It requires about ten or a dozen quarts of the seed for an acre. It does best in rich and moist land. More needs not to be said of a grass, the great value of which is so well known in this country; especially in the northern parts, where it prospers more than in the southern. It is of more importance to our farmers than any other grass that they cultivate.

HIDE BOUND, a distemper into which horses fall when they are poorly fed and neglected.

“A horse that is hide bound grows lean, has a feverish heat, his skin sticks to his ribs, the spine becomes harder than usual, small boils break out on his back, and yet his appetite sometimes continues good. As this disorder seldom is an original complaint, but generally arises from some former cause, regard must be had to that cause, in the method of cure. But as to the disorder itself, Vegelius directs the anointing the whole body with oil and wine mixed together, rubbing them strongly against the hair, in a warm sun, in order that the skin may be relaxed, and a sweat break out; after which the horse should be well curried, and placed in a warm stable, with plenty of litter.

“The authors of the *Maison Rustique* advise that the next day after bleeding the horse, a fomentation be made of emollient and aromatic strengthening plants, boiled in lees of wine, or beer, and that the whole body of the horse be rubbed with these plants, whilst they are warm, till it is thoroughly wet;—and that the loins, belly, and neck, as well as the rest of the body, be anointed with a mixture of one part honey and three parts of ointment of elder, rubbing it strongly in with the hand, that it may penetrate the skin. This done, the horse should be covered with a cloth dipt in the warm fomentation, and doubled, and another covering should be put over this, tying it on with one or two fuscings. The horse should remain in this condition 24 hours, and then be fomented, rubbed, &c. twice as before. These fomentations being finished, a warm covering must be continued, lest the horse catch cold; and he should then have

an opening clyster, and the next morning a purging medicine; continuing to wash his head and neck, and also to rinse his mouth with the decoction.

“For food, put into a pail or two of water about half a bushel of barley meal carefully ground, stir it well about, and let it settle. When the heaviest parts have subsided, pour the thin part off for the horse to drink, and give him what remained at the bottom, at three different times in the day, mixing with it a due quantity of crude antimony.—The horse must have rest for some time, and be fed with the best hay, or grass, according to the season of the year. In spring, there is nothing better than new grass. In about three weeks, he will begin to mend remarkably.” *Mills on Cattle.*

HOE, a well known instrument used in tillage. It is called by some writers the hand hoe, to distinguish it from the horse hoe.

Hoes are chiefly of two kinds, narrow and broad. The use of the narrow hoe is to break up spots of hard, or tough ground, as the balks left by the plough in swarded land, or the corners of lots where the plough cannot conveniently reach; or to take up strong roots, such as those of the shrub oak, &c. Therefore, this tool must be made thick and strong, with a large eye, that it may admit a strong helve.

It has also the name of a breaking up hoe; but it is seldom made to do the work of a plough in this country of late, unless by the poorest people, and in new places where teams cannot be easily had.

The broad hoe is a very important implement among farmers, as it is much used, though

not so much as it should be. The more mellow the land is, the larger the hoe should be, that work may be done more expeditiously. The tough and hard soil requires a narrower hoe, to render the labour more easy.

Where land is not stony, hoes should be kept sharp by grinding. They will enter the ground the more easily, and destroy weeds and their roots more effectually.

For the ease of the labourer, hoes should be made as light as is consistent with the needful degree of strength: Their handles especially should be made of some light kind of wood, as ash, or white maple, or a young tree of spruce. For the *Horse Hoe*, see that article.

HOEING, either burying seeds in the earth with the hoe; or breaking and stirring the soil, chiefly when plants are growing in it.

This after tillage, as I may call it, has been found to be of great advantage to almost every kind of plants, and to some it is so necessary that no crop is to be expected without it. The deeper land is hoed, the greater advantage do plants receive from hoeing, if due care be taken that their roots be not disturbed, or too much cut to pieces.

The ends to be answered by hoeing are chiefly these:—1. To destroy weeds, which are always ready to spring up in every soil, and which would rob the cultivated plants of most of their food. Scraping of the surface, if it be done frequently, may answer this purpose; but to destroy the roots of weeds, deeper hoeing is necessary. 2. To keep the soil from becoming too compact, which prevents the roots extending

extending themselves freely in search of their food, at the same time keeping up a fermentation, by which the vegetable food is concocted, and brought into contact with the roots. For this purpose, the deeper land is hoed the better. But hoeing should cease, or be only superficial, when the roots are so far extended as to be much injured by hoeing. They will bear a little cutting without injury. For where a root is cut off, several new branches will come in its place. 3. To render the soil more open and porous, so that it shall greedily drink in the nightly dews, and that rain may not run off, but readily soak in as it falls, and be retained. Accordingly, the more and oftener land is hoed, the more moisture it retains, the better it bears drought, and the more its plants are nourished. 4. Another design of hoeing, and which has not been enough attended to, is to nourish plants by drawing fresh soil near to them, the effluvia of which enters their pores above ground, and increases their growth. 5. At the same time, earthing of plants makes them stand more firmly, and increases their pasture in the spots where the roots most abound. At the same time it prevents the drying of the earth down to the roots.

But earthing, or hilling of plants, should be done with caution. Hilling excessively is hurtful, as it does not permit the roots to have so much benefit from the rains, and too much hinders the influence of the sun upon the lowermost roots. Whatever hilling is done, should be done by little and little, at several hoeings, that the roots may gradually and easily accommodate themselves to the altera-

tion of their condition. Lastly, frequent hoeing serves to prevent the standing of water on the surface, so as to chill the ground, and check all fermentation in it.

When all the hoeing between rows of plants is performed with the hand hoe, the labour is severe, and more expensive to the owner; and the plants will, on the whole, receive far less advantage from hoeing. Therefore, where land is tolerably free from obstacles, I would earnestly recommend that the hoe plough, or the common horse plough, which answers nearly the same end, be much used; and the earth stirred with it to a good depth, and frequently, during the proper season of hoeing, which is the former part of summer, but varies with respect to different crops.

A plough, called a cultivator, has been constructed, with two mouldboards, which turns the mould both ways at once, towards each of the two rows between which it passes. But, as it requires more than one horse to draw it in stiff ground, two furrows made with a hoe plough, or horse plough, according to the customary practice, may answer full as well. When the soil is light and mellow, it will be a saving of time to use this cultivator; and the work will be done with more regularity and neatness, if guided with skill, and due care.

The usual method of horse hoeing is as follows: At the first hoeing, turn the furrows from the rows, so that they form a veering, or ridge, in the intervals between the rows. The plough should pass as near to the rows as may be without danger of eradicating or disturbing the

the plants ; for it is best that the soil be loosened as near to the roots as possible : Because when they are tender and weak, they will extend their roots but little ; and there will be no opportunity afterwards of ploughing and stirring the earth so near to them, without too much danger of tearing and injuring their roots. After ploughing, the rows are to be cleared of weeds with the hand hoe, and a little fresh earth brought into contact with them.

At the next hoeing, and all after hoeings, in our common husbandry, the furrows are to be turned towards the rows, so as to form a henting, or trench, in the middle of each interval ; and cross the furrows last made, that the land may be the more thoroughly pulverized. This operation carries the share of the plough farther from the roots, and at the same time affords plenty of fresh earth about the plants ; which must be finished with the hand hoe. But if, in ploughing, any of the plants should chance to be covered, they must be set free without delay.

At the last hoeing, either of Indian corn, or of any thing that is planted in hills, as it is vulgarly called, it is best to make but one furrow in an interval, and to pass the plough both ways, or cut the ground into squares with the plough, or rather with the cultivator. This leaves the roots the more room, and less work will remain to be done with the hand hoe.

If the horse be weak, or the ground hard and stiff, it may be needful to let the plough go twice in a place, which makes four times in an interval. For the plough should go as deep for hoeing, as in any other plough-

ing, or else the intention of it will be partly defeated ; which is to keep that quantity of soil light and mellow from which the plants are to draw the most of their nourishment.

We apply horse hoeing to Indian corn, when the ground is well cleared from obstacles, and could not be easily persuaded to neglect it. Every farmer knows how much it saves labour, and that the crop is increased by it. Why then will they not be persuaded, by all that has been experienced, and written, by some of the wisest farmers, to apply this method of culture to many other plants ? I have no doubt it might be done with equal advantage. Indeed, we cultivate but few plants in tillage, for which this kind of culture would be improper. In Europe, they horse hoe all kinds of grain, and even some kinds of grasses.

In a dry season, or in land that is in no danger of ever being too wet, it is advisable to hoe only in the morning and evening. And if farmers will work as early and late as they can, they may afford to desist, and rest themselves from nine till four, when the air is hottest. The ground will get and retain the more moisture which is thus hoed early and late. And in the middle of some of our hottest days, there is danger of hurting tender plants, by drawing the scalding hot earth close to their stems. But the opinion entertained by many, that no hoeing at all should be done in a dry season, is irrational and ridiculous. They deprive their land of the benefit of the dew, by neglecting to hoe it, suffer it to be overrun with destructive weeds, which rob the plants of most of their nourishment; and allow the ground

ground to be so compacted and hard, that the rain when it comes will not penetrate it. This strange opinion will occasion much loss to those whose conduct is influenced by it.

HOGSTY, a kind of building in which hogs are confined and fed. The ways of constructing these houses are various: But the best are those which are framed and boarded. The boards, that the swine may not gnaw them to pieces, should be of some harder wood than white pine, and they should be fastened with ribbings and spikes. Whatever be the construction of sties, they should always have one part close and warm, with a tight roof over it; and the other part open, in which the trough is placed. Swine will not well bear to be wholly secluded from the weather and sunshine; and it is hurtful to them to have a cold and wet lodging; more hurtful than many people are ready to imagine.

The floor of a sty should be very tight, to prevent the loss of manure; or else it should be mounted so high above the ground, that the manure may be easily pulled out from under it. It is a good way to have the open side, or end, a little lower than the other, that the lodging part may always be dry. And some build them with a gap above the sill at the lower part, where much of the filth will go out, without the trouble of shoveling it.

If planks be thought too expensive for flooring, a good, and very durable floor, may be made of flat stones, bedded in clay, that the manure may not soak into the ground. But none of the rocks should be so small, that the largest hog can stir them with his nose.

In a neighbouring town, I once saw a light fly mounted on four low wheels, one at each corner; which was frequently drawn with ease from one spot to another, in an orchard near to the dwelling house. By means of these removals, every part of the enclosure might be manured in turn, and no manure wasted by its standing too long in one place. I heartily wish this example may be followed, as it may be with a trifle of expense, for it must needs be profitable in a considerable degree.

In feeding hogs, their food is often wasted, and so dirtied as to be spoiled, by their standing with their feet in the trough, and by their scuffling with each other. This may be easily prevented. Let the trough be so spiked to the floor, or otherwise made so steady, that they cannot displace it; and let a piece of joist be so framed in over the trough, that they cannot stand over it; but can put their heads under the joist into the trough. I have saved much in this way, since I first thought of it. The swine eat little or no filth, when a trough is so defended, which is a matter of some importance with me; for I am thoroughly convinced, that the more cleanly any animals feed, the more sweet and wholesome their flesh will be. And none of the food that is given them will in this way be wasted, or next to none.

As there is some labour, and much care required, in tending hogs, which are fattening in a sty, I shall with pleasure relate a method of doing it without tendance, excepting with water. It was discovered to me by an ingenious and valuable friend. Let a hopper be built over the trough, capable of holding as
much

coarse linen cloth. They are commonly about eleven feet long, and near two yards and a half in circumference, and contain about 250 weight of hops. The small bags, called pockets, contain about half as much.

The manner of bagging is thus. Make a round or square hole about 26 or 30 inches over, in the floor of the chamber where the hops are laid in heaps after sweating. Tie with a piece of pack thread, a handful of hops in each lower corner of the bag, to serve as handles for the more easy lifting or removing the bag; and fasten the mouth of the bag to a frame, or hoop, somewhat larger than the hole, that the hoop may rest on its edges. The upper part thus fixed, the rest of the bag hangs down through the hole, but not so far as to touch the lower floor. Then throw into it a bushel or two of hops, and let a man go into the bag, and tread the hops down till they lie close; then throw in more and tread; and so on till the bag is full. Loose it from the hoop, and sew up the mouth as close as possible, tying hops in the upper, as was done in the lower corners. The harder the hops are pressed, and the closer and thicker the bag is, the longer and better the hops will keep.

A small manuring of hop ground every second year is sufficient. Dung was formerly more in use than at present, experience having shewn that lime, sea sand, marle, ashes, &c. answer the end better, and last longer. But hog dung prevents mildew from taking hops.

Each pole, according to Dr. Hales, has three vines, which makes six vines to a hill. All the sprouts above this number, should be broken off in the spring.

HORN DISTEMPER, a disease of neat cattle, the seat of which is in their horns. Cows are more subject to it than oxen. It does not attack bulls; and steers and heifers, under three years old, have not been known to have it. The distemper gradually consumes the pith of the horn. Sometimes it is in both horns at once, but more usually in one only.

The disease is discoverable by the coldness, or loss of the natural warmth of the horn; by dulness of the eyes, sluggishness, loss of appetite, and a disposition to lie down. When the brain is affected, cattle will toss their heads and groan much as if in great pain.

To effect the cure, the horn should be perforated with a nail gimblet, through which the corrupted thin matter will be discharged, if care be taken to keep it open. By this boring, which should be nearly horizontal, or in the depending part of the horn, and two or three inches from the head of the animal, the cure sometimes is completed. When it proves otherwise, a mixture of rum and honey with myrrh and aloes, should be thrown into the horn with a syringe; and be several times repeated, if the disease continue. For a more particular account, see a letter from the Hon. C. Tufts, Esq. in the 1st Vol. of the *Memoirs of the Academy of Arts and Sciences*.

HORSE, one of the most useful of tame quadrupeds. The marks or evidences of a good one are these, a high neck, a full breast, a lively eye, a strong back, a stiff dock, full buttocks, ribs reaching near to the hips, well made hoofs rather large, and a good gait.

The size of a horse should be in proportion to the work in which

which he is chiefly to be employed. Small sized ones often prove good in the saddle. They are apt to be hardy, and in proportion to their size, and the quantity of their eating, usually are the most profitable. Plough horses, and all draught horses, should be large, as their weight is of importance in drawing; and as it is often inconvenient to put two horses to one plough, especially in horse hoeing. Largeness is also of importance, when they are used single, in journeying, as they most usually are, in a chaise or sleigh.

A horse's manner of going is a matter of no small importance. The ambling gait, or what in this country is vulgarly called pacing, is not good, neither for the horse nor the rider. It is tiresome to both. It habituates a horse to carry his feet too near to the ground, so that he is the more liable to trip and stumble.

The method so much practised formerly in this country, of teaching horses to pace swiftly, and racing in that gait, is highly pernicious. It puts them to a much greater strain than running; and numbers have been thus ruined. Some colts naturally amble, and others trot. But all may be made to trot, if due care and pains be taken with them while they are young, or as soon as they are first ridden. In a carriage an amble is tiresome to a horse, appears highly improper, and is disgusting to every one. And I do not see why it should appear at all more tolerable in the saddle.

When any change of gait is wanted for the ease of the rider, the canter is to be preferred, than which none can be more easy.

The way of breaking a young horse that is mostly used in this

country, is highly absurd, hurtful, and dangerous. He is mounted and ridden before he has been used to the bridle or to bearing any weight on his back: If he will not go forward, he is most unmercifully beaten; by which his spirits are broken, and his strength impaired. If he rears up, he is pulled backwards, with the risk of hurting both horse and man. If he runs and starts, as he probably will under such management, he flings the rider, perhaps is frightened, gains his liberty, and is encouraged to do just so the next opportunity; and the unfortunate rider blesses himself, as he has reason to do, if he escape without broken limbs. Or if the horse should chance to go kindly, the rider continues the exercise till the horse is fatigued, discouraged, and injured.

Instead of this mad management, the way practised in the older countries should be adopted. Let a horse first of all be tamed with the bridle, by leading him again and again; in the first place, after, or by the side of another horse; and after he walks well, bring him to trot after his leader. In the next place, put on the saddle, and lead him in that, time after time. Then lay a small weight on the saddle, and if he be apt to start, fasten it, that it may not be flung off, increasing the weight from time to time, till he learns to carry what is equal to a man's weight. Lastly, let a man gently mount him, while another holds him by the bridle, and fix himself firmly in the saddle. The place of riding is recommended to be a ploughed field. Let him thus be ridden with a horse going before him, till he learn the use of the bit, and will stop, or go forward,

at the pleasure of the rider, and without the application of much force. Being exercised in this manner a few times, and treated with all possible gentleness, there will be no more occasion for leading him. He will go well of himself; and be thoroughly broken, without so much as giving him one blow, and without danger or fatigue, to the horse or his rider. And, what is much to be regarded, the horse's spirits will be preserved, though he be sufficiently tamed. In teaching a horse to draw, gentleness must be used. He should be tried first in company with other horses, whether in carting or ploughing; and the draught should not be so heavy as to fret him or put him to great exertion till he has learned to draw steadily. After this he may be put to draw light loads by himself. Lastly he may be put to a pleasure carriage, but coupled with another rather than alone, and to a sleigh rather than a chaise.

It may be taken for a general rule, that the gait which is easiest to a horse, will be the easiest to his rider. For jaded horses, it has always been observed, are apt to go hard, and to tire their riders.

The feeding of horses, as I conceive, has not been sufficiently attended to in this country; which is, doubtless, one reason why they are in general so mean and despicable. Too many keep horses who cannot well afford to feed them. They should neither run upon the roads and commons, nor in pastures that are filled with wild and water grasses. They love a dry pasture, not too much shaded, and short grasses of the best kinds. Clover and white honey-suckle, both green and dry, are excellent food for them. It

nourishes them well, and prevents costiveness, which is very hurtful to them. The best of clover hay will keep them as well as most other kinds of hay with oats.

To fit a horse for a journey he should not be suffered to grow too fat and gross. He should for some time be kept in the stable rather than in the pasture, and fed mostly with hay and provender: But rather sparingly if he incline to be fat. He should have exercise daily to harden his flesh, and keep him in the habit of travelling. He should be shod some days before he begins a journey, that the shoes may be well settled to his feet, and the nails a little rusted at the points, that they may hold the faster. And the pads of the saddle should be well fitted to his back, so as to fill the hollows, and bear equally on every part. And while he is on the journey, he should be stabled every night. It is destructive to expose a horse to the dampness and cold of the night after severe exercise. But it would be best, if neither horses, nor any of our cattle, were wholly confined to dry meat in winter. Horses indicate this, by their eating snow with their hay. Set a basket of snow within reach of a horse, when he is at his manger, and he will take a mouthful from each alternately. Of all juicy food for horses in winter, writers on husbandry seem to give carrots the preference. They have been found by experience to answer well instead of oats for labouring horses; and to fatten those which are lean.

He that would be sure to keep his horse in good order, must beware whom he suffers to ride him, and must see that he is never abused. Profuse sweating should
always

always be avoided. And when a horse is much warmed by exercise, he should not be exposed to cold air, or night dew, and much less to rain and snow. If he cannot be instantly rubbed down and housed when warm, he should be covered with a blanket; and he should always have a dry stable, and be well littered. The neglect of these precautions may bring on incurable disorders.

Horses should not be too much deprived of the liberty of motion, as they too often are. Close confinement after hard labour, will be apt to abate their circulations too suddenly, make them chilly, and stiffen their joints. To be deprived of motion, is bad for man and beast. Horses therefore should not be straitened for room in their stables. Stables should not be so low as to prevent their tossing up their heads as high as they please. Some stables have so little room over head as to bring horses into a habit of carrying their heads too low. They become afraid to lift them up. They should also have room in their stables to turn their heads to any part of their bodies, that they may defend themselves from the biting of insects, allay itching, &c. And their halters should always be so long, and their stable so wide, that they may lie down conveniently. Nor should horses be so placed as to be able to deprive each other of his fodder.

When horses are kept in stables, as they generally are in the coldest half of the year, they should be daily dressed, as it is called. The curry comb, and the brush, should be well used on all parts of their skin, which are covered with hair. This increases perspiration through the pores of the skin,

which is necessary to health; and causes the blood to move faster in the veins. This treatment will not only cause them to look better, but they will have better health, and more activity and courage. They will digest their food better, and be better for service. But if rubbing and friction be wholly neglected, or slightly performed, the hair will appear dry and rough; the perspirable matter hardens in the pores of the skin, or remains lodged at the roots of the hair, and has the appearance of a dirty white dust: And sometimes like small scales attended with itching. More especially is rubbing necessary for horses, when they are growing cold after being sweated by labour. In such cases it should never be omitted.

Columella observes "that the bodies of cattle ought to be rubbed down daily, as well as the bodies of men; and says it often does them more good to have their backs well rubbed down, than their bellies well filled with provender."

But in warm weather it would be best for them, that they should not have the confinement of the halter, nor even of the stable. A small spot of feeding ground, if it were only a few rods, adjoining to the stable, and the door left open, that a horse may go in and out alternately as he pleases, would greatly conduce to the health of the animal. This degree of liberty will be most needful, when the flies are troublesome; and be better for him than confinement to a stable that is perfectly dark. In fly time it gives a horse much ease and comfort to smear his limbs, neck and head, with rancid fish oil, or something else that will keep the flies from attacking him. And in all seasons, when horses have
been

been heated with exercise, they should be well rubbed, or curried.

When a horse runs in a pasture during the grass season, he should have some shelter, not only a shade to defend him from the intense heat of the sun, but a shed, or a clump of trees, that he may retreat from the inclemencies of the atmosphere.

But horses that are daily worked, in summer, should be mostly kept upon green fodder in stables, rather than grazed in pastures. The tendance of them will not be so burdensome, with a spot of high and thick grass at hand, as leading them to and from a pasture, at the distance of a quarter of a mile. This will prevent their being often chilled by feeding in wet nights. A large quantity of manure will thus be saved. And a very small quantity of land will answer, in comparison with what it takes for the pasturing of a horse. Keeping a sieve and a basket at hand, a horse may be foddered in this way, in two or three minutes; and by the time that the whole spot has been once mowed over, that which is first cut will be grown up again. Where a number of horses are soiled, a pair of poles, or a hand cart, will be better than a basket to carry the hay to them. This practice, called soiling, answers well near to cities and large towns, where lands for pasturage are not plenty; and where, by means of the plenty of manure, lands may be made to yield the greatest crops of grass. For very thick grass should not be fed off; because the greater part of it will be wasted by the trampling, and the excrements of animals.

HORSE HOE, a kind of plough used in stirring the soil, when a crop is growing on it. It

does not essentially differ from a common horse plough, only in the different manner of connecting it to the horse. This is done by two arms, or shafts, like those of a cart, fastened by screws to a short plank about three feet long and one foot broad; which plank is made fast to the fore end of the beam, which may be occasionally removed to the right or left, according as the hoeing may require the plough to pass nearer to, or farther from the rows. This is less apt to injure the plants, than a common harness.

The advantage of this instrument above a horse plough is said to be principally the steadiness of its going, by which a furrow may be drawn very near to a row of plants, without danger of injuring them. This was the opinion of Mr. Tull, the inventor. But as it cannot be so well governed by the handles as the common horse plough, the safety of the plants must chiefly depend upon the steadiness of a horse's going. I therefore prefer the horse-plough, in the whole, for loosening the ground betwixt rows. It will answer, at least, every purpose of the horse hoe.

HURDLE. The hurdles used in husbandry, for fences, are frames of wood, consisting of two poles, four feet apart, connected with small sticks across from the one to the other. Spruce poles are good for this use, being light and tough. The sticks may be of split timber, such as does not rot too soon; or round sticks of natural growth, such as thrifty suckers from the stumps of oak trees. If they are wattled, or have twigs wove into them, the sticks may be a foot, or eighteen inches apart; and they will resemble the hurdles on which fish are dried. If they are not

not wattled, the sticks must be fo near together, that neither sheep nor hogs can pass between them. Cheap gates may be conveniently made in this way. A hurdle is often wanted, to make a good fence across a run of water, being most suitable for this purpose, as it may be fastened by strong stakes at the ends, and as it resists the current of water but little. They are useful to fence small pens and yards on any sudden occasion. And as they are easily removed, they are used in England, in eating off a crop of turnips with sheep. If there should be need of preventing the climbing of boys over them, the ends of the cross sticks may rise a few inches above the upper pole, and be made sharp at the points.

HURTS, and Bruises in the withers. Horses are very often hurt, or wrung in the withers, by the biting of other horses, or by unfit saddles, especially when the bows are too wide; for by that means they bruise the flesh against the spines of the second and third vertebræ of the back, which form that prominence which rises above their shoulders. When the swelling is moderate, the usual method is to wash the part with salt and water, or to apply horse dung, or salt and black soap mixed together, which very often succeeds. Any restraining charge, as bole and vinegar with whites of eggs, has the same effect; as also the whites of eggs beat up into a foam with a piece of alum. This is very much commended.

“Sometimes the hair is rubbed off, and the part becomes galled, in which case nothing is preferable to the rectified spirit of wine or brandy, which ought to be used often, covering the part with a flaxen cloth dipped in beefwax, and a little oil melt-

ed together, to keep the dirt from it and defend it from the air.” *Gibson's Far.*

HUSBANDRY, the art and business of a farmer. Though the word is commonly used as if it were perfectly synonymous with agriculture, it is, in strictness, a word of larger signification. It includes not only the business of tillage, and the care and management of vegetables, but it extends to the rearing and feeding of cattle, swine, poultry, the management of the dairy, raising flax and hemp, fruit and timber trees, &c. and indeed to every branch of rural economy.

I.

IMPROVEMENT, not the bare use or occupying of lands, though the word is too often so used improperly. In this sense of the word, some have improved lands till they would produce nothing at all.

By the improvement of lands, I would be understood to mean, making them better and more profitable.

To improve lands that are worn out, or bring them into such a state that they will bear good crops, the method most approved and practised, seems to be, to cease from tilling them, and let them lie for pasturage, perhaps eight or ten years. If land get a good sward by lying, it may be thought to be considerably recruited. But it may be done in a much shorter time by fallowing and plentiful manuring, if the owner will be at the expense of doing it.

Land that is so poor, either naturally, or by severe cropping, as to produce few or no vegetables spontaneously, may as well be laid common. This will be the most profitable method, when
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the fence is such that it can be easily removed, and profitably used elsewhere. More manure will be dropped by cattle, on land that is common, while so many people depend upon the roads and commons for pasturage, than if it were an inclosed pasture: Therefore it may well be expected to recruit the faster, and be sooner in a condition to bear good crops.

But if the circumstances of the farmer be such, that he cannot excuse his poorest land from tillage, let him either provide plenty of manure for it, or else let winter rye be sown on it. Some have found that a successive cropping with this grain will recruit land, and that each crop will be better than the preceding one. But if the land be very poor, such a course should begin with a year of fallow, or else manure should be applied. That weeds may not increase, some hoed green crop should intervene once in three or four years. But the most quick and effectual methods of recruiting land, perhaps, are fallowing and green dressing. Much may be thus done in one or two years.

If a field be not too far exhausted, laying it to clover will recruit it, if the soil be deep, and suitable for clover. But the grass should be fed off, not mowed.

The best management would be, not to suffer lands to become so poor as to need much recruiting; but to keep them, at least, in the same degree of richness, as they are when newly cleared. There is great loss in cropping land so severely as to wear it out, and using methods afterwards to recruit it. For, by doing this, we must be content with crops for one or two years, which will

scarcely pay the cost of culture: Or with none at all: Whereas, by a judicious course of tillage, if the seasons prove fruitful, profitable crops of some kind or other may be always obtained.

We shall scarcely find any spot in this country, that is not capable of much improvement. And, by the help of manures, lands which are continually cropped, may be made richer and richer; even by such manures as are obtainable in most parts of this country. We are too apt to be satisfied with a small degree of richness in our tilled lands. Being used to poor success in farming, we content ourselves with a crop of ten or a dozen bushels of wheat or rye from an acre, and think our lands are in heart, if they will produce so much. But, in old countries, where the soil is not naturally superiour to ours, farmers get more than twice this quantity. Mr. Young has found, that in several parts of the north of England, where the rule is a crop and a fallow, or a white and a green crop alternately, the average produce of an acre, reckoning wheat, rye, barley, oats, pease and beans, is thirty bushels. And in those places where the method is, two crops to a fallow, the average produce of the same crops is twenty six bushels.

It appears to be best, therefore, in that country, not to raise two exhausting crops in succession. Making this a rule, seems to be still more necessary in this country; because one of our most fashionable white crops of corn is more exhausting than any of theirs; that is, maize is more exhausting than wheat or oats.

He that would really *improve* his tillage land, or even keep it from depreciating, should always manure

manure it for a crop of maize, and very plentifully, or else fallow next after it; and never take two white crops without a green one, or an improving one intervening. A good improving course may be, 1. Potatoes on green sward land, well dunged. 2. Maize dunged. 3. Rye. 4. Clover two years. 5. Wheat. The second course may be, 1. Pease, beans, rye, or potatoes. 2. Maize, hemp, flax, barley or oats, dunged. The third course, 1. Rye. 2. Clover two years. 3. Wheat. I am convinced that, by such a management, with deep and frequent ploughings, our lands in general would yield more than twice as much as they do at present.

It is a despicable way of farming, to expend forty shillings on a crop that is worth no more than forty shillings. The landholder is, in such a case, in fact, no richer than the poorest labourer. But if the crop were double to the cost of culture, the farmer would receive some interest or rent, for his land; and might lay up something to support him when he is past his labour, as well as lighten his labours at present. Such a degree of improvement would enable farmers to provide settlements for more of their sons near home, than they can at present; not only as they would gain something to purchase lands with, but because fifty acres would afford a better living, than a hundred have hitherto, as most of our farms have been managed.

Some may inconsiderately think, that he who raises twenty bushels from an acre, has only double the advantage that he has who raises ten. But if ten only just pay for the culture, seed, fencing and taxes, the latter has no advantage at all from his land; and is in no better a condi-

tion than he who buys his bread; while the former clearly gains ten bushels from an acre. The more a farmer gets in a crop, over and above paying necessary charges, the greater is his clear gain, as it is called.

I would entreat farmers to consider that the cost of raising a poor crop, one time with another, is nearly as much as that of raising a large one. There is the same expended in fencing—the same tax paid—the same quantity of seed sown—the same almost expended in ploughing, as rich land ploughs so much more easily than poor, as to make up for the extra number of ploughings in a course of tillage. I may add, there is the same or more labour in thrashing. An attention to these things is enough to convince any one of the great importance of endeavouring to improve crops by a more spirited and rational husbandry.

If a farmer think he cannot afford to lay out a farthing more on the tillage of an acre, than he has been accustomed to do, let him be entreated to save a little in fencing, and so enable himself to do it, leaving out some of his lands that bring little or no profit, and pay taxes for a less quantity of land in tillage; or let him turn some of his tillage land to grass; and lay out the same quantities of labour and manure on a third less land in tillage. Lands in tillage might thus be made profitable; and more so than many are ready to imagine.

It has often been observed, that those farmers in this country who have the fewest acres, commonly get the best living from their farms. It is, doubtless, because their lands are under better cultivation. And some have taken occasion to remark, that our farmers

farmers are ruined by the great plenty of land in their possession: Though this remark is just, I can see no reason why it should continue to be so; any more than; that being rich should necessarily make a man poor: What need has the man who possesses three hundred acres, to destroy the wood, or clear the land, as they call it, any faster than he can make use of the soil to the best advantage? What need has he to be at the expense of enclosing more than his neighbour does, who has only one hundred acres, while he has no more ability, or occasion, for doing it? Or to pay taxes for more acres in grass or tillage? It is a foolish and ruining ambition in any one, to desire to have a wide farm, that he may appear to be rich, when he is able to give it only a partial and slovenly culture.

If such improvements as are possible, and even easy, were made in the husbandry of this country, many and great advantages would be found to arise. As twice the number of people might be supported on the same quantity of land, all our farming towns would become twice as populous as they are likely to be in the present state of husbandry. There would be, in general, but half the distance to travel to visit our friends and acquaintance. Friends might oftener see, and converse with each other. Half the labour would be saved in carrying corn to mill, and produce to market; half the journeying saved in attending courts; and half the expense in supporting government, and in making and repairing roads; half the distance saved, in going to the smith, the weaver, clothier, &c. half the distance saved, in going

to publick worship, and most other meetings; for where fleeces are four miles apart, they would be only two or three. Much time, expense and labour would on these accounts be saved; and civilization, with all the social virtues, would, perhaps, be proportionably promoted and increased.

Nothing is wanting to produce these, and other agreeable effects, but a better knowledge of, and closer attention to, matters of husbandry, with their necessary consequences; which would be a more perfect culture, a judicious choice of crops, and change of seeds; and making every advantage of manures.

Improvements of vast importance, might also be made in the management of meadows and pastures. See those articles:

INARCHING, "a method of grafting, commonly called grafting by approach, and is used when the stock intended to graft on, and the tree from which the graft is to be taken, stand so near, or can be brought so near, that they may be joined together. The method of performing it is as follows: Take the branch you would inarch, and having fitted it to that part of the stock where you intend to join it, pare away the rind and wood on one side, about three inches in length. After the same manner, cut the stock or branch in the place where the graft is to be united, so that the rind of both may join equally together: Then cut a little tongue upwards in the graft, and make a notch in the stock to admit it; so that when they are joined, the tongue will prevent their slipping, and the graft will more closely unite with the stock. Having thus placed them exactly together, tie them with

with some soft tying; then cover the place with grafting clay, to prevent the air from entering to dry the wound, or the wet from getting in to rot the stock. You should also fix a stake in the ground, to which that part of the stock, together with the graft, should be fastened, to prevent the wind from breaking them asunder, which is often the case, when this precaution is not observed. In this manner they are to remain about four months, in which time they will be sufficiently united, and the graft may then be cut from the mother tree, observing to slope it off close to the stock. And if at this time you cover the joined parts with fresh grafting clay, it will be of great service to the graft.

“This operation is always performed in April or May, and is commonly practised upon myrtles, jasmines, walnuts, firs, pines, and several other trees that will not succeed by common grafting, or budding.” *Dictionary of Arts.*

INCLOSURE, or **ENCLOSURE**, that which surrounds, encloses, and secures a field. See the article *Fence*. The word is also used to signify the land which is enclosed; also the appropriation of lands before held in common.

INCREASE, a word commonly used in husbandry, to express the proportion in which a crop exceeds the seed from which it is raised. It is generally true that the smaller the quantity of seed the greater is the increase; because a plant that stands by itself, has all the food that the earth is adapted to give it. But plants that are so near together that their roots intermingle, do more or less rob each other of their food. But we must not conclude

from hence, that the less quantity of seed we sow, the better. Because, in getting a crop, other things beside the increase from the seed, are to be taken into consideration.

Other things being equal, those crops are most to be coveted, which require the smallest proportion of seed. But the greatest profit, on the whole, is to direct the choice of crops. The cheapness of seed sometimes misleads the farmer. To this cause may be ascribed, not seldom, the cultivation of maize on soils that are more suitable for other kinds of corn; or on soils that will produce no crop of maize worth cultivating. In a suitable soil, well dunged, it is not uncommon for one quart of maize to yield ten bushels, which is an increase of 320 fold. The expense of seed, therefore, for producing a bushel of corn, at 4s. is but six tenths of a farthing. But an increase of 20 fold is a good crop of wheat; the seed to produce a bushel of wheat, at 7s. will be more than four pence: So that the expense of seed for wheat, is thirty times greater than for maize. One consequence of this difference in seed is, that many of the poor can obtain seed for the former crop, who cannot obtain it for the other. And I suspect that the greater expense for seed of English grain, as we call it, has gradually brought the people of this country into a habit of sowing it too thin, and made them establish rules of doing so. It is certain we sow much thinner than Europeans do. For the same reason, the poor persist too much in the culture of maize.

It is not easy to determine what quantities of seed will answer best for given quantities of ground,

ground. But it is observable, that, in kindness to man, the beneficent Governour of nature has made most plants of the farinaceous kind, capable of getting their full growth when they stand near together. The greatest increase from the seed, is not to be accounted the most profitable crop. A yield of eleven for one may be of more advantage than twenty for one. If one bushel of wheat sowed on an acre produce 20 bushels, and two bushels on an acre produce 22, it is worth while to sow two bushels. The farmer may consider one of the two bushels as yielding 20 bushels, and the other as yielding two bushels. In this case eleven for one is more advantageous than twenty for one. See the article *Seed*.

Another matter in which *increase* is to be considered, is the breeding of cattle, and other animals. The farmer may reckon increase in neat cattle as follows: He that has one cow may expect, in one year, to possess a cow and calf;—in two years, a cow, a yearling and a calf;—in three years, a cow, a two year old steer or heifer, a yearling and a calf. The two year old steer or heifer may be worth 3*l*. the yearling 40*s*. and the calf 20*s*. So that the increase from a cow worth 4*l*. in three years may be worth 6*l*. Consequently, he that lets out a cow for half her increase, as is the practice in some places, gets 25 per cent. simple interest on the money that he buys her with. No man therefore that has a due regard to his own interest, will choose to hire cows at this rate; or take them to the halves as it is called, engaging to return the cow and half her increase at the end of three years. When cows are thus let the own-

er ought to risque the cow and her offspring.

The increase of sheep is a matter of greater uncertainty, as they are liable to more fatal diseases and accidents than black cattle are. But as they often bring two at a yeaning, it many times happens that ewes increase as fast as cows, or faster. But as a lamb grows to maturity in one year, and a she calf not in less than three years, ewes may be said to increase three times as fast as cows, even when they bear single.

INDIAN CORN, *Zea*, a well known and useful plant of the grain kind. It is called maize in most countries, *zea* in some.

The parts of generation are on different parts of the same plant. The panicles, or tassels, contain the *farina fecundans*, which falling on the silk, or the green threads at the end of the ear, impregnate the ear, and render it fruitful. If the tassels, or spindles, were cut off before the grain in the ear is formed, the crop would be spoiled. This has been proved by experiment. But this effect will not take place, unless all the tassels be removed; because one of them will be sufficient to impregnate twenty plants. The silks, or threads, must be undisturbed to the time of impregnation. They are as necessary as the sowing itself. If part of them are taken away or pulled out as soon as they appear, part of the corn will be wanting on the ear: For every single grain has one of these threads. It is therefore a bad practice to suffer weaned calves to go among the corn, as some do, at the season of impregnation.

Maize is considered, in this country, as a most important crop. It is preferred to wheat and rye, because it is not subject to blasting,

ing, nor to any other distemper that is apt, in any great degree, to cut short the crop. A good soil, well tilled and manured, seldom fails of giving a good produce.

Another advantage of it is, that it is more productive than either wheat or rye are, even when they escape blasting and smut.

No grain on the whole is more useful; for there is no other grain equal to it, for the fattening of cattle, poultry and swine. No other beef is so well tasted as that which has been fed with it. The pork fattened with it is very white, firm and sweet; and it makes the flesh of all animals very solid and good.

Though it be not so light and easy to digest as most other sorts of corn, it is found, that people who are fed on it from their infancy, grow large and strong, and enjoy very good health. There are a variety of ways of preparing it for food. The Indians parch it in embers, then reduce it to meal, and carry it with them, when they go forth to war, or hunting. When they eat it they reduce it to a paste with water, for it needs no other cooking. It is called *nocake*.

The green ears, either roasted or boiled, are delicate food; especially some of the more tender sorts, which are cultivated for this purpose. Ripe corn, the hulls being taken off with a weak lie, and boiled till it is soft, is an excellent food; and not inferior to it is pounded corn, known by the name of samp. In either way, many account it equal to rice. But the most common use of it is in meal sifted from the bran, made into bread or puddings. For the latter, it is allowed to excel all other sorts of flour: For the former it does

not answer well by itself; but is excellent when mixed with an equal quantity of rye meal.

The cheapness of seed, being next to nothing, greatly recommends, to the poorer sort of people, the culture of this corn. For it is often the case, that they are scarcely able to procure other seed for their ground. But this they can often have gratis.

In our new settlements, bordering on the wilderness, it seems to be of more importance than in other places; because the stalks, leaves and husks, being good fodder, supply the new beginners with winter food for their cattle, before hay can be raised.

Of all soils a clayey one may justly be accounted the worst kind for this crop. A loamy soil will not answer without a plentiful dressing. But a sandy or gravelly soil is best; or sand, if it be not destitute of vegetable food. In the northern parts of New-England, it is not worth while to plant this corn on clay, nor on mere loam: For it requires much heat, and these soils are not so much warmed by the sun, as sandy and gravelly ones. On any soil it requires much tillage and manure in this country; if either be scanty, a good crop is not to be expected.

I think it is not the best method to plant it on what we call green sward ground, at least in the northern parts. It is apt to be too backward in its growth, and not to ripen so well. But if we do it on such land, the holes should be made quite through the furrows, and dung put in the holes. If this caution be not observed, the crop will be uneven, as the roots in some places where the furrows are thickest, will have but little benefit from the rotting of the sward.

But

But if the holes be made through, the roots will be fed with both fixed and putrid air, supplied by the fermentation in the grass roots of the turf. In this way, I have known great crops raised on green sward ground, where the soil was a sandy loam, but mostly sand.

But in the course of my experience, I have found pease and potatoes the most suitable crops for the first year. In the second, it will be in good order for Indian corn. This case, however, may be peculiar to the northern parts of Newengland.

For this crop, it is certainly best to plough in the fall preceding; and again in the spring, just before planting. If the land be flat, and inclining to cold, it should lie in narrow ridges during the winter; and if it is naturally moist, the corn should be planted on ridges; otherwise it should be ploughed plain in the spring.

Some recommend gathering seed corn before the time of harvest, being the ears that first ripen. But I think it would be better to mark them, and let them remain on the stalks, till they become sapless. Whenever they are taken in they should be hung up by the husks, in a dry place, secure from early frost; and they will be so hardened as to be in no danger of injury from the frost in winter.

I would not advise the farmer to plant constantly his own seed; but once in two or three years, to exchange seed with somebody at the distance of a few miles. Change of seed is doubtless a matter of importance in most kinds of vegetables; though it has not yet been so plainly discovered in this as in some others. But let the farmer beware of taking his seed from too great a dis-

tance. If he should bring it, for instance, a hundred miles from the southward, his corn would fail of ripening; if as far from the north he must expect a lighter crop; and in case of drought, the latter will be more apt to suffer, as it has been proved by experiment. A farmer in the county of Bristol, took seed from the county of Cumberland. It came on well at first. But the summer being pretty hot and dry, it parched up, and produced next to nothing, though the seed he had taken from his own field turned out very well.

If the farmer cannot conveniently obtain new seed; or if he be loth to part with a sort that has served him well, and choose rather to use it than seed he has not tried; let him, at least, shift seed from one field to another, and especially from one kind of soil to another.

And in the choosing of seed, some regard should be had to the state of the soil on which it is intended to grow. If it be poor, or wanting in warmth, the yellow sort with eight rows will be most suitable, as it ripens early. A better soil should have a larger kind of seed, that the crop may be greater, as it undoubtedly will.

If twenty loads of good manure can be afforded for an acre, it should be spread on the land and ploughed in: If no more than half of that quantity, it will be best to put it in holes. In the former case, the corn usually comes up better, suffers less by drought, and worms; and the land is left in better order after the crop. In the latter case, the plants are more assisted in their growth, in proportion to the quantity of manure. If the manure be new dung, burying it under the furrows is by far the better

better method. None but old dung should be put in the holes.

Let the ground be cut into exact squares, by shoal furrows made with a horse plough, from three to four feet apart, according to the largeness or smallness of the sort of corn to be planted. This furrowing is easily done with one horse, and is by no means lost labour, as the more the ground is stirred, the more luxuriantly the corn will grow. If dung is to be put in the angles where the furrows cross each other, the furrowing should be the deeper, that the dung may not lie too light.

The right time of seeding the ground may be from the first to the third week in May; or a little sooner or later according to the dryness of the soil, and the forwardness of the spring. The farmers have a rule in this case, said to be borrowed from the originals, which is, to plant corn when the leaves of white oak begin to appear. But so much time is commonly taken up in planting this corn, it being tedious work to dung it in holes, that it will be necessary to begin in the driest part of the field a little earlier than this rule directs.

Shell the seed gently by hand, that it may not be torn or bruised at all, rejecting about an inch at each end of the ear. And, if any corns appear with black eyes, let them also be rejected, not because they will not grow at all, the contrary being true; but because the blackness indicates, either some defect in drying, or want of perfection in the grain. Put five corns in what is called a hill, and let them not be very near together; for the more the roots crowd each other, the more they will prevent the growth of each other. Four corns would perhaps be a better number, if it

were certain they would all prosper. The true reasons for putting more than one in a place I take to be, that by means of it, the rows may be so far a part as to admit of ploughing between them; and that some labour in hand hoeing is saved, it being no more work to hoe a hill with five plants, than with one in it.

Some steep their seed. But in general it had better be omitted; for it will occasion it to perish in the ground, if the weather should not prove warm enough to bring it up speedily. If planting a second time should become necessary, by means of the destruction of the first seed; or if planting be delayed on any account till the beginning of June, then it will be proper that the seed should have boiling water poured on it. Let it not soak more than half a minute, and be cooled speedily, and planted before it dries. The corn will be forwarder in its growth by several days. The seed should be covered with about two inches of earth.

To prevent birds and vermine from pulling up the corn, steep some corn in a strong infusion of Indian poke, or refuse tobacco, and scatter it over the ground before the corn is up. White threads stretched over a field of corn, will prevent crows from alighting upon it: But I doubt whether this will deter any other birds.

A handful of ashes on each hill, will nourish the plants, and have a tendency to prevent their being annoyed by worms. Some lay it on just before the first, or second hoeing. It will have a better effect in preventing worms, if laid on before the corn is up. But it is commonly designed to answer chiefly as a top dressing; and

and for this purpose it would answer better near the third hoeing; for then the plants want the greatest degree of nourishment, as they begin to grow very rapidly. Two dressings with ashes, to answer the two purposes, would not be amiss.

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; and then the weeds killed with the hand hoe, and a little fresh earth drawn about the plants. This operation we call weeding.

In about half a month after, plough again, but across the former furrows, and turn the furrows towards the rows. Then with the hand hoe earth the corn as much as it will well bear. This is called moulding, or half-hilling.

When the plants are about knee high, and before they send out their panicles, or spindles, give them the third and last hoeing. The best way at this hoeing is to plough one furrow in an interval, both ways. The cultivator with two mouldboards would be better for this work, than the common horse plough, as it would throw the mould equally towards each row, and save labour in hand hoeing. The ground would thus be cut into squares, and the hills almost completely formed. In finishing them, care should be taken that they be not made too high, or steep; that so they may not divert the water, which falls in rains, from the roots. When hills are too much raised, they also prevent the warm influence of the sun upon the lowermost roots, by too great a thickness of earth; in consequence of which, the plants are put to the exertion of sending out a new set of roots,

at a suitable distance from the surface.

Some think high hills are needful to make the corn stand upright. I never could perceive the advantage of it. But I am confident it is oftener broken by winds when the hills are uncommonly high, which is a greater evil than its leaning half way to the ground, if indeed that be any evil at all, which I think may be doubted.

The farmer, who wishes for a large crop of this corn, should not annoy it with running beans, or pumpions; the former, by winding round the stalks and ears, cramp them in their growth, and sometimes bend them down to the ground by their weight; the latter, by their luxuriant growth, rob the hills of much vegetable food, and by their thick shade, shut out the influence of the sun from the roots of the corn. So that they must needs be very detrimental to its growth, and ripening.

At the second and third hoeings, all the suckers should be buried under the soil; not broken off, as is the common practice, because this wounds the plants. If the suckers be suffered to grow, they seldom, or never produce fair and perfect ears; and they rob the ears on the main stalk of their nourishment. I mention the second and third hoeings, because the suckers will not all appear till the third; and the sooner they are destroyed the better the crop will be.

Instead of the common method of planting, if your land be rich and easy to till, and free from obstacles, I should think it would be best to plant the corn in the drill method, the rows being of the same distance

as in the common way, placing the corns about five or six inches asunder. I have found by experiment, that a greater quantity of corn may be produced in this method, than in hills; and the labour is but little, if at all increased. In a small field, where the dung had been evenly spread, and ploughed in, I planted one row thus, the rest being in the common way; and it yielded, at harvest, one eighth part more corn by measure than either of the two nearest rows, the corn being equally ripe and good.

When there is reason to apprehend that the ground will prove too moist for this crop, it will be advisable to plough it into narrow ridges, and seed each ridge with one or two rows, as shall be found most convenient. Some of the finest crops that I have known, have been raised in this method.

When a season is at all wet, this would be the best culture in almost any soil, unless the very driest be excepted.

There is a kind of ridging, which would be very proper for this plant, not only on account of drying the soil, but that the land may have an alternate resting, or fallowing, between the rows. In the common method of plain ploughing, it commonly happens that a hill stands precisely in the place of a hill of the preceding year. When this is the case, the plants will receive less nourishment than if the hill had had a new situation. That each hill may always have this advantage, let a ridge be formed by two furrows, turning part of a row of hills on each side, so as to meet each other, in the last year's interval: Thus small ridges will be formed, on which

the rows should be planted. If dung be first spread over the ground, the most of it will be buried where it should be, in the bottom of these ridges. At the time of weeding, or at the second hoeing, the remainders of the old hills may be turned towards the new rows. With such a mode of culture, land could not soon be exhausted, even by a successive cropping with maize. Land which has before been planted on ridges is as proper for this management, as if it had been planted in hills, or even more proper. For the success of a method not very dissimilar to this, see *Experiment for raising Indian corn*, in the *Memiors of the American Academy*, by Joseph Greenleaf, Esq.

The tassels, or top stalks, should not be cut off, till the top of the spindle is perfectly sapless. I think we usually cut them too early, unless their total greenness for fodder be a sufficient compensation for pinching the ears. The wounding and mutilating of most other annual plants, in their green state, is known to make them less fruitful. I have suspected the effect must be the same on this plant.

To satisfy myself, I made the following experiment. The whole of a small field was topped, Sept. 10, 1783, excepting two rows through the middle, the extremities of the spindles being quite dry. The tops of the two rows were not cut at all. The two uncut rows produced a tenth part more corn by measure, than the two nearest rows did. The quantity of ripe corn was equal, all the excess being in the green ears. I am led by this experiment to think the stalk ought never to be topped at all: For the greenness of the stalks mak-

ing them a better fodder, will not compensate for the loss of a tenth part of the corn, if nothing be reckoned for the extra labour of topping and preserving them. But as M. Aimen has suggested that the panicles should be cut off as soon as the plants are impregnated, I choose rather to suspend my judgment concerning it, till I see the result of more experiments.

We are certainly guilty of an error when we harvest this corn too early. The difference of early and late harvested corn may be seen by the shrinking of corn in the former case. In drying, large spaces will be left between the kernels on the cob; but that which is well ripened on the stalk, will shew no such interstices. The corn will undoubtedly be growing better till the stalk below the ear is perfectly sapless, and the cob dry; receiving continual nourishment from the sap, unless the frost or some accident should happen to prevent it. Squirrels and other animals drive people to early harvesting; but there is commonly more lost than saved by it. When corn stands tolerably safe from the attacks of tame and wild animals, harvesting early is an unpardonable error. See *Harvest*.

This plant is so luxuriant in its growth that it impoverishes the soil faster than almost any other crop. Therefore it is not good husbandry to plant it more than two years in succession. It would be better still to grow it but one year in the same place.

European writers say, the land should be ploughed as soon as the crop is off, to prevent the stalks from drawing the moisture out of the ground. But the reason of this is not so evident as to

carry conviction, unless the stems are quite in a green state. It is, however, a good method to plough all fields in tillage, as soon as the crop is off.

INOCULATING, or BUD-DING, inserting a bud so that it will live and grow, in the side of the trunk, or limb of a tree. It answers the same end as grafting. Mr. Miller says, "This is commonly practised upon all sorts of stone fruit in particular, such as peaches, nectarines, cherries, plums, &c. as also upon oranges and jasmynes, and is preferable to any sort of grafting. The method of performing it is as follows: You must be provided with a sharp penknife, having a flat haft (the use of which is to raise the bark of the stalk to admit the bud) and some sound ba's mat, which should be soaked in water, to increase its strength, and make it more pliable; then having taken off the cuttings of the trees you are to propagate, you should choose a smooth part of the stock about five or six inches above the surface of the ground, if designed for dwarfs; but if for standards, they should be budded six feet above ground; then with your knife make a horizontal cut cross the rind of the stock, and from the middle of that cut make a slit downwards about two inches in length, so that it may be in the form of a T; but you must be careful not to cut too deep, lest you wound the stock. Then having cut off the leaf from the bud, leaving the foot stock remaining, you should make a cross cut about half an inch below the eye, and with your knife slit off the bud, with part of the wood to it, in form of an escutcheon: This done, you must with your knife pull off that part of the wood which

was taken with the bud, observing whether the eye of the bud be left to it or not (for all those buds which lose their eyes in stripping should be thrown away, being good for nothing.) Then having gently raised the bark of the stock where the cross incision was made, with the flat haft of your penknife, cleave the bark from the wood, and thrust the bud therein, observing to place it smooth between the rind and the wood of the stock, cutting off any part of the rind belonging to the bud, which may be too long for the slit made in the stock: And so having exactly fitted the bud to the stock, you must tie them closely round with bas mat, beginning at the under part of the slit, and so proceed to the top, taking care that you do not bind round the eye of the bud, which should be left open.

“When your buds have been inoculated three weeks or a month, you will see which of them have taken; those of them which appear shriveled and black being dead, but those which remain fresh and plump you may depend are joined. At this time you should loosen the bandage, which, if not done in time, will pinch the stock, and greatly injure, if not destroy, the bud.

“The March following” (perhaps April in this country) “you must cut off the stock about three inches above the bud, sloping it that the wet may pass off, and not enter the stock. To this part of the stock, left above the bud, it is very proper to fasten the shoot which the bud makes in summer, to secure it from being blown out; but this part of the stock must continue on no longer than one year, after which it must be cut off close above the

bud, that the stock may be covered thereby.

“The time for inoculating is from the middle of June to the middle of August, according to the forwardness of the season, and the particular sorts of trees to be inoculated, which may be easily known by trying the buds, whether they will come off well from the wood. But the most general rule is, when you observe the buds formed at the extremity of the same year's shoots, which is a sign of their having finished their spring growth.” *Gardener's Dict.*

INSECT, a numerous class of animals. They have the name insect from their appearing to be almost cut off in the middle, or in some part of their bodies. But the name is also applied to worms, &c. which have not this mark of distinction.

A general division of insects is into winged and naked ones.

Both sorts are generated from eggs. They are either hatched in the form of their parents, or into maggots or worms, which, after several transmutations, come to be in the form of their parents.

I do not undertake so great a task as to discourse of all sorts of insects; but only of those which are found to be noxious to the plants that are cultivated in this country.

As I have already said something concerning caterpillars, and treated more largely on that formidable insect the canker worm; I shall here begin with one that is almost equally terrible in its effects, the species of gryllus, or locust, called the *Grasshopper*, which is as difficult to guard against as the canker worm, or much more so. More or fewer of these well known insects appear every year on our

grounds,

grounds, more especially in dry summers ; and in a severe drought, they usually appear in endless swarms, hurting the most, and destroying many, of the fruits of the earth, by eating off the more tender parts, and depriving the stems of their sap. They have this year, 1789, in some places, eaten off the bark of the limbs of trees and shrubs.

An infusion of wormwood, or a decoction of almost any bitter plant, sprinkled on vegetables, it is asserted, will prevent their eating them. But this labour will be thought too tedious, unless it be in gardens or other very small inclosures. And this would be to no purpose, when green food to supply them became scarce. In this case, they will eat onions, and all sorts of plants, wormwood not excepted.

If our farms were always plentifully stocked with fowls, and particularly with turkies, these insects would be thinned, as they are fond of them, and eat multitudes of them, especially in the beginning of summer, before they can make much use of their wings. But this can be only a partial remedy.

As the grasshoppers deposit their eggs in the surface of the soil, it is thought that the greatest production of them is in mowing grounds, and in open fields that are not much trodden by cattle. They are seldom seen to tarry in forests, or in very moist or shady places ; though they traverse such places in quest of their food. The only way then, it seems, to guard against them most effectually, would be, to pasture the whole of our high lands closely, excepting the parts that are in tillage. For the eggs will be mostly crushed by the feet of cattle. But for a whole

country to do this, would perhaps be considered as making too great a sacrifice ; and for one or two farmers in a village or neighbourhood to do it, would have but little effect, unless where they are surrounded with large forests ; because the insects, when they come to be furnished with strong wings, at which time they devour fastest, pass from field to field with the rapidity of horses.

However, as they abide and eat chiefly where the soil is naturally dry, a proper expedient may be, to cultivate hay crops only on low and moist lands, which is practicable, as these lands might be made far more productive than they are. Or, if on high land, it should be some early crop, such as clover, which may be mowed before this insect has attained to its full growth.

The black worm, an insect so called, is an ash coloured worm, with a stripe almost black upon its back. At its full growth, it is about the bigness of a goose quill, and an inch and a quarter in length. The greatest mischief that they commonly do, is to young cabbages, cauliflowers, &c. They never choose to appear on the surface in the day time ; but keep themselves buried about an inch or two beneath it. In the night they come up, eat off the stems of the young plants, and again bury themselves in the soil, often attempting to draw in the plants after them.

They sometimes destroy other vegetables. I have known them to cut off great part of a field of Indian corn, before the first hoeing : But this is not a common case.

They begin to devour in May, and cease in June.

I once prevented their depre-
dations in my garden, by manur-
ing the soil with sea mud, newly
taken from the flats. The plants
generally escaped, though every
one was cut off in a spot of
ground that lies contiguous.
From the success of this experi-
ment I conclude, that salt is very
offensive, or pernicious to them.
Lime and ashes in some measure
prevent their doing mischief ;
but sea water, salt, or brine,
would be more effectual antidotes.

Top worms, or spindle worms, a
white worm resembling a grub,
found in the hose, or socket, of a
plant of maize, which eats off
the stem of the plant, and ren-
ders it unfruitful. When its
excrements appear on the leaves,
it may be known that a worm is
in the socket. They are most
commonly found in places that
are rich and dungy, particularly
in corn that grows near to barns ;
but they will sometimes prevail
through whole fields. Sprinkling
the corn, when they begin to eat,
with a weak lie of wood ashes will
effectually destroy them. So, I
suppose, would almost any bitter
infusion ; but of this I have made
no trial.

The striped bug, or yellow fly,
is a small four winged insect, the
outward wings of which are strip-
ed with yellow and black. They
eat and destroy the young plants
of cucumbers, melons, squashes
and pumpions. They begin to
eat while the plants are in seed
leaf ; and, unless they are oppos-
ed, will totally destroy them, es-
pecially in a dry season.

These insects may be consider-
ably thinned, by killing them in a
dewy morning, when they have
not the free use of their wings,
and cannot well escape.

I have sometimes defended the
plants in some measure, by en-

circling them with rock weed.
But nothing that I have tried
has proved so effectual, as sitting,
or sprinkling powdered foot upon
the plants, when the morning
dew remains on them. This
forms a bitter covering for the
plants, which the bugs cannot en-
dure the taste of. Perhaps water-
ing the plants with some bitter in-
fusion might equally preserve
them, if it were often repeated.
I prefer foot, as I know by ex-
perience that once sprinkling
with it will answer the end, un-
less it happen to be washed off
by rain. When this happens,
the footing should be repeated.

The turnip fly, a well known
winged insect, which eats the
seed leaves of turnips, before the
first rough leaf appears. Their
ravages are so general, and of
such consequence, that the inge-
nious have attended to the matter,
and explored many methods, both
preventive and remedial, to op-
pose them.

One of the preventive meth-
ods is, making the ground so rich
that the plants will grow rapidly,
and continue but for a short time
in the seed leaf ; for, after the
evolution of rough leaves, the
plants are almost or quite out of
danger of this insect.

It is also recommended, to
pass a roller over the ground, as
soon as the seed is sown. This
not only prevents the too sud-
den escape of the moisture in the
surface, and causes the plants to
rise sooner and more vigorously ;
but fills up or closes ten thou-
sand little interstices in the sur-
face, which serve the insects as
places of retreat. The conse-
quence is, either that they are
destroyed by rains, driven away
by winds and storms, or stiffen-
ed with the dews of the coldest
nights.

Mr. Tull thought it best that the seed should be buried at different depths in the soil, and says, as they will come up at different times, either the first or the last will probably escape the fly. He accordingly constructed his turnip drill in such a manner as to bury the seed at different depths.

The same thing in effect may be done in the broad cast way of sowing. The ground may be harrowed with a common harrow with iron teeth; then half the seed sowed, and the ground smoothed with a bush harrow and rolled; then the other half sowed, and bushed in, or raked. After which the roller should be again passed over the surface.

Some writers on this subject are confident that the best method is, to sow the seed very thick, equal to double the usual quantity of seed, that when the flies have eaten all they can, there may be a sufficient number of plants remaining to insure a good crop. Another project is sowing a mixture of old and new seed, as the latter is known to come up sooner than the former, one or other of which may happen to escape.

After the turnips are up, if the flies appear in plenty, it is advisable to pass a smooth roller over them. If the roller be drawn carefully by hand, or even by a horse, turning the roller about on the head lands only, the operation may be performed without hurting the turnips; and the flies will mostly be crushed by the roller. This operation should be performed in a dewy morning, when the flies are so stiff that they cannot make their escape.

Or, instead of this, I am confident that the sifting of foot over the turnip ground in a dewy morning will be effectual; at the same time that it will answer as a

slight top dressing, and increase the growth of the plants.

Some writers assert, that only drawing a green bush of elder over the young plants will save them from the fly. I think it may have some tendency towards it; but I have never made the experiment. An infusion of elder, applied by sprinkling, would probably have a greater effect. But I should expect more from an infusion of tobacco.

Some set plants of tobacco thinly in their turnip ground, thinking that the scent of them does something towards repelling the fly. I have no objection to this, excepting that a much richer ground is requisite for tobacco than for turnips, in our climate.

Some attempt to clear a turnip ground from flies, by making smokes on the head lands around it, or chiefly on the windward side.

The red worm is another enemy to the farmer. This insect is slender, and usually about an inch long, with a hard coat, and a pointed head. It eats off wheat, barley and oats, above the crown of the roots. It perforates, or bores quite through bulbous roots, turnips, potatoes, &c. My turnips for several years, which were sown in the spring, have been thus almost ruined, though on a soil that suited them. When a turnip is once wounded by them, it grows no bigger, unless it be in ill shapes, and hard excrescences, and becomes totally unfit for the table. As to potatoes, I have seldom known them do much hurt, unless when they were planted in a soil that did not suit them, particularly in a clay. It is easier to say what will not stop those borers, than what will do it. I have manured with sea mud; applied dry salt

to the soil after the plants were up; mingled dry salt with the seed when it was sowed; steeped the seeds in brine before sowing, and coated them with sulphur; but all in vain.

I suppose the burning of a stubble as it stands would destroy all the worms that happened to be very near to the surface. A certain English writer thinks that a perfect summer fallow would destroy them, partly by exposing some of them to the heat of the sun at each ploughing, and partly by depriving them of food.

I should think ploughing late in autumn might destroy many of them, by exposing them to the most violent action of the frost. Or in a garden, throwing up the soil in ridges with the spade, so to lie during the winter, would have a good effect. Liming plentifully, if it could be afforded, I should rely upon as a most effectual antidote to this, and several other kinds of insects. The *Complete Farmer* mentions lime and soot as good antidotes to this insect in particular.

The garden flea is a minute fly that eats cabbages, and other plants of the *brassica* kind, while they are in seed leaf. They are of a very dark colour, or nearly black.

I once applied some clefts of the stems of green elder to some drills of young cabbages, which this fly had begun to eat, and could not find that they eat any afterwards. But as I made this trial but once, I dare not positively assert its efficacy. I would heartily recommend the trial of bitter steeps to gardeners who are troubled with this insect. They are earlier in gardens than any other insect; and I have never known them fail to appear in a dry spring.

Lice, an insect in the shape of mites, but larger, and of the colour of the plants; which eat and destroy cabbages, french turnips, mustard, &c. They adhere so strongly to the plants that rains and storms will scarcely beat many of them off; and their bodies are so unctuous that water will not soon wet them. Salt manures do not prevent their appearance. I have often sprinkled them with a strong infusion of tobacco, which does but partly conquer them. The smoke of tobacco I have tried with no greater success; and urine I have found to have little effect on them. But branches of elder laid on the plants seemed to have a great effect this summer, 1787.

I have never been able to find any better remedy before, than to take away those parts of plants which are almost covered with them, and wipe off those which are scattering. But when they have taken possession of the centre of a plant, it is difficult, if possible, to preserve it by wiping, as the young leaves are too tender, and too much crumpled, to admit of being cleared of the insects by this method. The whole plant in this case should be removed out of the way. Frost kills these insects.

There is a kind of black lice, which ascend the trunks of apple trees about the middle of May, and afterwards appear on the small branches, changed to the colour of the bark, and strongly adhering to it. I know of no better way to deal with these insects than to rub them off.

Sometimes the leaves of trees will appear dead in the latter part of the summer, and drawn together with filaments of the appearance of cobweb. The eggs of future caterpillars are enclosed

with these leaves. These branches should therefore be taken off and burnt; not suffered to continue through the winter.

Maggots. I have often found a white maggot, of the shape and size of those in cheese, preying upon the roots of young cabbages, turnips, and raddishes. My raddishes, when sown early, seldom escape; those that are sown in June mostly prosper.

A person in my neighbourhood, who has often been defeated by these insects, in his attempts to raise cabbages, declares, that last spring, as usual, the maggots attacked his cabbages before he transplanted them; and that, having a scarcity of plants, he transplanted, on the same spot where they used to fail, some which had maggots in their roots among sound plants: That as soon as he had done transplanting, he watered them plentifully with sea water: That the watering was not repeated; but the maggots did no damage at all; and that his crop was very large and good. Some that were left without watering were destroyed, as before, by the maggots.

I have since tried this experiment, with a good effect. Very few of the cabbages were touched by the maggots. But I find there is danger in applying the sea water plentifully, unless it be in a wet season. The plants are in danger, when the ground is dry, of imbibing too much of the salt. In this case their growth is greatly obstructed.

Though I have conceived that it would kill all sorts of plants, to pour sea water upon them, the cabbage, having an oily surface to which water does not easily adhere, is perhaps an exception. The farmers who are remote from the sea cannot apply sea

water to their cabbages, without too much expense of carriage. But they can afford to water their plants with a brine of equal saltiness. I wish them to make the experiment, not only on cabbages, but on raddishes, &c. It is safe to apply salt water in a wet season, or just after a rain.

The Hessian fly, so called, is an insect that is pernicious to wheat, while it is growing. It made its appearance in the time of the late war, in the vicinity of Newyork, and is supposed to have been imported with the German troops. From thence it has spread into Connecticut and Newjersey, laying waste whole fields in its course. A more formidable insect has scarcely ever appeared in the country.

But against this enemy it seems an easy antidote has been already discovered. A letter, signed *D. Wadsworth*, which has lately been published in the newspapers, communicates a method of preventing its depredations, which the writer says he has seen used with effect. It is only steeping the seed before sowing for twelve hours in a strong infusion of the leaves of elder.

In the latest edition of *Dr. Morse's Geography*, there is an account, that yellow bearded wheat, sown late in autumn, escaped the Hessian fly.

The palmer worm, a wanderer, as its name signifies. This is a small worm, about half an inch in length, with many legs, and extremely nimble. It appears at different times in different parts of the country. I have seen them only on apple trees and oak trees, in any great abundance. They give trees the same appearance that the canker worm does. They appeared in the county of Cumberland in the year 1791, about the

the middle of June, eating off the covering of the leaves on both sides, and leaving the membranous part entire. The following year there were none to be seen; and I have not known them in any place two years in succession. The seeds of them may be constant, wanting only a particular state of the weather to produce them. The spring which preceded their appearance had been remarkably dry, both in April and May. The history of this insect is so little known, that I will not undertake to say how they may be successfully opposed. I made smokes under the fruit trees, without any apparent effect. As they let themselves down by threads, they may be thinned by shaking the trees, and striking off the threads. Their ravages had not any lasting effect: For the orchards that had been visited by them bore plentifully the following year.

Weevil, an insect injurious to corn in granaries. Shutting up an apartment and filling it with the smoke of burning sulphur will destroy them. But the smoke should be continued as much as twelve hours. Grain may be cleared of them by sifting, in a sieve so made that the insects will pass through, and the grain stay behind. *See the article Weevil.*

The timber worms should also be mentioned. These are of two kinds. The smaller kind eats only the sappy parts of the wood, turning it to what is vulgarly called *powder post*. To prevent damage from this insect, nothing more is necessary than to fell the timber in December or January, in which months it is sure to be free from sap. When it is necessary to fell trees that are full of sap, something should be done to divest it of the sap, or alter the

quality of this juice. Soaking it, even in fresh water, will be of some service. But in salt water, soaking will be quite effectual, against most kinds of worms.

The large boring worm is far more mischievous than the one I have mentioned; and no season of felling secures timber wholly from this insect. They make the greatest havock in pine. They are hatched in the cavities of the bark, and being small when they enter the wood, they grow larger as they proceed, till their boring may be heard, like the cutting of an augur, to a considerable distance. They proceed to eat the wood in every direction, till they become as large as one's finger, or till the juice of the wood, being altered, is unfit to nourish them any longer.

Steeping the wood seasonably in salt water destroys the worms, or prevents their entering the wood. If the trees be scorched in a light flame, before they have entered too far, the effect will be the same.

To prevent and cure worms in timber, Mr. Evelyn recommends the following, as much approved. "Put common sulphur into a cucurbit, with as much aquafortis as will cover it three fingers deep; distil it to a dryness, which is performed by two or three rectifications. Lay the sulphur that remains at bottom on a marble, or put it in a glass, and it will dissolve into an oil; with this oil anoint the timber which is infested with worms."

Besides the destructive insects which appear more or less every year, there appear sometimes formidable swarms, or armies of worms, which suffer scarcely any green thing to escape them. They overran many parts of the county of Cumberland; in the

1770, rather before the middle of July, to the extreme consernation, as well as the great injury of the inhabitants. They stripped the corn and grass of the leaves, leaving only the bare stems, and those deprived of their sap. They were extremely voracious; and appearing to be in the utmost haste, they all moved in the same direction. They suffered nothing that they could climb upon to stop their course. They crawled over houses, and all other buildings, unless when they found a door, window, or chink in their course, where they could enter. Whether they passed in this manner over the plants they destroyed I did not take notice.

Between twenty and thirty years ago the same dreadful insect appeared in the county of Essex; and between 1770 and 1780, in some places in the territory of Vermont.

The only ways of opposing their ravages that have been used, are, either to mow a field of grass, whether it were fully grown, and fit to cut, or not; or, to fence against them with narrow trenches, made perpendicular, or rather hanging over, on the side next to the field. Many fields of corn have been thus saved; and bushels of the worms being unable to climb such crumbling walls died in the trenches.

If their history were attended to, perhaps it would be found they have stated periods.

It is not sufficient for the farmer to defend his vegetables against insects. There are insects also that annoy and hurt his animals.

Lice are often found on colts, and on neat cattle, especially on yearlings in the spring. When these animals become poor, they

most commonly grow lousy, which makes them still poorer. Possibly it may be owing to an obstruction of perspiration. For there are doubtless many oily particles in the effluvia of healthy cattle, and oil is an antidote to this insect. Oiling their skins will clear them of lice; so will a strong infusion of tobacco. But when they are cured, better feeding is the best preservative from the return of the insects.

The tick, or tike, is the sheep louse. When these insects become numerous, they are very hurtful to the sheep. In England, the farmer smears his sheep, after shearing, with a mixture of butter and tar. This fortifies them against being injured, either by the weather, or by insects. But at any time, oil, or tobacco, will destroy the ticks.

INTERVAL, the space between two places, or things. The word is used in husbandry to denote the space between rows of corn, or other vegetables; especially in the horse hoeing husbandry.

By interval, also, and more usually in this country, is understood land on the border of a river. Interval land is commonly so high and dry as to be fit for tillage; and yet always so low as to be frequently overflowed by the swelling of rivers, especially in the spring. On some of these lands the water often continues so late in the spring that they cannot be seeded till June. But the increased fruitfulness of the soil seems to more than make up for this delay. For when the waters subside, they leave a fat slime upon the soil, most friendly to vegetation.

The soil on these intervals is most commonly sand, with a large mixture of the finest vegetable

table mould ; and much of it is made, from time to time, by the shifting of the channels of rivers.

This sort of land has generally been prized highly in this country. But in some places it has become less fruitful of late than formerly. The reason of this alteration most probably is, that the floods are not so great as, or that they subside quicker than formerly ; owing to the more cultivated state of the country, and a quicker evaporation of the waters.

K.

KALE, Colewort, an excellent potherb, early, and of quick growth, which ought to be cultivated in this country.

KALENDAR, an account of time. That great naturalist, Dr. Linnæus, did not approve of farmers' confining themselves to certain set days, or weeks, for committing their seeds to the earth. The seasons are much forwarder in some years than in others. Therefore, he who thus governs himself, will assuredly sow his annual seeds sometimes too early, and sometimes too late.

That a better practice might be introduced, he recommended it to his countrymen to take notice at what times the trees unfold their leaves. Nature is so uniform in her operations, that the forwardness of trees is an unfailing indication of the forwardness of the spring. And the genial warmth, which causes trees and shrubs to put forth their leaves, will be sufficient to cause seeds to vegetate.

In order to reduce to practice so ingenious a hint, an account should be made out of the first leafing, and I may add, the blossoming of a variety of trees and shrubs. I suppose trees and

shrubs to be most suitable for this purpose, as they are more deeply rooted, and therefore more steady and uniform in their appearances, than any plants which are perennial only in their roots. They are especially much more so than annuals.

It is certain that such an account taken in one place will not answer alike for every part of the country ; because the vegetation in every part is not equally forward. Therefore, I would earnestly recommend, that in each degree of latitude, throughout Newengland at least, some attentive naturalist would make a list of a considerable number of trees and shrubs, which are common, and near at hand ; carefully watch their appearances, and minute the times of the first opening of their leaves, and also of their blossoming. By comparing the accounts, the absurdity will immediately appear, of sowing the same kind of seeds at the same time of the month or year, in the 42d, 43d, 44th, and 45th degrees of latitude. This is a matter that farmers ought to attend to ; that so those who remove from one degree of latitude to another, may not be confounded concerning the true times of sowing, on supposition that they have been once in the right practice. The right in one place will be wrong in another.

When these accounts are obtained, let trials be made, by sowing a certain kind of seed before, at, and after the foliation, or the flowering of some particular plant, and the produce compared. Let accurate experiments of this kind be yearly repeated, with all the most useful spring plants ; by this, in a few years, complete kalendars may be obtained for every degree of latitude

tude in this country. The consequence will be, that the farmer will be able infallibly to read the true times of sowing, by casting his eye upon the trees and shrubs that are about him. We have already such a rule as this, with respect to Indian corn; but it perhaps ought to undergo a further examination.

But such rules, after all that can be done, must not govern us invariably. The right times of feeding admit of some latitude, on account of the degree of dryness of the soil, and of its exposure to the solar warmth. Land should have the right degree of moisture when seeds are sown on it; and a southern exposure will afford an earlier vegetation than a northern.

That I may set an example of what I have been recommending, and begin the needful work, here follows an account of the leafing and blossoming of trees and shrubs in that part of Newengland which lies in the 44th degree of latitude, in the spring of the year 1789.

	Leafing.		Blossoming.
Goosebery,	April 16		May 12
English Willow	28		
Wild red Cherry	29	- -	19
Lilac - - -	30		
Currant	May 1	- -	9
Alder - - -	- -	5	
Apple Tree - - -	- -	6 -	25
Thorn Bush - - -	- -	7	
White Birch - - -	- -	8	
White Maple - - -	- -	9	
Beech - - - -	- -	10	
Plum Trees - - -	- -	12	
Hazle - - - -	- -	14	
Elm - - - - -	- -	15	
Summer Pear - - -	- -	17 -	31
Wheat Plum - - -	- -	- -	19
Common red Cherry	19	- -	20
Damascene Plum - - -	- -	- -	22
Grey Oak	20		
White Oak	23		

KALI, *Salicornia*, glass wort, or rock weed, a sea plant which grows upon rocks near the shore. By burning of this weed a hard fixed salt is obtained, which is a principal ingredient in the composition of glass. Rock weed is also an important manure.

KALMIA, *angustifolia*, a shrub commonly called laurel, or lamb poison. It is an evergreen, with narrow leaves of a dirty green colour. The flowers are red, growing round the upper part of the stem. It grows plentifully in low flat land, which has never been ploughed. It indicates a cold soil.

But I mention it in a work of this kind, on account of its poisonous quality. Sheep and goats, especially young lambs and kids, will eat it, when compelled by hunger, by which they sicken and die. The way to cure them of this sickness, is drenching them repeatedly with milk, mixed with oil, or fresh butter. Or, a tea of rue, given in season, may have the same good effect.

KID, the young of a goat. See *Goat*.

KILLING, *of beasts*. As several of the tame kinds of animals are, by divine leave, used as the food of man, it is requisite to deprive them of their lives by violence. This may well be accounted a disagreeable operation, as it is apt to hurt the feelings of tender hearted people, who have not accustomed themselves to it.

Mercy, which ought to be extended to beasts, and even to the meanest animals, pleads that their lives should be taken in a way which is least painful. The speediest method is therefore in general to be preferred. The usual method of stunning neat cattle by a blow on the head is laudable,

laudable, as they have probably no sense of pain after it. But for one to knock down a beast while another is holding him, is not without danger to the holder; and such a practice ought not to be continued. Instead of this, the beast should be tied, and in such a manner that he cannot escape, nor cause the blow to be misplaced by starting. Thrusting the pointed knife into the heart of a hog, if it can be done without erring, is nearly the same, as he expires in a few seconds. But who can approve of the barbarous practice, of hanging up calves alive by the heels? Or of carrying them to the butcher on horses in a posture still more uneasy? Decapitation with a single stroke is a good method of killing sheep, lambs, and calves. Some will object that it is not cleanly; but greater cleanliness will not atone for cruelty. It should be remembered that no death can be more instantaneous than beheading; therefore none less painful.

For our own advantage, care should be taken that the blood be entirely discharged; and beheading is favourable to this design. Blood is not wholesome food; one reason perhaps why it was anciently forbidden by divine authority; and the lawfulness of eating it seems disputable among christians.

The time of killing beef is to be regulated by the market, and the advantage and convenience of the farmer. And the same things must fix the time, if he sells them to the butchers. Beef that is only grass fed must be killed as early as the beginning of November; because after this time, grass will not increase the fatness of cattle. This may be afforded at the lowest price, per-

haps 2½ pence per lb, without loss. Cattle that are fatted till December must have, besides grass or hay, corn or juicy vegetables, or both, to increase their fatness. The price of beef therefore ought to be higher, by about two farthings. If not killed till January, the price should continue rising, at least in the same proportion; and so on, till the time of fatting by grazing returns.

KILN, a fabrick for admitting heat, to dry or burn various things. Malt is dried on a kiln. Another sort of kilns is used for the burning of lime stone. A lime kiln should be constructed of a sort of stones which will endure the fire. But if such cannot be easily obtained, hard burnt bricks will answer, and last a good while. The shape of a lime kiln should be like that of a pitcher, widest in the middle, and gradually narrower to the top and bottom. The fire will be the more confined, and act the more powerfully. In countries where lime stone is plenty, each considerable farmer is furnished with a lime kiln, in which he makes lime to manure his soil. This practice might doubtless be imitated with advantage, in a few places in this country, where this sort of stone is at hand.

KINE. See the article *Cow*.

KITCHEN GARDEN, a garden to produce vegetables for the kitchen. Mr. Miller says, "A kitchen garden is almost as necessary to a country seat, as a kitchen to the house: For without one there is no way of being supplied with a great part of necessary food. Whoever proposes to reside in the country, should be careful to make choice previously of a proper spot of ground for this purpose; because fruit trees and asparagus require
three

three years to grow, before any produce can be expected from them." The same writer recommends, "that this garden be near to the house, that so it may be the better attended to; that the soil be two feet deep, on account of raising parsnips, and other long rooted esculent plants; that it should have a good exposure to the sun; that no plants that require much depth of soil should be cultivated in the borders that are planted with trees, lest the roots of the trees be disturbed, or injured; that if the soil be too much inclined to wetness, it should be laid drier by hollow drains. But he prefers a spot that is not naturally low and wet, as the fruits and herbs raised on dry ground are wholesomer, and better tasted."

These directions are excellent. But I cannot approve of the quantity of land he proposes to be laid out for a garden. Four or five acres I should think three or four times too much for almost any person in this country. Half an acre will be sufficient for almost any family, unless we except those who have independent fortunes, or can afford to keep two or three gardeners in pay. A small one well tended, will be more profitable than a large one poorly cultivated. Every man may determine the size of his own garden by his ability and circumstances.

Dwarf trees are most suitable for the borders of small gardens; or it may be still better that trees should be in a garden by themselves. Too many of the falling leaves of trees are disagreeable in a garden, and their shade is no advantage to vegetation near them. But every one has a right to consult his own fancy in such matters. Where horticultural

neatness is meant to be preserved the plough must not be introduced, but the whole dug with spades, shovels or forks.

The breadth of the walks, that they may not offend the eye, should be proportionable to the largeness of the garden: The broadest should be lengthwise through the centre, and narrower ones round by the outside borders. A walk should be a little rounding, highest in the middle, for the sake of dryness. See the articles *Garden*, and *Gardening*.

L.

LAMBS, the young of sheep. The first care of them is to see whether they can come at the teat; and if not, to clip away the wool of the ewes which hinders them, as also all tags of wool on the udders of the ewes, which the lambs are liable to take hold of instead of the teats.

If a ewe refuse to let her lamb suck, she and her lamb should be shut up together in a close place, till she grow fond of him. For this purpose, some say that surprising a sheep with a dog will be effectual.

Care should be taken to feed the ewes plentifully after yeanning, and with some juicy kind of food, that so the lambs may not fail of having plenty of milk. The rams may be gelded at any time from one to three weeks old, if they appear to be well and strong.

They should not be weaned till they are six weeks, or two months old. At this age they should be taken from the ewes, and have the best of pasture during the first fortnight; by the end of which time they will be so naturalized to living wholly upon

upon grafs, that they may be turned into a poorer paffure.

The worft woolled lambs, and bad coloured ones, and thofe that are very fmall, fhould be deftined to the knife, and not weaned. So great is the need of increafing the manufacture of woollen in this country, that I muft earneftly recommend it to the farmers, not to kill, or fell for killing, any lamb, till it is near half a year old, or till the wool be come to fuch fulnefs of growth, as to be valuable for fpinning. To kill them earlier is fo wafteful a practice as to be inexcufable.

Thofe ewe lambs which are kept for flock, fhould not come at the rams : For if they have lambs at a year old, it ftints them in their growth ; and they have fo little milk, that their lambs commonly die for want of nourifhment. Or if they chance to live, they will be apt to be always fmall. This practice is one reafon why our breed of fheep in this country is fo poor. See the article *Sheep*.

LAMPAS, “ an excrefcence in the roof of the mouth, which hinders a horfe from feeding, and happens ufually to young horfes. It is cured by applying a hot iron made for that purpofe. It is fuccefffully performed in all parts ; fo that there is no need of any caution, but only that the farrier do not penetrate too deep, fo as to feale the thin bone that lies under the upper bars ; for that would be attended with very troublefome and dangerous fymptoms.” *Gibfon's Farriery*.

LAND, a general name applied to the furface of the earth, or to the ground.

LARCH, *Pinus larix*, “ a genus of trees, whofe leaves are long and narrow, produced out of little tubercles, in the form of

a painter's pencil. The cones are produced at remote diftances from the male flowers, on the fame tree : The male flowers are very like fmall cones at their firft appearance, but afterwards fretch out in length. In autumn they caft their leaves. From the wounded bark of this tree exudes the pureft Venice turpentine.” *Complete Farmer*.

A fort of trees which grow naturally, and in great plenty, in the northern parts of Newengland, called juniper, I take to be the true larch, as it answers to the above defcription, as well as to that given by Mr. Miller. They thrive beft in poor, wet and cold foils, and fhould by all means be cultivated. This is eafily done by fowing the feeds which are found in their cones. The trees are an excellent timber for fome ufes. They are commonly ufed as pofts for fences, and are faid to be more durable than almoft any other timber, when fo ufed. But for rails in fences, or any work that is expofed to the weather, this timber will laft a long time.

LAYERS, tender twigs buried in earth, which having ftruck root, are afterwards cut off, and become diftinct plants.

Potatoes, and many other herbaceous plants, may be in this manner propagated. But there is little advantage to be gained by doing it.

As to thofe trees and fhubs which yield no feed in this climate, neither can be propagated by cuttings, there may be often occafion for laying them. The manner of doing it is as follows : Take fhoots of the laft year's growth, bend them to the earth, and bury them in good mellow foil half a foot under the furface, and faften them with hooks to prevent

prevent their rising, bending the tops so as to bring them above the surface. A slit upwards in the twig should be made in the part that lies deepest in the soil, or a wire drawn fast round it, to prevent the sap mounting too fast; and moss should be laid on the surface, to prevent the sudden drying of the mould. Afterwards they should be watered as there may be occasion. If they form roots, they may be cut off, and transplanted the next spring into the nursery.

The time for laying evergreens is July or August; for laying deciduous trees, October.

LAYLAND, or LEYLAND, or LAYS, fallow ground, or that which lies untilld.

LEAVES, the most extreme parts of the branches of trees, shrubs, &c.—“ Their office is to subtilize the nourishing sap, and convey it to the little buds, and to cover and defend the flowers and fruit.

“ Dr. Grew observes, that the fibres of leaves consist of two general kinds of vessels, viz. for sap, and for air; and are ramified out of greater into less, as veins and arteries are in animals.

“ If the surfaces of the leaves are altered, by reversing the branches of trees on which they grow, the plants are stopped in their growth, until the foot stalks are turned, and the leaves recover their former position. If leaves are eaten, or cut off, the enclosed buds will not grow, and the plants will be weakened. The winter feeding of wheat, therefore, is hurtful; and it has been found so by experience.

“ Another principal use of the leaves, is to throw off by transpiration what is unnecessary to the growth of plants, answering to the discharge made by sweat

in animal bodies. As plants receive and transpire much more, in equal times, than large animals, so it appears how necessary the leaves are to preserve the plants in perfect health: For it has been found by the most exact calculation, made from repeated experiments, that a plant of the sunflower receives and perspires, in twenty four hours, seventeen times more than a man.” *Complete Farmer*.

Mr. Bonnet made many experiments, which proved that leaves imbibe the moisture of the atmosphere on their under surface; excepting such as have the upper surface covered with hairs, or down. The leaves undoubtedly serve for inspiration, as well as for transpiration; and plants draw through their leaves, some considerable part of their nourishment.

Leaves also serve for ornament, and to screen vegetables, and their fruits, from the too intense heat of the sun in summer.

Leaves of trees are useful as a manure, excepting those of the resinous kinds. They should be collected into farm yards, trampled by the cattle, and mixed with their excrements. Some recommend leaves of oak for hot beds, instead of tanner's bark, as, by fermenting more slowly, they afford a more regular and permanent heat. Dr. Hunter proved the advantage of them by his continued practice. See *Georgical Essays*, by A. Hunter.

LEES, the gross sediment in fermented liquors. Most kinds of lees contain much of the food of plants. But they should not be applied to the soil as a manure till their acidity is destroyed, by mixing and fermenting them with large proportions of alkalious substances, such as marle, lime,

lime, ashes, foot, &c. Even the pomace of cyder mills, which has hitherto been considered by our farmers as good for nothing, might be thus changed into a good manure. It is nearly the same substance as the lees of cyder. Cyder lees will also produce brandy by distillation.

LICE. See *Insects*.

LIME, a crumbly soft substance, made by burning stones, and the shells of shell fish, and slacking them with water.

Lime has been proved, by the long experience of European farmers, to be one of the most efficacious manures. This may be thought strange by those who know it to be a mere alkali, containing neither oil nor salt, which are certainly the principal ingredients in the food of plants. Oil is an indispensably necessary part of this food.

But, by experiments made of late, it has been clearly proved that plants are greatly nourished by fixed air, of which it is known that lime contains a large quantity. It has been proved by the experiments of Mr. Lavifier, that one third part of calcareous earths, and particularly of lime stone, consists of fixed air.

But besides affording to plants this nourishment, which is known to be in plants, lime acts as a manure, by attracting and imbibing the oils and acids which are contained in the earth and atmosphere. It not only collects these ingredients of vegetable food, but so alters them as to fit them to enter the roots of plants. With the acids it forms a salt, which, by mixing with the oils, becomes a saponaceous mucilage, which is the true pabulum for the nourishment of plants.

These changes cannot be made in the ingredients of which veg-

table food is composed, without² considerable degree of fermentation. This fermentation breaks and mellows the soil, and so increases the pasture of plants, that the roots can more freely extend themselves in quest of their food. Accordingly it is found that liming renders a soil very soft and open.

And as lime, when it is slacked, is a very soft substance, I can see no reason to doubt of its containing a very considerable quantity of those impalpably small particles of earth which enter into plants, and become part of their substance. If so, it must be allowed that lime is fit to answer every intention of manure. It either has all the ingredients of vegetable food, or produces and prepares them, though not in the same proportions as dung, which is allowed to be the most valuable of all manures.

Lime has been complained of, as impoverishing the soil; and it has been often remarked, that though one dressing will produce several good crops, the land is less fruitful for some time after, than before it has been limed; and that a second dressing with lime, will not have such an effect as the first, in increasing the fertility of the soil. But the farmer should consider how far he has been recompensed by extraordinary crops, for the exhausting of his soil; and that if lime will not, other manures will recruit it. So will fallowing, rest, or using it as a pasture.

It is granted that lime may have an ill effect, when it is injudiciously applied, as in too great quantities, or to an improper soil. Three cart loads, or 120 bushels, are allowed to be a sufficient dressing for an acre. But in Ireland,

Ireland, where they plough extremely deep, they lay on twice as much. This dressing enriches cold, stiff and clayey soils, for many years after; and in such soils it may be safely repeated. If it force any soils too much, it can be only those which are weak and sandy.

The best time for applying lime as a manure is, when land is newly broken up, or after lying a long time in grass. This may be ascribed to the plenty of roots in the soil, which the lime soon dissolves, and changes into food for plants.

Mr. Evelyn advised to the mixing of lime with turf in alternate layers, to lie in heaps for months; in which time it will become so rich and mellow as to run like ashes. He thought it would nourish the soil more than if used alone in a greater quantity, and without any danger of exhausting the vegetative virtue of the earth, which should be preserved. If it were mixed with a large proportion of clay, or with mud from the bottom of ponds or rivers, it might be applied even to sandy and gravelly soils without danger, and to great advantage.

Lime is a very important ingredient in composts, as by raising a strong fermentation it dissolves and prepares the other materials. There should be some layers of it, where it can be easily obtained, in every heap of compost. It will be the sooner fit for use, as well as prove to be a more fertilizing composition.

When lime is laid on land which has a quick descent, it should be always mixed with dung, and laid on the highest part; because it so loosens the soil, as to dispose it to be plentifully washed downwards by rains, soil and manure together.

Lime is an excellent manure for soils that are mossy, as it speedily dissolves the oil which is contained in moss, which is not soon dissolved by other manures, and changes it to vegetable food. It destroys all aquatick weeds, and dissolves the remainders of decayed vegetables in the soil. Therefore it does well in moory and peaty swamps that are drained.

While I am treating on this excellent manure, I have the disagreeable reflection, that it will be to little purpose; as lime is so scarce and dear in most parts of the country, that it must not be used as manure. Most people can scarcely obtain a sufficient quantity of it for building. But those farmers who know they have lime stone or shells in plenty near them, should not neglect to make use of them as manures, after reducing them to lime.

LIME STONE, a stone of a calcarious nature, which, by calcination, or burning in the fire, becomes lime. There are many kinds of lime stone; the hardest kinds make the best lime, and require the most burning. Chalk will burn into lime, of the nature of stone lime, but a great deal weaker; lime may be made of marble and alabaster, &c. But the stones used for lime are mostly of a bluish colour, or inclining to grey. They are sometimes purely calcarious, but often mixed with undissolvable stones, which lessen their value.

Some countries are very plentifully furnished with these stones, Great Britain and Ireland in particular. It is strange they have been found in so few places in Newengland. It has probably been owing to want of attention. An infallible way to distinguish them is, by dropping
upon

upon them a few drops of aqua fortis, spirit of sea salt, or oil of vitriol. All those stones, on which these, or any other strong acids, effervesce, or rise into bubbles, are lime stones, and will burn into lime.

It is greatly to be wished, that some persons in the various parts of this country, would be furnished with one or other of these acids, and make frequent trials with them. They who are not furnished with the proper acids, may prove stones, by burning them for some days in a smith's fire, and then throwing them into water. Possibly we may find the benevolent Author of nature has not left us so unfurnished with these valuable stones, as we have been ready to imagine.

LOAM, one of the principal kinds of earth. Some suppose it to be not one of the natural soils; but gradually made since the creation, by the putrefied vegetables which have fallen upon the earth. This does not appear probable; for, if so, why do we meet with any other kind of soil? This soil consists of very fine particles, without grit, almost as fine as those of clay, but do not cohere like them. If it lie long under water, it is apt to have the appearance of clay. It receives water readily, and retains it long; on which accounts it is preferable to clay or sand. It is better adapted by nature to nourish vegetables than either the one or the other. But it needs manure, and will commonly pay well for it by the increase of its crops.

Loams are of various kinds. Some is stiff, approaching to the nature of clay, and is apt to be adhesive in wet weather. This is not fit for the nourishing of those vegetables which require much

heat. It needs to be dressed with hot and opening manures for any kind of crop. Other loam is more light, soft and mellow, and does not so much need the most heating manures. Some loam is of a dark red, hazely, or brown colour. This is commonly a most excellent soil. Other loam is of a light yellow, or whitish colour, and requires abundance of manuring to render it fruitful.

All kinds of loam are apt to be too wet, and to be covered with a short green moss, if they lie flat. In this case, ridge ploughing is best, and hollow drains often necessary. Loam that has a mixture of gravel, or sand, is warmer, and fitter for tillage; but all loams are good for the growing of grasses.

LOCUST TREE, *Robinia*, a well known tree, which grows in great plenty in the vicinity of Boston, and is a native of this country, but does not flourish so well in the Province of Maine, as the frost of winter is apt to kill the extremities of the limbs. There are particular places, however, in this district, where the growth of this tree is considerably rapid.

This tree would be more prized for its beauty, were not its limbs often broken by high winds. Its leaves put out late in the spring, and fall off early in autumn. It blossoms about the beginning of June, at which time it makes a beautiful appearance, and perfumes the circumambient air with an agreeable odour. The branches are armed with hooked spines; and the leaves composed of ten pair of oval lobes, terminated with an odd one.

The wood is not only good fuel, but excellent timber, very durable

rable in any situation, and particularly when used as posts in fences.

This tree grows best in a sandy soil, and will propagate itself in the most barren places, where the soil is so light as to be blown away by winds. By sheltering such places, and dropping its leaves on them, it causes a sward to grow over them, and grass to grow upon them. It is not advisable to plant groves of the locust tree on the borders of fields, on account of their spreading too much by scattering their seeds, unless on those which are most barren. But those who possess hills of barren sand, and in a climate that suits them, should not delay to make forests of these trees on such spots. It may be easily done by sowing the seeds in a nursery, and transplanting them. A plenty of wood may be thus speedily produced, without the least injury to the land, yea, with advantage to it.

It is much to be regretted, that of late years a worm has destroyed many of the trees, by eating and boring them through the trunks and limbs. Perhaps it will be found that quicksilver is an antidote to these insects.

LUCERN, *medicago*; a plant with a perennial root, and an annual top. The blossoms are of the butterfly kind, of a fine purple colour, growing upon spikes from two to three inches long. The seeds are kidney shaped, and contained in pods.

This plant is supposed to have been brought from Media, whence the names *medicago* and *medica*. It has long been profitably cultivated in France, more in the southern than northern parts of that country, where they call it Burgundy hay.

It loves a soil moderately rich, and not very dry. It is tender while young, and must be culti-

vated with care; afterwards it grows more hardy. No other plants, nor weeds, should be suffered to grow with it. The most approved method of cultivating it is by transplanting it in rows. It grows so fast that six crops of hay may be cut from it in one year.

After each cutting, the weeds should be killed, and the ground stirred with the ditch hoe. It should be cut a good while before the time of its blossoming. The leaves and stems are so juicy, that they require abundance of drying, to make them into hay. The best use it can be put to is, to cut it and give it green to cattle and horses. It is a very sweet and fattening food for them; and some say it will cure them, when they happen to be sick. Three acres of lucern, in England, has yielded so much as to feed ten working horses from the end of April to the first of October, in which time they would have eaten 20 tons of hay. Mr. Roque says it has yielded him at the rate of eight tons of hay per acre. And M. Duhamel had 40 tons green from an acre, equal to ten tons of hay. Volumes have been written on the virtues and advantages of this plant. But, from repeated trials, it appears that our winter frosts destroy it. I have been informed that it prospers well in Virginia. In that and the more southern states greater attention than hitherto has been, ought to be paid to its cultivation.

LUPINES, a species of wild pea, cultivated principally for a green dressing. They will grow well in almost any soil; especially in that which is dry, sandy and poor.

The red and blue lupines, which are cultivated in gardens, are

are said to grow wild in great plenty in Spain.

LYE, or *lie*, a fluid impregnated with salts.

M.

MALANDERS, a horse disease, caused by corrupt blood, or over hard labour, &c. It consists of chops, or cracks, on the inside of the fore legs against the knee, discharging a red sharp humour.

To cure this disease, wash the cracks with warm soap suds or old urine; then rub them twice a day with an ointment of hog's lard mixed with two drachms of sublimate mercury. Or apply a poultice of the roots of marsh mallows and flax seed, softened with linseed oil, tying it on with a roller. Continue that till the seeds fall off and the sores become clean. Afterwards a mixture of turpentine and quicksilver will be a proper application.

MALT, barley, or other corn, prepared for making beer or ale. As it is of great importance that the people of this country should make a greater use of malt than they do at present, I will here give the process of making it, from the *Dictionary of Arts and Sciences*:

"In making malt from barley, the usual method is to steep the grain in a sufficient quantity of water, for two or three days, till it swells, becomes plump, somewhat tender, and tinges the water of a bright brown, or reddish colour. Then, this water being drained away, the barley is removed from the steeping cistern to the floor, where it is thrown into what is called the wet couch; that is, an even heap, rising to the height of about two feet. In this wet couch, the capital part of the operation is per-

formed; for here the barley spontaneously heats, and begins to grow, shooting out first the radicle, then the plume, spire or blade. But the process is to be stopped short at the irruption of the radicle, otherwise the malt would be spoiled. In order to stop it, they spread the wet couch thin over a large floor, and keep turning it once in four or five hours, for the space of two days, laying it somewhat thicker each time. After this it is again thrown into a large heap, and there suffered to grow sensibly hot to the hand, as it usually will in twenty or thirty hours: Then being spread again, and cooled, it is thrown upon the kiln, to be dried crisp without scorching. If these directions be followed, the malt will always be good.

"The method of malting Indian corn, or Virginia wheat, is much less laborious. For, if this corn be buried two or three inches deep in the earth, and covered with the loose mould, in ten or twelve days time the corn will sprout, and appear like a green field; at which time being taken up, and washed or fanned from the dirt, it is immediately committed to the kiln, and by this means becomes good malt."

MALTDUST, the dust which falls from the kiln, while malt is drying. Repeated experiments made by Europeans, have established the credit of this dust as a manure for stiff loams and clays. A good dressing of it has been found to increase a crop of barley as much as fifty per cent. and wheat still more. The quantity used is from thirty to sixty bushels per acre, according to circumstances. It is used mostly, or only, as a top dressing. It exerts its strength so suddenly as to be nearly exhausted with one crop.

It should not be sown together with winter wheat, but upon it in December or January following : For if it be sown early, it will exert its strength too soon, and bring the wheat forward too fast, as has been proved by experiments. For barley, this dressing should be sown with the seed and harrowed in. A small dressing of this manure on grass land, mightily increases the vegetation, and the sweetness of the grass.

Maltsters should carefully preserve this precious manure in some place where it will not contract dampness. It may be of use to farmers in their neighbourhood : But it cannot become a manure of general use, the whole quantity that is made being so small.

MANURE, any kind of substance suitable to be laid on land to increase its fertility.

Manures contribute several ways to the producing of this effect : Either by increasing the quantity of vegetable food in the soil—or by preparing the nourishment already contained in the soil to enter the roots of plants—or by enlarging the vegetable pasture in which roots spread and seek their food—or by attracting the food of vegetables from the air. Some of the manures increase fruitfulness in all these ways, particularly the dung of animals, rotted vegetables, &c. Other manures perform each office, excepting the first : And some have no other immediate effect besides opening and loosening the soil : But even these last kinds may sometimes be used to great advantage.

There are different ways of ordering and managing manures, according to their different natures. Some are to be applied to land without alteration, or

mixing ; the rest to be prepared by compounding and fermentation : Some are suitable for stiff and some for light soils : Some to be mixed in the soil by the plough and harrow ; other kinds to be used only as top dressings.

Farmers and gardeners should not be so inattentive to their own interest, or that of their employers, as to suffer a variety of valuable manures to lie useless, while they are suffering for want of them. I have drawn up the following list for their benefit, hoping that such a variety, all of which can be had by one or other, in this country, and by most farmers in plenty, might excite the ambition of some to make use of their advantages, and suffer no manures to escape their attention.

The substances fit to be used as manures, are either animal, vegetable, fossil, or mixed.

Animal manures are such as these that follow :

Putrefied flesh, such as the carcasses of animals, or meat not well saved. This may be an ingredient in compost, or buried at the foot of fruit trees to increase their fruitfulness. Dead horses, dogs, cats, rats, and uneatable birds, should, instead of putrefying the air by rotting above ground, be thus converted to an economical purpose. When the carcasses of animals are buried in dunghills, it may be proper to lay over them some bushes of thorn, to prevent ravenous dogs from taking them away.

Blood, mixed with saw dust, and used as a top dressing, &c. See the article *Blood*.

Hair, a top dressing for grass land ; under the surface of a dry soil in tillage ; or used in compost. In either way it is an excellent fertilizer,

Feathers,

Feathers, such as have been worn out in beds, or are unfit to go into them—in compost.

Refuse wool, such coarse daglocks as are not fit for carding—covered with the plough in a dry soil. They will serve as sponges to retain moisture, and be a rich food for plants when they are dissolved. So will

Woollen rags, chopped to pieces, for a light soil. They should be cut as small as an inch square. Twenty four bushels are said to be a sufficient quantity for the dressing of an acre. These should be under the surface.

Hoofs of cattle, sheep, &c. If large hoofs were set in holes with the points downward in a dry soil, so low as not to be disturbed by the plough, they would cause the land to retain moisture, and hold the manure, not only by the sponginess of their substance, but also more especially by their hollowness.

Bones, of all kinds, pounded or broken into small pieces, with hammers or mallets. This is an incomparable manure, if they have not been burnt, nor boiled in soap. But in either way they should be saved for manure. Sixty bushels are a sufficient dressing for an acre.

Raw skins of all kinds of animals. These should be cut into small pieces, and used for light soils, ploughed in.

Leather, new or old, in small bits, for dry soils, ploughed in.

Curriers' shavings, cut small, for a soil of sand or gravel, ploughed in.

Oil, of all sorts, used in composts, not applied to the soil till a year after it is mixed, that it may be dissolved and altered.

Fish, of all kinds, from the whale to the muscle; they are best used in composts; and

should lie a year, that their oil may be dissolved, and fitted for the nourishing of plants.

Offal of fish, in composts, fit for one soil or another, according to the predominant ingredients of the mixture.

The vegetable manures are good, though not so strong as animal ones. They can be had in greater plenty in most places; and ought to be laid on in larger quantities.

Green vegetables, such as all the otherwise useless weeds in fields and gardens. These should be collected and rotted in heaps. They are a good manure for all soils, and to nourish all sorts of plants.

Aquatick weeds, such as grow in the borders of ponds and rivers. These should be collected in large heaps on the higher ground, and covered with turfs, the grass side outwards. These heaps will be easily made in some places, and will be a valuable manure. Some say, care should be taken to prevent their taking fire by fermenting, as their heat will be very great.

Straw; and other offal of corn of all kinds, rotted in farm yards, or dung pits.

Refuse hay, both fresh and salt, rotted in yards, and trampled on by cattle, and mixed with their excrements.

Thatch, that grows by the sides of salt creeks, or the parts of it which cattle will not eat, should be thrown into the farm yard, to putrefy. Thus a great increase of good manure may be made.

The haulm of all dry vegetables, such as the stalks of potatoes, beans, peas, &c. Even the offal of flax, if it have sufficient time to rot, will be a good manure.

Fern, a vegetable peculiarly adapted to the purpose of making manure. See *Fern*.

Lees of fermented liquors, rotten fruit, and pomace, in compost.

Oil cakes, which may be got at the mills where linseed oil is factured, for top dressing, being first pulverized.

Tanner's bark, from the oak tree,

Leaves of deciduous trees,

Rotten wood,

Saw dust,

Decayed ships,

Wood ashes, a good top dressing for almost any kind of soils, but best for a moist one.

Coal ashes, top dressing for cold damp soils.

Coal dust, top dressing for low meadows.

Malt dust. See that article.

Sea plants, rock weed, eel grafs, &c. are the most valuable of green vegetables for manure. They should be either ploughed into the soil, or mellowed in compost dunghills. It is a wrong practice to use them as top dressings. Much of their virtue in this way is lost.

Moss, mixed with dung in holes for a dry soil. Good for potatoes.

Linen rags; these will be a manure worth saving, but they take a long time to putrefy—in compost.

The fossil or earthy manures are these:

Lime, mixed with the soil, or in composts, for stiff soils. See the article *Lime*.

Marle, most suitable in general for light soils. See the article *Marle*.

Sand, in roads, washed down from hills, to open a stiff clayey soil. See the article *Sand*.

Plaster of Paris, and *Dust of hewn stones*, } Absorbent manures for cold wet soils, for top dressing.

Gravel, for a wet puffy swamp. *Clay*, to mix with the plough and harrow in a sandy or gravelly soil. It should be exposed to the action of the frost one winter before it is ploughed in. Otherwise it will remain a long time undissolved.

Swamp mud, *River mud*, *Pond mud*, *Sea mud*, } To be mixed with a sandy or gravelly soil; but best in composts, with dung. See the article *Mud*.

Ashes of sea coal—for cold stiff land.

Peat, when reduced to ashes, top dressing for all soils, best for a cold one. See *Peat*.

Turfs, either in composts, or dried and burnt. They may be taken from the sides of highways without damage. These places are the walks of cattle and swine, where much dung is dropped; the turf is therefore a rich ingredient in manure.

Shells of shell fish, ploughed in whole, are a good manure for dry soils; and ground or pounded small for stiff land.

Brick dust, } To open a clayey, *Burnt clay*, } or warm a cold soil.

Beach sand, to open a stiff, and warm a cold soil. That which has a fine grain is the best.

Pit sand, of any colour, to meliorate a soil of stiff clay. It should be laid on plentifully.

The mixed solid manures are these.

Dung of all kinds. Though it chiefly consists of rotten vegetables, there is a mixture of animal juices in it, and some of the finest particles of the earth. Most dungs should be mixed with the soil, by the plough or harrow. See the article *Dung*.

Composts of every kind, fit for light or stiff soils, according to the difference of their predominant

nant ingredients ; or a general manure for all soils.

The scrapings of back yards, for all kinds of soil, but when containing chips, shavings of wood, or much saw dust, for stiff soils.

Rubbish of old houses, for cold and stiff soils. This contains much nitre—in composts it is of most advantage.

Earth that has been long under cover. This commonly collects much nitre. Best in composts.

Scraping of streets, a general manure, fit for all soils. Farmers who live in the vicinity of cities, and great towns, should always avail themselves of this kind of manure.

Mixed liquid manures.

Old brine of salted meat or fish, which contains, besides salt, some blood, oil, &c.—in composts.

Sea water, which contains other things besides water and salt, fit to nourish vegetables. It may be sprinkled on land, or used in composts.

Soap suds—replete with a prepared food for plants ; excellent for watering gardens in dry weather. None of this should be lost. If the garden be distant, or wet, it may enrich the dunghill.

Urine of all animals that are mingent. This contains earth and animal juices, salts and oil ; and is, next to dung, perhaps the most valuable and important of all manures. See the article *Urine*.

Water in the hollows of farm yards. Instead of suffering this rich liquor to soak into the bowels of the earth, it should be taken up by mulch, or some absorbent substance thrown into it, or else carried out in a water cart, and sprinkled over a soil that needs it.

Water that runs from compost dunghills. This should be thrown back upon dunghills, or else used as the preceding article.

Liquors from die houses. This should be used in composts.

After all, I may add *Salt*, being distinct from all other manures, an important ingredient in the food of plants, and adapted to prepare other ingredients. Some apply it as it is, but it has a better effect when used in composts.

If our farmers in general would be persuaded to avail themselves of so many of these manures as fall in their way, or can be easily obtained, we should no longer hear so many dismal complaints as we do, of short crops, and worn out lands. The face of the country would soon be surprisngly improved.

But that manures may fully answer their intention, they must be judiciously applied. We should not only apply each manure to the soil for which it is most suitable, but at seasons when it will produce the most valuable effect. For a general rule, it is best to apply those rich fermenting manures, which are to be mixed in the soil, as near as may be to the time when the ground is seeded. Dung should be ploughed in with the seed furrow, as it is called. Composts may be harrowed in with the seed. The reason for applying these manures at this time is obvious. They will begin to raise a fermentation in the soil, almost as soon as they are applied ; so that if there be no seed, nor plants to be nourished by them, some part of the good effect of the manure will be lost. As part of the fermentation will be past, before the plants begin to grow ; so there may be danger of its being over,
before

before they have attained to their full growth. If so, the soil will harden, and the plants will receive the least quantity of nourishment at the time when they need the greatest.

As to those manures which raise little or no fermentation, they may be laid on at any time when the farmer has leisure for it, as sand on a clayey, gravel on a boggy and puffy soil; or clay, marle, or mud, on a light soil.

It has been too much practised in this country, to apply scanty dressings to lands in tillage, hardly sufficient to have a perceptible effect, and to repeat it year after year. But this, I think, is a wrong practice. A sufficient dressing once in two years, I have always found to do better than a half dressing each year. This last method does not so well agree with a succession of crops; because some crops require a much greater degree of strength in the soil than others do. Let us then rather follow the example of the European farmers, who commonly manure very plentifully once in a course of crops, and no more; and the year the manure is laid on, take a crop that requires the greatest assistance from manure, or that bears high manuring best, or makes the best returns for manure: Afterwards, crops that need less manure, till the end of the course. Perhaps the year of manuring in this country should be chiefly for Indian corn. This crop is not easily overdone with manure, and it pays well for high manuring. And this happens well for us, as a hoed crop, when the dung is used, will prevent the increase of weeds, which a plentiful dunging will greatly promote in every kind of soil.

MAPLE, *acer*, a tree. See *Sycamore*.

MARE, the female of a horse.

Breeding mares should be free from diseases; and have good eyes; because the colts are apt to inherit their distempers. They should be the strongest, best spirited, and well shaped; not of any bad colour. If any defects are dispensed with, the mare and the stallion should by no means have the same defects. In such case there can be but little prospect that the issue will be good. Some say they should not breed with stallions of the same blood. Crossing the breed is said to be of great consequence. Mares should not be suffered to breed till after four years old; and the best time for them to take horse is about the latter end of June, then they will not foal till the same part of the month of the following May, when the grass will be grown, which is better to make mares give milk than dry food is.

Mares that are with foal should be housed the earlier in the fall, and fed well till foaling. For the last month or two before foaling, they should not be ridden swiftly, nor be put to draw at all, nor to carry heavy burdens on their backs.

MARKING *of cattle*. As one man's cattle, horses, and sheep, have very often such a resemblance to those of another, that they cannot easily be distinguished; and as they often graze together on commons, or in common pastures, marks for these different animals have been found necessary.

I have known no other marking used for horses than branding with a hot iron, on the shoulder or thigh. As these marks are not ornamental, most persons choose that their horses should have no marks

marks, but natural ones, as they are called, such as particular spots on them of different colours, &c. In this case, these natural discriminations should be registered; because, in cases of dispute in law, no owner's word, who is a party, will be taken as evidence.

The marking of neat cattle on the horn, with the branding iron, is so easily done, and without giving them pain, and is so permanent, that it should never be neglected. The brand should be made nearer the point than the root of the horn, on the outside which is most exposed to view, and not very deep, especially on young cattle, which have thinner horns than older ones. Burning a horn through to the pith will hurt a creature, and will spoil the horn for certain uses afterwards.

The same kind of mark would be preferable for sheep, if they all had horns; as they have not, some other mark, alike suitable for all, should be used. Marking them on the wool is a bad practice. Some of the wool is spoiled and lost by it; and, at longest, it can last only to the next shearing; oftentimes not so long; and an uncertain mark is worse than none. The ear mark must be used, though the operation gives some pain to the animals. These marks may be distinct for a great number of flocks. And these marks should be matter of record.

MARLE, a fine fat kind of earth, but little coherent, and easily dissolved in water. It is allowed to be one of the richest of manures. It is of various colours in different places, grey, blue, brown, yellow, red, and mixed. It is distinguishable into three sorts, stone marle, clay marle, and slate marle. The first is hard, the second soft, the last

is found in thin lamina, like slate. Each kind, however, is of the same nature as the others.

Marle is said to have been found in several parts of this country. Possibly it may abound in all parts; if so, it may double the value of our lands when it comes to be in general use. People should make themselves acquainted with the nature and use of it, that they may be disposed to seek for it, and be able to distinguish it from all other earths.

It often bears so near a resemblance to clay, that the one may be easily mistaken for the other. That we may be able to distinguish these substances, we should remember, that marle is apt to break into little square bits, like dice; that when it is wetted, it has not the tenacity of clay; that after being exposed to the weather, it easily falls to pieces with a blow; that after lying on the surface for some time, it looks as if it were covered with white frost, or with a sprinkling of fine salt.

Marle effervesces with acids; but this effervescence does not distinguish it from other calcareous fossils.

It has been said that a most infallible way to distinguish marle from other earths, is, to drop a piece of dry marle, as big as a nutmeg, into a glass of clear water, where it will send up many sparkles to the surface of the water, and soon dissolve into a soft pap. But I have found that some clays exhibit nearly the same appearances.

Sometimes the beds of marle are near the surface, but they are oftener found deep in the earth.

It is sometimes found on the banks of ditches, by means of the rank growth of weeds and grass on it. Boring with a long

auger, or the screw borer, may discover where it is. Two kinds of marle were lately found at Penobscot in digging a well. Sometimes it is very dry and compact in the earth, but in some places almost liquid. Earths, thrown out of wells, if they have a clayey appearance, should always be examined.

Marles have been known to fertilize all kinds of soil, but light sandy ones more than any other. But as Dr. A. Hunter, by decomposing, has proved that marle consists of particles of lime stone, mixed with clay or sand, or both; according as either of these ingredients is more predominant in it, the soil will be indicated for which it is most suitable. That which contains the least proportion of clay will be proper manure for a stiff soil; being of the most absorbent kind; that which has the largest proportion of clay should be applied to a sandy soil. To discover the proportion of these substances in marles, the same ingenious writer advises as follows:

“ Having dried and powdered the marle to be examined, pour upon any given weight of it a small quantity of water. To this mixture, well shaken, add a little of the acid of sea salt, and when the consequent effervescence is over, add a little more. Repeat this addition at proper intervals, till no more effervescence ensues. Then throw the whole, with an equal or greater proportion of water, into a filter of grey paper, whose weight is known. When all the fluid parts have passed through, fill up the filter again and again, with warm water. By this means the dissolved particles of calcarious earth, adhering to the residue, or entangled in the pores of the paper,

will be washed away, and nothing but what is really unfoluble will remain in the filter. This *residuum*, with the filter, must be completely dried and weighed. Then the difference betwixt its weight and the original weight of the filter, gives you the weight of unfoluble parts contained in the marle under examination. This being known, the proportion of calcarious earth in the same marle is evident. The proportions of clay and sand in it are discovered by subjecting the *residuum* to a proper elutriation. This operation is very simple, and performed thus: Having weighed the dry residue, mix and shake it well with a sufficient quantity of water. After allowing a little time for the subsidence of the grosser parts, let the water, with the finest particles of clay suspended in it, be gently poured off. When this is done, add more water to the remainder, and after sufficient mixture and subsidence, pour off that likewise. In the same manner repeat the operation, again and again, till the water comes over perfectly pure. The substance which then remains is sand, mixed perhaps with some flakes of talc; and whatever this substance wants of the weight of the residue employed, is the weight of pure clay carried away by the water in the process of elutriation.” *Georgical Essays*.

If five parts in six prove to be calcarious in a piece of marle, the lime is predominant, and it is fit for the stiffer soils; if two thirds only be calcarious, and the rest clay, it is fit for a sandy soil, &c.

The calcarious part of marle does not produce so quick an effect as lime, when used as manure; because the latter is burnt, and

and flakes suddenly. This seems to be the true difference, which is not essential; because the calcareous part of marle gradually flakes in the earth without burning. Like lime, it attracts and imbibes the acids of the earth and air, forming a salt, which dissolves the oils, increases the pasture of plants, and prepares the food of plants to enter their roots.

The quantity of marle to be applied to an acre is about sixty loads. Some sandy soils may bear more of the clay marle; rich soils need not near so much, of the kind of marle which suits them.

Marle should be mellowed by the frost of one winter before it is buried in the soil; even in this case, it will not fertilize the soil so much the first year as afterwards. Some marles do not produce their full effect till the third year, as they dissolve slowly. Some say the good effect of one full dressing with marle will last thirty years.

As good soils may be overdone with this manure, it is better to err at first in laying on too little than too much. More may be added at any time. As the principal effects of marle are like those of lime, it is not to be expected that marling a second time will have so good an effect as the first. This observation is said to be confirmed by experience.

There is another sort of marle no less valuable than the former kind; and much used in old countries. It is composed chiefly of broken shells, which were undoubtedly once the shells of marine animals, mixed with a proportion of sand. It sometimes also contains a mixture of moss and decayed wood.

This marle is usually found under moss, or peat, in low funk-

en parts of the earth; and especially those which are nigh to the sea, or considerable rivers. Mr. Mills says, "Whoever finds this marle finds a mine of great value. It is one of the best and most general manures in nature; proper for all soils, and particularly so for clay." This sort of marle, as well as the other, may be easily found by boring. It has been sometimes discovered by ant hills, as these insects bring up some small pieces of shells from their holes. One would think that this country must be furnished as plentifully as any other with this kind of marle; whether we suppose the beds to have been formed by the general deluge, by the raging of the sea and inundations since that great event, or by the shifting of the beds of rivers.

The goodness of this marle depends upon the shells, which are the principal, and sometimes almost the whole that it contains. It is much of the nature of lime, and will go further than other marle. It effervesces strongly with all acids.

MARSH, according to Dr. Johnson, a fen, bog, or swamp. In this country the word is used only to signify flat land, bordering on the sea, and lying so low as to be often overflowed by the tides, when they are fullest.

Marshes are distinguished into high marsh and low marsh. The former bears a very short grass, but in many places very thick; the latter produces a tall rank grass, called thatch. Both these sorts of grass are too highly impregnated with salt to be a constant food for cattle; but the long grass is saltier than the short, as it is oftener wetted with sea water during its growth.

It is esteemed healthy for horses, cattle, and sheep, to have some

some of this sort of land in their pasture; or to be turned, now and then for a few days, into a marsh. At least it saves the trouble and expense of giving them salt. In England, it is thought to save sheep from that fatal distemper, the rot.

Marshes are certainly the richest of our lands, as appears by the astonishing degree of fruitfulness, apparent in those peices from which the sea has been excluded by dikes. Marsh may be so far improved by diking and tillage, without manuring, that instead of producing less than one ton of salt hay per acre, it shall produce three tons of the best kinds of hay. The value of this soil must needs be great, as it is not exhausted by cropping, and needs no manure, unless it be sand, or some other cheap substance, to dry and harden it.

Some marshes require a long dike to exclude the sea, in proportion to the land it contains; others a short one, as where the marsh is narrowest towards the sea. He that possesses a marsh of the latter kind, can undertake no business that will be more profitable than diking it. Two men can easily build a rod of dike upon high marsh in a day. Through the hollows and creeks, more work will be required.

If a marsh, after it is diked, should be rather too wet for tillage, a ditch should be made round by the upland to cut off the fresh water, both above and below the surface, and lead it to the outlet or sluice. See *Dike*, and *Sluice*.

MATTOCK, a pickaxe. This is a useful instrument in sinking wells, digging trenches, ditches, &c.

MEADOW, grass land for mowing. In this country the word is seldom used to signify upland

mowing ground, but that which is low and moist, and seldom or never ploughed. In other countries it is the name of all mowing grounds.

Too much or too little moisture is hurtful to these meadows. Those that are apt to be too wet should be made drier by ditching or by draining, if it be practicable. They may be made drier also by spreading sand, gravel, or coal dust, upon them: At the same time, their fruitfulness will be increased, and better kinds of grass may be introduced.

When they are become dry, they should be ploughed and tilled, if the soil be not a tough clay with only an inch or two of black mould above it. In this case, I think a low meadow should not be ploughed at all. Instead of ploughing, perhaps it would be better to cut away the hillocks and unevennesses; which by rotting in heaps, or burning, may be converted into good manure for the soil. And to increase the thickness of good soil, let sand and other earths, with dung, be spread over it.

When the soil is a loose crumbly clay, such as is found under some meadows, such a meadow may be converted to tillage land with great advantage.

Flooding in the spring not only enriches the soil of meadows, but makes them bear a sharp drought the better. It causes the grass to grow so rapidly that the soil is sooner screened from the scorching heat of the sun.

Particular care should be always taken to keep cattle out of meadows in the spring and fall, when they are very wet and soft. For they will so break and spoil the sward with their feet, that it will not be fit for mowing, nor bear more than half a crop. All

the fall feeding of such land should be over, before the heaviest rains of autumn. In the spring, no hoof should, by any means, be suffered to go upon a soft meadow. It occasions so much loss and damage, that a farmer had better give treble price for hay to feed his cattle, or buy corn for them, than to turn them in, as some do, to eat the grass that first springs, and which has but little more nourishment in it than water. No husbandry can be worse, if husbandry it may be called.

Meadows that bear poor water grasses should be mown rather before the grass is grown to its full size. The hay will be so much sweeter and better, that what it wants in quantity will be more than made up in its quality. And the loss of quantity may perhaps be made up in fall feeding; or else a second crop may be taken.

I have long observed that heavy rains commonly fall before the end of August, by which low meadows are often flooded. Therefore, there is danger in delaying to mow them till it is so late. The crop may be either totally lost, or men must work in the water to save it in a damaged condition.

MEASLES, a disease in swine. The eyes are red and inflamed, and the skin rises in pimples, and runs into scabs. To cure a swine of this disease, take half a spoonful of spirit of hartshorn, and two ounces of bole armeniac, mix it with meal and water, and give it him in the morning when he is hungry. Repeat the dose every day, till he is cured, which will be in four or five days.

MELON, a pleasant tasted, cooling fruit. It grows best in a warm climate; and is large and

excellent in the southern states. But they will ripen in Newengland, in the common way of planting; but are not so large, nor so early in the most northern parts. Some improvement has lately been made in this fruit, by bringing seeds from the southward. Whether this will be a lasting advantage time will shew.

Of all the kinds of melons, Mr. Miller greatly prefers the cantaleupe, a native of America. But I have not heard whether it has yet found its way into this country.

The same writer says, the seeds of melons should be three years old before they are planted; and that those seeds which are so light as to swim on water, are not good to plant. Melons grow best on a sandy loam, which has a warm exposure to the south or southeast. The vines should be sheltered against cold winds which stop their growth; and against boisterous winds from any quarter, which will hurt them, by disturbing and displacing their vines.

A good manure to be put under melons, is an old compost of good loam, with the dung of neat cattle or swine. The ends of the runners, and the fruit latest formed, should be taken off, that the fruit first formed may have more nourishment, grow larger, and arrive to the greater perfection. To raise melons on hot beds, under frames, or under hand glasses, see *Gardener's Dictionary*.

MESLIN, wheat mixed with other grain in sowing. The name is most commonly applied to a mixture of wheat and rye. But there is an unfitness in sowing these together, as wheat requires the best soil and tillage, and rye will answer with the poorest.

I should greatly prefer the mixture of spring wheat and barley, as barley requires nearly as good a soil, and as many ploughings, as wheat. But that which chiefly recommends this mixture, is, that wheat will not blight when it is sown with barley. This has been proved by the experience of a number of farmers in my neighbourhood, who are encouraged to persist in the practice. This confirms a hint that was thrown out by Mr. Eliot, in his *Essays*.

What should be the reason why barley prevents the blighting of wheat, may be worthy of the inquiry of naturalists. May it not possibly be this? That the large, bushy beards of the barley so enclose the necks of the stems of wheat, as to defend them in some degree from cold in the cool nights; so that the sap in the stems of wheat is not so much thickened by the cold, as to be obstructed in its ascent to the ear?

The worst circumstance attending this kind of messin, is the difficulty of separating the two sorts of grain. Though wheat does no harm in malt, barley is a poor ingredient in bread. So that there is need of making the separation. Barley being lighter than wheat, will mostly fall nearer to the tail of the sheet in winnowing, by means of which, some of the wheat may be almost or quite extricated from the barley. Throwing it with a shovel may do still more towards separating the two sorts. The lighter grain will drop short of the heap.

METHEGLIN, a pleasant fermented liquor, made of honey and water. It is made thus: Put so much new honey into spring water, that when the honey is dissolved, an egg will not sink to the bottom. Boil the liquor for

an hour. When cool, barrel it up, adding a spoonful of yeast to ferment it. Some add ginger half an ounce to a barrel, and as much cloves and mace; but I have had it very good without any spices. One hundred weight of honey will make a barrel of metheglin, as strong as good wine. I once had a barrel made with 90 pounds of honey. After fermenting and fining, it was an excellent liquor; some part of which I kept bottled several years; it loses the honey taste by age, and grows lighter coloured: But on the whole, it does not improve by age, like some liquors.

MICE, a well known genus of quadrupeds, troublesome to all housekeepers, but more especially to farmers, and those who keep quantities of grain in their houses, or in granaries. Farmers should know the best ways of opposing their depredations, and of destroying them. The field mouse eats the bark of trees in nurseries and young orchards, when snow is on the ground, and mostly when it is deep. A good way to prevent this mischief is to tread down the snow, and make it very compact, about the stems of the trees. And though laying mulch about the roots of trees be good for the trees, it occasions the mice to increase; therefore I do not go into that practice, while the trees are small, and have a smooth bark. It is only while the trees are young that mice eat the bark.

In spring, the field mice eat corn and other seeds under the surface; in the summer they hurt the grass; and in autumn I have found that they eat potatoes before they are dug up. I know not whether the field mouse and those in houses, barns and granaries,

ries, be of the same species; though the former are larger. But it has been found that both may be destroyed by the same poison.

Take a spoonful of flour, mixed with some scrapings of old cheese, and seeds of hemlock, made as fine as possible. Set it where they haunt. If it be set in a house, let it not be in the same apartment with any thing that is to be used as the food of man. This mixture will destroy all the mice that eat it.

But since many fear to use poison, they may take them alive in wire cages. However, instead of the round ones which are commonly used, I would recommend square ones, enclosed in thin wooden boxes, with a hole in the box against the entrance of the cage; because a mouse will not so readily enter into a place where he sees another confined. The bait may be a rind of cheese scorched, made fast to the centre of the bottom of the cage, and so far from the hole that a mouse cannot reach it till he has got quite into the cage. For if he should stick in the passage, he will prevent the entrance of others.

MILDEW, or MELDEW, or HONEY DEW, a certain sweet tasted clammy substance, found in mornings, on the leaves of some vegetables, the pores of which do not absorb it. Many have believed that this dew is the real cause of the rust, or dark coloured spots, on the stems and leaves of blasted grain. This has been the popular way of accounting for the disease, among my countrymen. It has been supposed, that this moisture adheres to the plants, and so condenses as to obstruct their perspiration, by which they sicken and become unfruitful.

The French call this distemper in grain *rouille*, or rust. It is undoubtedly the same which the Romans called *Rubigo*. The stems and leaves are bespattered with brown spots, and the grain appears shrunk and small, in proportion as these spots abound on the plants. It mostly attacks wheat and rye, but sometimes also oats and barley.

Mr. Worlidge, an ingenious writer on husbandry, was an advocate for the hypothesis I have mentioned. He therefore advised to brushing off such dew with a rope, before the sun could condense it on the grain. But it is much to the discredit of this opinion, that though brushing has often been tried, it has never been certainly known to have had the desired effect. I am one among the many who have tried it without effect. M. Duhamel made trials, to determine whether this were the real cause, by applying to the leaves of plants such glutinous substances as were sufficient to stop the perspiration; but it had no such effect as rust. How much less can such an effect be expected from adhesions to the stems, since the leaves are the principal organs of perspiration? Or when not a fourth part of the surface of a plant is ever covered by the spots?

Some impute this distemper in grain to intense heat from the sun, happening after dry gloomy weather. But it is known that it attacks young plants in autumn, when the heat from the sun is not great, nor the weather dry, and covers the leaves with spots of rust.

Mr. Miller and others suppose insects to have a hand in this distemper; either originally, or after the stems are wounded. But microscopical observations have not

not afforded reason to believe this to be the true cause. And Mr. Tillet has observed that the spots are of different colours on different plants, according to their different kinds of sap; from whence it may seem probable that the sap, rather than insects, or their eggs or excrements, is the substance of which the spots are formed.

Some have supposed the spots to be made by the intense action of the sun on the drops of common dew, while they adhere to the stems after the sun is up, and collect the rays as lenses, by which the stems are over heated under the drops, or rather burnt. But the shape of these drops will hardly justify such an opinion: For though their convexity on the outside is considerable, their concavity on the inside is almost the same. Or if it should be allowed that the rays do converge a little in the drops, yet their action on the stems cannot be so great as to dissolve their substance into that powder, of which the rust is known to consist. Besides, if this were the cause, the spots would be made only on the eastern sides of the stems, which is contrary to fact. They appear equally on every side of the stems.

Mr. Tillet's hypothesis seems to bid fairer than either of the foregoing to account for this distemper. He thinks it is caused by a sharpness in the air in dry cloudy weather, which breaks the vessels interwoven with the substance of the blades and stems, and makes them discharge a thick oily juice, which, by degrees, is turned into that rusty powder. He examined with a microscope, and saw small openings in the membrane covering the plant where the powder lay: And observed that the juice issued

through these small openings, over which he saw some pieces of the membrane, which partly covered the openings. Hence he justly concluded that the cause of the disease is the wounding of the sap vessels, from which wounds the sap exudes, which should pass into the ear to perfect the grain: But I greatly suspect he does not here assign the true cause of these fractures. If they were caused by any unfavourable state of the air, one would think that, of two adjoining fields, one would not escape this distemper, and the other be ruined by it, which is not an uncommon case. And M. Chateauvieux has remarked, that the whole of the same field of wheat is not usually affected at the same time. Besides, M. Duhamel often applied to plants acid and corrosive, alkaline and spiritous liquors; which trials did not produce any thing like rust. How then can any such effluvi-um in the air be supposed to corrode and break the vessels of the stems?

M. Chateauvieux believed that the powder which forms the rust, is the extravasated juice of the plants, because it stops their growth. As he had not observed the rust to come but in dry weather, and when there were no dews, he conjectured that the want of moisture causes the surfaces of the stems to crack, and pour forth their contents. Whether this be the true cause or not, future observations and experience may enable us to determine. To me it does not appear very probable; because, in this country, in some of the driest seasons, grain has been most free from rust. I rather think this is generally the case.

Were it proper that I should attempt to assign another cause, after

after the vain inquiries of so many of my superiours, I should ascribe the bursting of the sap vessels to cold. The facts that have led me to form this hypothesis are chiefly these: First, that in the colder parts of North America, grain is far oftener hurt by this distemper than in the warmer; oftener in the northern than in the southern states. Secondly, because early ripe grain most commonly escapes the rust. Thirdly, because the rust does not often appear on summer grain, before the nights begin to grow colder, as they do about the latter end of July. From these observations, I have been led to think, that the increasing cold of these nights thickens the sap in the leaves and the neck of the stem, just below the ear, where it has the thinnest covering, so as to form obstructions in the sap vessels: After which the pressure of the sap upwards, in a warm day, is so strong as to burst the vessels, and outward membrane, and so to form passages for the sap to the surface of the stems, &c. I am the more induced to adopt this hypothesis, because I have observed the spots usually appear first on the neck of the stem, and are always there in the greatest plenty.

By a greater degree of cold than that which formed the first obstructions, I conceive new obstructions are formed below the wounds or fissures, by means of which new cracks are made from whence the sap exudes: And thus the stems may become spotted, as they sometimes are, quite to the ground.

I dare not absolutely depend upon the truth of this theory, though I do not conceive how it can be otherwise. I would earnestly request all who are able,

to make observations concerning this distemper, that so my opinion may be either confirmed or refuted; especially that light may be thrown on a subject that is very interesting to the inhabitants of this country. For we are not to expect that we shall be able effectually to prevent or cure this distemper, by which we suffer greatly, until the cause of it be investigated.

If I have been so happy as to assign the real cause of rust on grain, will it not follow, that the most probable way to prevent it must be, to bring our seed from a more northern climate, where it has been used to bear a greater degree of cold than it will meet with here? This has been found to be the case by experience; and seems to be much in favour of my hypothesis. But it soon alters by repeatedly sowing it, so as to become naturalized to our climate; and as liable to this distemper as any other seed: Whence I conclude, that it ought to be renewed once in three or four years, at the longest.

M. Chateauvieux cured rusty plants of wheat in autumn, by taking off the leaves close to the ground. If the rust comes on after the stems are grown, he supposed it to be incurable. But the rusting of the leaves is not always followed by the rusting of the stems; and if the latter escape, the grain will be well filled. If there be no way of curing this distemper, we should neglect nothing that we can do to prevent it. As to spring grain, this I conceive may be done by new seed from the northward, by sowing early, and only on warm soils; giving it plenty of tillage before sowing, and warm top dressings about the time of earing. By these means the grain will

get beyond its milky state, before the time when rust is expected to appear; and the crop will be good, though some spots should be formed on the grain afterwards, or when the grain is nearly arrived at its most perfect state of fulness.

Winter grain is not so often blasted, because it ripens earlier. But that it may escape an autumnal rust, it should not be sown before the hottest of summer is past. Some grains of wheat sown by M. Chateauvieux, on the sixth of July, were totally destroyed by the rust in autumn. Early sown winter grain undergoes too great a change of weather, from hot to cold.

Some writers tell of other distempers in grain, besides rust, utrilago and smut; but I have met with no other in this country of any considerable extent; therefore, I shall not trouble the reader with the mention of any other. See the articles *Burnt Grain* and *Smut*.

MILK, a nutritious liquor, which nature prepares in the breasts of female animals, for the nourishment of their young. The milk of cows is that with which the farmer is most concerned.

That the greatest quantity of milk may be obtained from cows, they should not calve out of the right season. April is a good time of the year, if the calves are to be reared; if not, perhaps May is better, being rather more favourable to the dairy. But that cows may give plenty of milk to nourish their calves at this season, they should not be wholly confined to hay, or any other dry meat: But be daily fed with some kind of juicy food, such as potatoes, turnips, carrots, &c. until they have plenty of grass.

In feeding milch cows, the flavour of the milk should be attended to, unless it be when their calves suck all their milk. Feeding them with turnips is said to give an ill taste to the butter made of the milk. The decayed leaves of cabbages will undoubtedly give a bad taste to the milk, though the sound heads will not. There is no fear of potatoes and carrots having any bad effect upon the milk in this way. The quantity of milk is greatly increased by potatoes, but it becomes thinner. Some think carrots have a tendency to dry up the milk in cows; but I have assured myself of the contrary by much experience.

The milk of cows in summer is sometimes made very bitter by their feeding on ragweed, which they will do, when they are very hungry. To prevent this evil it is only necessary that they should not be forced to eat it by the want of other food.

MILLET, *Panicum*, a round yellowish white grain, which grows in panicles at the top of the stalk. The stalks and leaves are like those of Indian corn, but smaller. It grows to the height of three or four feet. A sandy warm soil suits it best. It should be sown about the middle of May, in drills three feet apart. The plants should be so thinned at the first hoeing as to be about six inches apart in the rows. It will produce as large crops as Indian corn, and bears drought admirably well. Cattle are fond of eating it green, preferring it to clover. A crop of it sown thick, and mowed green, would be excellent fodder.

Some say a crop may be obtained by sowing it at about midsummer. Perhaps it may be so in hotter climates. I tried the experiment

experiment in the 44th degree of latitude, and the crop was little better than mere chaff, for want of continuance of heat to fill the grain.

This grain appears to be subject to no distemper; but when it is nearly ripe, the birds are apt to get a great deal of it, if it be not watched carefully.

The way to harvest it is, to cut off the pannicles with a knife, near the uppermost joint of the stalk, put them into sacks or sheets, carry them to the barn floor, and empty them into heaps, covering them with cloths. After lying five or six days, it must be thrashed and cleaned. It should be dried well in the sun, before it is stowed away in the granary; for it will not keep well with any moisture in it.

Millet is an excellent food for fowls and swine; for the latter it should be ground into meal. Some mix it with flour in bread; but it is better for puddings. There is also a red sort of millet; but this I have never seen.

MOSS, *Lichen*, a sort of plant that is injurious to the growth of other plants in general. It was formerly thought to be an excrescence; but even the minutest kinds are now known to be propagated by seeds, and have organs of generation.

Low meadows are often infested with moss, which prevents the flourishing of the grass, and indicates the coldness and sourness of the soil. To cure meadows of moss they should be top dressed with lime, ashes, and other absorbent manures; as well as laid drier by ditching or draining. After which fire should be put to it at a time when it will burn freely.

Tillage lands, when they are laid down to grass, often become

mossy, especially when they are too long in grass. Cold loamy soils are most subject to this evil. The moss on such land is often so small, as to appear only as a green mouldiness of the surface. But this mould consists of distinct minute plants, as well as all other mouldiness, as may be seen by the help of microscopes. If dressings of warm manures do not prove sufficient to clear the ground of this moss, it should be scarified, or harrowed, or else broken up and tilled. For if it be permitted to continue, it will rob the grass of most of its food.

A very long white or yellowish moss grows in wet swamps. Draining the swamps, and setting fire to the moss in a dry season, will commonly be sufficient to subdue it.

I mentioned moss under the head of manures. As moss is known to contain a large proportion of undissolved oil, any thing that will dissolve that oil, will convert it into a rich food for plants. Lime is excellent for this purpose: Moss and lime, therefore, mixed in compost dung hills, may well be expected to make a good manure.

As moss retains water more than almost any thing else; some have found advantage by mixing it with sandy and gravelly soils. It enables the soil to retain the moisture it receives from rains and dews, and to hold the manures that are laid on it: And the moss itself slowly dissolves, and becomes food for plants.

Richard Townsley, Esq. a writer in the *Georgical Essays*, tried experiments of yellow moss in the culture of potatoes. One row was manured with stable dung; another row of the same length, with stable dung covered with common yellow moss. The first

first row yielded 438 lb of potatoes; the second 515 lb. Encouraged by this great success, he tried a row of potatoes on stable dung by itself, another on moss by itself; the crops were of equal weight; those on moss more sizeable than the other. In the first experiment, I suppose the heat of the stable dung dissolved the moss as fast as was necessary for the nourishment of the potatoes, which was most needed in the latter part of summer. The result of the latter experiment is more surprising. Doubtless the ground had been before richly furnished with some substance which was adapted to dissolve the moss: Perhaps it had been limed in the year preceding. If so, it renders the story more credible.

Nothing is more common than to see moss of a light green colour upon forest trees. The seeds being carried in the air, lodge in the crevices of the bark, where they vegetate and grow into plants of a larger or smaller size, according as they happen to be more or less shaded. This is so different from the yellow swamp moss, that cattle eat it very greedily.

Moss on fruit trees is detrimental to their fruitfulness. "The remedy is scraping it off from the body and large branches, with a kind of wooden knife, that will not hurt the branches; or with a rough hair cloth, which does very well after a soaking rain. But the most effectual cure, is taking away the cause. This is to be done by draining off all superfluous moisture from about the roots of the trees. And it may be guarded against in planting the trees, by not setting them too deep in the soil.

"If trees stand too thick in a cold ground, they will always be covered with moss; and the best way to remedy the fault is to thin them. When the young branches of trees are covered with a long and shaggy moss, it will utterly ruin them; and there is no way to prevent it, but to cut off the branches near the trunk, and even to take off the head of the tree, if necessary, for it will sprout again. And if the cause be in the mean time removed by thinning the plantation, or draining the land, the young shoots will continue clear after this.

"If the trees are covered with moss in consequence of the ground's being too dry (as this will happen from either extreme in the soil) then the proper remedy is, the laying mud from the bottom of a pond, or river, pretty thick about the roots, opening the ground to some distance and depth to let it in. This will not only cool it, and prevent its giving growth to any quantity of moss; but it will prevent the other great mischief which fruit trees are liable to in dry grounds, which is the falling of the fruit too early." *Mortimer's Husbandry.*

MOULD, a word that imports the finest parts of a soil, or the surface above the soil. It is the stratum or layer of earth which forms the surface, or turf, in pastures or grass land, in which the roots get the principal part of their nourishment. The plough acts in the mould; hence the name mould-board is given to that part of a plough which turns up the soil and mould. In some places this layer is thicker, in others thinner. The deeper it reaches, the richer the land may be esteemed; and it is the more valuable. It is commonly black, or of a dark brown colour,

colour. The layer which is next under it is soil, which is also fit for tillage. But in tilled lands the rich mould and soil are blended, and the mixture has the name of mould.

The best mixed mould is of a hazelly or chesnut colour; neither too adhesive nor too loose; neither baking to a crust with drought, nor turning to mortar with wetness; it is sweet scented; and feels unctuous and fine. All good mould and soil will become black, by being exposed to the sun and air for a year or two. An ash coloured mould is not good, a pale yellow mould still worse.

A good mould contains much of that extremely fine impalpable earth, which is a real ingredient in the food of plants. This is called, by some writers, vegetable mould.

The word mould is also used to signify soil that is made loose, light and fine by tillage and manuring. Hence plants are said to be moulded when this fine earth is drawn up to their stems by the hoe. And a garden mould is made by tillage and manure.

MOULDBOARD, that part of a plough which turns over the furrow. For ploughing green sward an iron mouldboard is best: For if it be wood it ought to be plated with iron to prevent its being soon worn through. For ploughing in tillage land a wooden mouldboard will answer.

MOW, a quantity of hay, or grain in the straw, piled in a barn for keeping. Ground mows are more liable to take damage by moisture, than mows upon scaffolds. Mows of grain should be laid upon the latter. The larger the mow, the drier the hay or sheaves should be of which it consists. See *Fodder*.

MOWING, the operation, or art of cutting down grafs, corn, &c. with a sith.

— They who have not been in their youth accustomed to do this work, are seldom found to be able to do it with ease or expedition. But when the art is once learnt, it will not be lost.

As this is one of the most laborious parts of the husbandman's calling, and the more fatiguing as it must be performed in the hottest season of the year, every precaution ought to be used which tends to lighten the labour. To this it will conduce not a little, for the mower to rise very early, and be at his work before the rising of the sun. He may easily perform half the usual day's work before nine in the morning. His work will not only be made easier by the coolness of the morning air, but also by the dew on the grafs, which is cut the more easily for being wet. By this means he may lie still and rest himself during all the hottest of the day, while others who begun late are sweating themselves excessively; and hurting their health, probably, by taking down large draughts of cold drink to slake their raging thirst. The other half of his work may be performed after three or four o'clock; and at night he will find himself free from fatigue.

If the mower would husband his strength to advantage, he should take care to have his sith, and all the apparatus for mowing, in the best order. Whoever does his work with insufficient, or bad tools, the mower should not. His sith ought to be adapted to the surface on which he mows. If the surface be level, and free from obstacles, the sith may be long and almost straight; and

and he will perform his work with less labour, and greater expedition. But if the surface be uneven, cradley, or chequered with stones, or stumps of trees, his fithe must be short and crooked. Otherwise he will be obliged to leave much of the grass uncut, or use more labour in cutting it. A long and straight fithe will only cut off the tops of the grass in hollows.

A mower should not have a snead that is too slender; for this will keep the fithe in a continual tremor, and do much to hinder its cutting. He must see that it keeps perfectly fast on the snead; for the least degree of looseness will oblige him to use the more violence at every stroke. Many worry themselves needlessly by not attending to this circumstance.

Mowing with a company ought to be avoided by those who are not very strong, or who are little used to the business, or who have not their tools in the best order. Young lads, who are ambitious to be thought good mowers, often find themselves much hurt by mowing in company.

Mowers should not follow too closely after each other: For this has been the occasion of fatal wounds. And when the dangerous tool is carried from place to place, it should be bound up with a rope of grass, or otherwise equally secured.

“Mr. de Lisle introduced in England, the mowing of wheat. The method is this: The fithe he uses is at least six inches shorter in the blade than the common fithe; and instead of a cradle, has two twigs of osier put semicircular wise into holes made in the handle of the fithe, near the blade, in such a manner that one semicircle intersects the other.

“By this method of mowing wheat, the standing corn is always at the left hand. The mower mows it inward, bearing the corn he cuts on his fithe, till it come to that which is standing, against which it gently leans. After every mower follows a gatherer, who, being provided with a hook or stick, about two feet long, gathers up the corn, makes it into a gavel, and lays it gently on the ground. This must be done with spirit, as another mower immediately follows.” *Complete Farmer.*

As reaping is slow and laborious work, it would be right for our countrymen to learn this method of mowing their wheat; which will undoubtedly answer also for other sorts of grain.

MOWING GROUND, a name commonly given in this country to land that is mowed for hay; which being fit for either mowing or tillage, is occasionally used for the latter.

The generality of farmers, in this country, lamentably 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 labour; and allow them to convert half their mowing land to tillage or pasture; especially to the latter, which is most wanted.

A Newengland farmer is not contented, unless he yearly mows over the greater part of his cleared land; because he supposes that if he does not, he shall be able to winter but a small stock. His grass on the most of his acres must needs be very thin, even when the seasons are most favourable;

avourable ; therefore, if a summer happen to be dry, the soil, which is so poorly covered as to retain neither dews nor rains, is unavoidably parched and bound. The grass, thus deprived of its nourishment, does not get half its usual growth in a dry season ; and the crop turns out to be almost nothing. The distressed farmer, not knowing how to get fodder for his cattle in the ensuing winter, with severe labour or cost, mows his dead grass, and gets perhaps four or five cocks from an acre. He cannot sell off many of his stock, because of the general scarcity of hay ; nor fatten them to kill, for want of grass ; therefore he keeps them along poorly and pinchingly, till the ground is bare in the following spring ; then, to save their lives, he turns them into his mowing ground, as soon as there is the least appearance of green grass. They rotch the soil to the depth of six or eight inches, which is sufficient to prevent the growth of a good crop that year ; as it sinks a great part of the surface to such a depth that it can produce nothing ; tears and maims the roots which remain in their places ; and leaves the surface so uneven, that if a crop of grass should grow, it could not be mown closely, if at all. Therefore, through want of hay, the soil and sward must be mangled in the same way the spring following ; and so on from year to year perpetually. How absurd and ruining is this practice !

If our farmers would resolve they will mow but half the quantity of ground which they have mowed hitherto, I should think they might soon find their account in it. But it will be necessary that they should adopt a new kind of management

with respect to their mowing grounds.

In the first place, let them not lay down to grass for mowing, any lands that are quite exhausted by severe cropping ; nor without manuring them well. Good crops of grass are not to be expected when there is no strength, or next to none, in the soil. Therefore the lands should be dunged when the grass is sown, unless we except clover and other biennial grasses. And even for these it is often quite necessary, always advantageous.

Mr. Miller advises to sowing perennial grasses in autumn, not with corn, but by themselves. This is the right way to have the soil well filled with good grass roots, before it subsides and becomes compact. I think the farmer need not grudge to forego his corn crop in this case ; but perhaps this is not necessary ; for no crop will be missed by sowing grass by itself. If it be sown with winter grain it will not produce a crop for mowing the next year ; but if sown by itself it will produce a good crop ; and a plenty of strong roots will be established in the soil. But when grass is sown with grain, the grain kills part of the roots, and stints the growth of the rest to such a degree that they will never recover. But whether the seed of red clover will come up so well if sowed in autumn, as if sowed in the spring, is perhaps yet to be proved. Concerning other grass there needs no question.

Also, the surface should be rolled after the seed is sown, to close the mould about the seeds, to prevent their being removed by strong winds, to prevent the surface from being irregularly torn by the frost of winter, and

to make the soil smoother for mowing.

Grass land, by lying, is apt to become uneven, and knobby. For this reason the good farmers in England pass a roller over their grass land every spring and fall. It gives the roots of grass a more equal advantage for nourishment and growth, and facilitates the mowing of the grass, and the raking of the hay.

When land becomes bound, or mossy, so as to diminish the growth of the grass, if it be not convenient for the farmer to break it up, it should be cut, or scarified, with some such instrument as the three coultered plough, invented by M. de Chateauvieux. Then dressed with some short rotten manure suited to the soil; bushed, and a roller passed over it. Instead of the three coultered plough, when that cannot be had, a loaded harrow with sharp steeled teeth may answer. There is no danger of destroying the roots of the grass by this operation. Though they are broken they will be speedily renewed; new offsets will be more plentifully formed, and the crops will rise with renewed vigour.

Let farmers keep their mowing land so completely fenced, that cattle and swine may be effectually prevented from breaking in at any time of the year. I think every one must be sensible of the necessity of this.

It is ridiculous to think of taking many crops of hay from any piece of upland, in uninterrupted succession, without affording it any manure. For it does not imbibe the richness of the atmosphere so plentifully as land in tillage. Grass land should therefore, once in two or three years at least, have a dressing of good

rotten dung, or of a compost suitable for the soil. But the best way is to do it every year. Autumn is the time for applying the manure, according to long approved practice. But a writer in the Geographical Essays recommends doing it immediately after the first mowing, when a second crop is expected, which will undoubtedly be the larger. Whenever it is done, 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. By this management, four or five tons of hay may be the annual produce of an acre. Or if the surface be not dunged, the crop should be fed off once in three years; that the excrements of the cattle may recruit the soil.

No cattle should, on any account, be turned into a mowing ground in the spring. The mischief they will do, will be ten times more than the advantage they can get. In the fall, neat cattle may take the aftermath: But sheep and horses will be apt to bite so close as to injure some of the roots. Therefore I think they should be kept out, especially after the grass comes to be short. Whatever dung is dropped by the cattle, should be carefully beat to pieces, and spread, before winter, or early in the spring.

These lands should never be fed so bare, but that some quantity of fog may remain on them through the winter. The snow presses it down to the surface, where it rots; it holds the rain water from passing off suddenly; and the virtue of the rotten grass is carried into the soil, where it nourishes the roots.

Grass lands, with such a management as is here recommended, would

would produce crops surprisingly large; especially in the northern parts of Newengland, which are extremely natural to grass. The surface would be covered early in the spring with a fine verdure. The crops would cover the ground so soon as to prevent most of the ill effect of drought in summer. It would, by forming a close cover to the soil, retain most of the moisture that falls in dews and rains. So that a dry summer would make but little difference in the crop; and the rich lands would often produce two crops in a year.

On this plan of management, much labour might be saved in hay making; and the grass might all be cut in due season; not only because the farmer has more leisure, by having so much less mowing to do; but also because a good crop is not apt to dry up so suddenly, as a poor and thin one. The grass in our mowing grounds is often said to be winter killed. It is observable that this happens only in the little hollow places, where the melting snow towards spring forms little ponds of water. A cold night or two turns these ponds to cakes of ice, which lying long upon the roots chills them so much that they cannot soon recover. Or the ponds made by the thawing of the ice destroy the roots by drowning them; so winter flooding destroys all the best grasses. The grass, however, only of one crop is destroyed in the hollows; for it rises again by the midsummer, or autumn following.

Laying lands very smooth and level, according to the above direction, will do much towards preventing this evil. But if a field be perfectly flat, and apt to retain too much wet when it is in tillage; it should be laid down to

grass in broad ridges or beds. I am acquainted with some farmers who have found advantage from this method. The trenches, or furrows between the beds, should be the breadth of two or three swarths asunder, that the grass may be mowed with the less inconvenience. It is near as much work to mow a half swarth as a whole one; which is a good reason why the beds should not be very narrow. Ten or twelve feet is a good breadth, as it is equal to two swarths.

MUCK, dung or other filth, suitable for manure.

MUD, a black or dark coloured sediment, found at the bottom of ponds, rivers, creeks, ditches, and wet sunken places. It is mostly composed of a fine vegetable mould, mixed with the substance of perished vegetables, &c. and therefore it contains much of the natural food of plants.

In ponds and rivers, this sediment is made up of fine dust, together with a rich variety of other substances, which have been waisted in the air, and have fallen into the water; together with the subtlest particles of the neighbouring soils washed down into them by rains. That is supposed to be the richest mud, which is near to the borders, and which has been alternately flooded and fermented; as it will ferment when it lies bare, in some degree.

In rivers, and in long ditches that have currents, there is a greater proportion of soil in the mud. It has been brought down from soft, mellow lands, through which the rivers pass; and some of it doubtless from beds of marle, which are often found in the banks of rivers, and which readily dissolve in the water.

Some ponds are totally dried up in a hot and dry summer; and

and all ponds and rivers are so diminished by a copious evaporation, as to leave part, and the richest part, of their beds uncovered. And these beds, where there has been no rapid current, are always found to contain a rich mud. In some places it reaches to a considerable depth. This mud, though taken from fresh waters, has been found to be a valuable manure; more especially for dry, sandy and gravelly soils. I have known it to have as good an effect as barn dung, in the culture of Indian corn, upon such soils. The advantage of it is not found to be only for one season; it meliorates the land for several years. It restores to a high piece of ground what vegetable mould the rains, in a long course of years, have been washing away from it.

It is happy for the farmer that Providence has prepared for him these magazines of manure in all parts of the country. None but the stupid will let them lie unnoticed, or unremoved. When a dry autumn happens, the prudent farmers will be very industrious in carting mud up from evaporated ponds, and other sunken places in their farms, and laying it upon their light soils, especially upon high gravelly knolls; or into their barn yards, if the distance be not too great. We had a fine opportunity for doing much of this work in the autumn of 1786. We might thus in great measure have recompensed ourselves for the disadvantages we suffered by the uncommon drought.

But with respect to using mud as a manure, the maritime farmers have the advantage of all others. For the sea ooze, that uliginous matter which appears on the flats, and in creeks and harbours, along

the shores of the sea, has all the virtues of fresh water mud, with that of sea salt superadded, which is one of the most important ingredients in the composition of the best manures. I might add, that it abounds, more than any other mud, with putrefied animal substances. Much of these are contained in the sea itself: And innumerable are the fowls and fish that have perished upon flats since time began; and the component parts of their bodies have been sealed down by the supervenient slime.

Mud taken from flats where there are shell fish; or even where they have formerly lived, is better for manure, than that which appears to be more unmixed. The shells among it are a valuable part of its composition. If it abound much with shells, it becomes a general manure, fit to be laid upon almost every kind of soil.

That mud, however, which is a richer manure than any other, is taken from docks, and from the sides of wharves in populous towns. For it has been greatly enriched by the scouring of foul streets, and from common sewers; as well as from an unknown quantity of animal and vegetable substances, accidentally fallen, or designedly thrown into such places.

Sea mud may be taken up at any season, whenever the farmer has most leisure. It is a good method to draw it up on sleds from the flats in March, when the border is covered with firm ice. I have thus obtained mud from flats, with great expedition and little expense.

Mud that is newly taken up, may be laid upon grass land. But if it is to be ploughed into the soil, it should first lie exposed to the

the frost of one winter. The frost will destroy its tenacity, and reduce it to a fine powder; after which it may be spread like ashes. But if it be ploughed into the soil, before it has been mellowed, it will remain in lumps for several years, and be of less advantage.

A layer of mud will be no bad ingredient in a heap of compost. But it should be contiguous to a stratum of lime, if that can be obtained. But where this is wanting, new horse dung is the best substitute, to excite a strong fermentation.

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 stale 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 of it is so great as to pay for the increased expence of twice carting. For it will absorb the stale of cattle, and retain it better than straw, and other light substances.

MULBERRY, *Morus*, a well known tree, the leaves of which are the proper food of silk worms. For this use, those which bear a black fruit are preferred. According to Mr. Miller, the male and female organs of generation are commonly on the same tree; but sometimes a tree will have only male flowers.

It would be right for us to propagate these trees, as it might be done with the greatest ease. We may do it by their seeds, or by layers, cuttings or slips. If we are not disposed to make use of them for the feeding of silk worms, they would pay for the trouble of rearing them, by their fruit and their timber. They suit

our climate, and grow rapidly, at least in Connecticut, and in the western parts of Massachusetts.

Possibly the time may come when we may be glad to make silk for our own use in this country. If this should happen, it will be regretted if there be no trees in the country from which the worms can be fed. They will grow well in a deep dry soil which is moderately rich.

MULCH, rubbish of decayed vegetables. Litter is a word of the same import.

N.

NAVE, the middle part of a wheel, through which the axle passes. See *Wheels*.

NAVEL GALL, "a disorder on the top of the spine, opposite to the navel, whence the name. It is most commonly caused by an ill formed saddle, or want of good pads, and being neglected turns to a foul fungous excrescence; and sometimes, after long continuance, to a fistulous ulcer. While there is moisture and sensibility in the part, an ointment may be applied of quicksilver and turpentine; an ounce of the former to two ounces of the latter, rubbed in a mortar till they be well incorporated; and then spread upon tow. On each side of the spine, over the swelling, may be laid smooth dry pledgits, or bolsters, which may be girt round with a surringle. But if the sore be dead and lifeless, a good sharp knife must be used to cut it to the quick; then let it be dressed according to the directions for the cure of wounds.

"*A fit fast* also proceeds from a saddle gall, and is another of the accidents that happen to the spine. It is dry and horny, and may be cured by anointing it first with oil

oil of bays, until it turns soft ; then by dressing it with quicksilver and turpentine, as above directed. This will make a cure, especially if the hard horny substance be gently scarified in some places." *Gibson's Farriery.*

NECTARINE, *Amagdalus*, a species of the peach, with a smooth rind, and a firm pulp. The name is derived from nectar, the poetical drink of the Gods.

NEW HUSBANDRY, *drill husbandry*, or *horse hoeing husbandry*. It chiefly differs from the old husbandry, in this, that the soil is tilled while the plants to be nourished are growing in it. This mode of culture was introduced into England, by the ingenious Jethro Tull, Esq. who wrote largely and repeatedly on the subject. His volume in folio, entitled, *New horse hoeing Husbandry*, was published in the year 1731. An Essay on the same subject, in the year 1733. A Supplement to the Essay, in 1735. Addenda, and Conclusion, in 1738, and 1739. This gentleman expended as it were his whole life, in zealous and benevolent exertions to convince mankind of the great utility of his new system, and directing them in the practice of it. But he had the mortification of finding, that only here and there an enterprising genius adopted it in practice. And though more than sixty years have now elapsed, since he made it publick, it is so far from having become the general practice of farmers in that country, that there is no reason to suppose that it ever will : Although it has been recommended, and further explained and improved, by writers of note in several nations.

The author of this husbandry meant to apply it chiefly to

wheat, as being the most important kind of corn. The new husbandry differs from the old in the manner of preparing the ground for a crop, and in the manner of sowing the seeds. The ground is ploughed into ridges, or beds, five or six feet wide, and smoothed with harrows. Instead of sowing at random with the hand, or broad cast, as it is called, the seed is dropped by a drill, in straight lines, in little furrows about two inches deep. Either two or three such rows are on one bed, eight or nine inches apart ; and the seeds are closely covered in the furrows, by a small harrow annexed to the drill.

Mr. Tull invented a drill, or drill plough, on a new construction. It is not only essentially different from the sembrador, or sower, invented by Don Joseph de Lucatello ; but an improvement upon the drill which was invented by Mr. Worlidge. With this machine one may sow such a quantity of seeds, and as many rows as may be thought necessary, lay the seeds at a convenient depth, and cover them nicely, only by drawing the machine once along the ridges.

As soon as the plants are a few inches high, the horse hoe is introduced, which differs but little from a horse plough, excepting in the manner of connecting it to the horse that draws it. With this plough, passing it within three or four inches of the rows, the earth is turned from the rows into the intervals or alleys, so that the furrows meet each other, and form a sharp ridge. This is the first hoeing, and is performed late in autumn, just before winter. It lays the young plants so dry, that it is thought they are in no danger.

danger of being killed by the frosts of winter. But some improvers on this system have recommended omitting one of these furrows, or if both be ploughed, to turn back one of them towards the row before the hard frosts of winter; lest the ridges should be too much in danger of being washed away by rains, and the young plants removed. This seems to be a real improvement upon Mr. Tull's method.

Early in the following spring (they say in March, but it must be April in this country) the earth is turned toward the rows; then in May, from them; and lastly, in June, it is turned back to the rows, and partly against the stems, when the grain is just out of blossom; which last ploughing is thought to do more service than any other, as it greatly helps to fill out the grain; and must not, therefore, on any account, be omitted.

Each of the ploughings must be very deep, so as to keep the ground very loose and open. But care must be also taken to uncover plants that chance to be buried by the plough; to weed the grain once or twice in the rows, and to stir the earth between the rows, with a prong hoe or hand hoe, as often as the intervals are ploughed, or horse hoed.

The advantages of this method of culture are said to be these: That indifferent land will produce a good crop, which would produce little or nothing in the old way; that a good crop of wheat may be raised each year from the same piece of ground, without impoverishing the soil, as the intervals are always fallowed; that there is no need of manuring the land at all, as the extraordinary tillage will answer

the same end as manure, and at less expense; that there will be no crop missed or prevented by a year of fallow, which must take place every second year in the old way of cultivating wheat, to prevent exhausting the soil; that the crops will be larger, better and fuller grain by far, and entirely free from the seeds of weeds.

The editors of the last edition of Mr. Tull's *horse hoeing Husbandry*, by a computation of the expense and profit of the old husbandry and the new, and comparing the accounts, make the clear profit of the latter appear to be more than double to that of the former. This may be seen at large in the *Complete Farmer*, under the article *Husbandry*. Other ingenious writers in Great Britain, since have written in confirmation of this opinion. See *Encyclopedia*, article *Agriculture*.

I do not at all scruple the fairness of the computations; nor the accounts of writers in other countries to the same purpose. But there is no arguing with any certainty from the advantage of the new husbandry in England, or other parts of Europe, to the advantage of it in this country. Because, in the first place, labour is more than twice as dear in this country; and that there is a greater quantity of labour required in the new husbandry than in the old, is very obviously true. There are at least two or three ploughings extraordinary to a crop, besides weeding and hand hoeing; and weeders will not accept of the weeds they pull as sufficient pay for pulling them, as poor women sometimes do in the old countries.

Another reason for suspecting that the new husbandry may not answer

answer so much better than the old in this country, when applied to wheat and rye, is, that these grains are here very subject to blasting; and the later they ripen, the more they are in danger of this distemper. Hosing of grain will cause it to ripen later, as may be seen in the border of a field that is contiguous to hoed ground. The plants that stand nearest to the hoed ground retain their greenness much longer than the rest of the grain, because they are more plentifully fed. Hence there appears to be some reason to doubt of the advantage of hoeing wheat and rye in this country.

But if there were no weight in this, nor in the foregoing argument, yet the difference of climate must be taken into consideration. Our lands are hoven and mellowed by the frost of every winter, to a greater depth than the hoe plough can ever stir them, by which the roots of winter grain are often hoven out of the soil; but in England, the ground seldom freezes to half the depth that a plough goes. Therefore, the most forcible argument in favour of the new husbandry, which is used by its advocates, will not so well apply in this country; which is, that the ground settles and becomes very compact, during the long continuance of a crop of grain upon it. I see no reason to doubt but that our extraordinary degree of frost may, on the whole, have nearly as much effect towards loosening and breaking the soil in tillage ground, as one ploughing has. But this by the bye.

Not only is the success of the new husbandry in this country for the above reasons uncertain; but there are several disadvantages and inconveniences, at-

tending this husbandry, which are common to all countries. One of these disadvantages is the cost of the drill plough. This is every where a material objection to the new husbandry in the minds of common farmers. And the curious and complicated structure of this machine, which renders it liable to get out of order, is no small inconvenience; for common labourers are not expected to have skill enough to rectify, or repair it. Besides, the accuracy of the work of drill sowing requires so much thought and attention, that the ignorant and careless, who are apt to despise new inventions, will not perform it in the best manner. So that a gentleman must always do his own sowing himself, if he wishes to have it done well. And not every gentleman who has a farm will be disposed to submit to this employment. Neither does the drill plough perform well on sideling situations and declivities. To which it may be added, that there are many kinds of seed which it is next to impossible to sow well with this machine. Such are all the hooked, winged, flat, long shaped, and extremely light seeds; such as those of carrots, parsnips, lettuce, &c. It will not well deliver any but those which are ponderous, smooth, and so round, or regular shaped, as to be easily put in motion.

These difficulties are complained of in the old countries; but there is a more material one to conflict with in many parts of this. In many of our fields, stumps of trees, roots, rocks and stones, are so frequently met with, that the drill plough could not be used. It is necessary that the ground should be perfectly clear of every thing that can obstruct

must or hinder the going of the drill. These obstacles, I confess, are not insuperable; but in process of time may be removed. And in future generations the drill may be more conveniently used.

I have not mentioned these things with any view to deter my countrymen from attempting to apply the new mode of culture to winter grain. There is nothing that I more sincerely wish, than to see careful experiments made with it. But I think this caution ought to be observed, never to attempt to raise spring wheat, or spring rye, in this manner. Though I have never read, nor heard, of horse hoeing spring wheat in England, I have known it tried by several persons to their mortification and loss, in this country. The crops were so entirely blasted as to be scarcely worth reaping. This has been the case, when the culture has been conducted by some of the most judicious persons, with great attention, and with the proper apparatus. The true reason of their miscarriage I take to be this, that as spring grain ripens later than winter grain, and hoed later than unhoed grain, it could not be ripe till some time in August, when some of the nights are so cold as to blast the grain, by stopping the ascent of the sap.

But let the new husbandry be tried on winter wheat, sown in August, or September, on a warm soil with a southern exposure, and where there are no stones, nor any other obstacles; and let the seed be brought from some place at least a hundred miles northward. If with these advantages for ripening early, and in favourable seasons, a good crop of wheat cannot be obtained, it will not be worth while to make

any further trials. But it should be tried on rye also; for as that is known to be a hardier grain than wheat, it is possible it may answer better in this husbandry.

We need not be at the expense of procuring drill ploughs, and horse hoes, to make experiments of these kinds. After the ground is ploughed into ridges and well harrowed, the channels may be expeditiously made two inches deep with the head of a common rake, and the seed may be scattered in them by hand, and covered with the rake. The horse hoeing may be well enough performed with a common horse plough, passing it twice in a furrow, if it be found necessary, that the ground may be stirred to a sufficient depth.

If, after a fair trial or two, the new culture of winter wheat and rye should prove unsuccessful, it need not discourage any from sowing their grain with a drill plough. In land that is fit for it, the sowing may be performed with great expedition. If the seed were to be drilled in rows about nine inches apart, leaving no wider intervals, it would be attended with several advantages. Half the seed may be saved by it, which is a matter of some importance, especially in a time of scarcity of grain.

If the seed be good, it will undoubtedly all come up well and prosper: Because it will all be buried at the most suitable depth in the soil. But in the common way of sowing, some of the seeds are buried at such a depth, that they scarcely come up at all. Some are so near the surface, that the least drying of the soil prevents their vegetating, or alternate moisture and dryness turn them to malt. And some will be uncovered, which will be taken away

way by birds. Many stinted plants will appear ; the crop will be uneven, some part of it being better, and ripening sooner, than the rest. Another advantage of drilling will be, that weeders may pass through a field to weed it, if there should be occasion for it, without any danger of hurting the plants. And all fields of wheat that produce weeds, ought to be carefully weeded. Sowed in this way the ground might also be stirred in the narrow intervals with a small hoe, which would encourage the growth of the plant, and keep it cleaner from weeds.

Instead of the drill husbandry, Dr. Hunter recommends a new scheme of his own, which partakes partly of the new, and partly of the old husbandry. He calls it alternate husbandry. The scheme is as follows : He ploughs his ground in flat ridges, or in lands, nine feet wide. When seed time arrives, he sows one land in the broad cast way, and leaves the next, sowing the third, and so on alternately through the field. The lands which are not sown he fallows, allowing them three or four ploughings in the fallow year ; sows them the next year, and fallows the other.

He finds this to be a good mode of culture for land that is weak, and which lies remote from manure. A mean soil will thus bear pretty good crops without dressings, or with very small ones. The grain has greater advantage of a free air than in the old husbandry. No new implements are needed, nor any greater accuracy in the culture required, than any ploughman is capable of. Perhaps a row or two of potatoes, or carrots, in the middle of the fallow ridges, might not be amiss in this husbandry ; but rather an improvement.

But, to return to my subject : Every one must be easily convinced, that plants in general receive a greater degree of nourishment, if the ground about their roots be frequently stirred during their growth. We find the benefit of this in our gardens. We see that bare weeding does not answer so well as hoeing, among the plants we cultivate in them.

The great advantage of horse hoeing husbandry must appear, if we only attend to our ordinary method of cultivating Indian corn, which differs but little from that husbandry. If ploughing and hoeing were to be totally neglected, while the plants are growing, we should have no good crops. On the contrary, the deeper we plough the intervals, and the oftener we stir the mould with the hand hoe, the better is our crop. And why should not the advantage of the same culture be equally great, when applied to most of the plants which we cultivate ? The more the ground is opened by frequent stirrings, the more vegetable nourishment it will receive from the atmosphere ; and the roots will find a freer passage in extending themselves after their food. They will, therefore, receive a greater quantity ; and their growth and perfection will be answerable.

I have not the least suspicion that barley and oats will fail of receiving great advantage from this culture ; in both of which I have had some experience. Several years of late I have applied this culture to barley, in single rows or ridges three feet apart ; and have never once failed of gaining at the rate of 40 bushels per acre. The grain has been perfectly clear from seeds of weeds, and more full and large than

than when cultivated in the common way. After ploughing the ground, and harrowing it, I form the ridges with the cultivator. I sow the seeds with a most simple drill of my own inventing. The weeds are killed, and the plants earthed, by passing the cultivator between the rows, with the addition of but little hand hoeing. That it does well for hemp, has been proved by trials in this country. None will doubt the advantage of it in raising potatoes, our common culture of which is so similar to that of Indian corn. But if they were set in drills, instead of hillocks, the produce would be greater, in both corn and potatoes, as I have found by several trials.

The new husbandry may as well be applied to all filiquose plants, as pease, beans, &c. and to all esculent roots, as parsnips, carrots, beets, and the like. The same may be said with regard to cabbages, asparagus, and most kinds of pot herbs. The trials that have hitherto been made upon such plants, in this country, have been so successful, that I trust the practice will soon become general. See the Rev. Mr. Eliot's *Essays*, p. 111.

These kinds of plants require so much less labour in the drill way, than is usually bestowed on them in gardens, that when they are cultivated for the market, or for feeding of cattle, they should by all means be sown in drills, and horse hoed. The above writer from his own experience concluded, that five bushels of carrots might be as easily raised, as one bushel in the common method. My own experiments have fully justified this opinion.

NURSERY, a garden, or plantation of young trees, to be transplanted. In a nursery for

fruit trees, the land should not be quite so rich as that into which they are to be transplanted; because it will be better for them to have their nourishment increased than diminished, as they increase in age. Therefore, a nursery will need but a little manure, unless the soil be uncommonly poor.

A nursery should not be on a spot where fruit trees have lately grown, or indeed any other deep rooted plants. It should be on a medium between the too extremes of wet and dry.

To prepare the ground for sowing, it should either be trench ploughed, or dug with a spade to a considerable depth. From a foot to fifteen inches is not too deep. This should be done in the latter part of summer, and the ground well cleared of the roots of all perennial weeds and grasses. The season for planting either seeds or stones, is about the month of October. If it were done in the spring, none of the plants would be up in less than a year: And a considerable proportion of the seeds would perish. The seeds may be sown promiscuously; and they should be pretty thick, because they will not all come up. Some think it necessary to sow the pomace with the seeds of apples. I have sown them with and without it, and do not see that sowing seeds with the pomace is to be preferred.

When you transplant trees of one or two years growth in the nursery, mark the ground in lines three feet apart. Then open a trench a foot wide on the first line, and of a depth proportionable to the length of the roots: Take the stocks out of the seed bed, with a spade, preserving the roots as entire as possible: Cut

off all the very small fibrous roots; and if a root tends directly downward, it must be shortened: Plant them in the trench twelve inches asunder. Then dig a trench and plant it in the next line, and so on, till the business is completed.

The main branch for the top should not be cut off, but carefully preserved. Several of the lateral branches should be taken off, more or fewer in proportion as the root is more or less diminished. In this situation they are to grow, till they are transplanted into orchards, &c. And they must be carefully tended, or they will not become good trees. Every spring and fall the ground between the rows must be well digged, and so carefully as not to injure or disturb the roots; or else the intervals must be horse hoed. If the latter be intended, the rows should be planted at least three feet and a half apart. But the plough must not go so near the rows as not to leave some ground to be dug with the spade, or stirred with a dung-fork; and in using the plough, great care should be taken to avoid galling and injuring the trees.

A nursery should always be kept clear of weeds by frequent hoeing. No suckers that spring up from the roots should be suffered to remain. They will need a little pruning each year, to prevent their becoming misshapen; and all buds should be speedily rubbed off, which would make branches too low on the stems. A nursery requires so much attention, that it should be in a situation where the owner cannot avoid seeing it often; otherwise it will be in danger of suffering through neglect.

The fruit trees should be allowed to grow to the height of five or six feet, before they are budded or grafted. *See those articles, Inoculation, and Grafting.*

Trees, to be transplanted into forests, may be cultivated in a nursery in the same manner as fruit trees. But, as Mr. Miller advises, it would be best to have a nursery of these in the place where the forest is designed to be planted; where a sufficient number of the trees may be left standing, after the rest have been removed.

If a nursery be in such a situation that the young trees are in danger of being broken down by deep snows; either the fence on the windward side should be made so open, that the wind may have a free passage through it, and drive away the snow: Or else the trees may be defended by staking. A stake a little taller than the tree, made of a slip of board, should be set close on the windward side, and the top of the tree fastened close to it with a soft string. Or two such stakes may be so set, that the upper ends may meet over the top of the tree.

NUT TREE, or WALNUT TREE, *Juglans*, a well known tree, valuable for its fruit and timber. There are six sorts, according to Mr. Miller, who makes the hickory, or white walnut of Virginia, to be distinct from our white walnut.

There are but two sorts that grow spontaneously in this country; the white walnut, and the shagbark, so called. The first of these is a very hard and tough wood, which our farmers find useful for many purposes. It will bend into almost any form without breaking, especially the lower

er part of the body of a young tree. It is white and smooth; it is therefore much used for ox bows, goads, and axe helves. But it soon decays when it is exposed to the weather. The fruit of this tree has a thin smooth shell, and is of very little value. The inner bark is useful for making a yellow die.

The shagbark tree is so called, on account of the roughness of its scaly bark, which hangs in slips on the bodies of old trees. This has a small rich nut, enclosed in a very thick shell; but it is not so much esteemed for its timber as the other sort. The nuts naturally adhere strongly to the trees, but the first hard frost causes them to drop.

The black walnut tree is said to grow naturally in Virginia, and particularly on the banks of the Ohio. Though it be rather brittle, it receives a good polish; is hard and heavy, and is much prized for its beautiful brown colour, and used in all sorts of cabinet work.

We have another sort, not indigenous, but the only one that is much cultivated in this country. It goes by the name of the English walnut. The fruit is much larger and better than that of either of the other sorts. In its tender state, it is used in pickles for sauce. But the nuts are too solid for this use when they are come to their full growth.

A moist loamy soil seems to be the best situation for walnut trees; but they will grow on almost any upland. They are not well adapted to be cultivated in nurseries. They bear transplanting but poorly, unless when they are very young. The roots should not be wounded, but it is not easy to avoid it in taking them up, as

they naturally run deep. Though the transplanted trees are best for fruit, they grow short and bushy, and are not fit for timber. Therefore, he who wishes to cultivate a grove of them for timber, should plant the nuts in the places where he wishes the trees to remain.

As there is a considerable pith in the limbs of walnut trees, they do not admit of much pruning. The water is apt to enter at a wounded limb and cause it to rot.

NYPHHA, "the state of winged insects, between their living in the form of a worm, and their appearing in the winged or most perfect state. The eggs of these insects are first hatched into worms, or maggots; which afterwards pass into the nymph state, surrounded with shells, or cases, of their own skins: So that, in reality, these nymphs are only the embryo insects, wrapped up in this covering; from whence they at last get loose, though not without great difficulty.

"During the nymph state, the creature loses its motion. Swammerdam calls it *nympha aurelia*, or simply *aurelia*; and others give it the name of *chrysalis*, a term of the like import." *Dict. of Arts*.

It is in their winged state only, that they copulate. The female lays eggs; and their offspring go through the same changes. The state of these animals may serve to remind mankind of the manner of their existence, first in mortal bodies, then in a state of death, afterwards possessed of glorious bodies. In their aurelian state, these animals have no vital motion, but are to all appearance dead. So that in their last state of existence,

istence, insects have as it were resurrection bodies.

O.

OAK, *Quercus*, a well known tree, the timber of which is of great use and importance in ship building, and architecture, and is valuable for fuel and many other purposes. The timber is both strong and durable.

Mr. Miller reckons eighteen species of the quercus, or oak. I know of but five that grow in this country, unless the swamp white oak, so called on account of its growing in wet swamps, may be a distinct species from that which grows on the upland.

The first and best is the white oak, *Quercus alba*, which bears a long shaped, small and pleasant tasted acorn. The bark is of a very light ash colour. The timber is more strong, and far more durable than the other kinds. Staves for casks, made of this tree, bear a higher price than any other. As it does not soon decay, the farmers find it convenient to have their wheels, carts, ploughs, and several other implements of husbandry, made of this timber. The butt ends of the trees which have grown in pastures, are commonly found to be extremely tough, and are most fit for the naves and spokes of cart wheels.

The black oak, *Quercus nigra*, has a very dark coloured, hard and rough outer bark. The inner bark is of a bright yellow colour, and may be used to advantage in dyes. Little or none of this oak is found in the District of Maine. Of all the kinds of oak produced in our country, this is esteemed the best for fuel, as it will burn freely in its green state: But it is not so much prized for timber as some other sorts.

The grey oak is next in quality to the white for building. The red, *Quercus rubra*, which is so called from the colour of its wood, answers well for staves, especially for molasses hogheads. But as it is not a lasting timber, it is more proper for fuel; and for the last purpose, it does not answer well in its green state. The acorns of the grey and red oak, are much larger than those of the white. The leaves are also larger, and very deeply sinuated. They are probably not different species of the oak, but only varieties.

The last kind, and the meanest of all, is the dwarf, or shrub oak, it being fit for neither fuel nor timber. It is always crooked and small, and seldom rises to the height of ten feet. It delights in a poor soil, and overruns many of our sandy and gravelly plains. It has a strong root, which will continue to send up new shoots, though they are cut off yearly; so that there is no effectual way to subdue them, but by grubbing them, or pasturing goats upon them.

As all the kinds of oak bear fruit, the shrub oak as plentifully as any, these trees are of some advantage in feeding swine and poultry. They are fondest of the acorns that grow on the white oak, as the other kinds have a bitter taste. Some persons gather them, and lay them up for winter feeding of swine. It is said that acorns were anciently used as the food of man: I suppose it must have been only those of the white oak. But even these, as well as the other kinds, are of a very astringent quality, too much so to be a very wholesome food, unless in composition with something that has a contrary quality.

The bark of oak is still more astringent, some say equally so with the *cortex peruvianus*, and may answer the same medical purposes. This bark is of great use in tanning hides, and a good ingredient in dyes.

The oak produces a fungous ball, or apple, of a loose, soft con-texture, which soon dries and falls off, and is of no use.

But besides, it has little round hard kind of excrescences, called galls, which are of great use in dying and making the best writing ink. Though they grow as large as nutmegs in other countries, those which I have found in this, have been much smaller. Perhaps trees must stand single many years, before they will be apt to produce galls of a large size. I have not found them but upon the white oak, and those not larger than peas.

I beg leave here to give the reader the history of galls, from the *Dictionary of Arts*. "An insect of the fly kind is instructed by nature to take care of the safety of her young, by lodging her eggs in a woody substance, where they will be defended from all injuries. She, for this purpose, wounds the branches of a tree; and the lacerated vessels, discharging their contents, soon form tumours about the holes thus made. The hole in each of the tumours, through which the fly has made its way, may for the most part be found; and when it is not, the maggot inhabitant, or its remains, are sure to be found within, on breaking the gall. However, it is to be observed, that in those galls which contain several cells, there may be insects found in some of them, though there be a hole by which the inhabitant of another cell has escaped."

It is to be wished, that persons in the oldest parts of the country, when an oak is felled, would search for galls. If they are produced here in plenty, it will not be right to persist in sending our money for them to foreign countries.

As trees, both for timber and fuel, are become scarce in some parts of the country, it is high time to begin to make plantations of trees for these purposes. And I know of no kind that will answer, all things considered, better than the oak. The trees are so hardy as never to be damaged by the severe coldness of our winters: Neither have they been known to suffer much by any kind of insects. The red and grey kinds are very rapid in their growth, and will soon repay the cost and trouble of rearing them: And the white is of so essential importance for timber, that a scarcity of it is to be dreaded.

Some of our pasture lands, which are high and quite bare, would be much improved, if every hundred feet square were shaded by a lofty oak: Besides gaining a beautiful appearance, especially if they were placed in regular order. Barren heights, in some pastures, are in great want of trees to shade them. Copses, or clumps, in such places, would have excellent effects. There would be more grass, the appearance would be beautiful, and the profit considerable. But the question is, in what manner shall oaks be propagated? They may undoubtedly be raised in nurseries, and transplanted, as well as other trees. But this method is not universally approved.

Mr. Miller says, oaks are best produced from the acorns in the places where the trees are to re-

main ; because those which are transplanted, will not grow to so large a size, nor remain sound so long. He advises to planting the acorns as soon as they are ripe in October, which will come up in the following April ; because if they are attempted to be kept, they will sprout, although spread thin. He directs that the ground designed for a plantation, should have a good and durable fence ; that it be prepared by three or four ploughings and harrowings ; that the acorns be taken from the largest and most thrifty trees ; that they may be sowed in drills about four feet asunder, two inches deep, and two inches apart ; that the ground should be ploughed and hoed among them, during the first eight or ten years ; that after two years some of them should be drawn out where they are too close ; and so from time to time as they grow larger, till they come to be eight feet distance, each way, when they will want no further thinning for a long time. . But after the trees come to be large, he thinks 25 or 30 feet apart will be the right distance.

Another writer directs that the acorns be gathered as soon as they fall in autumn, and kept in a box or boxes of sand till the following spring. Then open them, and carefully plant those of them which are sprouted, which he says will not fail to come up. But no time should be allowed for the sprouts to dry. I incline to prefer this method, especially since I have tried that which is recommended by Mr. Miller without success. Not one in a hundred ever came up.

A rich deep soil suits the oak best, and in such land they will grow to a large size. The timber is apt to be tough and pliable :

But in a gravelly soil, or one that is dry and sandy, the wood is more hard and brittle. The oak, however, will grow in almost any soil that is not too wet.

Many are apt to object against attempting to raise timber trees, that they shall not live to receive any advantage from them. But do they think they were born for themselves only ? Have they no great regard for the welfare of their own children ? Do they not care how future generations fare after they are gone ? The more growing trees they leave upon their farms, the better will their children be endowed ; and does this appear as a matter of indifference ? Or if they should providentially be under the necessity of selling their farms while they live, will they not be prized higher, by any rational purchaser, for having a few hundreds of thrifty young trees growing upon them ? But it is possible that while they hold their farms, they may receive actual advantage from their trees themselves. Possibly trees may grow faster than they apprehend. The Marquis of Lansdown planted with trees a swampy meadow, with a gravelly bottom, in the year 1765, and in the year 1786, the dimensions of the trees were as represented in the following table.

	Height in Fet.	Circumf. Ft. In.
Lombardy poplar	60 to 70	4 8
Arbeal - - -	50 70	4 6
Elm - - -	40 60	3 6
Chestnut - - -	30 50	2 9
Weymouth pines	30 50	2 5
Scotch fir - - -	30 50	2 10
Spruce - - -	30 50	2 2
Larch - - -	50 60	3 10

The measures were taken five feet above the ground. It appears that if trees can be waited for 21 years

years they will repay the cost, by becoming fit for many important uses. And I am persuaded that some of the species of oak will grow as fast as most of the trees, in the foregoing table.

One acre will bear 160 oaks, at the distance of 15 feet from each other : If each tree will grow in 30 years to half a cord of wood, worth 12s. per cord, the whole produce will be 90 cords of wood, worth 160 dollars, which is four dollars and a third per acre per annum, for the use of the land, a greater profit than we expect from other acres in general. It ought to be considered that intermediate trees taken out young may pay the cost of planting and culture ; and that the land may serve most of the time for tillage or pasture ; for tillage while the trees are small, which will hasten their growth. The increasing dearth of fuel and of timber should put the holder of land, in old settlements, upon thinking of the cultivation of all trees that are useful for either of these purposes. The day is at hand, if not already arrived, when this will be one of the most profitable, as well as important, branches of husbandry.

OATS, *Avena*, a well known grain, very pleasant and nourishing to horses, and conducive to keep them in health. Though other sorts of grain are too binding, oats have a contrary effect ; and even too much so, unless they be sweated in a mow before they be thrashed. The flour of this grain is no bad ingredient in table provisions. It is highly approved for gruels and puddings : And would be more used, were it not for the difficulty of divesting the grain of its husk.

There are varieties of this grain, distinguished by their different

colours, the white, the black, the grey, and the brown oats ; but as these differ only in colour, they are not considered as distinct species.

The white oats which are most commonly cultivated in this country, are generally preferred in other countries, as producing the best crops. But I suspect that sufficient trials have not yet been made here, in the culture of the black oats. The produce of them from a few corns sowed in a garden, has been astonishing. But this might be owing to the newness of the seed in our climate, or to some circumstance less considerable, or less obvious.

There is also a species of the naked oats. This, one would think, must have the advantage of other oats, as it is thrashed clean out of the husk, fit for grinding. But with this grain we are yet unacquainted.

I have lately met with the Tartary oats, which resemble our white oats, but differ in their manner of growing. They bear very plentifully : But are rather apt to lodge.

Oats cannot be sowed too early in the spring, after the ground is thawed, and become dry enough for sowing. The English farmers sow them some time in February. But in a wet soil they sometimes answer very well, though sowed in June.

Three bushels of seed is the usual quantity sown on an acre. This quantity say some will be rather more than enough on a rich soil. If the soil be poor, the quantity of seed should be the greater, say they, as the plants will be smaller, will not tiller ; and so may stand the nearer each other without crowding. But this is a matter of opinion only, and may be a mistake.

Oats have strong piercing roots, and are called hearty feeders, so that they can find their nourishment in stiff soils; and for the same reason they sometimes produce great crops when sown after one ploughing. But two ploughings are generally better for them than one.

When they are cultivated according to the new husbandry, they should be sowed in double rows, fifteen inches apart, on beds six feet wide. For they will grow taller than wheat, and therefore require more room. One bushel of seed will be sufficient for an acre in this way. Some advise to brining and liming the seed; but this may as well be omitted, unless when they are sowed late. It may serve in this case to quicken their growth.

Oats should be harvested in a greener state than other grain. The straw should not be wholly turned yellow. It will be the better fodder, if it do not stand till it be quite ripe and sapless. Mr. Cook, an English writer, recommends cutting them about four or five days before the state of ripeness; and says they will improve by lying on the ground. But if they be quite ripe when they are cut, they will be apt to shed out by lying.

Though they should be well dried on the ground after cutting, they should not be raked, nor 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. If they should be got in when they are somewhat damp, there will be no danger, having been before thoroughly dried; for the straw and chaff are of a very dry nature.

Some choose to reap them? But the straw is so valuable a fodder, that it is better to cradle or mow them. And that the ground may be well prepared for mowing and raking, a roller should be passed over it after sowing and harrowing: But some prefer rolling the ground after the grain is some inches high; it is said to close the soil to the roots, and make the grain grow with fresh vigour.

Oats are so apt to rob land of its richness that they should not be sowed on the same spot twice in succession, unless the soil be very plentifully manured. 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 enough for other grain: Or they may follow wheat or barley. In the latter case, the wheat or barley stubble should be ploughed in as soon as the crop is off.

OLIVE, *olea*, the famous tree which produces oil. A species of these trees grow wild in the woods and forests of France. But those which they cultivate prosper well, and are so fruitful and profitable, that the oil is an article of their exportation, particularly in Provence and Languedoc.

Even in England the trees have produced fruit in the open air fit for pickling, though their summers be not warm enough to bring the fruit to maturity.

I am persuaded our summers are hot enough for this tree, so that we might cultivate it to advantage, if our winters do not prove to be too cold. It is said to grow on any kind of soil, though largest in a rich one: But to produce the best oil in a poor lean soil. As Boston and the fotherly

southerly part of France are in the same latitude, it is to be wished that trials may be made to cultivate those trees in this country. Whoever attempts it, should let them be screened, either by buildings, or high fences; from the cold northwardly winds.

But if this climate should not suit them, doubtless they may be cultivated to advantage in some of the southern states. And I think every possible attempt should be made, that may enable us to live less dependently on Europe. The oil and pickled olives brought from thence, amount to more than a trifle; which ought to be saved if practicable.

ONIONS; *Allium*; a well known esculent root. The common sort have purple bulbs: The white, or silver skinned; which are supposed to have come from Egypt, are by some preferred to the other: They have not so strong a taste:

This plant flourishes so well in the southern parts of Newengland, that it has long been a considerable article of exportation; in the northern parts; it requires the very best culture; but even there; onions may be raised in sufficient plenty for home consumption.

A spot of ground should be chosen for them, which is moist and sandy; because they require much heat, and a considerable degree of moisture: A low situation, where the sand has been washed down from a neighbouring hill, is very proper for them. And if it be the wash of a sandy road, so much the better: The most suitable manures are old rotten cow and horse dung mixed, ashes, but especially foot. A small quantity of ashes or sand, or both, should be spread over

them after sowing, especially if the soil be not sandy. And it is not amiss to roll the ground after sowing; or harden the surface with the back of a shovel.

I have many years cultivated them on the same spot; and have never found the land at all impoverished by them. But on the contrary, my crops are better than formerly. But the manuring is yearly repeated; and must not be laid far below the surface.

The ground should be dug or ploughed in autumn, not very deep; and then made very fine in the spring, and all the grass roots, and roots of weeds, taken out; then laid in beds four feet wide. Four rows of holes are made in a bed, the rows ten inches apart, and the holes in the rows ten. About half a dozen seeds are put in a hole, or more if there be any danger of their not coming up well, and buried an inch under the surface. This is allowed by the experienced cultivators in Connecticut, to be the best way of setting the seeds: For they will grow very well in bunches: I have lately found that they grow full as well in drill rows a foot asunder: They crowd each other up out of the soil, and lie in heaps as they grow upon the surface. Though the largest onions are those that grow singly, some inches apart, those that are more crowded produce larger crops: And the middle sized onions are better for eating than the largest.

The last week in April is the right season for sowing the seeds; if the ground be capable of being got into proper order so early. In wet ground it is often necessary to sow them later.

Last year I sowed my onions in drills, twelve inches apart, across

across the beds : And I found my crop was near double to what it used to be, when they were sowed in bunches. Perhaps this will prove to be the better method. But I gave them also a slight top dressing of foot, just before they began to form bulbs, which might be the true reason of the great increase : So that I dare not yet absolutely prefer the drill method to the other ; though I am much inclined to give it a decided preference.

Onions should be hoed three or four times, and kept quite clear of weeds, before the tops arrive to their full height. At this time the bulbs will begin to swell ; hoeing should therefore be laid aside, and the weeds pulled up by hand as often as they appear. Weeds not only rob the plants of their food, but injure them much with their shade ; for they have occasion for all the warmth of the sun that they can get.

To promote the growth of the bulbous roots, I have found it advantageous to trample the ground hard between the rows or bunches, and to draw the soil away from the bulbous roots, laying them bare to the sun. They are the more warmed, and grow faster.

Some think it proper, and even necessary, to pass a roller over beds of onions, or cripple down their tops by hand. But I have never been able to find the least advantage from either of these methods : Nor do I think they ought to be practised ; for I cannot easily conceive how the crushing and wounding any plant, while it is growing, should conduce to its improvement. Though some may have good crops, who treat them in this manner, I am persuaded that if

they neglected it, they would have much better crops. For, besides the mischief already mentioned, the sun is shut out from the bulbs by crushing the tops down upon them ; but the more upright the tops are, the more the sun will shine upon the roots. I would sooner cut off part of the tops than go to crushing them.

Others shake and twist the tops, to loosen the bulbs in the soil, which I cannot approve of : For if it do not snap off some of the fibrous roots, it gives too free a passage of the air to them, by which, if dry weather follow, they will be injured, rather than assisted in their growth.

When onions are thick necked, do not incline to bottom, but rather to be what are vulgarly called scallions, the more care should be taken to harden the ground about them, and to lay the bulbs bare to the sun. And it may be proper to let them touch the soil only in that part which sends out the fibrous roots.

At the worst, if they fail to have good bottoms the first year, and chance to escape rotting till spring ; they may perhaps get them by being transplanted. Even an onion which is partly rotten will produce two, three, or four good ones, if the seed stems be taken off as soon as they appear. They ripen earlier than young ones, have the name rare-ripes, and will sell at a higher price.

When onions are so ripened that the greenness is entirely gone out of their tops, it is time to take them up : For from this time the fibrous roots decay, and no longer convey any nourishment to the bulbs, as appears by their becoming quite loose in the soil, and easy to take up.

After

After they are pulled up they should lie on the ground for ten days or a fortnight, to dry and harden in the sun, if the weather be fair. Then, in fair dry weather, be moved into a garret, and laid thin. The scallions should not be mixed with the good onions, lest they should cause them to rot; but be hung up in some dry place in small bunches, where they will not be too much exposed to frost.

That onions may keep well through the winter, they should not be trusted in a warm and moist cellar; but have a situation that is dry and cool. Moisture soon rots them, and warmth causes them to vegetate. A degree of cold which would ruin most other esculent roots, will not injure them at all. The spirit that is in them is sufficient to enable them to resist a considerable degree of frost. Accordingly, in the southern parts of this country, as I am informed, they are usually kept through the winter in dry casks placed in chambers, or garrets. But they should not be removed, or touched, while the weather is very frosty.

Those which are shipped for market, are usually made into long bunches, by tying them to wips of straw.

When onions are kept long, they are apt to sprout, which hurts them for eating. To prevent this, nothing more is necessary than to scar the fibrous roots with a hot iron. The pores of the roots will thus be stopped, through which the air enters and causes them to vegetate.

To obtain seed from onions they should be planted early in beds, about nine inches apart. The largest and foundest are best. In a month the tops will appear; and each one will send up sever-

al stems for seed. They should be kept free from weeds; and when the heads of the flowers begin to appear, each plant must have a stake about four feet long, and its stems be loosely tied to the stake by a soft string of sufficient strength. If this be neglected, the heavy tops will lay the stalks on the ground, or the winds will break them. In either case, the seeds will fail of coming to perfection.

ORCHARD, an enclosed plantation of fruit trees, not again to be removed.

An orchard may consist wholly of pear trees; or of quince, peach, plum, &c. or it may be a mixture of various kinds of trees. But orchards of apple trees are the most important, and are almost the only ones in this country. Other fruit trees are commonly planted in the borders of fields, or gardens; because only a small number of them is desired, or considered as advantageous, by farmers.

The soil for an orchard should be suited to the nature of the trees planted in it. Though a clay soil will do well for pear trees, it is not at all suitable for apple trees. Dry sand and gravel are not good; but a deep hazel loam is preferred to any other soil; and it is the better if it be somewhat rocky and moist.

Plains, hollows, or high summits, are not so good situations for orchards, as land gently sloping: And a southeastern exposure is generally the best. But when this exposes the trees to sea winds, a southwestern exposure may be accounted better,

If the land be swarded, it should be broken up and tilled one year before the trees are planted; and if it be dunged it will be better for the trees. The rocks should

should also be taken out ; because it cannot be done so conveniently afterwards. And if there be any large stumps of trees, which would last long in the ground, they should be taken out. Otherwise they will render the operations of tillage in the young orchard very difficult.

Trees which are ungrafted are supposed to bear as good fruit as any for cyder. They commonly bear more fruit, and will last longer.

But when grafted trees are to be transplanted, those should be chosen that have not been grafted more than two years. Old stunted trees, the refuse of a nursery, are to be avoided, which will grow very slowly, if at all. For directions concerning the time and manner of planting an orchard, see *Fruit trees and Transplanting*.

Concerning the right distance of the trees in an orchard, there are a variety of opinions. But the coldness and wetness of the climate, an argument used in England for placing them far asunder, does not so well apply in this country. Trees in that cold and cloudy region need every possible advantage of exposure to the sun and air. It should be considered at the time of planting, to what size the trees are likely to grow : And they should be set so far asunder, that their limbs will not be likely to interfere with each other, when they arrive to their full growth. In a soil that suits them best, they will become largest. Twenty five feet may be the right distance in some soils ; but thirty five feet will not be too much in the best, or even forty. If, contrary to expectation, they should be too close when they are grown up, they may be easily thinned : And it will be better to take away here

and there a whole tree, than to lop and maim them all, that they may have room.

The planting of small trees in the midst of full grown ones does not answer so well for the small ones, as when the trees are all nearly of one size. A small tree among large ones has not an equal chance of exposure to the sun and air : Both of which are of great importance. So that it is of the less importance to replace a tree that dies in an orchard. And it is of no advantage to do it, when the nearest neighbouring trees appear to be rather too much crowded.

An orchard must be constantly well fenced, to keep out cattle. It should be enclosed by itself. Hungry sheep would peel the trees while they are young ; and cattle will bite off all the limbs of young and old trees that are within their reach. But there is no danger in turning in a horse occasionally, when there is grass and no apples ; and swine may be confined in an orchard that is grown up, so that the trees cannot be hurt by them, and when the fruit is not in their way.

Sheep sometimes get into an orchard that is well fenced, by means of high banks of snow, when they are stiff or crusted. I can think of no better way to prevent this, than to make the fence so open, with round poles, or pickets, that the snow will pass freely through it, and not rise in high banks. The latter kind of fence might be so constructed as to keep out such creatures as are apt to take fruit from the trees, without leave of the proprietor.

After an orchard is planted, it is best to keep the land continually in tillage, till the trees have nearly got their full growth ; at least till they have begun to bear plentifully.

plentifully. The trees will grow faster, and be more fruitful. But great care must be taken that the roots be not disturbed by ploughing, nor the bark on the stems of the trees wounded. The ground near the trees, which the plough leaves, should be broken and made mellow with a spade, for two or three years, before the roots have far extended.

Severe prunings should generally be avoided. The limbs that interfere, and rub each other, must be cut out; but never shorten the shoots, nor cut off any of the bearing spurs. Take off all decayed and broken branches, close to the stems from whence they are produced; and cut away all suckers, as soon as they appear, whether from the roots, trunks, or any other parts. Pruning should be done in November, or in the beginning of December. In the depth of winter it will be apt to be neglected, and towards spring the sap will be in motion, and the buds swelled. But suckers should be taken away whenever they appear. This requires close attention.

In some of our new towns and plantations, woodpeckers attack apple trees. They girdle the trunks of the trees with a row of deep holes, and sometimes with several rows; which renders the trees sickly and unfruitful. I am informed that sinearing the part with cow dung where they have begun, causes them to desist. A piece of birch bark, put round the part where they usually peck, might guard a tree against them. It will hold itself on for a long time, wherever it is put, and not need renewing. The birds seem to be most fond of pecking on the upper part of the stems, near to the lowest branches.

ORE WEED, *sea weed, sea ware, or sea wreck*. These names are applied to all the vegetables which grow plentifully in the sea, and on the muddy and rocky parts of the shore below high water mark.

The sorts are chiefly three; the kali, or rock weed, which strongly adheres to rocks, and which is allowed to be of the greatest value for manure. The alga, called eel grass, or grass wreck, is of the next rank as to its richness. But there is another sort, consisting of a broad leaf with a long shank or stem, of an inch diameter, by some ignorantly called kelp; this is said by Sir A. Purves to be of the least value of any of the sea weeds. However, none of them are unimportant for fertilizing the earth.

All vegetables when putrefied are a good pabulum for plants; for they consist wholly of it. But the value of marine vegetables is greater than that of any other; for, besides the virtues of the other, they contain a large quantity of salt, which is a great fertilizer. Mr. Dixon thinks those weeds which grow in the deepest water are the best. Perhaps they contain a greater proportion of salt than those which grow near the shore, as they are seldom or never wetted with fresh water.

A great advantage that these plants have above any other, is their speedy fermentation and putrefaction. The farmer has no need to wait long after he has got them, before he applies them to the soil. The rock weed may be ploughed into the soil, as soon as it is taken from the sea. This is practised in those parts of Scotland which lie nearest to the shore; by which they obtain excellent crops of barley, without impoverishing the soil. Neither have they any occasion for sal-

lowing

lowing to recruit it. In hills of potatoes, it answers nearly as well as barn dung. I have known some spread it upon young flax newly come up, who say it increases their crops surprisingly. The flax may grow so fast, and get above this manure and shade it, so soon, as to prevent evaporation by the sun and wind; so that but a small part of it is lost; and flax is so hardy a plant that it does not suffer by the violence of salt, like many other young plants.

But I rather think it is best to putrefy sea weeds before they are applied to the soil. This may speedily be accomplished by laying them in heaps. But the heaps should not lie naked. Let them be covered with loose earth or turf; or else mixed in compost dunghills, or laid in barn yards with divers other substances. This substance will soon dissolve itself, and what is mixed with it, changing to a salt oily slime, very proper to fertilize light soils, and not improper for almost any other.

As to the eel grass, &c. the best way is to cart it in autumn into barn yards; filling the whole areas with it, two or three feet deep. It may be either alone, or have a layer of straw under, and another above it. When it has been trampled to pieces by the cattle, and mixed with their stale and dung, it will be fittest to be applied to the soil. It being a light and bibulous substance, it will absorb the urine, which is totally lost by soaking into the earth, unless some such trash be laid under, cattle to take it up, and retain it.

Farmers who are situated near to the sea shore have a vast advantage for manuring their lands. If they were once persuaded to

make a spirited improvement, they might enrich their farms to almost any degree that they please. They should visit the shores after spring tides and violent storms, and with pitchforks take up the weeds, and lay them in heaps a little higher up upon the shore; which will at once prevent their growing weaker, and secure them from being carried away by the next spring tide.

Many are so situated that they can drive their carts on a sandy, hard beach, at low water, to the rocks; and fill them with weeds. Can they be so stupid as to neglect doing it? It is even worth while to go miles after this manure with boats, when it cannot be obtained more easily.

It has often been observed that manuring with sea weeds is an excellent antidote to insects. It is so, not only in the ground, but also upon trees. I have an orchard which has been for many years much annoyed by caterpillars. Last spring, about the last of May, I put a handful of rock weed into each tree, just where the limbs part from the trunk; after which I think there was not another nest formed in the whole orchard. April is a better time to furnish the trees with this antidote to insects. And the month of March is perhaps better still.

Putrefied sea weeds should, I think, be used for crops of cabbages, and turnips, and for any other crops which are much exposed to be injured by insects.

One disadvantage attending the business of farming in this country, is, that our cold winters put an entire stop to the fermentation, and putrefaction of manures. This may be in some measure obviated by the use of rock weed, which is so full of salt that it is not easily frozen: Or if frozen, it is soon

soon thawed. I have been informed that some have laid it under their dunghills by the sides of barns; in which situation it has not frozen; but by its fermentation has dissolved itself, and much of the dung that lay upon it. There is undoubtedly a great advantage in such a practice.

Another advantage of this kind of manure, which must not be forgotten, is, that it does not encourage the growth of weeds so much as barn dung. It is certain it has none of the seeds of weeds to propagate, as barn dung almost always has. But some suppose that its salt is destructive to many of the seeds of the most tender kinds of plants; if it be so, it is only when it is applied fresh from the sea, at the time of sowing. But even this is doubtful.

This manure is represented in the Complete Farmer to be twice as valuable as dung, if cut from the rocks at low water mark; that a dressing of it will last three years; and that fruit trees which have been barren are rendered fruitful by laying this manure about their roots.

OSIER, *Salix, Sallow*, or *Willow Trees*. According to Mr. Miller there are fourteen species; the twigs of some of which are much used by basket makers in Europe.

A sort of grey or brown willow grows naturally in this country, in low moist places. But it is only a bushy shrub, of slow growth, and has not that toughness in its shoots for which some of the foreign willows are valued.

Two sorts are propagated in this country, which were brought from Europe. The young shoots of the yellow sort have a golden colour; but the trunks of the trees are almost black. The green sort bids fair to be more useful

than the other. They will grow in almost any soil, and come to be large trees; but a moist soil suits them best. I have known the green sort to grow where the ground is some part of the year flowed with water, as in the borders of rivers and ponds.

It might be advisable for the people in some parts of the country to propagate them for the sake of the wood. I know of no other trees that increase nearly so fast as both these kinds do. A prodigious quantity of wood might be obtained from an acre planted with them. In less than twenty years they would be large trees. I have known sets, or cuttings of the smallest size, in ten years, grow to the size of thirty inches round, or ten inches diameter.

The trees are easily propagated by cuttings, or sets, either in spring or fall. If in spring, they should be planted early, as soon as the ground is thawed. Young sets should be three feet long, and two thirds of their length in the ground.

Live hedges may be more cheaply and expeditiously made of osiers than of any other plants. Stakes or truncheons of seven or eight feet long may be set in a spongy or miry soil; they will take root and grow, and form a hedge at once. This saves the cost of securing a young hedge. It is with great pleasure that I observe some fences of this kind are begun in the country. It is a very cheap and easy method of fencing, which cannot be too much encouraged. The trimmings of the hedges will be of great value in towns where wood is become scarce, and may be had yearly. See *Willow*.

OVERFLOWING of the GALL, a disease in horned cattle,

the, known by a copious discharge of water at their eyes. To cure it, take a hen's egg, open the end, and pour off the white, reserving the yolk; then fill up the cavity with equal quantities of foot, salt and black pepper; draw out the tongue of the animal, and with a slender stick push the egg down his throat. It should be repeated two or three mornings. It seldom fails to cure.

OUT HOUSES, slight buildings that belong to a mansion house, but stand at a little distance from it. When it can conveniently be so ordered, the out houses of a farmer ought to be so placed as to be all contiguous to the farm yard. Then all the dung, filth and rubbish they afford at any time, may be flung into the yard, without the trouble of carrying; where they will be mixed and mellowed by the trampling of beasts, and contribute to the increase of manure.

OX, a castrated bull. Till they are four years old, they are usually called steers, afterwards oxen. Oxen that are white, black and white, or a very pale red, are seldom hardy, or good in the draught. Red and white oxen are often good; but the darkest coloured oxen are generally best. Brown, dark red and brindled are good colours.

The signs of a good ox are these: Thick, soft, smooth and short hair; a short and thick head; glossy, smooth horns; large and shaggy ears; wide forehead; full, black eyes; wide nostrils; black lips; a thick fleshy neck, and large shoulders; broad reins; a large belly; thick rump and thighs; a straight back; a long tail, well covered with hair; short and broad hoofs.

Steers at the age of two years and a half, or earlier, may be

yoked and trained for the draught. If it be longer delayed, they are apt to be restiff and ungovernable. They should not be worked by themselves, but in a team with other cattle which have been used to labour. Their work should be very easy at first, and only at short intervals, as they are apt to fret and worry themselves excessively. A gentle usage of them is best, and beating them should be avoided.

If oxen are worked in the yoke in wet and rainy weather, which sometimes unavoidably happens, their necks are apt to become sore. To prevent this, a little tallow should be rubbed on the parts of the yoke which lie upon their necks, and also upon the bows.

When steers come to be four years old, they have one circular ring at the root of their horns, at five two rings, and one ring is added each year; so that if you would know the age of an ox, count the rings on one of his horns, and add three, which amounts to the true number of his years. It is the same in a bull, and a cow. In very old cattle, these rings are sometimes rather indistinct.

When an ox has completed his eighth year he should be worked no longer, but be turned off to fatten. His flesh will not be so good, if he be kept longer. A little blood must be taken from him, that he may fatten the faster.

OYSTER, or OISTER, a bivalve testaceous fish. The lower valve is hollowed on the inside, and protuberant without: The upper shell is flat or hollow on the outside. The shells of these fish are an excellent manure, but being large they should be burnt to lime before they are applied to the soil.

P.

PALE, a pointed stake, used in making enclosures, partitions, &c. Gardeners oftentimes have occasion to make pale fences, to secure choice apartments from the entrance of tame fowls, which will not often fly over a paled or picketed fence : As well as to prevent the intrusion of idle and mischievous people.

PAN, a stratum of compact earth under the soil. In some places it is so hard that it cannot be dug through without pickaxes or crows. If the pan be low, the soil is said to be deep and good ; but if near the surface, the soil is thin and poor. The common depth in good land is from eighteen to twenty four inches.

The deeper strata, or layers in the bowels of the earth, are supposed to have been formed, by the diurnal rotation of the earth, before it had become compact and solid. But this stratum being more constant and regular, the formation of it, if I mistake not, should be ascribed to other causes. If we suppose that this and the soil above were intermixed, and of one consistence after the creation, the pan must have been formed long before this time, by the subsiding of the more ponderous parts of the soil. For it has been often observed, that clay, chalk, and lime, which have been laid on as manures, after some years, disappear from the surface, and are found a foot or more beneath it. Rains, and fermentations in the soil, make way for the descent of the heaviest particles contained in the soil.

It is in favour of this hypothesis, that the pan under the soil most commonly bears an affinity to the soil itself. Under a grav-

elly soil, there is a large proportion of gravel in the pan ; under a sandy one it usually is found to consist chiefly of sand ; and under a stiff loam it is commonly clay : I think it is always found to be so.

But I suppose the operation of frost should be considered, as assisting in forming the pan. All the soil above it is usually hovent by the frost in winter. At least it is so in this latitude. We see rocks and stones below the surface when the ground is frozen, which before were on a level with it ; and in a soft soil they do not rise quite up to their former situation, when the ground is thawed. The frost does more than tillage, and perhaps more than rains, or fermentation, towards causing the more ponderous parts of the soil (or ponderous bodies in the soil) to subside, or sink.

The frost may have another influence in increasing the compactness of the under stratum. As the frost expands the soil, the pressure of it downward is increased ; by which pressure, the matter of which the pan consists, is made most close and hard, like earth that has been violently rammed. But this perhaps can take place, only when the frozen stratum is held down by strong objects, which reach far below the frost and pan ; as the stumps of large trees deeply rooted, large rocks, &c.

But it will be objected, that some soils appear to have no pan under them. To answer this, it may be said, that perhaps some soils were originally made up of particles equally ponderous ; so that one had no more tendency to subside than another. Or else the looseness and openness of the under earth in such places, was so great that it could not stop the ponderous

ponderous parts of the soil in their descent; so that they have been dispersed among the loose earth, and part of them gone to a very great depth.

If I have given a just account of the formation of the pan, will it not follow, that this under stratum is less penetrable in cold than in warm latitudes, when made of like materials? So far as my observation has extended, this appears to be the case. It ought also to be lower in the earth, and the soil deeper; and future observations may convince us that this also is fact.

Another corollary may be, That deeper ploughing than is usually practised in this country would be proper. For it seems that nature designed all the strata above the pan to serve for pasture of plants. And it is well known that the more it is stirred and mixed, the fitter it is for this purpose; not only because it lies the more loose and open, but because the more of the food of plants will be contained in it.

Such a stratum, at a right distance from the surface, is a great benefit to the soil. For, as no manures can easily penetrate it, they must remain in a good situation to be taken up by the roots of vegetables. But where there is no compact under stratum, unless at a great depth, manures laid upon the soil are partly lost. Hence appears the great propriety of claying and marling such soils. In a long course of tillage, these dressings will subside, and do something towards forming the stratum that is wanted.

But to form a good under stratum at once, where it is wanted, let one hundred or more loads of clay be spread on an acre of sandy grass land. After it has lain, spread upon the surface one,

winter, let it be made perfectly fine and even by a bush harrow, and rolled. Afterwards turn it under with a very deep ploughing. This will greatly assist a weak dry soil to retain moisture, and to hold the manures that shall be given it. It will be a lasting benefit. But this ploughing should be done at a time, when the clay is so damp that it will turn over in whole flakes.

When a plot of ground intended for a garden wants an under stratum, it may be advisable to dig trenches four feet wide, and place a regular bed of clay in the bottom. The second trench may be contiguous to the first, and the first be filled up with the earth that is taken out of the second; and so on till the whole work is completed.

Some have put themselves to the expense of this operation, only with a view to get rid of all the seed of weeds in a garden which had long lain neglected, placing the upper part of the soil at the bottom.

PANAX, GINSENG, or NINSENG. As this plant is a native of our country, and is become a considerable article of commerce, I think it is necessary that every one should know how to distinguish it from all other plants when he meets with it. I desire therefore to entertain the reader with Mr. Miller's account of it.

“It hath male and hermaphrodite flowers on distinct plants. The male have simple globular umbels, composed of several coloured rays, which are equal. The flower hath five narrow, oblong, blunt petals, which are reflexed, sitting on the empalement, and five oblong slender stamina inserted in the empalement, terminated by single summits. The hermaphrodite

hermaphrodite umbels are simple, equal, and clustered; the involucrum is small, permanent, and composed of several awl shaped leaves. The flowers have five oblong, equal petals, which are recurved, and five short stamina terminated by single summits, which fall off, with a roundish germen under the empalement, supporting two small erect styles, crowned by simple stigmas. The germen afterwards becomes an umbilicated berry with two cells, each containing a single heart shaped, convex, plain seed.

"The species are, 1. *Panax quinquefolium, foliis ternis quinatis*; or panax with trifoliate cinquefoil leaves; called ninzin. 2. *Panax trifolium, foliis ternis ternatis*; or panax with three trifoliate leaves.

"Both these plants grow naturally in North America; the first is generally believed to be the same as the Tartarian Ginseng. It has a fleshy taper root, as large as a man's finger, which is jointed, and frequently divided into smaller fibres downward. The stalk rises above a foot high, naked to the top, where it generally divides into three small foot stalks, each sustaining a leaf composed of five spear shaped lobes, which are sawed on their edges; they are of a pale green, and a little hairy. The flowers arise on a slender foot stalk, just at the division of the foot stalks which sustain the leaves, and are formed into a small umbel at the top; they are of an herbaceous yellow colour, composed of small petals, which are recurved. These appear the beginning of June, and are succeeded by compressed heart shaped berries, which ripen the beginning of August. The Chinese affirm that it is a sovereign remedy for all weak-

ness occasioned by excessive fatigues, either of body or mind; that it cures weakness of the lungs and the pleurisy; that it stops vomitings; that it strengthens the stomach, and helps the appetite; that it strengthens the vital spirits, and increases the lymph in the blood; in short, that it is good against dizziness of the head, and dimness of sight, and that it prolongs life in old age."

Mr. Miller found he could not propagate this plant by the seed, either raised in England, or brought from America. None of the seeds would grow. He believes the hermaphrodite plants should have some of the male plants standing near them, to render the seed prolific; for all the plants he saved seed from had only hermaphrodite flowers.

PANIC, or PANNIC, a kind of grain that resembles millet, and requires the same culture. Of this grain whole fields are cultivated for bread, in Germany and Italy. The Italian kind is said to be larger and better than the German.

PARSNIP, *Pastinaca*, an esculent root, of a sweet taste, and of a very nourishing quality.

Parsnips must have a mellow, rich and deep soil, not apt to be very dry. The best tasted roots are produced in a soil that is more sandy than loamy. When they are cultivated in kitchen gardens, the ground should be dug uncommonly deep; eighteen or twenty inches at least. No common ploughing will loosen the soil to a sufficient depth. The goodness of a crop of these roots depends much upon their length.

If they be set near together, they will not grow to a large size.

fize. I sow them in rows across the beds, 15 inches apart, and allow about six inches from plant to plant at the last thinning, which may be early, as they are not often hurt by insects. I have seldom known any to be destroyed by them.

The seeds should be sowed as early as in March, if the ground be thawed, and not too wet. Some sow them in the fall; but that is not a good practice, because the ground will grow too close and stiff, for want of stirring in the spring; which cannot well be performed in gardens, without danger of injuring the roots. And weeds will be more apt to abound among them, if they be sown in autumn.

The manure that is used for parsneps should be very fine and rotten, and quite free from straws and lumps; otherwise it will cause the roots to be forked, which is a great damage to them. They require but little manure, as they draw much of their nourishment from a great depth. What manure is given them, should be spread before digging the ground, that some of it at least may go deep. They do not impoverish the soil. I have raised them near thirty years in the same spot, on a soil not naturally rich, and with a very slight yearly dressing. The crops are better than they were at first: And the earth is become very black to a great depth.

Parsneps will continue growing so late as till the tops are killed by the frost, if not longer. Some let them remain in the ground through the winter, expecting that they will grow larger in that season. But it is not possible they should grow at all, so long as they are enclosed with

the frozen soil. They may possibly grow a little in the spring, before there is opportunity to take them up, if they escape rotting. But their growing will be chiefly sprouting at the top, which hurts them for eating. As soon as they begin to sprout, which will be as soon as the ground is thawed, they will begin to grow tough, and to have a bitterish taste.

The best way is to dig them up about the last of November, or in the beginning of December. Let them not be wounded, or so much as touched with the spade in doing it, if it can be avoided; neither should the tops be cut off very close to the roots, nor any of the lateral roots cut off. In either case the roots will rot, or become bitter.

Many lose their parsneps, or make them sprout, by putting them into a warm cellar. It is better to keep them in some out house, or in a cellar that freezes; for no degree of frost ever hurts them. But to prevent their drying too much, it is best to cover them with dry fods, or else bury them in sand that has no moisture in it. Beach sand is improper, because the salt in it will make them vegetate.

It is said by European writers, that parsneps are an excellent food for swine, and useful for feeding and fattening all sorts of cattle.

If we would cultivate them for these purposes, the horse hoeing husbandry must be applied. The ground must be trench ploughed in October, and all the stones carefully taken out. The trench ploughing must be repeated before the end of November, the soil made fine by harrowing, laid in beds of from three to four feet wide, and sown by a line in drills on the middle of the beds. There may

may be either one or two rows on a bed. If there be two, they should be full twelve inches apart, and the intervals proportionably wider.

Autumnal sowing in the field culture is not amiss, as the ground is to be kept light by horse hoeing. In this operation the ground should be stirred very deep. The plough should go twice in a furrow. At the last ploughing, the furrows should be turned towards the rows.

PASTURE, according to the language of farmers in this country, means land in grass, for the summer feeding of cattle.

To manage pasture land advantageously, it should be well fenced in small lots, of four, eight or twelve acres, according to the largeness of one's farm and flock. And these lots should be bordered at least with rows of trees. It is best that trees of some kind or other should be growing scattered in every point of a pasture, so that the cattle may never have far to go in a hot hour to obtain a comfortable shade. The grass will spring earlier in lots that are thus sheltered, and they will bear drought the better. But too great a proportion of shade should be avoided, as it will give a sourness to the grass.

Small lots, thus sheltered, are not left bare of snow so early in the spring as larger ones lying bare, as fences and trees cause more of it to remain upon the ground. The cold winds in March and April hurt the grass much when the ground is bare. And the winds in winter will not suffer snow to lie deep on land that is too open to the rake of winds and storms.

It is hurtful to pastures to turn in cattle too early in the spring: And most hurtful to these pastures

in which the grass springs earliest, as in very low and wet pastures. Potching such land in the spring, destroys the sward, so that it will produce the less quantity of grass. Neither should cattle be let into any pasture, until the grass is so much grown as to afford them a good bite, so that they may fill themselves without rambling over the whole lot. The 20th of May is early enough to turn cattle into almost any of our pastures. Out of some they should be kept later. The driest pastures should be used first, though in them the grass is shortest, that the potching of the ground in the wettest may be prevented.

The bushes and shrubs that rise in pastures, should be cut in the most likely times to destroy them. Thistles, and other bad weeds, should be cut down before their seeds have ripened; and ant hills should be destroyed. Much may be done towards subduing a bushy pasture, by keeping cattle hungry in it. A continual browsing keeps down the young shoots, and totally kills many of the bushes. Steers and heifers may mend such a pasture, and continue growing.

But as to cleared pastures, it is not right to turn in all sorts of cattle promiscuously. Milch kine, working oxen, and fatting beasts, should have the first feeding of an enclosure. Afterwards, sheep and horses. When the first lot is thus fed off, it should be shut up, and the dung that has been dropped should be beat to pieces, and well scattered. Afterwards, the second pasture should be treated in the same manner, and the rest in course, feeding the wettest pasture after the driest, that the soil may be less potched,

Something

Something considerable is saved by letting all sorts of grazing animals take their turn in a pasture. By means of this, nearly all the herbage produced will be eaten; much of which would otherwise be lost. Horses will eat the leavings of horned cattle; and sheep will eat some things that both the one and the other leave.

But if in a course of pasturing, by means of a fruitful year, or a scanty flock of cattle, some grass of a good kind should run up to seed, and not be eaten, it need not be regretted; for a new supply of seed will fill the ground with new roots, which are better than old ones. And I know of no grass that never needs renewing from the seed.

A farmer needs not to be told, that if he turn swine into a pasture, they should have rings in their noses, unless brakes and other weeds need to be rooted out. Swine may do service in this way. They should never have the first of the feed; for they will foul the grass, and make it distasteful to horses and cattle.

Let the flock of a farmer be greater or less, he should have at least four enclosures of pasture land. One enclosure may be fed two weeks, and then shut up to grow. Then another. Each one will recruit well in six weeks; and each will have this space of time to recruit. But in the latter part of October, the cattle may range through all the lots, unless some one may have become too wet and soft. In this case, it ought to be shut up, and kept so till feeding time the next year.

But that farmers may not be troubled with low miry pastures, they should drain them, if it be

practicable, or can be done consistently with their other business. If they should produce a smaller quantity of grass afterwards, it will be sweeter, and of more value. It is well known, that cattle fatted in a dry pasture, have better tasted flesh than those which are fatted in a wet one. In the old countries it will fetch a higher price. This is particularly the case as to mutton.

Feeding pastures in rotation, is of greater advantage than some are apt to imagine. One acre, managed according to the above directions, will turn to better account, as some say who have practised it, than three acres in the common way. By the common way I would be understood to mean, having weak and tottering fences, that will drop of themselves in a few months, and never can resist the violence of disorderly cattle; suffering weeds and bushes to overrun the land; keeping all the pasture land in one enclosure; turning in all sorts of stock together; suffering the fence to drop down in autumn, so as to lay the pasture common to all the swine and cattle that please to enter; and not putting up the fence again till the first of May, or later. Such management is too common in all the parts of this country with which I am most acquainted. I would hope it is not universal.

Land which is constantly used as pasture, will be enriched. Therefore it is advisable to mow a pasture lot once in three or four years, if the surface be so level as to admit of it. In the mean time, to make amends for the loss of pasture, a mowing lot may be pastured. It will thus be improved: And if the grass do not grow so rank afterwards in the pasture lot, it will be more clear

clear of weeds, and bear better grafs. Alternate pasturing and mowing has the advantage of saving a good deal of expence and trouble, in manuring the mowing grounds.

Though pastures need manuring less than other lands, yet, when bushes, bad weeds, &c. are burnt upon them, the ashes should be spread thinly over the surface. The grafs will thus be improved: And grafs seeds should be sown upon the burnt spots, that no part may be vacant of grafs.

PASTURE of PLANTS, or *vegetable Pasture*, that part of the earth in which the roots of plants extend and receive their nourishment. This is properly their natural pasture. But more commonly these expressions intend that depth of soil which is stirred, and rendered so loose by tillage, that the roots of tender vegetables easily penetrate it, as they extend themselves in quest of nourishment.

Within certain limits, the greater quantity of pasture a plant has, the greater advantage it has to get nourishment. But some require a greater, and some a less quantity of pasture, according to the distance to which their roots are disposed to extend. Therefore, some plants should be placed at greater distances than others. The farmer should be able to determine these distances, with respect to every plant that he cultivates; because the largeness of his crops in some measure depends on it. He should therefore attend to the construction of the roots of different plants; and observe to what length the lateral fibres extend.

But as the capillary fibres of most plants are so small, and so impregnated with the colour of the soil, as to become invisible

near their extremities; the following experiment is adapted to throw much more light on this subject, than any examination of the roots by the eye.

In a soil that is become hard and bound by lying, let a triangle be marked on the ground, forty yards the length of the sides, and four yards the length of the base. Let the soil it includes be well dug and pulverised. Then draw a line so as to bisect the base and the acute angle. On this line, at equal distances, plant the seeds, give them the usual culture, observe their growth, and see at what breadth the plants arrive to their greatest growth. If they do so in that part of the triangle which is four feet wide, it will follow that the plant has sent its roots two feet on each side, and from that distance drawn part of its nourishment. Mr. Tull, in his experiment, made use of the seeds of turnip: But other seeds may serve as well; and it might be advantageous to make trial with many kinds of seed.

I do not recommend that all plants, which extend their roots as much as two feet, should be placed four feet apart. Doubtless the capillary roots may intermix, to a certain length, without robbing each other to such a degree as to injure the crop essentially: But the comparative distances at which different plants ought to grow, may in this way be ascertained with exactness.

Another thing which ought to be determined, is, what depth of pasture different plants require. For this purpose, let one bed be dug nine inches deep, another of equal dimensions, and soil, twelve, and another fifteen. Let the three beds be set with equal numbers of the same kinds of seeds;

seeds ; and let the produce be compared. If it be found that the excess in the crop will not pay for extra tillage, the extra tillage should be avoided for the future. But the experiment should be made two years in succession, without shifting the beds ; because the deepest part of the soil will be in better order the second year than the first, in land which has not before been dug to that depth. The result might be with the more safety depended on, if the trials were made three years in succession.

And there will still be some danger of drawing too hasty a conclusion, if another thing be not considered, which is, that plants, which stand so near together as to be somewhat crowded, will alter the natural form of their roots, and point more downward, when there is a plenty of artificial pasture below them. So that deep tillage will render it proper to set plants proportionably nearer together. The beds should therefore be dug the fourth year as before. If the first include one hundred plants, let the second include one hundred and fifty, and the third two hundred. I suppose all the beds to be equally manured, and equal in dimensions, as well as equally pulverised, and to the same depth as before, and equally tended after sowing. Then by comparing the produce, it may be determined whether making a deep pasture for the roots be really advantageous, and to what depth the ground ought to be loosened, as well as at what distance the plants ought to be set.

I have here gone upon the supposition that the beds be equally pulverised : For, if not, the quantity of pasture in one, may be double to that in another, in the

same depth. If the tillage differ, the crops will differ in proportion.

But I will next observe, that there are three ways of increasing the artificial pasture of plants : One is tilling the land to a greater depth, by means of which a greater quantity of soil, under a given surface, is employed in the business of vegetation : Another is a more perfect tillage, by which the number of little cavities in the soil are increased, so that the roots may come into contact with a greater quantity of vegetable food, more or less of which is contained in the stiffest parts of the soil : The third is applying such manures as raise a fermentation in the soil, by which its parts are well broken and divided, and kept in that state till the fermentation ends, and for some time after, till the soil has had time to subside.

Tillage and manure are both requisite to pulverise the soil. Without the former, the manure cannot be properly mixed with the soil ; and tillage alone will not answer, not even in land considerably stored with the food of plants, unless it be often repeated while the crop is growing : Because the soil that is only tilled, soon settles, and becomes too compact ; unless manure be applied, which will keep up a fermentation, sometimes for several months, besides increasing the vegetable food. Any one may observe, that dunged land feels softer to the foot, than land which has not been dunged, when both have had equal tillage. The former therefore will afford more nourishment for the plants growing in it, besides the nourishment contained in the dung.

Indeed there is one kind of soil, which, instead of being too close, is too puffy and porous to

be a suitable pasture for plants. The interstices are so large, that the roots will not pass through them. We sometimes meet with such a soil in drained swamps. This soil must be ploughed and harrowed to make it more solid, or compact. Tilling it helps to fill up the vacuities; and in the place of one large one, many smaller ones are formed, of a size more suitable to facilitate the extension of roots.

PEACH TREES, *Amygdalus*, a well known kind of fruit trees, of which there is yet no great variety in this country. Mr. Miller reckons no less than 31 sorts, besides a number of less value. We have room for making very great improvements, it seems, in the culture of this fruit. What we call the rareripe, is almost the only sort I have seen, that is worth cultivating: And this kind, within thirty years past, seems to have greatly degenerated. I apprehend it is time that these were renewed, by bringing the trees or stones from some other country.

Peach trees should be cultivated near to or in the borders of gardens. When they are propagated by planting the stones, they should be taken from fruit that has thoroughly ripened on the tree, and be planted in October, three inches under the surface. The trees may also be propagated by inoculating upon plums and apricots. This will undoubtedly render them longer lived.

When the trees are transplanted, the downright shoot of the roots should be pruned very short, and the lateral ones be left at a good length; for if the trees draw much of their nourishment from a great depth, the sap will be crude, and the fruit not so good. As these trees are natives

of a warmer climate they ought to have a southern exposure. They should also be screened from the direct influence of north, and northeasterly winds.

The soil that suits them best is a dry light loam; and the surface should be constantly tilled, and moderately manured with old rotten dung.

If too great a quantity of peaches appear on the trees, so as to crowd each other, they should be speedily thinned, by taking off the poorest: For if they be suffered all to remain on the tree, much of the fruit will drop off unripe: What remains will not be so perfect, and perhaps fewer in number.

As the fruit grows not on spurs, but on the shoots made in the last preceding year, Mr. Miller directs, that the new shoots should be shortened, by cutting them yearly in October, leaving them from five to eight inches in length, according as they are weaker or stronger. I have practised this method of cutting in October for several years; which has caused trees, which were before barren, to bear some fruit. And I observe that the branches of the trees are not so often killed by the frost in winter. But the trees have now become sickly and barren.

PEAR TREES, *Pyrus*. Pears have a nearer affinity to quinces than to apples: For a pear cion will grow and prosper upon a quince stock, but not so well upon an apple: And a quince cion will grow upon a pear stock.

The vast variety of pears, which are cultivated in the world, have been obtained from the seeds, which, like those of the apple, will produce fruit trees different from the parent tree. Seeds sometimes bring degenerate, and sometimes improv-

ed fruit trees. So that all the best grafted fruits have been, some time or other, produced by nature itself: And though the fruits vary, there is not a specific difference.

Though the pear will grow upon the quince, or even upon the white thorn, it should not be grafted on the former, unless it be for dwarf trees, and in no case upon the latter. The stock of the thorn will not grow to so large a size as the cion will: The trees will therefore be top heavy, and short lived, as I have found by experience. Therefore it is best in general, that pears should be grafted upon pears.

The propagation of pear trees from the seeds, and the culture of them in nurseries, do not differ from the propagation and culture of apple trees. See *Nursery*.

Pear trees bear fruit to the ends of the last year's shoots, as well as upon the spurs. Therefore, the new shoots should not be shortened, lest the fruit be diminished: And, for the same reason, these trees should never stand so near together as to crowd each other. But the distance at which the trees are to be set in an orchard, or in a grove, depends partly upon the nature of the trees, as some grow larger than others; and partly upon the fruitfulness of the soil. In general they may be allowed to stand nearer together than apple trees. These, as well as other fruit trees, should have the ground tilled about them, to promote their growth and fruitfulness, at least until they are become so large as to bear plentifully, and occasionally from time to time afterwards.

PEASE, *Pisum*, a sort of plants which bears a papilionaceous or

butterfly flower, succeeded by unocular pods full of globose seeds.

The varieties are so numerous, that I shall not undertake to distinguish them. They are cultivated in gardens and in fields. The garden culture is thus: After the ground has been well dug, raked and levelled, mark it out in double rows one foot apart, and leave intervals of three feet between the double rows, so that when they are brushed, there may be a free passage through the intervals. Open the trenches three inches deep with the head of a rake, or with a hoe; scatter in the pease at the rate of about one to an inch, or nearer together if you have plenty of seed; and then cover them with a rake. Or small marks may be made for the rows, and the pease pricked in with a finger to the same depth, and the holes filled with a rake. The former method is best, as the mould about the pease is left lighter; and it is more expeditiously performed.

The ground should be hoed, and kept clear of weeds; and when the young plants are six inches high, the stems should be earthed up a little, and each double row filled with brushwood, 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. I set the larger bushes strongly between the rows, making the holes with a crow bar; and then the smaller bushes in the rows as leaders. The latter may be sharpened a little at the points, and pushed in by hand. They will be the more fruitful for brushing or sticking, as well

as more lightly, and more conveniently gathered. But the low dwarf kinds seldom need any supporting.

Whatever be the sort, no weeds should be suffered to increase among them; and the alleys should be hoed deep once or twice after brushing. But the soil should not be very rich, lest the plants run too much to haulm. The most hungry part of a garden answers well for pease.

The earliest sorts of pease will sometimes be ripe in June: So that a crop of potatoes, turnips, or cabbages, may be had after them.

For field pease, land that is newly ploughed out of sward is generally accounted best; and land which is high and dry, and has not been much dunged. A light loamy soil is most suitable for them; and if it abound with flaty stones it is the better. But they will do in any dry soil. The sorts that grow large should have a weaker soil; in a stronger soil the smaller sorts answer best. The manures that suit pease best are marle and lime.

Horse hoeing husbandry applied, if it were practicable, would greatly assist the growth of pease. They so soon begin to trail upon the ground, that the season in which this culture can be applied, is extremely short. But some have obtained very good crops in this way. Much of the seed at least might be saved.

Our farmers do not commonly allow a sufficient quantity of seed for pease, in broad cast sowing. When pease are sowed 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.

At Fryburgh and Conway, as I am informed, the farmers sow three bushels on an acre, according to the practice in England; and their crop, one time with another, is upwards of twenty bushels. This is certainly better for them, than to sow one bushel, and reap eighteen: But he that sows one bushel only on an acre, must not expect, one time with another, to reap twelve.

The only insect that commonly injures our pease, is a small brown bug, or fly, the egg of which is deposited in them when they are young, and the pods easily perforated. The insect does not come out of his nest, till he is furnished with short wings. They diminish the pease in which they lodge to nearly one half, and their leavings are fit only for the food of swine. The bugs, however, will be all gone out, if you keep them to the following autumn. But they who eat buggy pease, the winter after they are raised, must run the venture of eating the insects.

If sown in the new plantations, to which this bug has never been carried, pease are free from bugs: For the insects do not travel far from their native place. Therefore, care should be taken not to carry them, as some are apt to do, in seed, from older settlements. Even in a part of an old farm, near to which pease have not for a long time, if ever, been sown, a crop of pease are not buggy, if clean seed be sown. Therefore, in such places, one may guard against this insect, by sowing guard pease which are certainly known to be clear of them. But if the contrary be known, or even suspected, let the pease be scalded a quarter of a minute, in boiling water; then spread about, cooled, and sown without delay.

If any of the bugs should be in the pease, this scalding will destroy them: And the pease, instead of being hurt, will come up the sooner, and grow the faster.

All pease that are sown late, should be steeped, or scalded, before sowing. They will be forwarder. But pease should always be sown as early as the ground can be got into a good tilth, without any silly regard to the time of the moon; by which I have known some miss the right time of sowing, and suffer much in their crop. The real causes of a crop not ripening equally, are bad seed, poor culture, and sowing too thin. If the ground be ploughed but once, it should be harrowed abundantly. But on green sward ground, I think it should be ploughed early in autumn, and cross ploughed and harrowed in the spring. In old ground, as it is called, it is no bad way to plough in the seed with a shoal furrow: It will be more equally covered, and bear drought better; and I should think the crop would ripen more equally. There is no danger of their being buried too deep, in our common method of ploughing. The European farmers think six inches is not too great a depth for pease to be covered in most soils, and four inches not too deep in clay.

Changing the seed is a matter of very great importance; for pease are apt to degenerate more rapidly than almost any other plants. Seeds should be brought from a more northern clime; for those which ripen earliest are best. I would change them yearly, if it could be done without much trouble or cost. Once in two or three years is necessary.

If weeds come up among field pease, while they are young, they

should be weeded. But when they are grown up, they will hinder the growth of weeds by their shade, unless they are sowed too thin. Pease sown thick form so close a cover for the soil, that they cause it to putrefy; they are therefore called an improving crop: But they also draw a greater proportion of their nourishment from the air, than most other plants; for it is observable that they continue their greenness long after the lower parts of the stems are dead to appearance.

Garden pease are harvested by picking them off as they ripen; but field pease must unavoidably be harvested all at once. They should be carefully watched, and harvested, before any of them are so ripe as to begin to shell out. Those among them which are unripe, will ripen, or at least become dry, after they are cut or pulled up; and such pease, well dried, are not commonly bad for eating, though ill coloured. To dry them, they should be laid on the ground in small heaps, as light and open as possible, the greenest of the straw and pods uppermost. The heaps should never be turned upside down, though rain should fall, but they may be gently lightened up, if they settle close to the ground. This will be sufficient. When thoroughly dried, they should be carefully removed to the barn, at a time when the air is not dry, and thrashed without delay. But if the thrashing must be delayed, it is better to keep them in a stack than in a barn.

After winnowing, pease should lie on a floor, three or four inches thick, and air should be let into the apartment, that they may be dried; which they will be in two or three weeks, the weather being

being generally dry. After this they may be put into casks to keep.

Our common method of pulling up pease by hand, is too laborious. They should be cut or pulled up with a sharp hook in the form of a sickle; fastened to a long handle. Some perform it expeditiously with a common sickle. But this is little, if at all, less laborious than doing it with the hand.

When land is in suitable order, field pease may be cultivated according to the new husbandry, with advantage. M. Eyma found his crops were half as large again in this way, as in the old husbandry, besides saving half the seed. The intervals between the double rows should be near four feet wide, or there will not be sufficient room for horse hoeing. And this should be done with, before the plants begin to trail on the ground.

PEAT, a kind of earth, or rather a fossil, used in some countries for fuel.

It is often found in low, miry, and boggy places, that lie between hills. That which is the most solid is the most valuable. It lies at different depths; sometimes, very near the surface; sometimes eight or ten feet below it. The best way to find it is by boring. The stratum above it is most commonly mud, or moory earth.

I suppose many places where it is found to have been originally ponds; and that they have been, either suddenly, at the time of Noah's flood, or gradually since, filled up with wood, and other vegetable substances, which, by a slow putrefaction, have been changed into the substance we call peat. For some undissolved trunks of trees, bark, &c. are found among it.

It is sometimes found in interval lands, and near to the banks of rivers. In these places, the shifting of the beds of rivers, caused by the choking of the old currents, will afford a probable account of its formation.

Peat is distinguishable by its cutting very smooth, like butter or lard, by its being free from grit, and its burning freely, when thoroughly dried. It will not dissolve when exposed to the air for a long time, but become hard like cinder.

A dry season is the best opportunity for digging it, as the labourers are but little incommoded by water. They who dig peat for fuel, should have long angular spades, the blades of which should be shaped like a carpenter's bur, with which it may be easily cut out of the pits, in pieces four inches square, and twenty inches in length. These should be laid singly on the surface to harden. When they are partly dry they are piled open, athwart each other: And in a few days of drying weather, they will be fit to cart, and store for fuel. This fuel must be constantly kept in a dry place.

It has been found by trials that the ashes of peat is a very important manure, of three times the value of wood ashes. Fifteen bushels are allowed to be a sufficient top dressing for an acre. It is an excellent manure for cold grass lands; and for all such crops in any soil as require much heat. They should be sowed by hand, as they can thus be more evenly spread. It may be done in winter with the least danger of hurting plants by its heat. If sown in summer, it should be just before rain, when it will be immediately deprived of its burning quality.

The method of burning peat to ashes, I will give from the *Museum Rusticum*, as I have had no experience in it myself.

“As soon as it is dug, some of it is mixed in a heap regularly disposed with faggot wood, or other ready burning fuel: After a layer or two of it is mixed in this manner, peat alone is piled up to complete the heap. A heap will consist of from one hundred to a thousand loads.

“After setting fire to it at a proper place, before on purpose prepared, it is watched in the burning: And the great art is to keep in as much of the smoke as possible, provided that as much vent is left as will nourish and feed the fire.

“Whenever a crack appears, out of which the smoke escapes, the labourer in that place lays on more peat; and if the fire slackens too much within, which may be known by the heat of the outside, the workman must run a strong pole into the heap, in as many places as is needful, to supply it with a quantity of fresh air. When managed in this manner, the work goes on as it should do. It is noticed, that when once the fire is well kindled, the heaviest rain does it no harm whilst it is burning.” To preserve the ashes for use, this writer proceeds thus:

“It is necessary to defend the ashes from the too powerful influence of the sun, air, dews, rain, &c. or great part of their virtue would be exhaled and exhausted. If the quantity of ashes procured is not very great, they may be easily put under cover in a barn, cart lodge, or hovel; but large quantities must necessarily, to avoid expense, be kept abroad; and when this is the case, they should be ordered as follows:

“A dry spot of ground must be chosen; and on this the ashes are to be laid in a large heap, as near as possible in the form of a cone standing on its base, the top as sharp pointed as possible: When this is done, let the whole be covered thinly over with a coat of soil, to defend the heap from the weather: The circumjacent earth, provided it is not too light and crumbly.

“When thus guarded, the heap may very safely be left till January or February, when it is in general the season for spreading it. But before it is used, it is always best to sift the ashes, &c.”

Mr. Eliot supposed it was necessary to dry the peat before burning: But perhaps he never tried the above method. He says, if it be stifled in burning, it will be coal instead of ashes; and that the red sort makes better charcoal than that made of wood.

It is happy for mankind, that bountiful Providence has prepared and preserved this precious treasure, containing the essence of vegetables, by which they may be supplied with fuel in their houses, manure for their lands, and coal for smiths' forges. But in vain it is provided, unless men will search for it, and make use of it. There is no reason to doubt of its being as plenty in this country, as in any other. When Mr. Eliot searched for it, he tells us he soon found it in seven different places.

The ashes are said to have a better effect upon winter, than upon summer grain; and to be not good for leguminous plants, as it makes their haulm too luxuriant. The good effects of a dressing are visible for three years; and they will not leave land in an impoverished state.

PEN, a small enclosure, to confine animals in.

PERKIN, or **PURRE**, a liquor made from the murk, or gross matter, remaining after perry is pressed out. It has the same affinity to perry as cyderkin has to cyder. To make this liquor, the murk is put in a large vat with a proper quantity of boiled water, which has stood till it is cold again. It may infuse 48 hours if the weather be cool, and then be pressed out. The liquor may be put into casks and lightly stopped, and will be fit to drink, in a few days. It is equal to small beer: But if well boiled with hops, it will be fit for keeping till the following summer. And it may be greatly improved by bottling.

PERRY, a liquor made from pears, in the same manner as cyder is from apples. The pears should, in general, be ripe before they are ground. They will not bear so much sweating as apples. The most crabbed and worst eating fruit, is said to make the best perry. After perry is made it should be managed in all respects like cyder. Boiling has a good effect on perry, changing it from a white to a flame coloured and fine flavoured liquor, which grows better by long keeping and bottling.

PERSPIRATION of **PLANTS**, the passing off of the juices that are superfluous, through pores prepared by nature on their superficies for that purpose.

The analogy which plants bear to animals, is in no instance more remarkable than in this evacuation. The parts of a plant which contain the excretory ducts, are chiefly the leaves. For we find, that if a tree be continually deprived of its leaves for two or three years, it will sicken and die, as an animal does when

its perspiration is stopped. But smear the bark on the stems with any glutinous substance sufficient to stop any pores, and no great alteration will be observed in the health of the tree, as has been proved by experiment. And as M. Bonnet has proved that leaves generally imbibe the moisture of the atmosphere on their under surface, is it not reasonable to suppose that the pores for transpiration are placed on their upper surface? But that the stems of plants contain some bibulous pores, seems evident from this, that when placed in the earth, they will send out roots. But these pores in the stems are so few, that the stopping of them does not materially injure a plant.

As animals have other ways of throwing off those parts of their food which are not fit to nourish them, it is no wonder that plants have been found to perspire insensibly a far greater quantity than animals. Plants cannot choose their food as animals do, but must take in that which is presented by the earth and atmosphere, which food in general is more watery, and less nourishing, than that of animals; and for these reasons, also, it might be justly expected, that the matter perspired by a plant should be vastly more than that perspired by an animal of the same bulk; and this has been found to be the case. See the article *Leaves*.

A practical inference or two from the copious perspiration of plants may be, that the plants we cultivate should not be set too close, that they may not be incommoded, or rendered sickly, by the unwholesome steams of each other. They are as liable to be injured this way, for ought that appears to the contrary,

contrary, as animals are. And the water that drips from trees upon smaller vegetables is known to be not healthy for them; the reason is, because this water contains some of the matter which perspired from the trees. But if the perspirable matter of plants be injurious to plants, it does not follow that it is so to animals. It is thought to be not so in general, but the reverse. The effluvia of poisonous plants is an exception.

PLANT, an organical body, destitute of sensation and spontaneous motion, adhering to another body so as to draw its nourishment from it, and propagating itself by seeds.

This name comprehends every thing that exists in the vegetable kingdom of nature, from the lofty cedar of Lebanon to the minutest moss.

Plants by their want of sensibility, and their fixed position, are inferior to, and distinguished from the animal part of creation; also, by their organization, and power of reproduction, they are superior to and distinct from the kingdom of fossils and minerals. They hold the middle rank in the visible works of the Almighty Creator; and are constructed with such admirable wisdom, as to be fit to shew forth his praise.

The external and most obvious parts of plants are the root, stem, branches, leaves and flowers.

The root, by which a plant is connected with the earth, contains a vast multitude of absorbent pores, through which it undoubtedly receives the greater part of its nourishment.

But the internal structure of plants, though perhaps far more simple than that of animals, seems

not yet to have been thoroughly investigated

Dr. Hill's system of the anatomy of plants, as represented by Dr. Hunter, in the *Georgical Essays*, I will lay before the reader, as concisely as possible.

"The constituent parts of a plant are, 1. The outer rind. 2. The inner rind. 3. The blea. 4. A vascular series. 5. A fleshy substance, or the wood in a tree or shrub. 6. Pyramidical vessels included in the flesh. And 7. The pith.

"The smallest fibre of the root, and the smallest twig in the top, have all these parts; and no part of the tree has more. Even the flower is made of the extremities of these parts. The outer bark ends in the cup of the flower; the inner rind in the outer petals; the blea in the inner petals. The vascular series ends in the nectarium; the pyramidical vessels form the receptacle, and the pith furnishes the seeds.

"The outer bark is made up of membranes with a series of vessels between them, which vessels inosculate with those of the inner bark, to which they communicate part of their juices.

"The inner bark is made of regular flakes, each of which consists of two membranes, enclosing a series of vessels which communicate with those of the blea.

"The blea lies next to the inner bark, and is made up of hexagonal cells; and in angles formed by these cells are the vessels of the blea, which pour their contents into the cells. These cells seem to be reservoirs for the water imbibed by the plant." Out of the contents of these cells I suppose a new circle of flesh or wood in perennial plants to be annually formed.

“Next to the blea lies the vascular series, a course of vessels lodged between two membranes. These vessels have a free communication with the blea, and the wood.

“The wood, or fleshy part, is made up of strong fibres, in which may be seen the tracheæ, filled with elastick air.

“The pyramidical vessels are spread through the substance of the flesh, and as they advance upwards their ramifications inosculate, so as to prevent obstructions of the sap in its course. The sides of these vessels are always in contact with the tracheæ; and they also communicate with the pith; which is found in the centre of all plants, but not always regularly continued; therefore it is not thought to be absolutely necessary to vegetation. It receives a fluid from the pyramidical vessels, and is thought to be a reservoir of part of the sap. - It is found in the ribs of leaves, and runs to the ovarium.”

Doubtless there are also various strainers, by which different juices are assimilated to the nature of the plants; and by which juices in the same plant are prepared for several purposes; for the leaves, the fruit and the seeds contain different juices. The shortest cion must be supposed to contain some of these strainers; otherwise it would not produce its own proper fruit, but that of the stock on which it is grafted.

Many sorts of plants may be made to vegetate in an inverted state; a proof that the different parts of a plant are nearly of the same structure. It also shews that the leaves are adapted to take in nourishment as well as the roots.

PLASTER of PARIS, or GYPSUM. “The plaster of Paris is a preparation of several

species of gypsums, dug near Mount Maitre, a village in the neighbourhood of Paris; whence the name.

“The best sort is hard, white, shining and marbly; known by the name of *Plaster stone*, or *Paraget of Mount Maitre*. It will neither give fire with steel, nor ferment with aquafortis, but very freely and readily calcines in the fire into a very fine plaster; the use of which in building and casting statues is well known.” *Dict. of Arts.*

When this substance is reduced to powder, without burning, a moderate degree of heat will make it boil like milk, and appear like a fluid. But it cannot be made to boil more than fifteen or twenty minutes. Whence I conclude it contains a large quantity of fixed air, which is discharged in boiling. After standing a few days the fixed air will be restored, and it will boil in the same manner as before.

It was not till of late that it has been known as a manure. The Pennsylvanians have imported it from France, as I am informed, and find it a great advantage to their crops. They reduce it to a fine powder in mills for that purpose, before they apply it to the soil. Several ship loads have been carried from *Novascotia* to *Philadelphia*; but this is not found to be so good a manure as the French gypsum.

Five or six bushels are said to be a dressing for an acre; I have never heard of more than six bushels being laid on an acre. It is used as a top dressing on grass land; but mixed with the soil in tillage, when the crops are hoed, which is unavoidable.

When it is sowed upon wheat and other grain, while it is growing, it has as good an effect as the largest

largest dressing of the best dung. It should be finely pulverised after being burnt in a moderate fire, and sowed in May, as evenly as possible. Cloudy or dull weather is accounted best for doing it. The good effect of one dressing, it is said, will continue seven years.

It is doubtless a great absorbent, and acts like quicklime, or like powder of marble, in mending the soil. But in Nova Scotia, where it is found, I am told it does not appear to have any great effect as a manure. This may be owing to the want of being sufficiently pulverised. Or it may do better in a hot than in a cold climate.

PLAT, a small piece of ground.

PLOUGH, a machine with which the ground is turned up and broken. It is the most important of all the tools used in husbandry: And much of the comfort of the labourer, as well as the profit of the farmer, depends upon the good structure of it.

The plough was so early invented, that mention is made of it in some of the most ancient books, both sacred and profane. Numbers of them, however, have been so badly constructed as to be of little advantage.

Omitting what has been said of the various kinds of ploughs, I perfectly agree with the writer of the *New System of Agriculture*, that two ploughs are all that are requisite in the common culture of land, a strong one and a light one. The strong plough is necessary in soils that are strongly swarded, or very stiff; or filled with strong roots, stony, or rugged; in all other soils the light plough, or that which is commonly called the horse plough, will be sufficient.

The strong plough, which should always be made of the strongest of white oak, should not be heavier than is necessary for strength. One of the handles should be framed into the chip, and the beam into the handle; the other handle must be made fast to the groundwrest and mouldboard; and the handles should be so long, that the plough may be guided by them without much exertion of strength. Otherwise the ploughman will find his labour to be very fatiguing.

The share should be made of tough iron, well steeled and sharpened on the point and wing, and rightly tempered.

The coulter should also be steeled on the edge, and be frequently made sharp by grinding, when used in swarded ground that is not stony. This will render the draught the more easy, especially where there are strong roots in the soil, which must be cut off by the coulter. The plough will not only be the more easily drawn and less apt to choke with roots and rubbish; but will cut the furrow more evenly. The coulter should be inserted into the share six inches, at least, from the point, for land that has no impenetrable roots; but where such roots abound, the point of the share should be inserted into the back of the coulter, very near to the bottom.

The coulter should always lean backwards between the share and the beam; and be bent under the beam, so as to pass through it at right angles.

Every one knows that the chip and the groundwrest should be plated with iron, on two of their sides. Otherwise they will soon wear away.

In some parts of this country, ploughs are tolerably well constructed;

fructed ; in other parts, so badly, as to occasion the loss of much time and labour. But for those strong ploughs, which are accounted the best, I would suggest two or three improvements.

One is, that the sock, or socket of the share, should be so made as to receive a chip five inches thick, or deep, and that the chip be answerably thick at the fore end, where it enters the sock, and the sock should be large enough to receive it. By means of this construction the furrow begins to cant as soon as it is cut through by the coulter. Therefore the mouldboard takes it already turning, so that it meets with but little resistance ; consequently it requires less strength of team, by half, as some say, to draw the plough. The labour of the ploughman is also diminished, as the plough is more easy in its going. The late *Robert Pierpoint*, Esq. of *Roxbury*, was possessed of a plough of this make, the original of which came not long since from England. His family will doubtless be ready to oblige any person with a view of it.

That gentleman once told me, that with his plough he had broken up the hardest green sward ground, with only a yoke of steers four years old to draw it.

Another improvement that I would suggest, is, to have an iron plate rightly shaped, instead of a mouldboard ; either riveted to the share, or a continuation of it.

Every ploughman knows, that the greatest part of the trouble of his work arises from the furring up and clogging of the plough by the earth's cleaving to it, and particularly to the mouldboard. And it is plain that this not only hurts the regular going of a plough, but makes it harder to

draw, and causes it to have the less effect in turning and pulverising the soil.

But a plate of iron, in place of the mouldboard, would always be smooth and bright, and glide easily through the soil in swarded ground ; and the plough would be far more easily managed. It is the opinion of the above mentioned writer, that with a plough of this kind, rightly constructed, there can never be need of more than one yoke of oxen to plough in the hardest soil. If two yoke would be sufficient for our hardest land in this country, much would be saved by such a plough. And of this I think there is little reason to doubt.

I will just mention one thing more, which some will allow to be a considerable improvement. Instead of wheels to a plough, which are now generally reprobated, let a little roller be fixed to the fore end of the beam, in such a manner as to move upon the surface. It should be four or five inches in diameter, and as much in length, and be connected with the beam, by an iron rightly shaped for the purpose, which can be easily put on and off at pleasure. It is to be used only in ploughing green sward ground, and such as is pretty level, and clear of obstacles. It gauges the plough, so as to prevent its going too deep ; and it compresses the surface, so that the coulter cuts it more evenly. Besides, it is manifest that this will ease the ploughman of part of his labour.

But whether this be thought of importance enough to be attended to or not, the iron plate for a mouldboard, I think, can admit of no doubt concerning its utility. The cost of it will be the only objection ; but this

is of no weight. The extra cost will certainly be saved in the work of a few days; as the plough may be drawn with a weaker team; turn over the soil more completely; and perhaps save the hiring of a man to tend the plough and turn turfs. It should be remembered that a wooden mouldboard ought to be plated; which, if well done, may cost half as much as an iron mouldboard; and will much sooner come to need repairing.

The bloomers who make what are called share moulds, should draw the plate about four feet long; the hinder part, which is to be for the mouldboard, not more than one fourth or fifth of an inch thick; the part that is for the share, of the usual thickness. With such a piece of iron any ingenious smith can make the share and mouldboard in one piece.

The light plough may be made every way like the former, but smaller; but a roller to this plough is not requisite; and a wooden mouldboard will answer, if properly plated with iron.

As the handles of ploughs should be crooked, especially at the outer ends, a small stadle quartered, together with a part of the root, is the best timber that I know of for this purpose. While they are green they may be soaked in hot water and bent into the right shape. If dried in this shape, they will always retain it, though ever so much afterwards exposed to the weather.

PLOUGHING, the operation of turning, breaking and loosening the earth with a plough.

Lands in general that are used in tillage must be ploughed, if there be not insuperable obstacles, or great difficulties in the way to prevent it. **Breaking up ground**

with the spade, or the hoe, is tedious and expensive, in comparison with ploughing; so that but small quantities of land could be employed in tillage, were it not for the important art of ploughing.

One rule to be regarded in ploughing is, that no land, excepting green sward, should be ploughed when it is so wet that it will not easily crumble. For the principal design of ploughing is to break the cohesion of the soil, and set the particles of it at such a distance from each other, that even the smallest and tenderest roots of plants may find their way between them in quest of their nourishment.

When, in ploughing, of land in tillage, the furrow turns over like a dead mass of mortar, ploughing can be of no advantage at all. The soil becomes no lighter or looser by it, but rather heavier, and more compact. On the contrary, land should not be ploughed when it is too dry; because it requires the more strength of team to perform it, nor can the furrows be so well turned over.

The plough should be used much more than it is in this country. When a crop of barley or wheat is designed, the ground should, at least, be thrice ploughed; for a crop of Indian corn, twice is not too much. The extra expense will be repaid by the increased crops. The advantages of frequent ploughing have not been duly considered. By often repeated ploughings, land may be brought to any degree of richness almost that is desired. Frequent ploughings are destructive to weeds, and save much labour in hand hoeing and weeding; besides making a greater quantity of pasture for plants, preparing

the vegetable food the better to enter the roots of plants, and disposing the soil to imbibe the rich and fertilizing particles of the atmosphere.

As it is known that repeated ploughings supply the place of manure ; where manure is scarce, farmers have need to plough the more frequently. Mr. Tull was of opinion that it was a cheaper method to enrich land by ploughing than by manuring. In some situations it undoubtedly is so. But it is best that land should have enough of both, when it is practicable.

And the more to promote the fertilization of the soil by ploughing, let the farmer plough as much of his ground as possible while the dew is on it, because dew contains much nourishment for plants. The early riser has the advantage of his sluggish neighbour ; not only in ploughing, but also in harrowing and hoeing, to greater advantage.

When land is to be ploughed that is full of stumps of trees and other obstacles, as land that is newly cleared of wood, or that is rocky, the strong plough should be used ; and the strength of the team must be proportioned to the strength of the plough ; and the plough to the condition of the soil.

It is sometimes advisable, to cut off close to the bodies of stumps, before ploughing, the horizontal roots which lie near the surface ; especially if there be no stones, nor gravel in the way, to hurt the edge of an axe. When this is done, the strong plough will be apt to take out the most of the roots so parted. And the frosts of a few winters will be the more likely to heave out the stumps, or so to loosen them that they may be easily removed. I

have conquered the stumps of white pine in this manner ; but stumps which rot very soon it is not of such importance to manage in this way.

The plough must go deeper in breaking up new ground, than old. Otherwise the little hollows will go unploughed ; and there will not be mould enough raised in the hillocks to level the surface, and leave sufficient depth for the roots of plants to extend themselves.

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 pulverised. Therefore, the first ploughing should be performed so long beforehand, that before the second, the turfs 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 still earlier ; either in spring or summer will do very well, if time can be spared for it.

But it is best that the most or all of our tillage land should be ploughed in autumn, both in new and old ground. It saves time and labour in the following spring, the hurrying season, when more work is to be done than we can well get time for ; and when our teams are usually 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 will perform it for its having been ploughed in autumn. In very light old ground

a single horse may perform it ; and two ploughings are better than one in most cases.

Green sward land may be ploughed at any season of the year, if it be not too dry, nor too much frozen. In the former case the plough will go very hard ; in the latter ploughing is impracticable, which is the case for four months together, commonly, from the first of December to the last of March.

Farmers generally choose to plough green sward ground when it is pretty wet, if it be not miry ; because the labour is more easy for man and beast.

The English farmers practise ploughing green sward in January, not only because they have leisure, but because it is so wet as to plough easily. They call it *ploughing in lays* ; and it is said to be well performed, when the sward is all completely turned over, without lapping one furrow on another. The depth that the plough should go is a matter that ought to be attended to. The depth should be governed in some measure by the staple of the soil. Where the soil is deep, deep ploughing is best. See *Pasture of Plants*.

But where the soil is very thin, shoal ploughing is necessary ; for if the plough turn up much of the under stratum, and mix it with the soil, it will be rather hurtful, at least for some years after.

Land should always be ploughed out of sward with a deeper furrow than will be necessary afterwards, through the whole course of tillage. All the after ploughings will be the more easily performed.

Mr. Young, by attending particularly to the depth of ploughing in various towns in England, found that the average depth in

fandy soils was four inches, in loamy soils four and three quarters, and in clayey soils three and an half. But in Ireland they plough much deeper ; sometimes not less than nine or ten inches.

Our farmers are sometimes led to plough too shallow, to save a little labour. And some are too much afraid to turn up what they call dead earth. But they should know that all the soil above the hard pan may be well employed in tillage, for some crops or other ; and that if they turn up a red soil, it will in a year or two become dark, and fit to nourish plants, by being exposed to the sun and the weather, and imbibing rich particles from the atmosphere.

Trench ploughing is sometimes practised to advantage ; and the culture of some plants with tap roots requires it. This is done by passing a plough twice in a furrow. Ground may be thus ploughed to the depth of twelve or fifteen inches. But, instead of this double labour of the plough, where labourers are plenty, the furrows may be deepened with shovels, by a number of hands following the plough.

In old countries, where lands have been tilled for a thousand years, and have been frequently manured, the rich black soil has been growing deeper and deeper. So that trench ploughing by this time may be very proper in many of their fields ; and even necessary to bring up the strength of manures, which has subsided to a greater depth than common ploughing reaches.

But there is only a small proportion of our land in this country, to which trench ploughing is suitable, or which will well pay the cost of it. In most of our soils, even where the hard

hard under stratum, or pan, lies deep, trench ploughing would throw up so much cold hungry earth, and bury the upper mould so deep, as to render the land very barren at first. The places where it would answer best, are hollows, into which much vegetable mould has been washed down from the neighbouring heights, which has a black moory soil to a great depth; and such spots as have been used as gardens, and have been often dug with the spade.

If labour of men and teams were as cheap as it is in some countries, it would be advisable, to give more of our deepest soils this culture than we do at present. But wherever it is once begun, it should be continued, at least through a course of tillage; or else the first ploughings will be worse than lost. The best of the soil would be buried at such a depth as to become almost useless, unless it were alternately brought near the surface, by after ploughings equally deep.

Regard should be had to the shape of the land in ploughing. They who plough a steep hill up and down injure their cattle, and miss of ploughing their land to advantage. The furrow that is drawn up hill must be excessively shoal; or the team much stronger than common. For this reason a hill should be ploughed horizontally; with furrows as nearly parallel to the base as possible. This may be easily done when all the sides of a hill are to be ploughed at once. The rains will carry much of the finest of the soil to the bottom of the hill, if the furrows are made up and down. But ploughed the other way, the hentings, or parting furrows, will be sufficient drains; and the water will move so slow-

ly in them, that none of the soil will be washed away. But when a hill is very steep, no turning of a furrow upwards should be attempted. And if only one side of a steep hill is to be ploughed, the furrows should be all cut the same way, the team returning light after each furrow.

The reader will perceive, that what is commonly called cross ploughing on hills' sides is not approved. But cross ploughing of land that is level, or gently sloping, is oftentimes very proper. Land in general should be ploughed one way and the other alternately, that it may be the more thoroughly pulverised and mixed; that is, when the shape of the ground and the dimensions of a lot admit of it.

Green sward ground, that is broken up in the fall, is usually cross ploughed in the spring following. But this should not be done without caution. For if the turf be not considerably rotted, cross ploughing will only drive it into heaps, instead of cutting it to pieces: Neither will the harrow reduce the turf to powder. In this case it will be best to omit the cross ploughing: And after a heavy harrowing lengthwise of the furrows, seed the land with pease, potatoes, maize, or any thing that will do well with such culture.

Some plough green sward in the spring and seed it without delay. It sometimes does well for maize, oats, and flax, if well dunged; or for pease and potatoes without much dunging. Potatoes seem to do better than any thing else. But the holes must be made quite through the furrows, whether dunged or not. As this crop requires the greatest part of its nourishment in the latter part of summer, about that

time the turf comes to be in its best state for yielding nourishment to plants.

For a crop of winter wheat the tillage ground should be ploughed in the spring, again in June, and lastly just before sowing. Whatever manure be put on, it should be just before the last ploughing, and ploughed in immediately. If the grain be ploughed in with a shoal furrow, it will not be so apt to be killed by the winter. The roots will lie deeper than those of harrowed grain; and it will the better bear drought in the following summer, if that should happen.

For other seeding in general, or for whatever is planted or sown in the spring, on what we call old ground, it should be ploughed near the time of seeding, although it were ploughed in the fall; and the nearer to the time of seeding the better. The seeds will be the better supplied with moisture to make them vegetate; and the crop will have the better chance of being able to outgrow and stifle the weeds, and have the benefit of a looser soil, during the whole of its growth. These autumnal ploughings, I have found to be greatly advantageous, especially in clays, and in stiff loams.

Many, to save labour, plough their land so shallow for sowing, as scarcely to take up the roots of the weeds. Men of common understanding, I should suppose, need not be told that this is bad husbandry: For it may rationally be expected that there will be a larger crop of weeds, than if it had not been ploughed at all; and that the roots of the plants will not have sufficient room to extend themselves. Ploughing the ground in autumn will have a tendency to prevent this most

absurd conduct in the spring, which many go into that they may favour their teams in a faint season.

That seed may be sown as early as possible, many are led to give the seed furrow before the ground is sufficiently dry. If the crop should be a little earlier, it will be the poorer. It will be slower in coming up; more of the seeds will fail; the blade will be more slender; nor will it grow so fast as if it were sowed later, when the ground is warmer. Sometimes it will not grow at all for a long time, but become so stunted, that a crop must be despaired of. No practice can be worse than to give the seed furrow in stiff soils, before the ground is sufficiently dried.

Land that is low and flat, and therefore apt to be too wet and heavy, ought to be ploughed in ridges. The ridges may have two, three or four furrows on each side, according as the ground is wetter or drier. The wettest ground should have the narrowest ridges; but they should never be narrower than four furrows in a ridge. The rows will be between four and five feet apart, if one row of plants be set on each ridge. But if there be six or eight furrows in a ridge, it may admit of two rows, one on each side of the veering.

After lying in ridges through the winter, the ridges should be thrown into the hollows by another ploughing in the spring; which will bring it into good order for seeding.

Or if it should be too miry to be ploughed in the spring, either maize or potatoes may be planted on the ridges; and what is wanting of the proper tillage, may be made up after the ground is become drier, by frequent and deep horse

horse hoeings. Good crops of maize have been obtained in this method on land, which, with plain ploughing, would have produced next to nothing.

Most of our clay soils, which lie level, require this sort of culture; for this more than any other soil is liable to be injured by overmuch wetness. And the drier it lies the weaker will be the cohesion of its parts.

Some soils which lie gently sloping are so wet as to need ridging. It is not best to make the ridges directly up and down the slope, nor horizontally, but on a medium between both. But where the land will admit of it, the ridges should lie north and south. It is no bad practice to lay lands to grass in ridges or beds. For too much wetness is apt to hurt grass lands, as well as lands for tillage, whether they are used for mowing or pasturage. In the former, the grass will be too sour to make a good hay; in the latter, not only the grass will be bad, but the soil so soft as not well to bear the tread of cattle. I have found that not only better grass, but a greater quantity, will be produced in this method. Nor will the soil so soon become hard and bound.

Nor is it a bad practice to split the hills with the light plough in autumn, after a crop of maize; even though the ground be not seeded till the following spring. One side of a row of hills is ploughed off with one furrow, and the other side ploughed off the contrary way by another furrow, so as to form veerings, or ridges, in the intervals. It is performed with less than half the expense of a plain ploughing; and nearly the whole of the surface is either taken up or covered. European writers think land should

be ploughed immediately after a crop of maize, to prevent the stubs from robbing the soil of its juices. Be this as it may, the ploughing is at least as useful as other autumnal ploughing; and where dung has been put in holes, it mixes it with the soil; not to mention the burying of some of the stubs and leaves of the corn, which is of some advantage towards enriching the soil.

There is another way of ploughing called ribbing; which is making furrows unconnected with each other, three feet or more asunder. It is but about a fourth part so much work as ploughing plain. One very considerable advantage of it is, increasing the superficies of the soil, by which it is more exposed to the action of frost, air, and dews, and absorbs the largest quantity of nutritive particles.

In tillage land that is steep, ribbing is a further benefit to the soil, as it prevents the washing down of the vegetable mould, and the strength of manures. With this view the operation should be performed in autumn. And the plough must pass horizontally, or nearly so, not up and down the steep.

In pastures or grazing land, declivities would produce the more grass, if they were ribbed; as the benefit of sudden rains would not so soon be over, by means of their quickly running down into the vallies. At the same time, the vallies would not so often be overcharged with water. Furrows eight or ten feet apart would answer, and the ribbing would not want to be repeated for a long time. The furrows should be as nearly horizontal as possible, as well as in tillage land.

PLUM TREES, *Prunus*, stone fruit trees, which produce their fruit

fruit upon spurs, that spring out of all parts of the limbs.

The most common plum in this country, is the damascene plum, an excellent fruit for preserving, which is said to have been brought from Damascus, whence the name.

The black bullace, is a globular, tart fruit, of the size of grapes; besides, some very crabbed wild sorts, which are oval shaped, are found in some parts of this country. There is also a remarkable wild plum, peculiar to an island near Newbury, of a small size, and by some much valued.

The better sorts which are cultivated, are the horse plum, a very pleasant tasted juicy fruit, of a large size: The peach plum, red towards the sun, with an agreeable tartness: The pear plum, so called from its shape, which is sweet, and of an excellent taste: The wheat plum, extremely sweet, oval, and furrowed in the middle, not large: The green gage plum, which is generally preferred before all the rest.

All the varieties of plum trees may be propagated by budding, or grafting. Budding is preferable, as these trees are apt to discharge a gum, where large wounds are made. The trees grow best in a soil that is on a medium betwixt wet and dry. They should be kept clear of suckers, and have but little other pruning; and care should be taken not to diminish or wound the spurs.

POLLEVIL, "an imposthume on the poll of a horse. At first it requires no other method of cure than what is common to other boils, and inflamed tumours. But sometimes it degenerates to a sinuous ulcer, through ill management, or neglect.

"There is a small sinus under the poll bone, where the matter is

apt to lodge, unless care be taken to keep the part firm with a bandage: But instead of that the farriers generally use to thrust in a long teat, which raises the flesh, and opens a way into the sinus. And thus an ulcer is created where there needs be none. All therefore that is further necessary on this head is, to caution the practitioner against such ill methods. And if the tumour has a very large cavity, it is better to lay it open, than to thrust foreign substances into it. And if it acquires an ulcerous disposition, it must be treated as such." *Gibson's Farriery.*

POND, a collection of still water. A mill pool is so called, though it gradually receives water in one part, and discharges it in another: So that it is not perfectly still water. The water is so often shifted, that it is not apt to putrefy.

Pastures that are destitute of water, should have artificial ponds made in them, for watering places. "Observe where rushes, reeds, flags, and other aquatick plants grow spontaneously; or where frogs are observed to lie squatted down close to the ground, in order to receive its moisture. Or observe where a vapour is frequently seen to rise from the same spot. Some say, wherever little swarms of flies are seen constantly flying in the same place, and near the ground, in the morning after sunrise, there is water underneath." "If a well is made in a sloping ground, and the declivity is sufficient to give it a horizontal vent, it will be worth the husbandman's while to dig such a passage, and by means of pipes, or any other conveyance, to carry the water across the light soil, through which it might otherwise

wise sink. The greatest quantity of water will be obtained in this manner, because there will be a continual stream." There is no difficulty in making a durable pond in a clayey soil. Let a large hollow basin be made in such earth, and it will preserve the water that falls in rain. But it is apt to be thick and dirty, if some pains be not taken to prevent it. The declivity, by which the cattle enter, should be paved, and gravel should be spread on the bottom. Or it might be better if the whole were paved.

There are many large natural ponds, which have outlets in one part, and are supplied by brooks or rivers in other parts; but a greater number of smaller ponds which are perfectly stagnant, unless when they are agitated by winds. Such ponds as the latter, in hot seasons, are apt to become putrid, and contaminate the air about them. For this reason they should, if possible, be drained. And when the water is not deep, and an outlet can be made without too much cost, they should be drained for the sake of reclaiming the soil. This will be of great value, as it commonly is found to be extremely rich, being made up of the finest particles of soil, waisted into them by winds, and of decayed vegetable substances, besides the fine mould washed into them by rains.

Many farms contain little funken spots, which are most of the year covered with water, and produce some aquatick bushes and weeds. These are notorious harbours for frogs; and are therefore called frog ponds. They should be drained, if it be practicable. It is commonly the case, however, that draining them in the common way, by making an outlet, would cost more than

they would be worth when drained, because of the height of the land on every side. But in this case, if the banks be not clay, they may be drained in the following manner.

Take notice on which side land that is lower than the pond is nearest. On that side, in the bank near the pond, dig a kind of cellar, two or three feet deeper than the surface of the pond; do it in a dry season. If a hard stratum appear, dig through it; and leave digging where the bottom is loose gravel, or sand. Then make an open or a covered drain from the pond to the cellar. The water will be discharged from the pond, and soak into the earth through the bottom of the cellar, till a scurf is formed on the bottom that will stop the water from soaking into the earth. This scurf should be broken from time to time, and taken away with a long handled hoe. Or, the cellar may be filled up with refuse stones, which I think is preferable to the other method.

If the pond should not then become sufficiently dry, a small ditch should be drawn round it, and discharge itself into the cellar. The land that is thus gained will be rich muck, much of which may be carted away for manure; and common earth, or sand, may replace it, without detriment to the soil.

POPLAR, *Populus*, a well known tree of quick growth; but short lived, and seldom arrives to any great size. The wood decays very soon when exposed to the weather. But being a white, sweet, and light wood, it is used for trays, and various turned work, &c.

The Lombardy Poplar begins to be propagated in this country. It is done by cuttings or slips.

The trees grow most rapidly, are straight, tall, and beautifully tapering; and are therefore coveted for groves, and to adorn yards and avenues. They flourish well in a moist soil, and even in a heavy and clayey one. To what size they will arrive, and how durable they will be in this country, time will discover.

POTATO, *Solanum*, a well known vegetable. This plant is described by Mr. Houghton, to be a bacciferous herb, with esculent roots, bearing winged leaves, and a belled flower.

The potato was not known in Europe, till carried thither from Virginia, by Sir Walter Raleigh, in the year 1623. He stopped at Ireland, where he gave away many of the roots, which were planted there, and multiplied so fast, that in the wars that happened afterwards, when all the corn was destroyed, potatoes were the chief support of the people.

It is more than half a century since this root found its way into this country. And within thirty or forty years they have been much cultivated. They have been found by long experience, to be a very wholesome food for man: For no people enjoy better health and spirits than the common people of Ireland, who make them their principal food. So that their being classed by botanists among poisonous plants, will not deter us from cultivating them, and freely feeding upon them. If they were eaten raw, perhaps they would be found to be very unwholesome. But, like several other plants, the action of fire renders them very wholesome, and nourishing to man and beast.

The colour of the roots may be known by the flowers. The white have white, and the red

reddish flowers, succeeded by an apple, or berry, as big as a grape, containing a multitude of small white seeds. Potatoes are usually propagated by the roots: But it is easy to propagate them several other ways. Cuttings from the top branches, set in the ground, will produce a considerable crop. The cuttings will even strike root, if they are planted bottom upwards. The sprouts broken from potatoes which have been kept in cellars will produce roots. So will the apples, the bare eyes or buds, or even a piece out of the heart of a potato.

There seems to be nothing about a potato but what is prolifick, like the polypus. The parts of the plant, above and below the surface of the earth, seem to be the same. The running roots produce fruit, if confined under ground; but if they chance to pierce through the surface, they bear leaves and apples. So that potatoes may be considered as a fruit growing under the surface of the ground.

The sorts or varieties, may be multiplied in infinitum. It is therefore strange that so few sorts have yet been known in this country. No longer ago than about the year 1740, we had but one sort, a small reddish coloured potato, of so rank a taste that it was scarcely eatable. Soon after this, the white kidney potato appeared, as good table potatoes as any that I have known since; unless the brown rough coated potato be excepted, which was introduced soon after. Since these we have had the Spanish potato, extremely prolifick, but fit only for cattle and swine: Then the bunker potato: The small round potato, white and good tasted: A long

long red potato : A potato, part red and part white, brought from Ireland in the late war : A large white potato, a great bearer, known by the name of the flour potato : Orange potato, so called from its colour : Purple potato : Cranberry potato, which bears no apples on the tops ; and last of all, the winter white. The last is as pleasant tasted as any that are now cultivated, and exceeded by none, unless it be the yellow rough coat.

In the year 1785, I planted in my garden a mixture of the top seeds of Spanish, bunkers, flour, winter white, long red, and white rough skinned potatoes. From this seed I obtained ten varieties, really different from any I have seen before, yet bearing some resemblance to those from which they sprung, so that their parentage might be easily guessed. As my old sorts had grown mixed together, I supposed their being impregnated with the *farina facundans* of each other, might occasion these new varieties. Some of them appear to be excellent roots, and well worth propagating. I have since found that the top seeds will produce various sorts, though kept by themselves, or when there is no possibility of their mixing.

Since doing the above, I have found that the renewing of potatoes from the top seed, is no new thing with the English farmers. They hold it to be necessary to do it once in fourteen or fifteen years ; because, after that period, potatoes degenerate, and produce less and less till they almost come to nothing. The brown rough coats, and white kidney potatoes, have thus failed in this country ; and other sorts have become less fruitful than they were. Perhaps every kind that

we cultivate, might be improved by such a renovation from the top seed.

I have much reason to think my renewed potatoes will prove very productive : For, in the year 1786, three pecks of the roots, planted in a gravelly, poor soil, produced forty five bushels ; some of the hillocks containing more than a hundred roots each ; which is a greater number, by a third part, than I have ever found of other sorts. This was the second year from the seed.

As some persons may be disposed to renew their potatoes from the top seed, I shall here give the method of doing it. Take the apples in the beginning of October, before the frost has hurt them : Hang them up by the foot stalks in a dry closet, where they will not freeze : Let them hang till March or April : Then mash the apples, wash the seeds from the pulp, and dry them in a sunny window. Sow the seeds in a bed, about the first of May. When the plants are four or five inches high, transplant them into ground well prepared, one or two plants in a hill. They will produce full grown apples, and some of the roots will be as big as hens' eggs. But if the seeds were sown in autumn, some of them would come up in the following spring. Nothing is more common than their appearing in fields, where potatoes have been raised the preceding year.

As potatoes are come to be of more importance in this country, than any other esculent root, and are even an article of exportation, I shall be the more particular in pointing out the best methods of cultivating them.

This plant thrives best in a light sandy loam. A dry soil produces

produces the best eating potatoes; one that is rather moist will give the largest crops. But if you plant them in a clay soil, they will be ill tasted, wormy, and fit only for cattle. The land should be ploughed deep for this crop; because roots will commonly grow as low as the soil is stirred, and no deeper. And the more the ground is pulverised before planting, the better will be the crop.

Perhaps green sward ground ought to be mentioned here as an exception. I have had the largest crops on such land, even with one ploughing, and that just before planting. I account for it thus: Potatoes want air; such land affords it from the hollows under the furrows, in no small quantity, both fixed and putrid, and in the greatest abundance towards the end of summer, when they require the greatest quantity of nourishment.

No dung is found to be more suitable for potatoes than hogs' dung, mixed with a great deal of straw, or other rubbish. This dung is late in fermenting, and therefore affords the roots plenty of nourishment, when they most need it. And as they want air and room, rubbish, and even sticks and chips, or any thing that makes the ground lie light and hollow, encourages their growth.

But those roots are accounted best for eating, which are raised without dung. I once had a middling crop, by putting a handful of old weather beaten salt hay in each hill. New land, burnt, produces excellent roots, and a large crop, without any manure but what is made by the burning; sometimes not less than a peck in a hill.

The potato is so hardy a plant, that it will grow in any

kind of soil, and even with the poorest culture. It is a great improver of land; not only by the rotting of its succulent stalks, which should be buried in the soil at, or immediately after digging; but the digging itself is a further improvement. A crop of potatoes is good to prepare land for other crops. It is not uncommon, on poor land, with very little cultivation and without manure, to obtain one hundred bushels per acre. But in Ireland, with deep ploughing, or digging, with manure, four times that quantity is common: And Mr. Young mentions one instance of an acre in England, producing a thousand bushels. As they will grow almost any how, we are tempted to neglect them; but no crop that I know of will better pay for good cultivation.

The first of May is perhaps the right season for planting potatoes, in a dry warm soil: But they will sometimes produce well, though planted at the last of June. An early crop will be better ripened, and more dry and mealy. A late one is unsolid and watery, as the roots do not arrive to their full maturity.

When the ground has been well prepared, by deep ploughing, cross ploughing, and harrowing, let the sets be prepared by cutting. Pieces, as I apprehend, are better for sets than whole potatoes. Pieces consume quick in the earth, and pass their substance into the new plants: But when potatoes are planted whole, they come out of the ground in autumn, almost as hard and solid as when they were planted. And whole potatoes fill the ground with such a multitude of roots, that they will rob one another of their nourishment. I choose potatoes of a middling

middling size to cut into sets. Such a one will make half a dozen, or more good sets, with one or two buds in each; three or four of which sets are sufficient for one hill, and they should be placed six or eight inches apart; for the roots should never be much crowded.

The shooting parts exist in a potatoe, in the form of a tree, of which the stock is at the but, or root end. I therefore take care to cut athwart these parts as little as possible: For though they will grow any way, the greater length of shooting stem there is in a set, the more strong and vigorous will be its growth at first.

If dung be used, it may be spread before the second ploughing, or else laid under the sets. The latter method will give a larger crop. Dung laid under the sets, will produce more than if laid above them; as Mr. Wynn Baker proved by accurate experiments. The feeding roots should go into the dung, not directly into hungry earth below; and these roots strike downwards; and therefore need some loose earth under the dung to extend themselves into.

The fashionable way of planting potatoes in hills, may be as good as any in rough ground, or that which is not well subdued. But in a rich, mellow soil, well pulverised, the drill method is to be preferred. The sets may be either in single rows, three feet, or double, one foot apart, and from seven to nine inches asunder in the rows. One of my neighbours planted in his garden, drills and rows of hills alternately of equal length, and equally manured; when he dug them he found the drill rows produced twice as much as the other. It is not more labour to

lay the dung in drills, than in hills; and the labour of hoeing is not increased. My trials in the drill way, have produced only half as much again. But I did not put dung in the furrows, but always put dung in the hills. My method has been, in dry ground, first to plough in the dung; then harrow; raise the ridges, and dibble the sets into the ridges.

The lazy bed method, or trenching, is most practised in Ireland. I have tried it several times, and am convinced, that a greater quantity on the same ground may be raised in this way, than in almost any other. But the labour is so great, as it must be performed with the spade, that I dare not recommend it, unless in particular cases, or to those who have but little land.

It is a good, and very effectual method, to subdue bad weeds in the border of a field, which cannot well be ploughed. But the soil should be deep, that the trenches may not go into the under stratum of hard earth, nor too near to it.

And in this way good crops may be got in springy and miry places, which are too wet for other tillage. But the work must be begun in autumn. In October, mark out the beds, five feet wide, leaving two feet between each bed for the trench: Spread the dung upon the beds: Dig the trenches, and with their contents cover the beds to the depth of about five inches. In May following, dibble the sets into the beds, quite down to the dung, and fill the holes with earth. Besides getting a good crop, the soil will be thus drained and subdued, and fitted for ploughing, and tillage crops.

An expeditious way of planting potatoes is as follows. After

the ground is prepared, by ploughing and harrowing, cut furrows with the horse plough, forty inches apart; drop the sets in the furrows; then pass the plough along the back of each furrow, which will throw the earth of both furrows upon the sets; and afterwards level the ground with the back of a harrow, or with a harrow that has short tines if you will; but it is of no great consequence whether it be levelled at all. Another method of planting is, to plough the ground plain, keeping the furrows straight and regular, and drop sets in every third or fourth furrow. But before this is done, the ground should be ploughed and made level and fine with the harrow.

But the method last mentioned is fit only for a dry soil, where the seed needs to be laid deep. Where the soil is moist, a better way would be to furrow the ground, and lay the sets on the surface, close to the backs of the furrows, and cover them by turning another furrow towards each. If this should bury the sets too deep, the ridges may be easily lowered, with a hoe or a rake; but I do not apprehend it would be necessary. The ridges may remain as the plough leaves them.

As soon as rows of potato plants are grown to the height of four or five inches above the surface, or earlier if the ground be weedy, the cultivator, with two mouldboards, should be passed between them, as deep as one horse can draw it. For want of a cultivator, a common light plough should go and return in an interval, turning the earth at the first ploughing from, and then at the second towards, the rows. After each ploughing the plants should be weeded, and a little of the fresh earth drawn close to

their stems, uncovering those which chance to be covered by the cultivator, or plough. This operation should be repeated three times, taking care not to earth the plants too much, as some are apt to do where the ground is light and mellow: For potatoes will not grow well more than about five inches under the surface, being too far removed from the influence of the sun. The ridges, or hills, should be rather broad than steep; flat on the top, that the water, which falls in rain, may not be too much diverted from the roots.

The last hoeing should be finished before the plants are in blossom; and before the branches begin to trail upon the ground. Otherwise a new set of roots will be formed, too late to get their full growth, and which will rob the former sets of their nourishment. But if killing weeds be necessary after blossoming, it may be done with the hand hoe, observing not to earth up the plants at all.

Cattle should be kept from a field of potatoes, till the roots have got their full growth, as carefully as from a field of corn. For potatoes will not grow after the tops are browsed. They doubtless receive as much of their nourishment through the tops, as almost any plant.

As soon as the tops are dead, either by ripeness or by frost, the roots may be taken up. If they lie in the ground till they are soaked by the heavy autumnal rains, they will be the worse; and the labour of digging will be increased. Those that do not much adhere to the tops, may be thrown up by the cultivator, or by the horse plough, which will facilitate the digging. But the tops should be pulled out, and the fruit

fruit that comes out with them gathered, before the plough is passed under the rows. Some recommend a four or five pronged fork, as the best instrument to dig them with.

There is no difficulty in keeping them through the winter, in a cellar that is free from frost. Caves, dug in a dry soil, preserve them very well. They should be covered with two feet of earth over them. If they are in danger of frost in a cool cellar, they should be covered with a little salt hay. This any farmer may easily do, who has a maritime situation.

In cellars, they are more forward to sprout in the spring, than in caves. Those which are for summer eating, should be attended to in May, the sprouts rubbed off, and put into a cool and dark part of the cellar. They will thus keep well till new potatoes are grown. But if any light come to them, they will send out long shoots towards the place where it enters.

Raw potatoes will keep swine alive through the winter: But they will not grow much with this food alone. Parboiled, they are an excellent food for swine, and will almost fatten them. The English farmers parboil them, not only for swine, but for horned cattle. I know of no food that will more increase the quantity of milk in cows; and they give milk no ill taste, whether boiled or raw. In either way cows are very fond of them. For horses they should be boiled.

Though the Spanish potatoes be not fit for the table, they are so very productive, that it would be well to raise them by themselves for cattle. And out of other sorts, the largest and smallest, the irregular shaped and the

cut ones, should be put by for the cattle: For middling roots are best both for eating and planting. Overgrown ones are apt to be hollow and watery; and wounded ones rot, oftener than found ones.

As a further recommendation of this useful root, I may add, the farinaceous part of it makes an excellent starch, much superior, as some say, and not half so costly, as that made of wheat. The method of making potatoe starch, according to Mr. Weston, is as follows: "Wash and pare them, grate them upon large tin graters, and fill tubs about half full with the pulp: Then fill them up with water: Stir it well once a day, for three or four days, and take off all the scum. About the 5th day take out the pulp, and put it into shallow earthen pans, such as are used for milk, as much as will cover the bottom an inch thick, and put water upon it. Every morning pour off the water, break up the starch, and add fresh water. When it is thus become very white, leave it in the pans till it is quite dry, then put it into paper bags, and put it in a dry place to keep."

This sort of starch has been made and used in my house, for twenty or thirty years past. The making of a quantity that will serve for a year is always begun and finished in a day or two. As soon as the starch is settled to the bottom, which it does in twenty minutes, the water is renewed; and instead of its standing in tubs, and being skimmed, we strain it through a cloth. Which of these methods is to be preferred I do not determine.

Some suppose this starch is apt to rot the things which are stiffen-

ed with it; but this is a great mistake.

In an abstract of the *Memoirs of the Swedish Academy*, the above writer found the following account of one of their methods of using potatoes. "Mr. Charles Skytfe has proposed to distil brandy from potatoes, in order to save the corn, which is so dear in Sweden; and finds by experience, that an acre of land set with potatoes, will yield a much greater quantity of brandy, than when sown with barley." It is asserted that a gallon of good strong spirit may be taken from six pecks of boiled potatoes, by distillation.

The account given by Dr. Anderson of his success in extracting potatoe spirits is this: He boiled 72 pounds of potatoes, they were then bruised, and passed through a riddle along with some fresh water. The pulp was then mixed with cold water, till the whole amounted to about 20 gallons. This was allowed to cool, till it attained to such a temperature, as would be proper for mixing yeast with wort, when some yeast was put to it. In ten or twelve hours the fermentation began, which continued very briskly for as many hours. After waiting some time, and in vain warning it a little, with a view to renew the fermentation, he stirred it briskly, which renewed the fermentation: Stirring it daily, the fermentation went on for a fortnight, and then abated, and could not be renewed by agitation or otherwise. It was then distilled with due caution, care having been taken to stir it in the still, until it began to boil, before the head of the still was applied; and the fire was afterwards so kept up as to keep it boiling briskly, till the whole was run

over. In consequence of these precautions and due rectification, he obtained an English gallon of pure spirit, considerably above proof, and about a quart more of a weaker kind, a good deal below proof. The Dr. says, it was in every respect the most agreeable vinous spirit he ever saw; and that in taste it somewhat resembled fine brandy. According to this account, one acre of potatoes might yield 300 gallons of good strong spirit, worth at least 90*l*.

My new method of planting potatoes is this. After the dung is spread and ploughed in, and the ground levelled with the harrow, I raise the ridges about three feet and a half apart, with the cultivator; and then dibble in the sets along the tops of the ridges, about seven or eight inches apart, laying each set about as low as the surface was before the ridges were made. I have had as good crops in this way, as in any other.

The method of raising potatoes under straw, is very simple and easy. Lay the sets about eight inches apart each way, on any kind of soil that is not too rich: Cover them with straw, or refuse hay, to the depth of about twelve inches. Nothing more is to be done to them till they are taken up. They will be very clean, and the crop considerable.

POULTRY, all kinds of tame birds, as hens, geese, ducks, turkeys, &c.

These may be considered as part of a husbandman's stock: But the keeping of great numbers of dunghill fowls will not turn to his advantage; as it is certain they will never indemnify him for the corn and grain that are requisite for their support. Yet on a farm a few of them may be useful, to pick up what would otherwise be lost.

And

And in this view they seem to be profitable only part of the year. If confined they will not prosper, though they have a yard of some extent; if not confined they will be mischievous to the garden and field.

PRONG HOE, a hoe with prongs instead of a blade. It is either a bidens, or a trident. It is easily struck into the ground; and as the tines are six or seven inches long, it will stir the ground to the same depth that a plough does. It is useful in taking up strong rooted weeds, and opening ground that is crusted, or become too compact. The eye and handle are the same as a common hand hoe. It is the best instrument to stir the ground with, close to the roots of plants.

PROVENDER, dry food for brutes, as hay, corn, &c.

PULSE, the fruit of leguminous, or podded plants, which produce their seeds inclosed in a pericarpium, consisting of two valves, joined by a visible suture, having the seeds fastened alternately to the two valves.

Q.

QUAKING MEADOW, or **MARISH**, low boggy land, that shakes and settles under any one in passing over it.

It has a sward that is tough, being a web of the roots of strong grasses; but the mud under the sward is very soft and yielding.

Such places should be drained when it can be done without too much expense. For its natural produce consists of the worst water grasses, cranberries, &c. but the soil is always deep, and rich. See the article *Draining*.

Mr. Eliot drained such a piece of ground, and soon made it fit for tillage.

QUICK, or **QUICK HEDGE**, all kinds of live hedge, of whatever plants they are composed. The hawthorn or white thorn is most commonly used. The young sets are raised in nurseries in the old countries.

Mr. Miller says, "In the choice of sets, those which are raised in nurseries are to be preferred to such as are drawn out of the woods, because the latter have seldom so good roots; though, as they are larger plants than are commonly to be had in the nursery, many people prefer them upon that account; but he has found by long experience, that those hedges which have been planted with young plants from the nursery, have always made the best hedges. He says, if persons would have patience to wait for these from the seed, and to sow the haws in the place where the hedge is designed, these unremoved plants will make a much stronger and more durable fence than those which are transplanted. But where the hedge is to be planted, the sets should not be more than three years old from the haws; for when they are older, their roots will be hard and woody; and as they are commonly trimmed off before the sets are planted, so they very often miscarry, and such of them as do live will not make so good progress as younger plants, nor are they so durable." See *Hedge Fence*.

QUICKS, this name is given to the young plants of which a live hedge is composed.

QUICKSILVER, or **MERCURY**, a ponderous mineral fluid. It has been often asserted that quicksilver will destroy insects on trees. The method of applying it is thus. Make a hole sloping through the rind or bark, with

with an awl. The hole should go into the wood, but not reach the heart or pith. Pour in a small drop or two of quicksilver, and stop up the hole with a peg. On the 18th of May, in the present year, 1787, I applied quicksilver as above to two apple trees which had young nests of caterpillars on them. One was in a young orchard, the other in a nursery; nests of the same age being on neighbouring trees, which served as standards. Watching the nests daily, I found that the insects spread themselves on the latter, and ate the leaves as usual. On the former they multiplied but little; and I could not find that many of them spread on the trees, or ate the leaves at all. And from the nest in the nursery many of the insects removed to other trees. But the caterpillars were not all dead in either nest, till about the summer solstice, the usual period of their existence. Whence I conclude that though the quicksilver seemingly had some good effect, this is not to be relied on as the most effectual, easiest and cheapest method of destroying these insects, or preventing their ill effect.

QUINCE TREE, *Cydonia*, a small fruit tree, bearing a large yellow fruit, useful in cookery and medicine, but not fit to eat raw.

It is easy to propagate the trees by suckers, layers or cuttings, but they require a moist soil. The cuttings should be planted early in autumn. The trees require very little pruning; the principal thing is, to keep the stems clear of suckers, and thin the branches where they cross each other. Upright luxuriant shoots in the top should also be taken out, that the trees may not

have too much wood, which is bad for all sorts of fruit trees.

QUINCUNX ORDER, according to Mr. Miller, is applied to a plantation of trees, disposed originally in a square, consisting of four trees, one at each corner, and a fifth in the middle; which disposition, repeated again and again, forms a regular grove, wood, or wilderness; and, when viewed obliquely, presents straight rows of trees, and parallel alleys between them.

QUITCH GRASS, called also *Witch grass*, *Twitch grass*, *Couch grass*, *Dutch grass*, and *Dogs grass*, *Lolium*, a most obstinate and troublesome weed, which fills the soil with white stringy roots, and is harder to subdue than any other weed. The more the soil is tilled, and the oftener hoed, the faster it grows; for if the roots be ever so much cut to pieces, each piece will live and become a new plant.

Land that is much infested with this weed should be laid down to grass; and as soon as the sward binds, which it is apt to do soon, burn beating should be applied, which will go near to conquer it. See *Burn baking*.

But it may be kept from binding by plentiful and frequent manuring, and the grass makes very good hay.

R.

RABBITS. "In some situations these animals may be kept to advantage, as they multiply exceedingly, and require no trouble in bringing up. They delight in the sides of sandy hills which are generally unproductive when tilled, but level ground is improper for them.—The fur of the rabbit is worth
thrice

thrice the whole value of the carcass. Therefore, supposing a rabbit to consume a quantity of food in proportion to its carcass, it is a species of stock nearly three times as valuable as either cattle or sheep. Rabbit warrens ought to be inclosed with a stone or sod wall: And at their first stocking, it will be necessary to form burrows for them, until they have time to make them for themselves. Boring the ground horizontally with a large auger is perhaps the best method that can be practised. Eagles, kites, and other birds of prey, as well as cats, weasels, and polecats, are great enemies of rabbits. The Norfolk warreners catch the birds by traps placed on the tops of stumps of trees, or artificial hillocks of a conical form, on which they naturally alight."--*Encyclop.*

RACK, a frame made to hold fodder for cattle, to prevent their trampling it under foot, and wasting it.

Those racks which are under cover, as in sheep houses, horse stables, &c. may be constructed of almost any kind of wood; but those which stand abroad should be of such timber as lasts long in the weather. The rails may be larch, or white cedar, and the cross sticks white oak. Such a one will endure the weather many years.

RADICLE, that part of the plantule in a seed, which, when it vegetates, becomes the root. Whatever be the position of a seed, the radicle will shoot downwards. The radicle shoots from the seed before the plumula, which is the blade of a young plant.

RADISH, *Raphanus*, a pleafant root, which has an attenuating virtue, and is a good antiscorbutick.

I have had better success with those sown as late as June or July, than with those sown in the spring. The earliest are apt to be destroyed, or greatly injured, by the white maggots; to which sea water is an antidote; but with respect to this root not quite effectual.

To have a constant succession of radishes at table, the seeds should be sown once a fortnight, from April to August. But in midsummer they sooner grow sticky and strong, than in spring or fall. They must therefore be eaten while they are young. I have had better success with those sown in August, than in any other month. In hot houses they may be raised any month in the year. Or those raised in autumn may be kept in dry sand, fit for eating in the winter.

As radishes are uncertain in their growth, the best method is to put in the seeds between rows of other plants; and they are soon pulled up, that they will not incommode the plants among which they grow.

Radishes that are for seed require much room, as they grow to a large size. For this purpose some of the most thrifty ones should be left standing; or else be transplanted to a place where each shall have as much room as near a yard square. The ripeness of the seed is known by the pods turning brown. For this purpose the seeds must be sown early in the spring, because they ripen slowly.

RAGS, pieces of worn out cloth, a valuable manure. Woolen rags are an animal substance, and therefore contain much food for plants. The longer they have been worn, the more dirty they are, and the more perspirable matter they have imbibed.

the better they are for this use. But shreds of new cloth are good; some quantities of which may be collected where tailors work. Woollen rags should be chopped small on a block, and be scattered, or sown by hand. It is recommended to use these as a top dressing. This manure attracts nitre, and imbibes dews, which the first rain carries into the soil. Or, as the earth grows dry it attracts moisture from the rags.

Woollen rags are peculiarly good for a dry soil, as they will retain moisture a long time; and in such a soil I think they will do best when they lie a little under the surface. I would mix them in the soil with the harrow. Before they dissolve, they will cause plants to be nourished, by keeping the ground moist; when they are dissolved, they become food for plants. Twenty four bushels will be a sufficient dressing for an acre.

Linen rags, like other vegetable substances, contain food of plants; but they should be well rotted in dunghills, before they are applied to the soil. They do not retain moisture like woollen; and they dissolve slowly.

RAILS, pieces of timber placed horizontally in fences, supported at the ends by posts. See the article *Fence*.

RAIN, condensed vapour, which falls in drops, and waters the earth. This is of more advantage to the husbandman than all his labour and care. No kind or degree of culture will secure a crop, if the ground do not receive a considerable quantity of moisture from the clouds; for if the earth be not frequently moistened, the food of plants in it will become fixed; and there will be no fermentation in the

soil; so that the roots of plants cannot receive any nourishment. Was it not for the falling of dews the want of rain would be much oftener destructive to plants than it is. Dews are often great in a dry season; and from dews plants receive a considerable part of their nourishment.

The due quantity of moisture might indeed be supplied by watering by hand, as long as wells, springs and rivers were not dried up. But the labour of doing it would be worth more than all the crop. Neither would artificial watering have so good an effect as rain, on account of the inferior quality of the water for this use, and the mode of applying it. The gentlest rains are generally most conducive to the growth of plants, and the fruitfulness of the soil, as all parts are more equally soaked; and cloudy weather, which most commonly happens before rain, helps to predispose the earth, and its vegetables, to receive the greater advantage from the water that falls. It is also believed the electric fluid, which is conducted to the earth by rains, conduces much to the invigoration of plants.

Rain not only gives fluidity and motion to the food of plants contained in the soil, but contains in itself more or less of the ingredients of it. The atmosphere contains abundance of saline, earthy and oleaginous particles; so that rain water cannot fail of being impregnated with them.

It has been proved by a variety of experiments, that a much greater quantity of rain falls at the surface of the ground, than at the top of a house, or other building; which may be partly owing to the vapour contained in the lower part of the atmosphere,

phere, which is joined to the drops in their descent.

Perhaps the action of the sun's heat is proportionably greater in vallies than on summits of hills; if so, there is a happy balance between heat and rain on all parts of the surface of the earth. Though it is often regretted that low hollows are overcharged with water, it is commonly soon exhausted by the heat of the sun in summer, which is much greater in vallies than on hills.

It may be asked; would it not have been better, if a greater proportion of rain had fallen on hills than on vallies? But they need it not so much, because of the greater coolness of the air on hills. More of the fine mould would have been washed down into the hollows, and deeper channels would have been made in the soil by the running of water, which would have been considerable inconveniences.

The quantity of water that falls in a year may be from twenty five to thirty inches. If the whole were to fall at once, destructive deluges would be experienced, and droughts equally destructive. It is the frequency of rains that renders the earth fruitful. To some soils, as stiff clays and loose sands, frequent rains are more needful than to others. The former imbibes the water too slowly; the latter parts with it too speedily. These two kinds of soil, therefore, need the most frequent showers.

In some years the rains are so ordered, as to make the seasons most fruitful. A moderate quantity in each week through the summer will be apt to supply so much moisture, and keep up such a degree of fermentation in the soil, as is most conducive to the progress of vegetation.

Farmers in this climate generally wish for but little rain in April, and for much in May and part of June; then less in hay time, and English harvest. But as it is not left to us to order this matter, we should endeavour to accommodate ourselves to the seasons; and to assist nature whenever we have opportunity for doing it, draining land which is too wet, watering that which is too dry, and applying more manures to dry soils, which will make them more retentive of water.

RATS, a mischievous kind of vermine too well known to the farmer. No walls that I know of have been found to be sufficient barriers against them.

The same poison which I prescribed for mice, will well serve to destroy these animals. But the best way is to catch them in a cage made of wire, in a cubical form, enclosed in a wooden box. Each side of the cage should be a plane of about fifteen inches square.

RED WORM. See *Insects*.

REED, *Arundo*, "the name of an aquatick plant, infesting low grounds. The best method of destroying them, is by draining the land. Ashes and soot will kill them." So will ploughing the land, and laying it in high ridges. They always indicate a good soil." *Complete Farmer*.

RIDGLING, a male animal half castrated. A horse of this kind is as troublesome as a stallion, or more so; but is not fit to be depended on as one. A ridgling hog will never be fat, nor grow so large as a barrow, till his castration be completed; as it may be by making an opening in the belly, when the case is the most difficult. They should be either killed young, or completely castrated.

castrated. The flesh of a young ridgling pig is good ; but that of an old one brawny and disagreeable.

RIPLING CART, a machine to perform the work of reaping. In a pamphlet published at New-york, in the year 1790, by F. C. H. B. Pollintz, a ripling cart, as he calls it, is recommended for the harvesting of wheat. In the operation the heads of the corn are taken off by seven combs, each four feet in length. The combs are strongly fastened, at equal distances, to a roller, which is turned by bands from the wheels of the cart, and which throws the heads into the cart, which is pushed forward by one horse, harnessed with his head towards the cart. Allowing that the horse travels twenty miles per day, ten acres are reaped. A boy placed in the cart fills sacks with the heads, as the cart is going, and throws them out at the head lands.

After the heads are thus collected, the threshing of the wheat is represented as performed by a mill built on the principles of a common coffee mill, which is turned and fed by two small boys, who can do three bushels in an hour. If these modes of threshing and reaping were brought into common use, it is astonishing to think how much labour might be saved. But I suspect there are difficulties attending the method of reaping.

ROD, the same as a perch, or pole ; a measure of five yards and a half. A square rod of superficies is the 160th part of an acre.

ROLLER, a cylindrical instrument to pass over lands, to answer several good purposes in husbandry.

Those rollers which are cut out of free stone, being heavier than

wooden ones, are best to smooth, and harden, the alleys in gardens, walks, &c. But wooden ones answer better in tillage, when they are sufficiently large. A roller for field husbandry should be five or six feet long ; so that it may perform much in a short time, being drawn by a horse or a yoke of oxen, for either of which it may be easily harnessed. It should be made perfectly round and smooth, that it may be drawn the more easily, and press the ground the more equally in all parts. And it should be from eighteen to twenty four inches diameter. Being large, the pressure will be greater ; and the surface will be left the more level.

A spiky roller, or a roller filled with spikes, six or seven inches long, sharp pointed at the outer ends, is sometimes used in the old countries, to pulverise cloddy land in tillage, or to brake and open the sward of grass land when it is bound, and too compact. After grass land is so broken, a top dressing will have the better effect. A roller is sometimes armed with circular knives, four or five inches broad, put on in the manner of hoops, the edges at right angles with the axis of the roller, twenty inches from each other. They use these instruments to cut the sward into strips, in order to cut up the turfs with a sharp ironed plough for burn beating. This manner of doing the work, is far less expensive than cutting up the turfs with the beating axe. But the sward of land to which this instrument is applied, ought to be extremely level, and free from stones and strong roots.

ROLLING, smoothing and moderately hardening the surface of land, by drawing a roller over it.

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.

No soil will admit of rolling that is very uneven, or much rocky or stony. But small round pebbles in a mellow soil, well pulverised, need not prevent rolling: For the roller will press them all into the soil. Land that is apt to have a stiff crust formed upon it, by lying only a few weeks, I think should not be rolled; because it will cause the crust to be the more hard and stiff. But the advantages of rolling in a light and rich soil are so great, that it is pity that the practice of it is so generally laid aside in this country.

Rolling, after sowing and harrowing, will cause the mould to enclose the seeds; much of which, otherwise, lying in cavities that soon become dry, is apt to fail of vegetating.

Rolling also fills up ten thousand little cells, which, when left open, are haunts and harbours for flies and other noxious insects; besides, it has the advantage of destroying some kinds of insects in the operation. It is peculiarly beneficial on this account to a crop of turnips. And some recommend passing the roller over turnip ground, not only when the seed is newly sown, but after the plants are up.

When a clay soil is sown, rolling breaks many lumps, or hard clods, which have escaped the plough and the harrow. But an over light soil, which is apt to dry too fast, needs rolling more than any other. It serves to prevent the evaporation of moisture, by making it less porous.

Some of the European farmers prefer rolling after the grain has risen to the height of four or five inches. But of the utility of this

we are not yet convinced by a sufficient number of trials.

In all kinds of soil that are laid down to grass, rolling is necessary, to lay the surface so smooth and even as to facilitate mowing and raking. And those kinds of sowed corn which are to be cut with the scythe, and raked, should be rolled, that loss may be prevented in harvesting. Without it, a crop of barley cannot be well taken up clean with a rake, especially when the corn is short and small, as I have often found to my loss. Some writers on husbandry think a crop of barley, in particular, will be considerably larger for rolling it, as it is a dry seed, that needs to be well enclosed with mould, in order to its vegetating. Lands that are in grass, may be kept even by a yearly rolling, which will press down mole hills and other unevennesses, and cause the grass to grow thicker. It will also be an advantage to be able to mow it the more closely.

ROOD, forty perches of land, or a quarter of an acre.

ROOTS, the parts of plants that are under the surface of the earth, which imbibe the nutritious juice of the earth, which feeds and increases the plants.

Botanists distinguish roots into divers sorts, according to their different forms. But the only distinction to which the husbandman needs to give his attention, is, to consider roots as of the tap, bulbous, or fibrous kind. Of the first kind are the carrot, parsnep, beet, &c. of the second, the potato, onion, turnip, and several other; of the last, wheat and other kinds of grain, and many grasses.

But still there are perhaps but few plants which have only one of these kinds of roots, though the form that is most obvious

denominates a root. Carrots, and other tap rooted plants, send out horizontal fibres to a considerable distance. Trees in general have both tap and fibrous roots. A turnip has the three kinds of roots, having a bulb, a tap, and many lateral fibres from the tap.

Mr. Mills, on this subject says, the roots that proceed immediately from the seed, are always of the carrot or tap kind. Tap roots strike down perpendicularly into the earth, till it becomes too hard to admit of their farther passage; but when the soil is deep, and easily pierced, they penetrate sometimes to the depth of several yards, unless they are cut or broken; in which case they alter their direction. This is frequently observed; particularly in plants raised in water only. The tap roots shoot out branches which extend horizontally; and these branches are stronger, in proportion as they are nearer to the surface of that layer of earth which is stirred by the plough or spade.

These are the roots which we call creeping or fibrous. They extend sometimes to a considerable distance from the plant that produced them; but then they become so minute, that the naked eye can no longer trace them; especially when they have taken the tincture of the earth that surrounds them, as they generally do.

A carrot, for an example, which seems to have only one great root, furnished with some fibres, pushes its roots, according to Mr. Tull, to a considerable distance; but they grow so very slender, that they cannot be distinguished from the earth that covers them, without great attention. The case is the same with almost all plants.

To convince the reader of this, and at the same time to shew how far the roots of plants can extend in ground that is well loosened, he recommends the experiment which I have mentioned under the article, *Pasture of Plants*, which see.

The following instances, says M. Duhamel, shew what effort trees will make, to find a proper soil for the extension of their roots. On examining those of a hedge, at the side of which a ditch had been dug, it appeared, that after passing underneath the ditch, they reascended, and spread themselves in the ploughed earth on the other side.

He made the same observation on a row of elms, which were very near being killed by the digging of a deep ditch pretty near them, in order to prevent their roots from damaging an adjacent piece of ground. The elms shot out fresh roots in the loose mould that dropped into the ditch; these roots reascended on the other side of the ditch, and spread in the ploughed ground, and the elms soon recovered their former vigour.

He likewise observed, that on digging a trench at a small distance from a young elm, and filling it with good mould, the roots of that elm took their direction towards the trench, and grew to a great length in it.

These observations prove that horizontal roots extend far, especially, in loose mould: And as a plant thrives in proportion to the length of its roots, Mr. Tull justly infers the necessity of keeping the earth in tillage in a light state, that the roots may easily penetrate it.

A root that has been cut or broken, never grows longer, but soon produces several new roots, all

all of which gather the proper food of the plant. Its means of subsistence are therefore increased, by the breaking of its roots, in digging or ploughing, rather than otherwise. In the horse hoeing husbandry many of the fibrous roots of the growing plants are undoubtedly cut off by the plough. But it occasions the multiplying of the roots, and consequently the greater nourishment of the plants.

ROT, a disease in sheep, similar to a pulmonary consumption in men. A writer in the Scots Farmer thinks that if the disease have not proceeded far, the animals may be cured by feeding on turnips. But this is rather to be doubted. It is said to be caused by keeping them in a pasture that is too moist, producing rank and watery grasses. The raging of this distemper in a flock, is stopped by removing them to a dry situation: But the individuals which are deeply seized with it, are seldom cured. Cough is a constant symptom. The lungs decay, and the whole body droops and languishes, in the same manner as persons in a hectic. The sick of the flock should be removed from the found sheep, that the infection may spread no further among the flock.

ROTATION of CROPS, a course of different crops in succession, on the same piece of ground.

This matter has not yet been sufficiently attended to by New-England Farmers. This appears by their often being necessitated to lay their tillage lands waste for a considerable number of years, that they may get recruited. The expense of recruiting worn out land is so great, that such a course of crops ought to be pre-

ferred as the soil will bear without material injury, or without being too much exhausted. And, when other things are equal, such a course should be adopted, as requires the least labour, or cost of manures and cultivation. When a course is well chosen, it may be repeated on the same spot perpetually, without damage to the soil.

It is not to be expected, that the best rules concerning this matter can be established, but from the experience of many years. For though it may be easy to compare the respective advantages of different courses, in a few years, so as to find which is more productive; it will take a much longer time to determine which course will be best on the whole. For the state of the soil, at the end of a long course, is to be taken into the account. And it is to be remembered that a course that is suitable for one soil, may not be so for another.

In countries where a spirited attention to agriculture has for a long time subsisted, one would expect, that people have most probably adopted the best courses. It is not amiss, therefore, to observe what courses they generally prefer in Britain and Ireland, taking care not to go into a rash and inconsiderate imitation of them, without making allowance for local differences, &c.

A common course in Ireland is, turnips, barley, clover, wheat: Or, potatoes, barley, clover, wheat.

From the account that Mr. Young gives of the courses in different places, which he passed through in his northern tour, the following things are observable: That where they do not fallow, green and white crops follow each other alternately; and that
wheat

follows clover oftener than any other crop : That where fallowing is practised, wheat is next, and after it sometimes another white crop ; but not generally. It ought to be never.

The courses of crops in Ireland, will furnish nearly the same observations.

The judicious farmer knows, that some regard must be had to the nature of the soil in a course of crops. Those crops which require a light soil, should make no part of the course in a stiff one, and *vice versa*.

But supposing the European courses to be the best that can be, some variation is surely to be made in this country ; what that variation is, experience must discover. Not only our climates, but also our crops are different. We raise some crops that they do not, and not all that they do raise. But a rule that is fit to be extended to all countries, is, that two impoverishing crops should seldom, or never, succeed each other in a course. And it is certain, that white crops in general, are apt to impoverish the soil, as they continue to draw nourishment from the earth, for some time after the leaves are dead, and cease to receive nourishment from the air. And all plants that bear an oily seed, rob the soil of much of its vegetable food : Such are flax and hemp, supposing them to continue on the soil till the seed is ripe.

Reasoning from experience and observation, I am led to believe, that the following are as good courses, as may be expected to be introduced in this country. On light warm soils, the first year, maize dunged, pease, or potatoes : 2d year, rye, barley, or buck wheat : The 3d, and 4th, clover : The 5th, wheat :

The 6th, and 7th, clover. On cold and stiff soils, 1st, oats or potatoes : 2d, Potatoes well dunged : 3d, Flax, or wheat : 4th, Grass, and so on till it needs to be broken up again. Though these may serve for general rules, yet as there is a great variety in soils, and some farmers can obtain manure in greater plenty than others, each farmer must endeavour to accommodate his courses to his soil and other circumstances.

ROWEL, a kind of issue, or artificial wound, made in the skin of a horse, by drawing a skain of silk, thread or hair, through the nape of the neck, or some other part, answering to what surgeons call a seton.

Horses are roweled for inward strains, especially about the shoulders or hips, or for hard swellings that are not easily dissolved. The rowel may be made in almost any part, and should always be not far from the diseased part, and about a hand breadth beneath it. The two ends of the rowel should be tied together, that it may not come out, and be smeared with lard, or fresh butter, before it is put in. Afterwards, it should be daily smeared again, and drawn backwards and forwards, that the putrid matter may discharge itself.

What are called rowels by the English Farriers are made as follows : An incision is made through the skin, about three eighths of an inch long. Then the skin is separated from the flesh with the finger, or with the end of a blunt horn, as far as the finger will easily reach. Into this a piece of leather made very thin, and round shaped, is introduced, about the size of a crown piece, having a large round hole in the middle of it. Previous to introducing

introducing the leather, it is covered with lint or tow, and dipped in some digestive ointment. Also a pledgit of tow, dipped in the same ointment, is put in the orifice, to keep out the cold air. See *Clark's Farriery*.

RUNNET, or RENNET, an acid juice, contained in the maw of a calf that has fed on nothing but milk. When the rennet is to be preserved for use, the calf should be killed soon after he has suckled; for then the curd is entire and undigested.

Dairy women usually preserve the maw, and the curd contained in it, after salting them; and then by steeping this bag and curd, make a rennet to turn their milk for making cheese. But a method which seems to be more simple, and is equally good in every respect, is, to throw away the curd, and after steeping it in very strong pickle, stretch out the maw upon a slender bow inserted into it, which will soon be very dry, and keep well for a long time. Take an inch or two of the maw thus dried, and steep it over night in a few spoonfuls of warm water; which water serves full as well as if the curd had been preserved, for turning the milk. It is said that one inch will serve for the milk of five cows.

In the Bath papers, Mr. Hazard gives the following receipt for making rennet: "When the raw skin is well prepared and fit for the purpose, three pints of soft water, clean and sweet, should be mixed with salt, wherein should be put sweet brier, rose leaves and flowers, cinnamon, mace, cloves, and almost every sort of spice; and if these are put into two quarts of water, they must boil gently, till the liquor is reduced to three pints, and care should be

taken that this liquor is not smoked. It should be strained clear from the spices, &c. and when found to be not warmer, than milk from the cow, it should be poured upon the cell or maw; a lemon may be sliced into it, when it may remain a day or two; after which it should be strained again, and put into a bottle, where, if well corked, it will keep good for twelve months. It will smell like a perfume; and a small quantity of it will turn the milk, and give the cheese a pleasing flavour." He adds, "If the maw be salted and dried for a week or two near the fire, it will do for the purpose again almost as well as before." Another receipt is as follows: After the maw has been well cleaned and salted, and dried upon sticks or splints, take boiled water two quarts, made into brine that will bear an egg, let it be blood warm, put in the maw, either cut or whole; let it steep twenty four hours, and it will be fit for use. About a tea cup full will turn the milk of ten cows. It should be kept in glass bottles, well corked.

An ingenious correspondent, who has made strict inquiry into this subject, recommends the following method of preparing a rennet, which he has found to be better than any other. "Throw away the natural curd, which is apt to taint, and give the bag a bad smell: Then make an artificial curd, or rather butter, of new cream, of sufficient quantity to fill the bag. Add three new laid eggs well beaten, one nutmeg grated fine, or any other good spice: Mix them well together, with three tea cup fulls of fine salt: Fill the rennet bag with this substance: Tie up the mouth: Lay it under a strong brine for three days, turning it over daily: Then

Then hang it up in a cool and dry place for six weeks, and it will be fit for use. When it is used, take with a spoon out of the bag, a sufficient quantity of this artificial butyrous curd for the cheese you purpose to make: Dissolve it in a small quantity of warm water, and then use it in the same manner, as other rennet is mixed with the milk for its coagulation."

Whatever kind of rennet the dairy woman chooses to prepare, she should keep it in mind, that this animal acid is extremely apt to turn rancid and putrefy, and take care to apply a sufficient quantity of salt to preserve it in its best state. It should be as much salted as possible. The strongest kind of salt should be used. For it is probable that the rank and putrid taste, which is so often in cheeses made in this country, is owing to a putridity in the rennet.

RUSH, *Juncus*, a troublesome sort of plant, commonly found growing in wet and miry land.

"Rushes always indicate a good soil. They may be destroyed by lime, even after it has been slaked, by sea coal ashes, or by draining the land. Rushes thrive most in land that is too cold and moist for most other plants. Ashes, and other warm manures of various kinds, laid on plentifully, will keep down the rushes for a time: But to eradicate them perfectly, it is necessary to drain the land." *Complete Farmer*.

RUST, dark spots, of the colour of the rust on iron, that appear on the stems and leaves of blighted grain. See the article *Mildew*.

Some sorts of grass are also subject to the same distemper.

RYE, or **RIE**, *Secale*, a well known grain, that is much cultivated in this country.

Though rye by itself makes a dark coloured, clammy, and unfavoury kind of bread, it is better to mix with Indian meal in bread, than any other kind of English grain; and for this reason, our farmers are the more fond of cultivating it.

Rye is as liable to suffer by rust, as wheat; but it is seldom known to be smutty. It is, however, sometimes hurt by a distemper called the *Spur*. See that article.

Mr. Miller thinks there is but one sort of rye, though distinguished by farmers, into winter and spring rye. The winter rye is larger and heavier than the other, and is commonly more profitable to the farmer. This is sown in autumn, at the same time as wheat. The spring rye should be sowed as early in the spring, as the ground will admit of it.

Some sow their winter rye at the last hoeing of Indian corn, and hoe it in. This is a good practice, when it is sown on flat land, or on a rich or heavy soil, where grain is apt to suffer by the frost of winter. For the plants of rye will be mostly on the corn hills, and so escape injury from frost: At least they will most commonly escape, or so many of them as are necessary to give a good crop. The plants that are killed will be those in the low spaces between the hills.

Sandy and gravelly soils are most suitable for rye. It commonly prospers much better on such, than on richer soils: The principal reason of which may be its ripening earlier, and so escaping the blight. Weak land has strength enough to produce rye, and it does not exhaust the soil so much as other corn.

I have known the same spot produce twenty crops of this grain in succession, (excepting that it was planted with Indian corn once or twice, to subdue the weeds) the crops yearly increasing, instead of diminishing. The right method is, to plough in the stubble as soon as the crop is off; and in a fortnight or three weeks, according as weather and circumstances favour, cross plough the ground, and sow the seed. The stubble, so early buried in the soil, serves as a manure. It will need no dung.

It is said by some writers, that sowing rye two or three years on a warm dry soil, it will be forwarded, so as to ripen a month earlier than that which has been long cultivated in other soils. This ought to be attended to by farmers in this country, where grain that ripens late, is so apt to be blasted. But this observation, possibly, may not be founded in truth.

The quantity of seed to be sowed, is recommended by some, to be two bushels per acre. But when the grain is small, five or six pecks may be a sufficient quantity. For the smaller the grain the greater the number of seeds.

The signs of ripeness are, the yellow colour of the straw, the hanging of the ears, and the hardness of the grain. But some choose to cut it when in the milk, because the flour will be whiter. The quantity, however, will be less, unless it lie a good while on the ground to ripen, which it may safely do in good weather, if care be taken to keep the top ends from the ground. Winter rye is some times fit to harvest by the middle of July even in the northern parts of Newengland: Spring rye is always later.

Some recommend sowing winter rye for grazing and fodder. It affords very early feed for cattle in the spring. Or it may be mowed for hay two or three times in a summer. In countries that are dry, and do not naturally produce much grass, this may be considered as a good piece of husbandry.

RYE GRASS, *Lolium*, a sort of grass propagated in England for hay, sometimes called *Ray grass*.

S.

SALT, a substance that readily dissolves in water, has a pungent taste, and easily unites with earth.

Salt is one of the essential ingredients of the nourishment of plants; and some kind of salt is contained in every plant.

Common salt is found in a variety of forms: But it always assumes a cubick, or parallelopiped figure, after solution and crystallization. It is contained not only in the sea, and in salt springs; but in large strata or masses in the bowels of the earth.

Salt is of essential importance to the farmer as a manure. It may be applied to the soil, either by itself, or mixed and dissolved in compost. In the latter method, I have found it to be a great fertilizer of land.

But if salt be applied unmixed and undissolved, it will endanger the existence of tender plants. Mr. Tull asserts, that common salt is poison to all plants, except marine ones: He doubts less means that it is so, before it is mixed, altered and assimilated.

In June, 1786, I salted one bed of my onions, one bed of my carrots, and one bed of my early turnips; laying the salt under

under the surface, in the centres of the intervals between the rows, at some distance, perhaps six inches, from the plants, that the salt might have time to be dissolved, and altered, before the fibrous roots should reach it. The carrots of the salted bed, evidently grew much larger and better than the rest of the carrots; but I could not perceive that the salt was at all beneficial to the onions, or to the turnips.

According to Mr. Ford's experiment in salting flax ground, salt seems to be highly beneficial to that crop. He spreads the salt over the ground, at the time of sowing the seed; and thinks that the quantity of salt should be double that of the seed. From three acres in flax salted, he had fifty bushels of seed, and an excellent crop of flax. It was thought that the advantage of salting appeared more in the seed than in the harle.

Mr. Eliot tells of five bushels of salt being applied to one acre of flax, which is a much larger proportion, and that it had an extraordinary effect: And also of a crop of wheat being increased by salt. It is hoped that future trials will more fully ascertain the utility of this kind of manure, and to what crops it may be most advantageously applied.

SALTING of MEAT, the method of preventing its corruption for a long time, by the application of common salt, &c.

As farmers are most commonly too far distant from market places, to be supplied from them with fresh meat, and as it is most convenient for them to kill only at certain seasons, they ought to be well acquainted with the best methods of keeping meat in good order, by salting.

The common method of preserving pork, reserving the lean parts for use in the cold season, and applying a large quantity of salt to the fat, is perhaps as good as any can be. But beef is greatly injured, and rendered unwholesome by a severe salting.

A good method of preserving beef, which I have known to be practised for several years past, is as follows: For a barrel of beef of the common size, reduce to powder in a mortar four quarts of common salt; then eight ounces of salt petre, and five pounds of brown sugar. Let the salt be well rubbed into the pieces, pack them close in the barrel, and sprinkle the salt petre and sugar evenly over each layer. No water at all is to be applied. The juices of the meat, if well packed, will form a sufficient quantity of brine; and the beef will keep sweet and good through the following summer, supposing it killed and packed in the beginning of winter, or late in autumn; and will not be too salt to be palatable. Draining off the brine and purifying it by boiling and scumming, with the addition of a little salt in the beginning of summer, and returning the brine upon the meat, will be a real improvement.

Dr. Anderson recommends a similar method for preserving butter. Take of sugar one part, of nitre one part, and of the best Spanish great salt two parts. Beat the whole into a fine powder, mix them well together, and put them by for use. One ounce of this is to be thoroughly mixed with a pound of butter, as soon as it is freed from the milk, and then immediately put into the vessel designed to hold it. After which it must be pressed so close as to have no air holes; and then so closely

closely covered that no air can come to it. If all this is done, he thinks the butter may be kept perfectly sound and good for many years. For he had seen it at two years old, in every respect as sweet and sound as when only a month old.

SAND, is described as a genus of fossils, found in minute concretions, forming together a kind of powder, the genuine particles of which are all of a tendency to one particular shape, and appear regular, though more or less complete, concretions; not to be dissolved, or disunited by water, or forming into a coherent mass by it, but retaining their figure in it: Transparent, vitrifiable by extreme heat, and not dissoluble in, or effervescing with acids.

“These are subject to be variously blended and intermixed, either with homogeneous or heterogeneous particles, particularly with flakes of talk; and, according to these, and their different colours, are to be subdivided into different kinds, as red, white, &c.

“As to sand, its use is to make the clayey earth fertile, and fit to feed vegetables: For such earth alone, we find, is liable to coalesce, and gather into a hard coherent mass, as is apparent in mere clay. The earth thus embodied, and as it were glued together, is no ways disposed to nourish vegetables. But if with such earth, a sufficient quantity of sand be intermixed, it will keep the pores of the earth open, and the earth itself loose and incompact; and by that means give room for the juices to ascend, and for plants to be nourished thereby.

“Thus a vegetable planted, either in sand alone, or in a fat

glebe, or earth alone, receives no growth or increment at all, but is either starved or suffocated: But mix the two, and the mass becomes fertile. In effect, by means of sand, the earth is rendered, in some manner, organical: Pores and interstices being hereby maintained, something analogous to vessels, by which the juices may be conveyed, prepared, digested, circulated, and at length excerned, and thrown off into the roots of plants.

“Grounds that are sandy and gravelly, easily admit both heat and moisture: But then they are liable to these inconveniences, that they let them pass too soon, and so contract no ligature, or else retain it too long, especially where there is a clay bottom: And by that means it either parches or chills too much, and produces nothing but moss and cankerous infirmities. But if the sand happens to have a surface of good mould, and a bottom of gravel, or loose stone, though it do not hold water, it may produce a forward sweet grass; and though it may be subject to burn, yet it quickly recovers with the least rain.

“Sea sand is accounted a very good compost for stiff ground: For it effects these two things; it makes way for the tree or seed to root in stiff grounds, and makes a fume to feed it.

“Sand indeed is apt to push the plants that grow upon it, early in the spring, and make them germinate near a month sooner than those that grow upon clay, because the salts in the sand are at full liberty to be raised, and put into motion, upon the least approach of the warmth of the sun. But then, as they are hasty, they are soon exhaled and lost.

“The best sand, for the farmer’s use, is that which is washed by rain from roads, or hills, or that taken from the beds of rivers. The common sand, that is dug in pits, never answers nearly so well. Sand mixed with dung, is much better than laid on alone: And a very fine manure is made, by covering the bottom of sheep folds with several loads of sand every week, which are to be taken away, and laid on cold stiff lands, impregnated as they are, with the dung and urine of sheep.

“Besides clay land, there is another sort of ground very improveable by sand. This is that sort of black foggy land, on which bushes and sedge grow naturally, and which they cut into turf in some places. Six hundred loads of sand, being laid on an acre of this land, meliorate it so much, that it will yield good crops of oats, &c. though before, it would have produced scarce any thing. If after this crop is taken off, the land be well dunged, and laid down for grass, it will yield a large crop of sweet hay.

“Sea sand, which is thrown up in creeks and other places, is by much the richest of all sand for manuring the earth: Partly its saltness, and partly the fat and unctuous filth that is mixed among it, give it this great virtue. In the western parts of England, that lie upon the sea coast, they make great advantage of it. The fragments of sea shells also, which always abound in this sand, add to its virtues: And it is always the more esteemed by the farmers, the more of these fragments are among it.

“Sea sand is best, which is taken up from under the water, or from sand banks which are covered by every tide. The

smallest grained sand, is the most sudden in its operation, and is therefore best for the tenant, who is only to take three or four crops: But the coarse, or large grained sand, is much better for the landlord, as the good it does lasts many years.” *Complete Farmer.*

Sand entirely changes the nature of a clayey soil; so that it will scarcely ever become so compact, as it was before sanding. Nor is any other manure so good as sand, to loosen and soften it. No other will have so lasting an effect. From being the least productive, a soil of clay, by sanding, comes to be the most fruitful of any, when it is sufficiently sanded; for it has more of the food of plants in it than any other soil, wanting only to have its cohesion sufficiently broken, to give a free passage to the roots of vegetables. For this purpose, a very small dressing of sand will not seem to produce any effect. A layer of two and a half or three inches will not be too much for land in tillage, if it be a stiff clay.

The benefit of sanding does not appear so much the first year or two, as afterwards: For the oftener the land is tilled, the more thoroughly is the sand mixed with the clay; by which the vegetable pasture is more and more increased.

But sand laid upon clay land in grass, will have a great effect, without mixing it with the soil. I have known half an acre of clay land laid to grass, which became so bound and stiff, as to produce only two or three cocks at a mowing, with a mixture of low moss and other trash. The owner, in October, 1783, with one yoke of oxen, carted on eighty loads of yellow sand from the road,

road, which was about equal to forty cart fulls; levelled it with a harrow, and threw in some hay seed. The following year it produced ten hundred weight of good hay: Last year it produced twenty hundred; and it is expected, that about thirty hundred will be the weight of the crop in the present year, 1786. The sand not only added warmth to the soil, but prevented the clay from becoming so dry and hard as to prevent the roots of the grass from extending themselves in it.

SANDY SOIL, a soil in which sand is the predominant ingredient.

It is seldom found unmixed with other ingredients. Wherever it is so, it is extremely barren, and of little or no value. It will scarcely produce weeds.

Some barren sands consist of very fine particles, and have no sward over them. The wind drives them before it, and makes what are called *sand floods*, which bury the neighbouring lands and fences. The fences near them should be tall hedges to abate the force of winds: And trees which require but little nourishment from the earth, should be planted in these sands, that a sward may be obtained upon them. See *Locust Tree*.

When a sandy soil is used in tillage, it should be for those crops which require the most heat, and are least apt to suffer by drought; as maize, tobacco, rye, pease, &c.

The best manures for a sandy soil, are marle, cow dung, and swines' dung; mud from flats, swamps, ponds, rivers, &c.

Clay is as beneficial to a sandy, as sand is to a clayey soil. A dressing of clay two or three inches thick, laid on a sandy soil, and well mixed, will make it

fruitful for many years after, as I have found by experience. It brings the soil to the right consistence, renders it less porous, and causes it to retain its moisture. At the same time it is more retentive of manures applied to it: Perhaps the benefit received from the clay will never be wholly lost. Though the clay is continually sinking further into the earth, by means of every rain, deep ploughing will return it to the surface; so much of it at least as is necessary. And repeated dressings of clay may be needed.

SAP, the fluid contained in plants, which is drawn from the earth and atmosphere, by which plants are nourished, augmented, and rendered fruitful. It answers the same purposes as the blood and other circulating juices in animals. It conveys nourishment to all the parts.

Before this juice enters, it is called the food of plants; afterwards, it has the name sap: But it still consists of nearly the same ingredients, being compounded of earthy, saline, aqueous, oleaginous, and aerial particles.

The greater part of the sap enters at the root, being a subacid juice: And the nearer it is to the root in a plant, the less it is altered from its original state. But the farther it removes from the root, or the more it circulates, the more it is assimilated to the nature of the plant; the heterogeneous particles being stopped by strainers, or thrown off by perspiration. When the sap has arrived to the germs and buds, it is highly concocted: And when the leaves unfold, they serve as lungs for the further preparation of this liquid for the purposes nature intends it should serve.

It has long been disputed whether there is a circulation of

The juice in vegetables, similar to that of the blood in animals. Malpighi, Grew, and others, have contended in favour of such a circulation. They supposed the sap to ascend through tubes, or arteries in the woody part, and to return in what they call veins, between the wood and the bark. But Dr. Hales has confuted this doctrine, and substituted a more rational one in its place.

To conceive aright of the motion of the sap, it should be considered that the pabulum for the nourishment of plants is presented to them, and especially to their roots, in the form of a steam, or vapour: That the capillary pores in the superficies of the roots and other parts, imbibe this vapour by the principle that is common to all capillary tubes; from whence it passes by anastomosing canals to the inner parts, where it gets its highest perfection. By the same principle, the sap also ascends to the top: But this is not the only cause of its ascent.

The increased rarefaction of this juice within the plants, often expands it and causes it to mount upwards. As often as once every day, when the weather is warm, as in spring and summer, the sap ascends and descends.

In hot weather plants perspire freely, through the pores of the leaves and bark, at which season the sap is much rarefied. By means of the heat, the air in the *tracheae*, or air vessels, expands, and enlarges their diameters. Therefore they compress and straiten the sap vessels, which are in contact with them. The sap by that pressure is forced upward, as it cannot escape by the root, and sends out the excrementitious and useless matters contained in it, through the leaves and branches. On the cooling

of the air, the sap subsides again in its vessels. The vessels in the uppermost branches and leaves, are thus alternately emptied; and in their exhausted state, they imbibe food from the air, which mixes with the sap, and increases its quantity. This is a circulation peculiar to plants, and is different from that of animals.

SCRATCHES, or *Selenders*, a disorder between the hinder pastern joints and hoofs of horses, consisting of cracks and soreness, with suppuration. It is troublesome commonly in the winter season only. The method of cure is the same as for malanders. See that *Article*.

SEA WATER, this fluid, besides water and particles of common salt, contains, according to Dr. Ruffel's account, sulphur, nitre and oil.

As it undoubtedly contains much of the essence of animal and vegetable substances, by means of the perishing and consuming of both in it, it is fitter than mere salt to be used as a manure, whether by itself, or in compost.

In the year 1786, one hundred hills of potatoes near the shore were watered with sea water, about two quarts on a hill, being one hour's work of a man. The crop was half as much again, as in the same number of hills adjoining. The water was applied to the soil just after planting the sets, which I suppose to be the best time for doing it, as there can be no danger of burning the young shoots, and as the salt will be mixed with rain and the moisture of the earth, before shoots are produced.

In the year 1787, alternate rows were watered in the same manner with sea water. The result of this experiment was uncertain; because by ploughing off and

and on alternately between the rows, the earth of the watered and unwatered rows was blended together. But all together, a good crop was obtained.

The same year a piece of flax was, in the month of June, very short and yellow on one side of the piece; but of a good colour on the other, and much taller: This induced the owner to water the poor side from the sea. In ten days it was equal in length and colour with that on the other side, though very little rain fell in the time. At pulling, the watered side was evidently better grown than the other. This was a sufficient demonstration of the advantage of sea water, when the land lies adjoining to the sea shore; so that the labour of applying it is inconsiderable.

The above experiments were made in a clayey soil.

In a sandy soil the same year, watering the ground where French turnips were just sown, had an excellent effect. Though it was a spot where the turnips had been destroyed by insects, several years successively, they generally escaped this year. Not more than one pailfull was applied to a drill row two rods in length, wetting the ground over the seeds, soon after sowing.

Salt water applied to tender plants, most commonly proves too strong for them, if applied when the ground is dry. But if it be wet, the strength of the water is abated by mixing with the juices in the soil, before it is taken up by the roots, and thus it is rendered innocent and safe, as I have found by experience. The seeds bear the application of the sea water, better than the young plants do.

SEEDS of *Vegetables*, "their last product, by which their spe-

cies are propagated; being frequently all the fruit of a plant, but sometimes only a part included in the fruit.

"Every seed contains a plant in embryo. The embryo, which is the whole future plant in miniature, is called the germ or bud; and is rooted in the cotyledon, or placenta, which make its involucre, or cover. The cotyledon is always double; and in the middle, or common centre of the two, is a point or speck, viz. the embryo plantule, which being acted on by the warmth of the sun and of the earth, begins to protrude its radicle, or root, downwards, and soon after, its plumula, or bud, upwards; and as the requisite heat continues, it draws nourishment by the root, and so continues to unfold itself and grow.

"The two cotyledons of a seed, are a case to the little embryo plant; covering it up, and sheltering it from injuries, and feeding it from its own proper substance; which the plantule receives and draws to itself by an infinite number of little filaments, which it sends into the body of the placenta.

"The cotyledons for the most part abound with a balsam disposed in proper cells; and this seems to be oil brought to its greatest perfection, while it remains tumid, and lodged in these repositories. One part of the composition of this balsam is oily and tenacious, and serves to defend the embryo from any extraneous moisture; and, by its viscidty, to entangle and retain the fine, pure, volatile spirit, which is the ultimate production of the plant. This oil is never observed to enter into the vessels of the embryo, which are too fine to admit so thick a fluid.

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The spirit, however, being quickened by an active power, may possibly breathe a vital principle into the juices that nourish the embryo, and stamp upon it the character that distinguishes the family; after which, every thing is changed into the proper nature of that particular plant.

“Now when the seed is committed to the earth, the placenta still adheres to the embryo for some time, and guards it from the access of noxious colds, &c. and even prepares and purifies the cruder juice the young plant is to receive from the earth, by straining it through its own body. This it continues to do, till the embryo plant being a little enured to its new element, and its root tolerably fixed in the ground, and fit to absorb the juice thereof, it then perishes, and the plant may be said to be delivered; so that nature observes the same method in plants, as in animals in the mother's womb.

“Many sorts of seeds will continue good for several years, and retain their vegetative faculty; whereas others will not grow after they are one year old: This difference is in a great measure owing to their abounding more or less with oil; as also to the nature of the oil, and the texture of their outward covering. All seeds require some share of fresh air, to keep the germen in a healthy state; and where the air is absolutely excluded, the vegetative quality of the seeds will be soon lost. But seeds will be longest of all preserved in the earth, provided they are buried so deep as to be beyond the influence of the sun and showers; since they have been found to lie thus buried twenty or thirty years, and yet vegetate as well as new seeds. How the vegeta-

tive life is so long preserved, by burying them so deep, is very difficult to explain; but as the fact is very well known, it accounts for the production of plants out of earth taken from the bottom of vaults, houses, &c.

“In the common method of sowing seeds, there are many kinds which require to be sown soon after they are ripe; and there are many others which lie in the ground a year, sometimes two or three years, before the plant comes up: Hence, when seeds brought from distant countries are sown, the ground should not be disturbed, at least for two years, for fear of destroying the young plants.

“As to the method of preserving seeds, the dry kinds are best kept in their pods or outer coverings; but the seeds of all soft fruits, as cucumbers, melons, &c. must be cleansed from the pulp and mucilage which surround them; otherwise the rotting of these parts will corrupt the seeds.

“When seeds are gathered, it should always be done in dry weather; and then they should be hung up in bags in a dry room, so as not to deprive them of air.” *Dictionary of Arts.*

SEEDING, the same as sowing of seed. See the article *Sowing*.

SEEDLING, a root that springs from seed sown. The name is applied also to the tender tops of plants that have newly come from seed. The little plants are thus distinguished from cuttings, layers, and slips.

SEMINATION, the manner in which plants shed and disperse their seeds.

Some seeds are so heavy, that they fall directly to the ground; others are furnished with a pap-

pus, or down, that they may, by means thereof, be dispersed by the wind; and others again are contained in elastick capsules, which, bursting open with considerable force, dart or throw out the seeds to different distances. Some of the second sort are wafted over vast tracts of land, or even carried to remote countries. The weed that is peculiar to burnt land, and is called fire weed, has such a kind of seed: It is not strange, therefore, that we see it grow in burnt places, many miles from where it has grown before.

SHADE, a shelter or defence against the heat of the sun. Cattle need not only to be sheltered against cold and wet weather in other seasons, but against heat in summer. Therefore the pastures in which they feed, should have trees in them, that they may repair to their shadow in the hottest hours. Clumps are preferable to single trees, as they not only afford a cool shade, but may screen the cattle from the violence of rain and storms, some of which happen in the time of grazing.

SHED, a slight roof or covering, of boards or other materials, for temporary purposes. Where boards are not easily obtained, they may be covered with straw, which will last a few years; or with the bark of trees, which will be far more durable.

SHEEP, a well known tame animal.

They multiply fast; they are subject to but few diseases in this country; their flesh is excellent food, and their wool of the greatest importance to this nation; in which the woollen manufactory ought to be encouraged, and may be carried on to great advantage.

Mortimer says, "The farmer should always buy his sheep from

a worse land than his own, and they should be big boned, and have a long greasy wool.

"For the choice of sheep to breed, the ram must be young, and his skin of the same colour with his wool; for the lambs will be of the same colour with his skin. Those ewes which have no horns, are found to be the best breeders."

The farmers in Europe know how to distinguish the age of sheep by their teeth. When a sheep is one shear, as they express it, that is, has been sheared but once, or is in its second year, it has two broad teeth before: When it is two shear, it will have four: When three, six: When four shear, or in its fifth year, it will have eight teeth before. After this, their mouths begin to break.

"The fat pastures breed straight tall sheep, and the barren hills square and short ones. But the best sheep of all, are those bred upon new ploughed land, the reason of which may be easily guessed, as such land is commonly the most free from bad grasses.

"All wet and moist lands are bad for sheep, especially such as are subject to be overflowed, and to have sand and dirt left on them. The salt marshes are an exception from this general rule: For their saltness makes amends for their moisture; any thing salt, by reason of its drying quality, being of great advantage to sheep. The best time for sheep to yearn, which go twenty weeks with lamb, is in April, unless the owner has any forward grass, or turnips. Ewes that are big, should be kept but bare; for it is dangerous for them to be fat at the time of their bringing forth their young. They may be well fed, indeed, like cows, a fortnight.

night beforehand, to put them in heart."

M. Buffon says, "One ram will be sufficient for twenty five or thirty ewes; but that he should be remarkable for strength and comeliness: That those which have no horns are very indifferent: That the head of a ram should be large and thick, the forehead broad, the eyes large and black, the nose short, the neck thick, the body long, the back and rump broad, the testicles large, and the tail long: That the best are white, with a large quantity of wool on the belly, tail, head and ears, down to the eyes: That the best sheep for propagation, are those which have most wool, and that close, long, silky and white; especially if, at the same time, they have a large body, a thick neck, and are light footed."

He says, "that ewes fatten very fast during their pregnancy; that as they often hurt themselves, and frequently miscarry, so they sometimes become barren; and that it is not very extraordinary for them to bring forth monstrous productions. But when properly tended, they are capable of yeaning during the whole of their life, or to the age of ten or twelve years. But most commonly when they come to be seven or eight years old, they begin to break, and become sickly; and that a ram is no longer fit for propagation after eight years, at which time he should be knit, and fattened with the old sheep."

According to the same writer, "sheep should in the summer be turned out early in the morning to feed; and in four or five hours, after watering, be brought back to the fold, or to some shady place. At four o'clock, P. M. they should be turned to their

pasture again, and continue there till evening; and were it not for the danger of wolves, they should pass the night in the open air, which would render them more vigorous, clean, and healthy. As the too great heat of the sun is hurtful to them, shady pastures are best for them; or else to drive them to a place with a western descent in the morning, and the contrary towards evening." That their wool may be saved, they should not be pastured in bushy places, or where there are briars. Sheep are often thus deprived of most of their fleeces; which besides the loss of the wool is very hurtful to the animals, when the weather is not warm.

The above writer directs, "that every year a flock of sheep should be examined, in order to find out such as begin to grow old, and ought to be turned off for fattening. As they require a particular management, so they should be put in a flock by themselves. They should feed while the grass is moistened with dew in the morning. Salt should be given them to excite thirst, as the more they drink the faster they will grow fat. But to complete their fattening, and make their flesh firm and solid, they should have some corn or grain given them." They may be fattened in the winter; but it is commonly too expensive, as they will require a good deal of richer food than hay. When sheep are once become fat, they should be killed; for it is said they cannot be made fat a second time. The teeth of ewes begin to decay at five, those of weathers at seven, and those of rams not until eight.

We shear our sheep in general too early in this country. In England,

England, where the spring is more forward than in this country, the approved time of shearing is from the middle to the latter end of June. They should be washed in a warm time. After this they should run three or four days in a clean pasture, before they are shorn. It is good for them to have time to sweat a little in their wool, after washing.

In shearing, great care should be taken not to wound, prick, or cut their skins with the shears. In England, after shearing, the farmers smear their sheep with a mixture of tar and fresh butter. This not only cures any little wounds they may chance to get in shearing, but is supposed to fortify their bodies against cold, and cause their wool to grow again the sooner.

If any cold rains happen soon after shearing, the sheep should be put up in a warm house. For if they be left abroad, it is apt to be fatal to them.

But Mr. Young thinks they are so apt to be hurt by being kept very warm that they should never be confined to a house, but always have the door open, that they may be in the house or the yard as they choose. They will undoubtedly prefer the warmer place when they are newly shorn, if the air be colder than common. Small flocks commonly prosper better than large ones, as they are not often so overheated by crowding each other.

In France, fifteen pounds of salt per annum are allowed to a sheep, and fifty for each head of cattle. The truth is, that in the inland parts of this country, both sorts should have salt often, and be allowed to eat as much as they please, their health requires it, and they will pay well for it to the owner.

Some are fond of having black sheep in their flock. But their wool is seldom so fine, or so strong, as that of white ones. Nor is the wool ever a perfectly good black, and it is found difficult to give it any good durable colour by dying.

SHELLS, stony coverings, which nature prepares for certain kinds of animals in the sea, and by which they are defended; which are therefore denominated shell fish.

These shells are much of the same nature as lime stone, and are one of the best kinds of manure. No length of time deprives those shells of their virtue, which are buried deep in the earth. Those which must have been in that situation, at least ever since Noah's flood, are unaltered. But shells which lie on the surface of the ground will gradually moulder, and become lime.

This manure is so highly esteemed in some parts of Europe, that the farmers even carry it in bags upon horses to the distance of several miles from the sea.

Shells may be applied to the soil at one season of the year as well as at another; excepting that they should not be carted on at a time when the ground is so wet as to be poachy; because poaching is hurtful to all soils. The farmer may generally do this work at a time when he is most at leisure. Even in winter those may well be removed, which lie lower in the sea than high water mark.

Mr. Weston recommends that shells be ground fine before they are used as manure; and says, the finer they are ground the farther they will go. But it requires so much labour to grind them, that I doubt whether it be worth

worth while to do it, unless it be for gardens. And in the long run, they will benefit the soil as much without grinding. Though the benefit of them, when applied whole, do not appear much in the first and second year, the tillage of every year will help to break and crumble them; and in a course of years, by continual tillage, they will be sufficiently dissolved, and intimately mixed with the soil.

It is chiefly the smaller shells that should be thus used, such as those of clams, muscles, &c. for these will be sooner dissolved than larger ones. As small shells are mostly mixed with sand, or tenacious mud, they need not be separated from these substances. Those that are mixed with sand will be a proper dressing for cold, stiff and clayey soils; and those which are mixed with mud should be laid upon soils that are dry and light. For many of the shells will lie with the concave sides upwards in the earth, and will stop the water in its descent, and so assist the soil in retaining moisture.

Mr. Eliot tried a sort of shell sand, which he says he found to be equal to good dung. If it had as much effect as dung at first, it must have been vastly better than dung upon the whole: Because shells are a lasting advantage to the soil.

SHRUB, a bush or dwarfish tree. Some apply the term to all plants that are woody and do not arrive to the size of trees, though not so durable as trees. The small oak bushes on plains, the elder, whortleberry bush, thorn, sweet fern, &c. are ranked under this head.

SILIQUEUSE PLANTS, or LEGUMINOUS PLANTS, those which contain their seeds

in pods. The seeds adhere to the stronger limbs of the two valves alternately. Of this kind are pease, beans, vetches, and many more.

SITHE, a well known instrument to cut grass. This instrument should consist of tough iron and the best of steel, well wrought together, and nicely tempered. If the temper of a sithe should prove to be too high, it may be lowered by laying it to the hot sun a few days in midsummer.

SLED, or SLEDGE, a carriage without wheels, chiefly used to convey loads when the ground is covered with snow. Plank sleds, and framed sleds, are both used. The latter for lightness are rather preferable. But plank sleds are more used for the heaviest loads, as masts and mill logs. The common length of a sled is eight or nine feet; but longer ones are better for carrying boards, and long timber.

SLIPS, twigs torn from a tree, or shrub, to propagate by planting them in a moist soil.

More than half, or even two thirds of their length, should be buried in the soil. They strike root more easily than cuttings. Early in the spring is the right season to perform it. I have the best success when I do it as soon as the ground is thawed in the spring.

The slips should either be planted immediately after they are taken from the trees; or the lower ends should be enclosed in wet clay till they are set in the ground. This last will be necessary when the slips must be carried to any considerable distance. And in this case, they should lie for a while in water before they are put into the ground.

It is necessary to place them in moist earth, rich, and finely pulverized.

verified ; and they should be frequently refreshed by a little watering, unless the season be wet.

But it is the surest method to plant slips in pots, especially of those kinds which are least apt to strike root. In this case, it will not be at all difficult to give them continually the right quantity of moisture. Slips from almost any kinds of trees and shrubs may be thus made to grow ; but they will never make so large trees as those which come from the seeds. They will be the more fit, however, for the borders of gardens.

SLOUGH, a deep muddy spot of earth.

Soft and hollow places in roads, where puddles of water stand after rain, by means of the frequent passing of loaded wheel carriages, often become deep and troublesome sloughs. The way to prevent their existence, is to make a channel, or a covered drain, where the shape of the ground admits of it, to lead away the superfluous water. For the ground will thus be permitted to dry and harden, so as to prevent the sinking of wheels into it.

To cure a slough in a road, sink pebbles, or any kind of stones into the bottom, and cover them with a thick coat of coarse gravel, or with cinder from a smith's forge, or with rubbish from a brick kiln. But this should be done in a dry season.

SLUICE, a frame of timber, serving to obstruct and raise the water of the sea, or of a river, and to let it pass as there may be occasion for it.

Sluices are required for mills, and for locks to carry on inland navigation. But I shall only consider those sluices which the husbandman may find useful in flooding of low lands, or watering a

dry soil with the Persian wheel, or in reclaiming of marshes.

For the first and second of these purposes, sluices with gates to raise and let down are proper. But for the last gates are not needed when the stream is large.

The Persian wheel has floats made hollow, and of such a construction, as to raise the water from a sluice, to the height of two thirds the diameter of the wheel ; where the floats discharge the water into a trough ; whence it is conveyed away in such a manner as to water the neighbouring lands. For a particular account of the machine, see *Mills's Duhamel*.

For reclaiming of marshes, boxes with shutters are used, especially when but a small quantity of fresh water will need to pass out through the sluices. A box may be made of four pretty wide and strong planks, either nailed or pegged together. The length of the box must be equal to the thickness of the bottom of the dyke ; and rather project a little at each end, that the passages may not be obstructed by dirt or sods falling from the dyke. These boxes should be placed in the lowest hollows of the marsh, or in the creeks, and the ground well hardened beneath them, and on their sides. It is better to place two or three boxes side by side, if needful, than go to the expense of building a more costly kind of sluice. And each hollow or creek, through which a dyke passes, and wherever there is likely ever to be fresh water to convey away, should have one or more of these little sluices.

Each box should have a clapper, or shutter. The shutter is to be fastened to the mouth of the box, at the end towards the sea, with hinges made of iron or wood. The rising tide presses the shutter

shutter close to the mouth of the box, so that no water can enter; and at ebb tide the fresh water, when there is any, opens it by its pressure, and passes out.

When it is found necessary to build larger kinds of sluices, *Belidor's Architecture Hydraulique*, and *Muller*, should be consulted.

SMUT, a distemper in grain, which dissolves the substance of the kernel, turns it to a black dust, and bursts the coats of the kernels.

M. Duhamel distinguishes it by its entirely destroying the germ and substance of the grain; by its affecting not only the ear, but the whole plant, and extending itself most commonly to all the ears which arise from the same root. He says he has found it as early as in April, by opening a plant, and taking out a young ear, not more than the sixth of an inch long; that a distempered ear, when it comes out of its hose, looks lank and meagre, and that the black powder may be seen through the thin coat of the grain; that the powder has a fetid smell, and no consistency; that it is easily blown away by wind, or washed away by rain; and that he has never found it to be contagious, like the powder of burnt grain.

M. Tillet observed that the upper part of the stalk of a smutty plant is not commonly straight, from about half an inch below the ear; and that in that part it is stiff and hard, and is almost entirely filled with pith, very different from the stems of healthy plants; whence he concludes, that the ascent of the sap is obstructed in the stems of smutty plants.

The real cause of smut has escaped the researches of many philosophers. M. Duhamel justly observes, that it cannot be a

want of fecundation, as it destroys both the male and female organs, long before the time of fecundation.

He confutes the conjectures of its being caused by wet upon the ears, or the violent heat of the sun, by observing that the ears are smutty before they cease to be covered by the blades. And if it were owing to the moisture of the earth, he observes, that there would be more smutty plants in the low and wet, than in the high and dry parts of a field, which is not fact.

He adds, that he never could make it appear that the distemper is caused by insects, though he had been of that opinion; and that Dr. Hales has proved by experiment that it cannot proceed from the seeds being bruised by the flail, by bruising a number of grains with a hammer, which grew well afterwards, and bore sound ears. The same excellent reasoner refutes the opinion of those, who impute smut to dung of sheep or pigeons.

M. Aimen, M. D. has very judiciously observed, "that the smut of corn cannot derive its origin from a defect in the sap, as all the parts of the plant, except the ear, look healthy, and there are plants whose roots are perennial, which appear vigorous, though their seeds are smutty every year. He is of opinion, that whatever weakens the plant, is apt to bring on the smut, and instances, as a proof of this, that it is a frequent custom in his country, to cut rye, as soon as it spindles, for food for their cattle; and that this rye generally produces other ears, which seldom contain any but distempered grain: To which he adds, that feed corn which has been pricked, or run through with a needle;

or which is not thoroughly ripe, and that which produces lateral or second ears, is subject to the smut."

He holds "that the distemper proceeds from an ulcer which attacks first the parts which sustain the seeds, and afterwards spreads to the rest of the flower. But some will say, what is the primary cause of that ulcer? In order to discover it, M. Aimen examined several grains of barley with a microscope: Some of them were bigger than others: Some were very hard; and others yielded to the pressure of his nail: Some were of a deeper, and others of a lighter colour; some longer and others rounder, than they ought to have been: Their rind was somewhat wrinkled in several places, whereas in its natural state it is smooth: And lastly, he perceived upon some of them black spots, which, when examined with a magnifying glass, appeared to be covered with mould. These grains were separated carefully, according to their several conditions, and sown apart, though in the same ground. *All the mouldy grains produced smutty ears*; the shriveled and parched, and those that were attacked by insects, either did not grow at all, or did not produce any smut.

"He then singled out a parcel of sound grains, sowed them, and some time after took them up, in order to examine them again with a magnifying glass. He found some of them mouldy, replanted them all, and observed that the mouldy grains produced smutty ears.

"M. Aimen, without pretending that this is the only cause of the smut of corn, concludes, from these experiments,

that mouldiness is a cause of this distemper."

That this philosopher has hit upon the true cause of smut, seems rather probable, when it is considered that mould is a kind of minute moss, and that the things which most effectually kill moss upon land, such as lime, &c. have hitherto proved the best antidotes to this distemper.

The methods of preventing it, recommended by different writers, are various.

The last mentioned writer thinks, "that the best and ripest corn should be chosen for seed, threshed as soon as possible, and limed immediately after; as well to keep it from growing mouldy, as to destroy the mould already formed, if there be any: Adding, that every method he has tried to make corn so prepared grow mouldy, has been ineffectual, and that he has never known it produce smutty ears."

"As weak plants are found to be most subject to smut, he also recommends good tillage, as a sure means of giving them strength and vigour. And he observes, that the lies made use of, preserve the plants from mouldiness, and of all of them lime seems to him to be the most effectual."

Though liming at the time of sowing, as is the practice in this country, does not always prevent smut, I would recommend it to farmers, to do it in the method that M. Aimen mentions as successful. The lime will probably have a greater effect, when used so early, than when the mouldiness on the kernels is become older and more deeply rooted. The subject I am upon, is of so great consequence to the farmer,

farmer, and to the publick, that I shall make no apology to the reader, for proceeding to lay before him the opinions of other writers; although I shall run out this article to what some readers may call a tedious length.

M. de Lignerolle says, "That the surest means of avoiding smut, and that which he has practised with success ever since the year 1739, on upwards of three hundred acres of land, is, to change the seed every year, to be very careful that the seed corn be well dried, and thoroughly ripe, and that it be not smutty, nor have any smutty powder sticking to it. He then pours boiling water on quick lime, in a large tub; and after the ebullition is over, as much cold water as there was hot, and stirs it all strongly together, in order to dissolve and thoroughly mix the lime. The quantity of wheat intended to be sowed, is sprinkled with this lie, and then well stirred with a shovel, and laid in as high a heap as possible. It is best to keep the grain for a week after this preparation, turning it every day; for otherwise it would heat so as to destroy the germ. By these means he has not had any smut, when the fields around him have been infected with that distemper."

"M. Donat, near Rochelle, thinking the ingredients commonly employed in the steeps too dear for the use of farmers, studied for some years to find out something cheaper, easy to be had every where, and therefore better calculated to be of general use. I have had the good fortune, says he, in a letter to M. Duhamel, to accomplish what I wished; for I now use only pigeons' dung, quick lime, ashes, and sea salt, where this last can

be conveniently had. I have sometimes made with these ingredients, steeped in water, so strong a liquor, that it has even destroyed the germ of the grain. But there will be no danger of that, if care is taken to observe the following directions, which are the result of seven years' successful experience, even at times when farmers who have neglected to follow my example, have had such wretched crops, as have not paid the charge of reaping.

"Take quick lime and pigeons' dung, of each twenty five pounds, forty pounds of wood ashes, and twenty five pounds of sea salt, or salt petre. Put all these into a tub, large enough to hold half a hoghead of common water added to them. Stir them all well with a stick, till the lime is quite dissolved. This lie will keep some time without spoiling. It must be stirred again just before the corn is steeped in it. The grain is then put into a basket, and plunged in the lie, where it remains till it has thoroughly imbibed it; after which it is taken out, and laid in a heap, till it is quite drained of all its moisture: Or, which is a still better way, take a mashing tub, fill it with grain to within four inches of the brim, and then pour in the lie well stirred beforehand. When the tub is full, let the lie run out at the bottom, into some other vessel, in order to use it again for more corn. Let the grain be then taken out, and laid in a heap to drain; and continue in this manner to steep all your seed corn. The wheat thus prepared, may be sowed the next day, and must not be kept above five or six days, for fear of its heating. This I say from experience. The quantity of lie above prescribed,

scribed, will serve to prepare more than twenty bushels of wheat."

Mr. Tull observes, "that bringing and changing the seed are the general remedies for smut. The former of these he had heard, was discovered about seventy years before he wrote, by sowing some wheat which had been sunk in the sea, and which produced clean corn, when it was a remarkable year for smut all over England: But he afterwards doubts whether this might not happen by its being foreign seed, and therefore a proper change for our soil. He tells us, that two farmers, whose lands lay intermixed, used seed of the same growth, from a good change of land, and that the one who brined his seed had not any smut, whilst the other, who neglected that precaution, had a very smutty crop. But again he doubts whether this seed might not have been changed the year before, and so might not be greatly infected: Or at least not more than the brine and lime might cure. He adds, that smutty seed wheat, though brined, will produce a smutty crop, unless the year prove very favourable; for that favourable years will cure smut, as unkind ones will cause it: But, above all, he assures us that the drill husbandry is the most effectual cure."

A writer in the *Museum Rusticum*, says, "having observed amongst wheat while green, though shot up into spindle, several black, blighted ears, I examined them, and found these were ears in which, by some accident, the intention of nature was prevented. I suppose, by being detained too long in the hose, and by the natural humidity of the plant, a fermentation

was promoted in its ear, destroying the small vessels through which the corns were to receive nourishment; by which means their contents became black, dry, and dusty. These ears growing up with the others, imbibe moisture sufficient to cause the dusty particles in the grains in them to expand, and burst the fine skin which contained them: Being thus set at liberty, the air, if it happen to be a dry season, dries them again; by which means they become light enough to float therein, when separated from the skin which held them. If this happens when the wheat is in the blossom, which it often does, part of the dust enters the stigma of healthy corns, and thereby infects them: The pulp in those becoming black, a fermentation is raised therein, which destroys the life of the grain thus impregnated. Hence the disagreeable smell is acquired peculiar to this disease (the smell in a grain of smut being the same as in a black blighted ear.)"

By the black blight, this author seems to mean the same as burnt grain, burnt ear, or ustilago, in which distemper the kernels do not burst, but are converted to a dry black powder. If his hypothesis be just, as it is certainly plausible, it will follow, that there is no more difference between smutty and burnt grain, than between a closed and an open kernel of wheat: And that they are in fact the very same distemper, as indeed many writers have considered them; making no distinction. The antidotes for the one, are certainly proper for the other. For experience has shown in many instances that what prevents the one prevents the other.

The remedy this writer prescribes, appears to be a probable

one. "When the corn is shot into spindle, and the ears begin to appear, let some persons go along each furrow in the field, and carefully break off all ears of the black kind; and when broke off, put them into a bag, and carry them away. As it is possible there may be some of these diseased ears which are not bursten, and therefore may escape being gathered, these may be known by the stalk at the neck being crooked backward and forward five or six bends, and the hofe nearer to the head of such, than in the ears which are good."

Another writer in the *Museum Rusticum*, says, "I have for many years past escaped having smutty crops, by a proper care of the seed wheat before it is put into the ground; and the method I pursue, though efficacious, is in itself simple and cheap. I take four bushels of pigeons' dung, which I put into a large tub: On this I pour a sufficient quantity of boiling water, and mixing them well together, let them stand six hours, until a kind of a strong lie is made, which, at the end of that time, the grosser parts being subsided, I cause to be carefully drained off, and put into a large keeve, or tub, for use. This quantity is sufficient for eighty bushels of seed wheat."

"My next care is to shoot into this steep a manageable quantity of my seed, which is immediately to be violently agitated, with either birchen brooms, or the rudders that are made use of in stirring the malt in the mash tub, in a brewing office. As the light grains rise, they must be diligently skimmed off; and after the seed has been agitated in this manner, for the space of perhaps half an hour, it may be taken out of the steep, and sown out

of hand with great safety: And I can venture to say, that if the land is in good heart, and has been properly tilled, it will not, when sown with these precautions, produce a smutty crop."

Another gentleman, who signs himself A Norfolk Farmer, "declares, he has observed, that if the seed was only well washed, it never failed: That he washed some seed which he knew to be smutty, in a large tub, filled with plain, simple water, stirring it violently with birchen brooms, taking care from time to time to skim off the light. This answered very well, and he has ever since continued the practice." The same practice of washing the seed, is recommended by Mons. de Gouffeville, of Normandy, in the *Foreign Essays on Agriculture*.

It appears very probable, that washing the seed very clean in several waters, may be the best method of preventing both smutty and burnt ears. The bursting of smutty ears in a field at the time of blossoming, may infect the grains in the sound ears; which, may produce a mouldiness, which, if not taken off, may cause the next crop to be diminished and corrupted by one or both of these black distempers.

But a Mr. Powell, in England, writes to the compilers of the *Complete Farmer*, that, in addition to the usual brining and liming of seed wheat, if one pound and a half of red lead were sifted through a cullender upon one bushel, stirring the corn with a shovel, so that every grain may have a spot or two of the lead adhering to it, it will effectually prevent smut: And that fowls will not lie upon it. He is confident, that even smutty seed, so prepared, will produce a sound crop.

A Mr. Marshall, a late British writer on agriculture, says he was informed by a Yorkshire farmer, that he had made use of a solution of arsenick as a preventive of smut, and for twenty years it had proved effectual. The preparation is made by pounding the arsenick very fine, boiling it in water, and drenching the seed with the decoction. The method is to boil one ounce in a gallon of water, from one to two hours. Then add as much water or urine as will increase the liquor to two gallons. This will answer for two bushels of wheat. It may be sowed without drying, or coating with lime. If this will prove an effectual antidote against smut; it may be further said in recommendation of it, that it will equally secure the seed against birds, and against every kind of insects. Nor need any one be apprehensive that a poisonous taint will be communicated to the crop.

SNEAD, or SNATHE, the staff, or handle of a sith. The right timber for sneads, is white ash that grows on upland, it being light and stiff, which are two very necessary qualities: For if a snead be heavy, it will help to tire the mower; and if it be limber and easy to bend, it will cause the sith to tremble, which will hinder, in some degree, its cutting; and render the labour of the mower more difficult and fatiguing. It must be naturally of the right crook, and not cut across the grain of the wood.

SNOW, a congealed vapour that falls in little fleeces to the earth.

Snow lies upon the ground commonly, in this country, in the winter months, and in March. Snows sometimes fall in November and in April; but they soon melt, and do not remain on the

ground unless it be in the thick woods. In some parts of the wilderness, it is not all thawed till July; as on the northern sides of high mountains, where the trees form a deep shade.

Snow is beneficial to the ground in winter, as it prevents its freezing so solid, or to so great a depth as it otherwise would. It guards the winter grain and other vegetables, in a considerable degree, from the violence of sudden frosts, and from piercing and drying winds.

The later snow lies on the ground in spring, the more advantage do grasses and other plants receive from it. Where a bank of snow has lain very late, the grass will sprout, and look green earlier, than in parts of the same field which were sooner bare.

A small snow, that falls level, pretty late in the spring, is better for the soil than rain. As it thaws gradually, it does not run off, but soaks directly into the ground, moistening every part equally, fostering the roots of grass, and other vegetables. And till it is thawed, the growing plants are guarded against the attacks of frosts and winds. If a snow happen to fall after spring grain is sown, it does not injure it at all; but rather assists its vegetating.

In the northern parts of New-England, the ground in some years is covered with snow for four months, even in the cultivated fields. This is not regretted by the inhabitants, as they find it is a great advantage for drawing masts, logs, lumber, and wood, upon sleds, which is much easier than carting them. The roads are also far better, when the ruts and sloughs are filled, and every part paved with ice, or condensed snow. The winters, tedious as they are, seem too

short for the teamsters to finish their winter business.

Meat that is killed in December, may be kept in perfection, if buried in snow, until spring. This is an excellent method of preserving fresh and good the carcasses of turkies and other fowls.

Set an open cask in a cold place; put snow and pieces of meat alternately: Let not the pieces touch each other, nor the sides of the cask. The meat will neither freeze, grow dry, nor be discoloured; but be as good in all respects at the last of March, as when it was first put in. The surfaces of the pieces should be a little frozen, before they are put into the snow, that the juice of the meat may not dissolve the snow. The cask should be placed in the coldest part of the house; or in an out house.

SOIL, that part of the earth which lies upon the hard under stratum, over which there is commonly a cover of rich mould, which forms the surface, unless destroyed by severe burning, or washed off by violent rains, or blown away by driving winds.

The original or unmixed soils, in this country, are but few. Clay, loam, sand, gravel, and till, or moor earth, are perhaps all that ought to be reckoned as fit for cultivation. But they are commonly more or less blended together. In places where they are unmixed, it would be a piece of excellent husbandry to mix them, especially where they are contiguous, applying gravel to moor earth, and moor earth to gravel; sand to clay, and clay to sand. And sand upon loam would be an improvement.

A chalky soil is but seldom found in this country. Marle is usually at too great a depth to come under the denomination of soil,

and the same may be said of peat. This last cannot easily be reduced to a condition fit for tillage. It is best to destroy it, by digging it wholly out for use, or by draining the land, and burning the peat on the ground. A chalky soil should have sand and hot manures applied to it.

I do not consider a stony soil as distinct from the rest, as removing the stones would bring it under some other denomination. And this ought to be done, when land is to be used in tillage, that its operations may be facilitated.

Soils are commonly distinguished into shallow and deep, the latter of which is preferred, as the under stratum comes not so near to the surface, but that the ground may be stirred to a great depth; and as it is fitted for the growing of long tap rooted plants, trees, &c.

But the most common distinction of soils is into rich and poor. This difference, which is certainly very great, is not perhaps natural. Richness, I imagine, is rather to be considered as superinduced. All soils have, since the creation, received large quantities of fertilizing substances which were adapted to improve them; and by which, in most places, they have been greatly mended. Not only vegetable substances, fallen upon the surface, and changed by putrefaction, have blended their salts and oils in the soil: But the soil has been drinking in vegetable food by the dews and rains, and from the air itself, which is loaded with fertilizing particles. But some spots have retained the added richness better than others.

As to land which has been long tilled, and often plentifully manured, it is not easy always to distinguish

distinguish what was its original foil; nor how rich or poor it was in its natural state.

It does not follow, that all uncultivated soils ought to be equally rich, by means of the general advantages mentioned above; because some soils are better calculated than others to retain the food of vegetables. Some are destitute of a compact under stratum; and it is no matter of wonder that such should appear hungry and barren; for whatever richness they receive, is washed by rains into the bowels of the earth. Some soils are too coarse, or too porous, to be a proper matrix for fertilizing substances. Some are too steep to retain them, so that they are washed into the hollows below. Some are so wet as to sour and corrupt them; and in some, there are either mineral waters, or steams of those kinds, which are unfavourable to vegetation.

In tillage, the surface mould and the soil beneath are mixed, and the more so the better, as the surface mould is made up as it were of the essences of vegetables.

SOILING, or ASSOILING, feeding animals with new mown grass, or grass not dried, in racks, or otherwise.

This is commonly practised in some countries, where they put it in racks, either under cover or in yards. Thick grass will go much further in this way, than if the cattle were turned in upon it to feed it off; as they would destroy and corrupt more by half with their feet and excrements, than they would eat. But when it is given them in racks, they will eat it up clean, without wasting any of it. An acre of rich land, used in this way, will summer a number of cows. By the time that it has been once cut

over as it is wanted, the first part will be fit to cut again. And the labour of doing it is not to be reckoned as any thing, as the trouble of driving the cows to pasture will be saved. This will be more than a balance for the labour of soiling, if cattle must be otherwise driven to any considerable distance. And it greatly recommends this practice, that a prodigious quantity of manure may be collected by it, which otherwise would be little better than lost, the dung being scattered in pastures, where it evaporates in the air.

SOOT, condensed smoke, which adheres to the funnels of chimneys. It is replete with the oil and volatile salts which were contained in the fuel, and is therefore an excellent manure, much superiour to ashes of any kind.

Both wood foot and coal foot should be carefully saved, and kept from the weather, to be used as top dressings.

Mr. Worlidge seems to think wood foot the best; but Mr. Mortimer give the preference to that which comes from pit coal, of which forty bushels are allowed to be a sufficient dressing for an acre. But of this kind our farmers can obtain but little; nor indeed plenty of either, unless in the neighbourhood of populous towns, where much of it may be collected for use by those whose business it is to clean chimneys.

Both kinds are to be used only as top dressings. The coal foot is particularly good for low meadows, or grass lands, which are sour and mossy.

Soot is a good top dressing for winter grain. But it should be applied early in the spring. Not in autumn, lest it should cause it to grow too fast, by means of which it will be the more liable

to be destroyed by the frost of winter. Neither should it be applied late in the spring; because in case of a drought soon after, it will be apt to burn too much.

Mr. Ellis recommends sowing foot over turnips, as soon as they are up. This will tend to prevent flies from attacking them. But that it may have this effect, it should be finely pulverised; sowed early in a morning before the dew is off; and in a moderate quantity, lest its heat should injure the tender plants, to which it will adhere and repel the insects. Sifting is the best way of applying it.

SOW, a female hog. See *Swine*.

SOWING, committing seeds to the earth, for the purpose of obtaining a crop.

There are three ways of seeding the ground: 1. In hills as it is called, or in squares: 2. In drills, or continued rows: And 3. In the broad cast method, or at random with a cast of the hand; which last method is always termed sowing. The first requires the least quantity of seed, the last the greatest. But the crops will not be in proportion to the different quantities of seed.

With regard to sowing, several things ought to be attended to; the quality or goodness of the seeds; the time of sowing them; the depth that is best for them; and the quantity, or proportion of seed to the ground.

The quality of seed should be ascertained, in order to determine the quantity that is proper to be sown; for if one tenth part of the seeds, for instance, should be destitute of a vegetative power, a tenth part more of such seeds should be sown than the usual quantity, supposing the seeds to be in perfection.

In order to determine the goodness of the seed to be sown, you should previously 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, or in a hot bed, that the farmer may have timely notice of the quality of his seeds, when it is too early in the spring to do it in the open ground. Many have missed of a crop, by not taking this precaution. When seeds are suspected of being too old to vegetate, this previous trial should by no means be neglected.

But if we wish to have seeds in the best condition for sowing, they should be well ripened on their plants before they are gathered in; afterwards they should be kept perfectly dry, that they may not contract the least mouldiness; and never be secluded from the air.

Mr. Miller found that air was absolutely necessary to maintain the principle of vegetation in seeds. Having saved a parcel of fresh seeds of several kinds, he took some of each, and sealed them up in glass phials; the other parts of the same seeds he put into bags, and hung them up in a dry place, in a free air. After a year had passed, he took some of the seeds from each phial, and each bag, and sowed them at the same time, and on different parts of the same bed. The result was, that almost all the seeds he took out of the bags grew well; but, of those which had been kept in the phials, not one came up. This discovery was further confirmed by experiments afterwards. How careful then should both farmers and gardeners

gardeners be, that no seeds designed for sowing be kept totally secluded from the air?

All kinds of seeds are best kept in their pods, or husks. Especially they should be so kept, when they are designed to be transported to distant countries.

Accordingly, some of the best writers recommend the lying of seed wheat in the sheaf to the time of sowing. And, that none but the best of the grain may be sown, instead of threshing, it is advisable to strike a handful at a time gently against a post, and collect what falls out; because the heaviest and best grain is always the most easily detached from the ear.

Being furnished with good seeds, the time for committing them to the earth must in great measure be determined by the judgment of the experienced husbandman; because, from various circumstances, it comes to pass, that the true time admits of some latitude. The time for spring sowing will vary according to the variation of the forwardness of the season; which may be best determined by the respective forwardness of trees and shrubs. See the article *Kalendar*.

But there are other circumstances to be taken into the account, which may further vary the season for spring sowing. A light warm soil may receive the seeds earlier than one that is strong and moist. The former will arrive to the right degree of dryness sooner than the latter, and is earlier fit for the operations of tillage. And this is certain, that seeds that require the earliest sowing, must not be sowed before the earth can be well pulverised. Neither should plants that are easily killed by

frost, be so early sowed as to be up till the spring frosts are past.

I may add, a spot which has a southern exposure may be seeded rather earlier than land which descends to the northward, or than land which is level.

If seeds are sown too early, or when the ground is too wet or cold for them, they will either perish, and fail of coming up; or if they come up, it is slowly, so that the plants become stunted in their growth, and never arrive to a full size.

If the right season for sowing should elapse, the husbandman, being convinced of it, may accelerate vegetation by sleeping the seeds in a lie of wood ashes, or any other proper menstruum, so that they may overtake in their growth those which were sown in the right season.

The depth at which different seeds should be buried in the soil is various, according to the difference of seeds and soils. M. Duhamel found by experiment, that but few seeds will come up at all, when buried deeper than nine inches; that some seeds rise very well from the depth of six inches; and that other seeds do not rise at all when they are more than two inches under the surface. And in general those seeds, the body of which is thrown above the surface in vegetating, should have the less quantity of soil above them, that they may not meet with too much resistance in rising; such as kidney beans and many other sorts. Also the same seeds may, and ought to be buried deeper in a light and dry, than in a heavy and moist soil. When the ground is rolled after sowing, the seeds, will vegetate the nearer to the surface; and therefore they do not need to be sowed so deep,

deep, as when the rolling is omitted.

To determine what is the right depth, in a doubtful case, Mr. Tull has suggested an excellent method. "Take a dozen of sticks for gauges; mark the first at half an inch from the end; the next at an inch; and so on, increasing half an inch to each. Then, in the sort of ground you intend to sow, make a row of twenty holes, with the half inch gauge; put in twenty good seeds and cover them, and stick up the gauge at the end of the row. Then do the like with the rest of the sticks. Observe how the seeds prosper in the different rows, and you will discover at what depth that kind of seed should be buried."

However useful this experiment may be, it can be of little or no use in the old field husbandry; for, in the broad cast way of sowing, the seeds will be differently covered. But sowing fields with the drill, in equidistant rows, when horse hoeing is not intended, cannot be too much commended. It is worth while to do it if it were only on account of the seed that may be saved by it. Much seed is wasted in the common way of sowing; for some of the seeds, will be so deeply covered, that they will not vegetate: Some will be left on the surface, which is a prey for birds, and perhaps leads them to scratch up some of the rest: Some will lie so near the surface as to be destroyed by variation of weather, being alternately wetted and scorched. And of those seeds that grow, some rise earlier, and some later, so that the crop does not ripen equally. The seeds will fall from the hand of the sower, too thick in some spots, and too

thin in others, by means of the unevenness of the surface; and the harrowing perhaps will increase the inequality; so that many will be so crowded as to be unfruitful, while the rest have more room than is necessary.

But when the seeds are put in with the drill, they will all rise nearly together; not so much as one seed will be wasted, or lost, supposing them sown at the right distance; each one may have so much room as is most conducive to its growth; no starved heads will appear, and the whole will ripen together. Half a bushel of wheat, or even a less quantity, in this way, will seed an acre sufficiently. How great must be this advantage at a time of great scarcity of seed!

It is difficult to determine the quantity of seed, that is best to be sown in the broad cast way. Doubtless it should vary according to circumstances.

When seed is very large, and full grown, two bushels may not be more than equal to one that is small and pinched, supposing the seeds equally disposed to vegetate, which is often the case. For the true quantity should be estimated, rather by the number of grains, than by measure or weight. Not that I would recommend the sowing of pinched grain, excepting in case of necessity. For it is to be expected, in general, that the most perfect seeds will produce the best plants.

Rich land will afford nourishment to a greater number of plants than that which is poor. It has been held by many farmers that the poorer the land is, the greater quantity of seed should be sown in it. But Mr. Miller says, "This is one of the greatest fallacies that can be imagined; for

for to suppose that poor land can nourish more than twice the number of roots in the same space, as rich land, is such an absurdity as one could hardly suppose any person of common understanding guilty of. Where the roots stand close they will deprive each other of nourishment, which any person may at first sight observe, in any part of the fields where the corn happens to scatter when they are sowing it; or in places where, by harrowing, the seed is drawn in heaps, those patches will starve, and never grow to a third part of the size as the other parts of the same field; and yet, common as this is, it is little noticed by farmers; otherwise, they surely would not continue their old custom of sowing."

The practice of farmers has been various, as to the quantity of seed. In England they sow from two or three to four or five bushels of wheat on an acre; six bushels of oats, and four of barley. But the above quoted author is very positive that a third part of the usual quantities would be better.

The usual quantities in this country are not greater than five or six pecks of wheat or rye, three bushels of oats, and two of barley, for an acre. And from these quantities, in some instances, large crops have been produced. Though, in old countries, the crops are usually larger than ours, I apprehend it is not owing to higher seeding, but to deeper and more perfect tillage, better manuring, and frequent changing of seed, with a judicious rotation of crops.

The sowing of winter grain is perhaps a more difficult matter to manage rightly, than vernal seeding. Farmers certainly mistake their interest, when they per-

sist in sowing winter grain at a certain time of the year, let the weather be ever so hot, and the ground ever so dry. By heat and dryness, the seeds will sometimes be so scorched in the soil, that not a fourth part of them will ever come up. Therefore, if a drought happen at the usual sowing season, it will be needful to defer sowing till some rain has fallen, and the soil has got a due degree of moisture. How long it may be best to wait for such a favourable opportunity, I will leave to the judgment of the experienced farmer.

Also, a spot that has been newly cleared by burning, may be sowed later in autumn than other land. It ought to be sowed later, if the growth before winter be wished to be only equally forward; for the ashes will so quicken the vegetation, that if it be seeded early, it will attain to too large a growth before winter, and be the more in danger of being killed by frost.

Pliny points out the falling of the leaves of deciduous trees in autumn, as an index of the right season for sowing. He observes, that "this circumstance will indicate the temperature of the air in every climate, and shew whether the season be early or late: That it constitutes a universal rule for the 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 is doubtless much better to sow winter grain rather early than very late; because that which is sowed late, will not be furnished

furnished with strong roots before winter, and therefore will not generally so well bear the frost. Though grain sown in December has sometimes prospered well, it ought not to encourage the farmer in sowing so late; because the instances in which it has succeeded have been but few. On the other hand, it should not be sown so early as to give time for the stalks to shoot up before winter. But perhaps it will be found to be a good rule, to sow grain the earlier in proportion as the winters are longer and colder. And yet, confining the true time to certain days or weeks, would be ridiculous.

M. de Chateauxvieux, from many experiments, and long practice, concludes, "that the best time for sowing in such a climate as Geneva, is from the 20th of August, to the end of September." And he thinks the first fortnight in October may answer, if the sowing cannot be done sooner.

But as the experience of persons in other countries may mislead us, it is greatly to be wished that a set of the most accurate experiments were made by some judicious person in this country, in order to ascertain the best time for autumnal sowing.

SPADE, an instrument used in digging. Spades differ in their shape and construction, according to the different operations in which they are to be used.

SPAVIN, a disease of horses, being a tumefaction about the joints, causing lameness.

"There are two kinds of spavin, a blood spavin, and a bog spavin.

"A blood spavin is a swelling and dilatation of the vein that runs along the inside of the hock,

forming a little soft swelling in the hollow part, and is often attended with a weakness and lameness of the hock.

"The cure should be first attempted with restringents and bandage, which will contribute greatly to strengthen all weaknesses of the joints, and frequently will remove this disorder, if early applied. But if, by these means, the vein is not reduced to its usual dimensions, the skin should be opened, and the vein tied with a crooked needle and wax thread passed underneath it, both above and below the swelling, and the turgid part suffered to digest away with the ligatures. For this purpose, the wound may be daily dressed with turpentine, honey, and spirit of wine incorporated together.

"A bog spavin is an encysted tumour on the inside of the hough, or according to Dr. Braken, a collection of brownish gelatinous matter, contained in a bag, or cyst, which he thinks to be the lubricating matter of the joint altered, the common membrane that encloses it forming the cyst. This case he has taken the pains to illustrate in a young colt of his own, where, he says, when the spavin was pressed hard on the inside of the hough, there was a small tumour on the outside, which convinced him the fluid was within side the joint. He accordingly cut into it, discharged a large quantity of this gelatinous matter, dressed the sore with dossils dipped in oil of turpentine, putting into it, once in three or four days, a powder made of calcined vitriol, alum, and bole. By this method of dressing, the bag sloughed off, and came away, and the cure was successfully completed without any visible scar.

"That

"This disorder, according to the above description, will scarcely submit to any other method, except firing, when the cyst ought to be penetrated to make it effectual. But in all obstinate cases that have resisted the above methods, both the cure of this, and the swellings called wind galls, should, I think, be attempted after this manner. If, through the pain attending the operation or dressings, the joint should swell and inflame, foment it twice a day, and apply a poultice over the dressings, till it is reduced." *Complete Farmer.*

SPAYING, the castration of female animals, to prevent conception, and promote their fattening. It is said, that spayed sows will have a greater quantity of fat upon their inwards than barrows, and that they are, on the whole, more profitable.

SPELT, a species of grain resembling wheat, but smaller, and darker coloured, bearded, with only two rows on an ear. It is used in Germany for bread, and will make malt. Of this grain the ancients are said to have made their frumenty, of which they were very fond. It may be sowed in autumn or spring, and delights in a dry soil.

SPIKY ROLLER, a wooden roller, armed with spikes, of important use in husbandry.

This instrument was formerly just mentioned by Mr. Ellis; but has been of late brought into use by the ingenious Mr. Randall, of York, in England: Who recommends, that the roller be a cylinder of the heart of oak, seven feet long, and eighteen inches diameter, with a strong band of iron on each end. Teeth or tines of iron, seven inches long, are driven three inches into the wood, and four inches apart, in

the quincunx order, over the whole convex surface. The outer points must be pretty sharp; and the ends which go into the roller should be ragged at the corners, to prevent their coming out. The tines need not be quite so strong as the teeth of a harrow. The whole instrument will weigh near a ton; and a frame is to be annexed to it, for the team to draw by; to which a box may be added for the driver to sit on. But beware of putting a wild, restiff or unmanageable team to this fearful instrument. The strength of four oxen or three horses, will be necessary to draw it.

The uses to which the spiky roller is to be applied, are, in the first place, to reduce a stiff, stubborn, and clotty soil, to a fine tilth for sowing. This it will perform with admirable expedition, by only passing forwards, and back again in the same track, reducing it even to a perfect garden mould. And, which greatly recommends it, it is used to advantage when the ground is too dry for ploughing; by means of which, there need not be any delay in preparing land for sowing.

"It is certainly an instrument," say the compilers of the *Complete Farmer*, "that no farm, where the land is stiff, or the least liable to clot, should want. For, besides the constant advantage of saving labour, and bringing land to a better condition for any kind of sowing, than the plough and harrow, with any assistance of the work of hands can make it; in favourable seasons, and under such circumstances as Mr. Randall has mentioned, the loss of the whole crop, by an otherwise unavoidable delay beyond the seed time, may be with certainty prevented."

Another important use of this instrument, is, to renew the fruitfulness of grass land, when it is so bound as to be almost barren, or overrun with moss and bad grasses. Mr. Randall directs, that a good compost be prepared: And, in autumn, when the ground is a little moist, that the spikes may enter the soil easily, to pass the roller up and down till the surface is well broken: Then sow hay seeds, and spread the compost over them, to be followed with a smooth roller, with a bush harrow after it. Thus a fine sward will be renewed, and good crops of the best grass will follow.

But it is obvious to remark, that the surface must be pretty level, and the land free from stones, to admit of these operations.

Mr. Randall also recommends passing this roller in the spring, over winter grain, to loosen the surface, and increase vegetation, and smoothing it afterwards with a bush harrow. Though this may seem to be a bold experiment, I think it is probable it might have a better effect than harrowing, which is much approved by many, as the tines would penetrate deeper, and as the plants would be less exposed to extirpation, than by the horizontal motion of the harrow.

SPRING, one of the four seasons of the year, so called from the springing or shooting up of vegetables, which in the winter were in a torpid state.

This season includes, according to common parlance, March, April and May. It is the most busy and hurrying season, for farmers in this country, of any in the year; partly owing to the long continuance of frost, which commonly prevents all kinds of til-

lage till near the beginning of April; and in the northern parts, till the end of that month. But sometimes it is partly owing also to what we might order otherwise, to sowing a larger proportion than is necessary of our grain in the spring, and neglecting in autumn to cart out so much of our manure as we might, that we complain of being so much hurried with work in the spring.

But besides tillage and feeding, which are enough to employ the whole time, there are other matters to be attended to at this season. The fences are always to be examined, and repaired: For though they were in good order in the fall preceding, high winds, violent storms, and deep snows, may overset, break or settle them, not to mention the gradual decay and rotting of wooden fences. Or the violence of frost may heave and disorder them. Compost dunghills it will often be needful to make at this season, especially if the materials were not all obtainable in the preceding autumn.

But preparing and feeding the ground must not be neglected, nor slightly performed: For as a man soweth, so shall he reap. Sluggishness at the beginning, will be followed with want at the end of the year.

SPRINGS, streams, or sources of water, rising out of the ground.

The water with which springs are supplied, is probably all imbibed by mountains, and high lands, from rains, dews and vapours. For the more uneven a country is, the more it abounds with springs.

A springy country is most convenient for husbandmen, on account of the need of water for their.

their flocks, and for other important purposes.

Some springs consist of the most pure and simple waters. Others are impregnated with minerals, or other matters in the earth, through which the waters pass. Hence some springs are metallick; some sulphureous, limy, marly, or saline. Some of these have become famous for their medicinal virtues.

Salt springs are found in the Ohio country, and in other places remote from the sea. These indicate the benevolence of the Creator to man and other animals. They are of essential importance to the inland farmer, as his stock always needs salt to keep them in health, and as the waters may be used to great advantage in manuring the land. Some are also useful for the making of salt.

Hot springs have been considered as astonishing phenomena. But if sulphur and iron, in large quantities, are blended in a mountain, the fermentation caused by these substances cannot fail of heating the waters that pass through them.

Some spots of ground are naturally too springy for farming, as where the water oozes out so plentifully as to keep the soil in a miry, cold state. Drains in such places are necessary, to carry off the superfluous water. If they cannot be thus made fit to be employed in tillage, they may at least answer well in grass. See the article *Draining*.

SPRING GRAIN, that which is sown in the spring.

Farmers generally think they cannot sow their wheat and rye too early. But their haste may possibly be too great. It certainly is, if they sow before the ground is sufficiently dry to

crumble, and become light and fine by ploughing and harrowing. For working the ground when it is too wet, will fail of bringing on the needful fermentation, and tend to make it too close and compact to nourish plants. At least, these operations may leave the soil as unfit to nourish plants as they found it.

It is of no small importance, I confess, that spring wheat and rye be forward, that so they may not be late in ripening: And a good method of quickening these crops, is steeping and liming the seed. The same end may be promoted by top dressings with warm composts, ashes, &c. But land designed for this use, should be ploughed and laid rough in autumn. It will be the earlier in a condition to receive the seed in the spring. And none but the driest parts of a farm should commonly be employed for crops of spring wheat or spring rye. As to barley and oats they will bear to be sowed rather later: And therefore are more fit to occupy the lower and wetter parts of a farm. Oats especially are often found to produce great crops in such situations, if they be not sown too early; or before the land is sufficiently dry for the operations of tillage.

SPRINGE, a device made of twisted wire to catch birds, or other small animals.

SPUR, a bad distemper in rye.

The grains which are affected, are thicker and longer than the sound ones, commonly projecting beyond their husks, and mostly crooked. They are dark coloured, have a rough surface, and appear furrowed deeply from end to end. They are bitter to the taste; will swim in water at first, and then sink to
the

the bottom. But they are easily distinguishable by their extraordinary bulk and length.

Various have been the conjectures concerning the cause of this distemper. Some think it is occasioned by the bite of an insect: Others ascribe it to fogs, dews, rain, &c. But as I have never found any such distempered grains, but in rye of a rank growth, I rather incline to ascribe it to too great a pressure and flow of sap into the kernels, while they are in their most tender state, by which they are too much distended, and rendered incapable of throwing off the grosser particles of sap; by which means they become fungous and misshapen.

M. Salerne, and others, have given sad accounts of the diseases with which numbers of people have been afflicted, in some years, when they have eaten freely of bread, in which there was much of the spurred rye.

The peasants of Sologne, it is said, sift out these grains, when corn is plenty: But in a time of scarcity, being loth to lose so much grain, they neglect it. And then they are wont to be attacked with a dry gangrene, which mortifies the extreme parts of the body, so that they fall off, almost without any pain.

“The Hotel Dieu, at Orleans, has had many of these miserable objects, who had not any thing more remaining, than the bare trunk of the body, and yet lived in that condition several days.

“As it is not every year that the spur in rye produces these dreadful accidents, Langius is of opinion, that there may be two kinds of this distemper; one which is not hurtful to human constitutions, and the other which occasions the gangrene. It is however probable, that there is but

one kind of spur, and that it does not sensibly hurt; first, when sufficient care is taken in sifting the grain; and secondly, when only a small part of the corn is distempered. It is also said, that the spur loses its bad quality after the grain has been kept a certain time: In which case, the reason why some peasants are attacked with the gangrene in years of dearth, may be, that they consume their crop as soon as their harvest is over.” *Duhamel's Culture des Terres.*

SQUASH, a culinary fruit, of the gourd kind; of which there are many varieties. This kind of fruit is very apt to alter and degenerate. Those are accounted best for early use, which grow on plants that do not run on the ground.

STABLE, a house, or lodgment for horses.

A stable should have an open airy situation, and be as free as possible from mud and wetness. The floor should be built of pine planks, not on a level, but descending backwards, that the stale may not remain under the horses, so that they may lie dry and clean.

As a horse is a cleanly animal, hen roosts, hog sties, and necessary houses, should not be too near to his apartment. A stable should have windows to open and shut, that fresh air may be let in when the weather is hot: And it should be tight and warm in winter. Otherwise the great vicissitudes of heat and cold will do much hurt to the animals; and the more so, being tied up, they cannot use much motion. Some of the windows should be glass, because horses are fond of light. And it is better for their eyes that they be not confined at all to total darkness in the day time.

A manger is necessary in a stable, to prevent wasting of hay. Some choose their horses should have their hay in racks. Others think it puts a horse into an unnatural posture, as he is used to take his food from the ground. If a rack be used, it should be perpendicular, not leaning towards the horse, nor placed too high: And the manger before it should be two feet wide, or more. The hinder part of the rack should be made shelving, that as the hay settles it may naturally press towards the horse.

A box for provender may be fixed at one end of the manger, in each stall; or the manger may be made as tight as a box, to prevent loss of grain. But the surest way to prevent wasting, is to give a horse his corn in a pail, with a strap of leather to slip over his head, which will prevent the loss of so much as a single grain. It may be put on or off in an instant. See the article *Horse*.

STACK, a large quantity of hay, grain, or straw, piled up, pointed at the top, and usually covered with long straw, or thatch, to keep out the weather.

Square and oblong stacks are not good. Round ones have a less quantity of superficies in proportion to their contents; and therefore will receive less damage from the weather.

When sheaves of corn are stacked, the heads should be all turned carefully inward. But if designed to stand long, it should be on a floor mounted on blocks, capped with flat stones, to prevent the entrance of vermine.

Farmers should not practise the stacking of good hay, in a country like ours, where timber for building barns is plenty and cheap. For so much of the outside is always spoiled by the

weather, that they may soon lose more in this way, than the cost of a barn.

But much of the salt hay in marshes must be stacked, on account of the difficulty of removing it before winter. These stacks must be mounted on what is called a stable, consisting of piles driven into the ground, of such a height, that the highest tides may not reach the bottoms of the stacks.

STAGGERS, a disorder to which both horses and neat cattle are liable. If the staggering and falling of a horse be owing to hard riding in hot weather, Gibson directs to take without delay a pint of blood from his neck, and then a quart from some vein in his hinder parts, that so an effectual revulsion may be made: And that he should afterwards be kept on a moderate and cleansing diet.

When the disease arises from an apoplectic disorder, he must not only be bled, as in the former case, but be exercised every day with chewing asafœtida and savin, and the most noisome things that can be got, which will put him upon constant action, and forward the circulation in the small vessels. Afterwards recourse must be had to clysters and strong purgatives, rubbing and exercise.

When the disorder arises from vertigo, or swimming of the head, the animal reels, turns round and falls. In this case, take an ounce of fenna boiled in five pints of water, with four ounces of common treacle, with the usual quantity of oils, or lard, to throw in as a clyster. And repeat it for two or three days. After which he may have a drench of beer, in which roots of peony, angellica, rue, rosemary, flowers of lavender,

der, and the like, have been steeped. If the disease should continue obstinate, balls of cinabar and asafœtida with bayberries will be proper here, as well as in apoplectic cases.

Some venture to put ginger, and other stimulating things, into the ear, to give the blood a quicker motion. But this practice, though it may chance to do service, is dangerous. See *Gibson's Farriery*.

STALE, the urine of animals. The urines of different animals are said to possess the same properties as their dungs. They are of more importance as manures than farmers in general are aware of. They may easily convince themselves of this, if they will only consider how much more a piece of ground is enriched by folding than one of the same size would be, by laying the same dung, or an equal quantity, upon it, that is dropped on it by folding.

If the stale of a farmer's flock were all saved, and well applied, it might perhaps be of near as much advantage as their dung. Every possible method should therefore be taken to prevent the loss or wasting of it. Floors where beasts are lodged, should be perfectly tight; and they should be constantly well littered with substances that will absorb and retain the stale; even with common earth, when nothing else is at hand. Pens in which beasts are kept should have a layer of mulch: Or else the surface of the ground should be taken up, and used as a manure. Otherwise the urine is lost.

Mr. Hartlib praises the Dutch for saving the urine of cattle as carefully as the dung, to enrich their lands. The older it is, the better it is for this purpose. When it is deprived of its fiery

hot particles by time, it will be a great fertilizer of every kind of soil. Columella recommends old urine as an excellent application to the roots of trees. But care should be taken not to apply too much of it. For trees have been sometimes killed by urine.

STALLION, a stone horse.

One that is kept for covering should be well shaped. See the article *Horse*.

He should be free from every kind of distemper and natural blemish, of a middle size at least, with a good gait, neither addicted to starting nor stumbling, and of such a colour as is most coveted. For it may be justly expected, that the colts will inherit the qualities of the horse, let them be good or bad.

STERCORARY, a store of dung, or compost, kept under cover: Also the building in which it is kept.

In these places, if they are well constructed, the manure will retain its whole strength. The dung so preserved, if I mistake not, will be of double the value of that which is managed in the common way. For it is secured effectually from washing rains, and drying winds; as well as secluded from the direct influence of the sun, which always causes a copious evaporation from uncovered dunghills.

To make a stercorary, Mr. Evelyn directs, to dig a square or oblong pit, of a size proportioned to the compost wanted, with the side towards the field sloping, so as to receive a cart, to load or unload easily: The bottom to be well paved, and the sides also made so tight as to hold water, the whole being under cover. Then the farmer's care must be to fill the pit with compost suited to the nature of his land,

A good proportion of lime will be proper in these composts, to assist in dissolving the vegetable substances. It is best that the layers of each substance should be thin, as the heaps will need the less turning and mixing afterwards.

It may be very convenient for the farmer to build a stercoreary adjoining to the side of his barn, where the cattle are housed, covering it with a continuation of the roof. In this case, the dung may be thrown directly through the windows into the heap; from whence, through doors, it will not be difficult to shovel it into carts.

But, instead of this method, some gentlemen farmers in this country have begun to set the example of making cellars under their barns, into apartments of which, the dung is easily passed through scuttles in the floors. Other substances may be easily mixed with dung from time to time, as there may be occasion. Or it may be kept to improve by itself. A cart way must be prepared to go through the cellar, or one entrance at least, not so steep but that a common team may draw out a cart full. The floor should be well paved, and the wall made tight with mortar, to prevent the escaping of the fluid parts of the manure. But the floor overhead needs not to be very tight; because the stale will not be lost, if it should pass through the seams.

This method, in our cold country, may be allowed to be preferable to building any other stercoreary; especially as part of the cellar may be employed in storing roots, &c. for the cattle. For it is no small advantage, to have the dung deposited, during the winter, in a place where no

stop is put to its fermentation by frost. Besides, it is to be remembered, that the freezing causes a plentiful evaporation of the strength of the manure, which in this way is prevented.

It would be well to divide the parts of the cellar under the scuttles into pens, that the heaps may lie the more compact, and be less liable to too much drying. And as the heaps will need mixing with the shovel, it will be convenient to shovel the manure from pen to pen.

But instead of making stercorearies, or dunghills, in the usual modes, the *Society of Improvers*, in Scotland, prefer middens, or middings as they are there called, as it saves labour and expense in the management of manures. "Take, say they, in the field intended to be manured, a head ridge that is conveniently situated. Plough it two or three times, as deep as can be in the cleaving way, if the ridge be high gathered, and harrow it well: Then lay thereon your slimy clay, about a foot thick, a part of the earth uncovered. Next lay a thin layer of dung, another of clay, and after that a layer of unslacked lime, at least a foot thick: Then throw up the earth left uncovered on each side. After this repeat another layer of clay, then lime and finish with clay or sea wreck, covered with earth. The more of the slimy clay the better; for though it may be cold, yet it will not be the worse for a sandy hot ground. If you examine the clay, we doubt not but you will find it a very fat substance; being, as we conjecture, mostly muscle and other shells mixed with earth, brought by the tide and the river. "After this bank has stood six weeks or two months, incorporat-

rating and fermenting, turn and mix it. Yoke your plough, enter upon your stercoreary with a cleaving furrow, and continue repeating the ploughings the same way, until the very bottom be ripped up; then harrow it; it is impossible to overdo it. If it is very cloddy, it should be harrowed between the ploughings. Begin then in the middle, and plough again and again in the gathering way, until it be brought into as narrow bounds, and be raised as high as possible. Let all that the plough has left be thrown up with shovels on the top. Every such turning and heaping occasions a new ferment, and improves the manure. If the first heat should go off before it is reduced to a fine fat mould, it may be turned over again, and will take a new heat. About fifty or sixty cart loads of this compost are used upon an acre of ground."

"Any farmer may easily follow this example, and suit his compost to his soil. It will save much carting, especially when the land to be manured with it lies at some distance from the farm yard. At the same time, it will reduce those disagreeable ridges that gather in the borders of lots that are long tilled, which are always a richer soil than the rest of the field, and more fit for this use.

An operation similar to the above, was experienced by Mr. Eliot. He built a cow yard very long and narrow, at the side of a road, and once in three or four days, he removed the fences from the ends, and gave it a deep ploughing. The consequence was, that all the earth which was stirred with the plough became, in his opinion, of equal value as a manure, with good

barn dung. The advantage of this method of increasing manure is unspeakably great. The manure of a yard may thus be increased to ten fold.

STOCK, a term used by English farmers, to express the quantity of money or wealth a farmer should have to enable him to hire and cultivate a farm to advantage.

The larger farm a man hires, the greater stock he should have in hand. Writers on husbandry reckon the needful stock is equal to the first year's rent, and feed; expense of horse keeping, clothes and pocket money; the cost of cattle to be kept, and farming utensils of every kind; besides the labour that must be hired, including fencing and draining.

It would not be amiss, if those who hire farms in our country, would carefully calculate these expenses, before they take farms, and consider their ability. For want of this needful precaution, they often find, when it is too late, that they are unable to carry on the culture to advantage, and are unable to pay their rent. The consequences are unspeakably bad and distressing. Both the landlord and tenant are sufferers.

But the word *stock*, in this country, is commonly used by farmers to express only live stock, or the beasts that are kept upon a farm. These should not be all of one kind, but such an assortment as is best adapted to the convenience and profit of the farmer. The stock should be adapted to the nature and circumstances of the farm.

Young stock, in general, is better than old. The more there are in a growing state, the greater is the profit. And very old cattle, when turned off to fat, do not

not answer so well as those which are but little past their prime, or full vigour. It costs more to fatten them, and the meat is not so valuable.

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. For this cannot be determined, but by some experience: Because some animals prosper best on one farm, and some on another; some best under one manager, and some under another.

A variety indeed, for other reasons, is always best: One is, because almost every farm produces a variety of food, some of which will answer best for one animal, and some for another. Even in the same pasture, that which one species of animals leave, another will feed upon.

Also, the stock should vary, in some proportion as the lands of a farm do. As some 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 well known to be neat cattle, that are young and growing. But if a farm yield a plenty of good sweet grass, it is the more suitable for a dairy farm, and the greater proportion of cows ought to be kept.

But on no farm should horses be multiplied, beyond the number which are needed, or which can be employed to advantage. For they are great eaters, and require the best of the fodder and pasture. A small farmer can scarcely afford to keep one, unless he puts him to the draught.

Let a farm be what it will, it should never be overstocked. This is an error that too many farmers in this country are guilty of. Doubtless it arises from a covetous disposition; but they sadly miss their aim. Instead of gaining, they lose by it. A half-starved stock can never be profitable.

A farm may be said with truth to be overstocked, when a greater number of animals are kept, than can be well fed with its produce, during the whole year. For it is a ruining practice, to suffer a beast to pine away, and lose, in one part of the year, the flesh he gains in another. And when the farmer is constrained to purchase food for his stock, he too often affords them but a scanty allowance. Sometimes, it is not in his power to obtain it.

The starvation of cattle, or keeping them too short of food, not only prevents their being profitable to the owner, but teaches them to be disorderly, and to break through, or leap over fences; and many times to become absolutely ungovernable; so that they must either be killed, or sold off at a low price; in either of which cases, there is often much inconvenience and loss.

It is far better that some of the stock of fodder should be left in the spring, than that it should fall short. It is a good reserve against a season of scarcity: And such seasons often happen in this country by drought.

STONES, well known hard and brittle bodies, which abound in some lands. Those of the flat kind, or which are flat or square cornered, are fit for building wall fences, and should be applied to that use. And many of the pebble kind may go into walls among others of a better shape; especially

especially if the wall is built double, as it always should be where stones are plenty. Where there are more stones than are needed, the walls may be made thicker and higher than is needful on other accounts; and lots should be made the smaller; for there are certain conveniences in having small sized lots, though they may not be thought necessary, in any other view than for disposing of the stones.

Pebbles are a greater annoyance on a farm, as they need removing, but are not very good for any kind of building. But picking them off very minutely, for common field tillage, is not needful. But the largest pebbles should be taken away.

Stones that are very large, and which cannot with ease be removed whole; may be blown to pieces with gunpowder. They will be not only more handy for removing, but far better to put into walls. For the blowing of round stones will make some square and regular faces. They will often come cheaper in this way than if they were dug out of quarries. As the soil that is occupied by a large stone is better than the rest of the field, it is purchased at an easy rate by removing the stone.

But another method of breaking rocks, which ought to be generally known, and which sometimes turns out cheaper, is this: Drill two holes in a stone, ranging with the grain, when that can be discovered by the eye. Then filling each hole with two semi-cylindrical pieces of iron, drive a long steel wedge between them. The stone will thus be split open. And, commonly, very regular shaped pieces for building may be thus obtained.

Another method is, to burn an inflammable piece of dry wood, laid on the part where you wish a flat rock to open. Thus the rock is heated in a straight line, and may be made to open in that part, by a smart blow of a maul. This method often answers well when the stones are flat shaped, and not too thick.

That stones which are so large as to obstruct the operations of husbandry, ought to be removed from land in tillage, all will agree. But it has been long a disputed point, whether the smaller stones should be taken away. Some have contended that they add fertility to the soil.

That the moisture of the soil is as much greater, as the proportion of room the stones take up in the soil is undeniable; unless the stones occasion some evaporation. But many fields need not any increase of moisture, but would rather be improved, by being made as much drier as they can be, by removing the stones from the surface.

M. Duhamel is of opinion, that no stones increase fruitfulness, unless they be lime stones, marle, or those that are of a calcareous nature. These, by rubbing against each other, &c. in the operations of tillage, do probably yield a dust that increases the richness of land.

But all stones in tillage land are so troublesome, and so much increase the labour of tillage, that, when they are not calcareous, they should be taken away, or at least so much thinned, that ploughing and hoeing may be comfortably performed, and without much injury to the tools used by the farmer. Fixed stones under the surface should be removed, or so sunk by digging under them as to put them

out of the plough's way, that ploughing may be performed without danger of destroying the plough.

To know whether stones are calcarious or not, they should be tried with aqua fortis, or spirit of sea salt. For stones on which the spirit does not effervesce, can be of no advantage to the soil. By the way, I do not expect that calcarious stones will be found in many fields in this country.

Ground that is laid down for mowing must have even the small stones taken out of the way of the sith. But, instead of picking them up, some recommend driving them down into the soil, when the ground is so soft in the spring that it can be easily done. In this case a field will not be disfigured with the heaps, nor any of the surface lost.

STONE WALL. See the articles *Fence and Stones*.

STOOKING, or SHOCKING, setting sheaves into shocks to guard corn from wet.

Farmers have various methods of doing this. But I would propose for their consideration, a method inserted in the *Museum Rusticum*, Vol. II. page 250.

"Ten sheaves are disposed in two rows, each row leaning against the other; then two sheaves are laid on the top, so as to meet at the centre with their tails, and to slope downwards."

The writer thinks, and with good reason, that this method is very favourable to drying the corn, if it needs it, as well as to defending it from rains. Thicker built shocks, if they chance to get wetted, will need opening to dry the sheaves.

In general, it is better for the corn to stand in shocks a few days in the field, than to carry

it sooner to the stack or mow. There will be less danger of its taking damage by heating.

STOVER, fodder for cattle. See *Fodder*.

STRAIN, vulgarly called *Sprain*, a violent extension, or stretching of the sinews, or tendons, by which the fibres are sometimes broken.

All sorts of animals, and particularly horses, are liable to lameness by strains.

My designed brevity will not permit me to treat fully on this subject. But let it be noted, that when a horse is lamed by straining, he should be permitted to rest, and be secured from wet and cold. Rest alone will sometimes recover the tone of the fibres, and complete the cure.

But bad strains should have some suitable applications to the parts affected. Oily medicines are in general to be avoided, on account of their relaxing quality: But oil of turpentine may be admitted.

A part that is lamed by straining should be bathed thrice a day, with hot verjuice or vinegar, in which a small piece of soap may be dissolved.

Early in the disease, if the part be swelled, a poultice should be applied after bathing. It should be made of oatmeal, rye meal or bran, boiled in vinegar, strong beer, or red wine lees, with lard enough to prevent its growing stiff.

After the swelling is down, bathe with camphorated spirits of wine, mixed with half as much oil of turpentine. Or, instead of the oil, take sharp vinegar, and spirit of vitriol, in equal quantities.

Keep on a linen bandage, drawn pretty tight, if the part affected will admit of it. But

long resting from labour, will in some cases be needful. For further direction, the reader may see *Bartlet's Farriery*.

STRANGLES, "a swelling under the throat of a horse, between the two jaw bones, which seems not to differ very much from that which in a human body is called the *quinsy*. Its seat is not so much upon the glands as on the muscles; and therefore it comes the more readily to an imposthumation.

"If the swelling has a tendency forwards between the jaws, so that the passages of the throat are not in danger of being choked up by it, the safest way is to ripen, and bring it to a suppuration; and for that end anoint the part with ointment of marsh mallows, covering them up warm. Or take oil of bays and fresh butter, of each a like quantity, ointment of marsh mallows the weight of both: Or the poultice recommended for the glanders may be applied warm twice a day.

After the swellings are ripe, and that you perceive matter in them, but that they do not break, which perhaps may be hindered by the thickness of the skin, you may open them with a lancet; but if they do not ripen as you could wish, you had better make use of a hot iron, and sear the outside pretty deep. But whether you open them by incision, or by the iron, you must be sure to make your operation in the lowermost dependent part, that the matter may more easily run off. While you observe this method your incision need be but small.

"As soon as the matter is nearly discharged, you may press out what remains with your thumb. Then make a dossil of fine flax, dip it in warm basilicon, and introduce it into the or-

ifice, but not too far, nor must it be continued above three or four days in any common case: For keeping the orifice too long open will derive too great a quantity of matter upon the parts, causing them to ulcerate, or to turn fistulous. Therefore when the running abates, only apply smooth flat pledgets of lint, armed with the same ointment, and above them thick compresses of soft canvass, in several doubles, to fill up the vacant space between the jaws, that the divided parts may again be united. If hard lumps remain after the sores are healed up, they may be removed by the following plaster. Take diacalon and red lead plaster, of each four ounces, pitch two ounces; dissolve them with a sufficient quantity of oil or lard. Then take bole in fine powder an ounce and an half, and stir into this mixture, and make it to the consistency of a plaster. This must be spread on leather, or thin dowlas, and after the hair has been clipped off very close, it may be notched and applied all under his chops, where it is to lie as long as it will stick on: And by the help of this all the little hardnesses will be dissolved.

"Sometimes this distemper is cast off chiefly by the nose; and sometimes the discharge is inward, about the roots of the tongue. In this case most of the matter issues also from the nose. In either case, the horse should be moderately ridden. But it will be very proper to wash his mouth sometimes with honey of roses; for that will keep it clean, and prevent ulcers. But if sores are like to continue, dissolve a quarter of an ounce of crude sal ammoniac in a pint of water, and wash his mouth with it once or twice a day.

“ If the cure seems imperfect, and the horse does not thrive upon it, recourse may be had to purging; for which purpose I chiefly recommend the preparations of aloes; because these are the most effectual to work upon the blood, &c.” *Gibson's Farriery.*

STRAW, the stems on which corn grows. See *Fodder.*

STRAWBERRY, *Fragaria*, a well known fruit which is much esteemed.

Mr. Miller reckons four sorts; the wood strawberry, the Virginia, or scarlet strawberry, the haut-boy strawberry, and the strawberry of Chili.

It is the scarlet strawberry that is most common, and perhaps most worthy of cultivation. Our grass fields often produce these strawberries in plenty. But it is better to have a spot of ground devoted to the culture of them; as they will be much larger and better flavoured; and as the trampling of the grass in the mowing grounds may be thus in some measure prevented.

A light loamy soil is best for them: And but little dung should be applied to the soil, as a large quantity will cause them to run much, and to be less fruitful.

The time to remove these plants, is said by the above mentioned author to be September, or the beginning of October. But they are known to do well in this country when removed early in the spring, and watered a few times after it. But they will bear little fruit that year.

He directs, “ That the ground should be cleaned from the roots of all bad weeds. For as the plants are to stand three years, before they are taken up, those weeds would overbear the plants.

“ The usual method is, to lay the ground out into beds of four feet broad, with paths two feet, or two and a half broad between them. These paths being for the convenience of gathering the strawberries, and for weeding and dressing the beds. The plants should be in the quincunx order, and fifteen inches apart, so that there will be but three rows in each bed.

“ The plants should never be taken from old neglected beds, where the plants have been suffered to run into a multitude of suckers, or from any plants which are not fruitful; and those offsets which stand nearest to the old plants should always be preferred to those which are produced from the trailing stalks at a greater distance.

“ During the summer, the plants should be constantly kept clean from weeds, and all the runners should be pulled off as fast as they are produced. If this is constantly practised, the plants will become very strong. Where proper care is taken of the plants the first summer, there is generally a plentiful crop the second spring; whereas, when this is neglected, the crop will be thin and the fruit small.

“ The old plants are those which produce the fruit; for the suckers never produce any till they have grown a full year; therefore it appears how necessary it is to divest the old plants of them; for wherever they are suffered to remain, they rob the fruitful plants of their nourishment, in proportion to their number; for each of these suckers sends out a quantity of roots, which interfere, and are so closely matted together, as to draw away the greatest part of the nourishment from the old roots, whereby

whereby they are weakened. And the suckers also render each other very weak, hence the cause of barrenness. For I have known, where the old plants have been constantly kept clear from suckers, they have continued very fruitful three years, without being transplanted.

“ In autumn divest the plants of any strings or runners which may have been produced, and of all the decayed leaves, and clear the beds of weeds. Then the paths should be dug up, and the weeds buried which were taken from the beds, and some earth laid over the surface of the beds, between the plants. This will strengthen and prepare them for the following spring. And if after this, there is some old tanners’ bark laid over the surface, between the plants, it will be of great service to them. In the spring, after the danger of hard frost is over, the beds should be forked, to loosen the ground and break the clods. And in this operation the tan which was laid over the surface will be buried, which will be a good dressing to the strawberries. Then if the surface is covered with moss, it will keep the ground moist, and secure a good crop of fruit; and the moss will preserve the fruit clean. When heavy rains fall, after the fruit is full grown, there will be no dirt washed over them, which frequently happens where this is not practised.” *Miller.*

STRING HALT, a kind of lameness peculiar to the hind quarters of a horse, which occasions a sudden jerking of the legs upwards in his going. When it seizes the outside muscles the horse straddles and throws his legs outwards. But when the inside muscles are affected, his legs are twitched up to his belly.

Sometimes it is only in one leg, sometimes in both. The cure is difficult, and rarely accomplished. Rubbing and fomentations are recommended, with daily moderate exercise: By which the blood and spirits may be equally derived into the disordered muscle and its corresponding one. See *Gibson and Clark.*

STUBBLE, the stumps of reaped grain, or the parts of the stems left standing in the field.

When the land is light and sandy, the stubble of wheat and rye should be ploughed into the soil to enrich it. For this will have as good an effect as a moderate manuring with dung; especially if it be ploughed soon after the crop is taken off; for then the stubble is in its best state. But after it has been exposed for some time to the sun and wind, it has much less virtue in it to enrich the soil. If this operation be performed in season, the stubble, together with what weeds are growing among it, will be equal to the best green dressing.

But with ploughs of the common construction, the ploughing of stubble ground is disagreeable work; neither can it be well performed. The plough is so apt to choak up, that it is more than one man can well do to keep it clear. Ploughs for this work should be much deeper built than the common ones. And this work might be greatly facilitated, if a heavy roller were passed over the stubble, to lay it flat to the ground before ploughing. When this is doing, great care should be taken to pass the roller the same way that the plough is to go. By means of this, the coulter will but seldom be clogged with the stubble. If this rolling be neglected, a small roller annexed to the

the fore end of the ploughbeam, in the place of a foot, or even a foot itself, will greatly help to clear the way for the coulter.

When stubble is on a soil that is stiff, it is not accounted so advisable to plough it in. For such land is not apt to cover the stubble so closely as to cause it speedily to putrefy. It will often lie in a sound unaltered state for a long time, and be very troublesome at the next ploughing.

But if the ground should be seeded after one ploughing, it might be expected the stubble would render the ground so hollow and cavernous as to starve many of the plants that grow upon the surface. At the same time these hollows would be receptacles for noxious insects and vermine. But in a light sandy soil, the stubble is soon reduced to a condition to nourish vegetables.

The better way, therefore, to dispose of the stubble on stiff lands, is, to mow it, collect it, and carry it into the farm yard; where, by the trampling of the cattle, and mixing it with their excrements, it will be converted, before the following spring, into a rich and valuable manure. And it is almost incredible how much a farm may be, in this way, improved and fertilized.

While in the old countries they are under the necessity of making use of part of their stubble, in thatching the roofs of their buildings, and of part of it for fuel, the farmers in this country have the privilege of converting the whole of theirs to manure. And perhaps it may be as well to do so, on whatever soil it is, as to turn it in with the plough; for it is not easy to bury it completely by ploughing;

and the part which is not covered is of little or no advantage to the ground.

STUMP, the part of a tree which remains fast in the ground after felling.

Stumps are very troublesome for some years after trees are removed, unless they be taken out. But doing this is commonly thought to be too much labour, especially when they are of any considerable bigness.

Mr. Evelyn's engine for pulling up large roots, may be thought useful by those who are in haste to have their land thoroughly cleared, and do not grudge the expense of doing it. See *Complete Farmer*, under the article *Stump*.

M. de Turbilly advises to the blowing up stumps with gun powder. But I think my countrymen will hardly go into this method, unless it be in particular cases.

Most of the stumps of hard wood trees will be so decayed in their roots in six or seven years, that they may be easily taken away. So will some of the soft woods. But the stumps of white pine trees, that are large, will last more than half a century. However, when they are well dried, and have somewhat decayed, they may be conquered by fire, where there is plenty of wood to pile on them. But before this is attempted, the earth should be removed from their sides, and if practicable from underneath them, allowing them a few days to dry. A good method of destroying the stumps of white pine trees is, to dig up the smaller ones, and pile them round the larger; and when they have become dry, set fire to them.

The stumps of trees are such hindrances to the operations of tillage,

tillage, as greatly diminish the profit of farming. Where land abounds with them, they are equal to a heavy tax. This should be considered by those who have the power of taxing new settlements. It is horrid oppression, to tax lands that are full of stumps of trees, equally with the oldest and most improved.

STY, a small house, or hut, in which hogs are kept, or lodged.

Hogs that are not confined should always have a sty, or cot, to lodge in, placed in a convenient situation, and easy of access. It should be very tight, warm and dry, of whatever materials it may be built, and kept well littered: For if swine have not a warm lodging, or are much pinched with the cold, they will be injured in their growth.

That a sty may be the warmer, the door of it should be no larger than is needful for the swine to pass through. And a door should be hung in this passage by the top, that it may be pushed up by their noses, either inwards or outwards, as there shall be occasion. The swine will no fail to open it, and it will shut of itself. See *Hogsty*.

SUCKER, a young twig, or shoot, from the stock, roots, or limbs, of a plant or tree.

SUMMER, the warmest quarter of the year, including June, July and August.

In this season, as well as in the spring, the farmer has plenty of work. Crops that are to be hoed, are first to be attended to, and must by no means be neglected. There is often much of this work to do in a little time, especially on farms where much Indian corn is raised. And the more fruitful the season is, the more frequent hoeings will be needful, to keep the weeds under. This

work can hardly be, and seldom is finished, before the grass on the high lands calls for mowing. And before the mowing season is ended, reaping, and all the toil of the former harvest, come on.

The summer business is the more toilsome, on account of the intense heat of a considerable part of that season. To lighten the labours of the field, the farmer and his men should be at their work early and late, and rest themselves in the hottest hours. Thus they may perform as much as they ought to do, without fatiguing or overheating themselves, and without exciting such an immoderate thirst as will tempt them to ruin their constitutions with cold drinks.

SUNFLOWER, *Helianthus*, one of the largest of annual plants, so well known as to need no description.

The sunflower is a native of America; but has been carried into England, where it flourishes. It bears very large discous flowers, and produces a large quantity of black seeds, which are of use for feeding poultry.

The seeds should be sowed early. They will grow in almost any soil. The young plants may be transplanted at any time, before they are six or seven inches high, only observing to take up a ball of earth about their roots. They should be placed in the northern borders of gardens, if in gardens at all, where they will do the least harm to other plants by their shadow; and they should stand not less than two feet asunder. They will rise to the height of a dozen or fourteen feet.

SURFEIT, a disease to which cattle, and horses especially, are liable.

It is produced by various causes; it comes from intense labour,
from

from overheating, and from diseases not well cured.

“ A horse is said to be surfeited, when his coat flares, and looks rusty and dirty; though proper means have not been wanting to keep him clean. The skin is full of scales and dander, that lie thick and mealy among the hair, and is constantly supplied with a fresh succession of the same for want of due transpiration. Some horses have hurdles of various sizes like peas or tares: Some have dry fixed scabs all over their limbs or bodies; others a moisture attended with heat and inflammation; the humours being so sharp and violently itching, that the horses rub so incessantly, as to make themselves raw. Some have no eruptions at all, but an unwholesome look, and are dull, sluggish, and lazy; some appear only lean and hidebound; others have flying pains and lameness, resembling a rheumatism; so that in the surfeits of horses, we have almost all the different species of the scurvy, and other chronical distempers.

“ The following method is usually attended with success in the dry species. First, take away about three or four pounds of blood; and then give the following mild purge, which will work as an alterative, and should be repeated once a week or ten days, for some time.

Take succotrine aloes six drams, or one ounce; gum guaicum half an ounce; diaphoretick antimony, and powder of myrrh, of each two drams; make into a ball with syrup of buckthorn.

“ In the intermediate days, an ounce of the following powder should be given morning and evening in his feeds.

Take native cinnabar, or cinnabar of antimony finely powder-

ed, half a pound; crude antimony in fine powder four ounces; gum guaicum also in powder four ounces; make into sixteen doses for eight days.

“ This medicine must be repeated till the horse coats well, and all the symptoms of the surfeit disappear. If the horse is of small value, two or three common purges should be given, and half an ounce of antimony, with the same quantity of sulphur, twice a day, or the alterative balls with camphire and nitre.

“ If the little scabs on the skin do not peel off, anoint them with the mercurial ointment; during the time of using which, it will be proper to keep the horse dry, and to give him warm water. This ointment properly rubbed into the blood, with the assistance of purging physick, has frequently cured these kind of surfeits, without any other assistance.

“ The wet surfeit, which is no more than a moist running scurvy, appears on different parts of the body of a horse, attended sometimes with great heat and inflammation: The neck oftentimes swells so in one night's time, that great quantities of a hot briny humour issue forth, which, if not allayed, will be apt to collect on the poll or withers, and produce the poll evil or fistula. This disease also frequently attacks the limbs, where it proves obstinate, and hard to cure; and in some horses shews itself spring and fall.

“ In this case bleed plentifully, avoid externally all repellents, and give cooling physick twice a week; as, four ounces of lenitive electuary, with the same quantity of cream of tartar, with four ounces of glauber salts, quickened, if thought proper, with two or three drams of powder of jalap,

dissolved in water gruel, and given in a morning fasting.

"After three or four of these purges, two ounces of nitre made into a ball with honey, may be given every morning for a fortnight; and if attended with success, repeated for a fortnight longer.

"The powders above mentioned may also be given with the horse's corn; or a strong decoction of guaicum shavings, or logwood, may be given alone, to the quantity of two quarts a day. These, and indeed all alterative medicines, must be continued for a long time, where the disorder proves obstinate.

"The diet should be cool and opening; and if the horse is hidebound, an ounce of fenugreek seeds should be given in his feeds for a month or longer. And as this disorder often proceeds from worms, give the mercurial physic too, and afterwards the cinabar powder, as above directed; but as in general it is not an original disease, but a symptom only of many, in the cure, regard must be had to the first cause; thus as it is an attendant on fevers, worms, &c. the removal of this complaint must be variously effected." *Complete Farmer.*

SWAMP, wet funken land. See the article *Bog*.

SWARD, the surface of grass ground.

The sward is formed of a web of the roots of grass, mixed with the best mould. The common English grass, or poa, forms a very firm and tough sward, which may be cut up and used as turf. Herdgrass has a weaker sward; and clover, being tap rooted, forms a very weak and crumbly sward. The first kind bears the tread of cattle, and the pressure of wheels far better than the others.

The sward is wisely contrived by the Author of Nature, for the recruiting and enriching of land. At the same time that it prevents the descending of the food of vegetables too deep into the soil, it is continually collecting it from the atmosphere. So that for a long course of years, some grasslands will afford good crops of hay with little or no manuring.

The sward always contains the richest part of the soil. Accordingly it is always found, that land newly ploughed out of sward is more fruitful than that which has been longer in tillage. Sometimes it will bear as good a crop without dung, as it will in succeeding years, well dunged.

Other things being equal, a sward that is always fed very close does not gather richness so fast as one that has more fogge. In the one case, the vegetable food in the atmosphere is blown away; in the other, it is entangled in the fogge, retained by it, and carried into the soil by rains, and melting snows.

A sward on which cattle lie much, or where swine frequently run, as in the borders of many of our roads, becomes very rich. So that if the surface be pared off, to the thickness of two or three inches, and laid in heaps to ferment, with the grassy sides inward, it will soon become an excellent manure. A dressing of this will surprisingly renew the fertility of an old worn out field. But a mixture of dung with this manure will be no small advantage.

By the sides of fences, a sward gathers richness faster than in the other parts of a field. The vegetable food which floats in the air, the earthy parts especially, may be supposed to fall, for the same reason that snow does, and

and remain, under the lee of fences. And the banking up of snow in these situations is another cause of enriching the surface of the ground. By lying for some time after the ground is bare, being peculiarly adapted to catch and retain the food of plants, it conveys the more of it into the sward. High and close fences produce these effects more observably than low and open ones. But this is to be understood with limitation; for it is observed that a close fence seven or eight feet high has often a much smaller bank of snow under its lee than a fence of but four or five feet.

When the sward of mowing ground binds too much, it should be broken up and tilled. But to prevent binding, it should not be fed very close after mowing; and especially a sprinkling of well rotted compost, applied in autumn, will not only prevent binding, but increase the next crop, to such a degree, that manure cannot be better applied.

SWARM, a large number of bees. See the article *Bee*.

SWARTH, or SWATH, a line or row of grass, or corn, &c. cut down by the mower.

The double swarth is where the grass of two swarths is thrown together in mowing. It saves a little labour in raking to make the double swarth the centre of a windrow. But when the crop is thin, this is an object unworthy of attention.

SWATH RAKE, a rake about two yards long, with iron teeth, and a bearer in the middle; to which a man fixes himself with a belt; and when he has gathered as much as his rake will hold, he raises it and begins again. *Complete Farmer*.

SWINE, the name of a species of tame quadruped animals, well known in all countries.

Sowen is the old English plural of *sow*, whence the name swine, which custom has applied to the whole species of hogs.

The keeping of swine is of essential advantage to the husbandman; because they feed much upon things, which would otherwise be of no considerable service to him. The roads, and commons, in the farming towns of this country, afford swine, excepting in winter, the greatest part of their scanty living. For they feed heartily, not only on grass, but many sorts of weeds, the tops and roots of fern, the roots of several kinds of aquatick plants, &c. They pick up grain and seeds that are necessarily scattered about the barn and out houses, besides eating worms and many kinds of insects.

Besides, the farmer's house affords many things which contribute to their support, which would otherwise be lost, such as whey, four skimmed milk and butter milk, the washing of tubs and dishes; animal and vegetable food that has accidentally got corrupted, decayed and rotten fruit, the offal of beasts, fowls and fish, and the grounds of cyder, beer, and other liquors.

As this animal is much disposed and adapted, to do mischief, those that are permitted to go at large, should be well yoked, that they may not break through fences. And whether they go at large or in pastures, they should always be ringed in the nose, to prevent their tearing up the ground too much, in search of roots. When kept in pens, they need ringing also, that they may live the more quietly together, and not tear and wound each other.

Their

Their running at large is, perhaps, not advisable, unless it be in wide roads, or in places where there is a large outlet for them; or where grass, brakes, acorns, or nuts of beech, chestnut, or hickory, are not to be found in plenty. For they are exposed to the more accidents; and in some of our settlements, which border on the wilderness, the bears are apt to catch them. And the most of our publick roads are so much frequented by other hungry beasts, that the swine can have but little advantage from the grass.

But in case of necessity, when the farmer happens to have no suitable pasture for his swine, let the walk from the house be regularly given them, morning and evening, to prevent their wandering away too far from home. This will induce them always to lodge at home, especially if they have a good fly to receive them in inclement weather; by means of which they will be the less in danger of being lost, or of straying too far from home.

I am sensible that the method of management, I here recommend, is liable to one considerable objection; which is, that if they be fed at all at home, they will be apt to haunt about the house all the time, crying for more, and never go away far in quest of food.

Instead of attempting to answer this objection, I wish I could make it appear a sufficient argument to convince farmers of the great advantage, or the necessity, of having good enclosed pastures for their swine. They will be safer, and fare better; and the cost of it is not great.

The hog pasture should be so near to the dwelling house, that it may not be troublesome to carry the walk to the swine: And

yet so far off that the people in the house may not be stunned with their noise. And a warm cot must be made in some convenient part of their pasture, for them to lodge in.

To prepare a pasture for them, let the ground be broken up, tilled and manured, and then laid down with clover. For swine are more fond of this grass than of any other which our country produces. Let the quantity of land be so proportioned to the number of swine, that they may keep the grass from running up to seed. For this will prevent waste; and the shorter the grass is, the sweeter it will be, and the more tender and agreeable to their palates.

I suppose that one acre of rich land in clover, will support twenty or more swine, large and small together, through the summer; and bring them well forward in their growth. But they should have rings in their noses to prevent their rooting out the clover.

It has been proved, by many trials, that hogs, in such a pasture, may be kept in good plight, without any other food. Some say they may be half fattened.

Arthur Young, Esq. of Great Britain, in the summer of the year 1766, pastured sixty four swine of various sizes, on two acres of clover ground. And allowing two pence half penny per week, one with another, their feeding amounted to seventeen pounds sixteen shillings sterling. Their keeping was set at a low rate, six months feeding for one swine being 5/5, and the profit of the clover put to this use is astonishing. He assures the publick that all these swine grew very fast. And in his opinion, this use of clover is greatly preferable to making it
into

into hay. I think this is not to be doubted, though the crop of hay were supposed to be the greatest that is ever obtained.

It should be remembered, that the pasturing with swine will enrich land more than pasturing with other beasts, and hereby the profit of the farmer will be increased. And if a common clover lay will produce a good crop of wheat, much more may be expected of the same kind of ground, after pasturing swine upon it; as their dung adds much to the fertility of the soil.

Hogs may be turned into their pasture about the first of May, and kept in it till the last of October. And if, in May and October, the grass should not be quite sufficient for their support, some potatoes or other roots may be thrown to them.

The fence about the pasture should be so tight and strong that the swine will not need to be yoked: Because yokes do much towards preventing their growth, as I have found, by letting yoked and unyoked ones of the same litter run together in a pasture.

It will be a great advantage to a hog pasture, to have plenty of water in it through the summer. Running water is best, as it will afford them the most wholesome drink, and at the same time, serve as well as any other for them to wallow in; and it will keep them clean, which is no small advantage.

But the most dirty puddle water is better than none, as they can cool themselves in it in hot weather, which is greatly refreshing to them, and conducive to keep them in health.

The best way of managing swine is, to keep them always in middling plight: Not too fat,

lest their health should be in danger, especially when the weather is hot: Not too lean, because this is apt to give them a ravenous appetite, and tempt them to eat things that are not wholesome for them. Those that have been long starved, cannot be made fat without great expense: Sometimes more than they will repay with their flesh.

When it can with convenience be so ordered, it is an excellent piece of husbandry, to make a hog pasture of an orchard. Their dung is allowed to be the very best of manure for the trees. They will keep the ground light and loose; destroy insects that infest the trees, and feed heartily on the premature apples that fall, which the farmer is too often tempted to grind up for cyder. And the shadow of the trees will be very grateful and comfortable to them in summer. An orchard may be prepared with clover as well as any other spot of ground. But it should be remembered that, when the trees in an orchard are young and small, swine should not be permitted to go among them: For there will be danger of their wounding them, and stripping off some of the bark.

I would not wish to have the keeping of swine wholly engrossed by the farmer. In populous towns, where there is so much as room for gardens, every family should keep at least one, to take off the refuse of the kitchen, dish water, &c. which would otherwise be thrown away.

Let him be kept in a pen, or sty, perpetually. For the weeds even of a small garden, thrown into his pen, will be ten times better for him, than all he can pick up in the streets, though there may happen to be a little grass in the bye lanes.

He should be fattened and killed in the fall; and a half year old shoot bought in, to supply his place. They who keep but one swine, or even two, had better purchase their pigs than attempt to breed them.

It is perhaps of more consequence than some are aware of, to be furnished with the best breed of swine. There has been very little care hitherto, in our country, taken about this matter.

The compilers of the *Complete Farmer* say, "A wild kind of hogs, though smaller than those bred in Leicestershire, are much more hardy and better meat." They add, "in the choice of hogs, choose such to breed out of, as have long, large bodies, are deep sided and bellied, that have a short nose, thick thighs, short legs, high claws, thick neck, a short strong groin, and a thick chine, well set with bristles."

A new breed of hogs, called Chinese, has lately been brought from England to Boston, which are so much coveted, that they are already propagated in many parts of the country. Those that I have seen, seem to answer pretty well in shape to the above description. They have long bodies, broad backs, short necks, noses and legs, and very slender tails. They multiply exceedingly, are remarkably still and quiet, are apt to keep themselves fat, when they are tolerably well fed; but seldom or never grow to a large size. Wherever I have seen them, and however treated, they have appeared much more plump and fat than other swine that ran in the same herds, and had equal advantage. Their skin is not very thin, but their flesh excellent, when killed young. No roasting pigs that I have seen are equal to those of this breed. As

they are great eaters, and get to their full growth in about a year, I suspect that they all ought to be killed in the first year. I have kept some two years; but could never fatten them up to more than two hundred pounds.

In the breeding of swine, care should be taken to have them pigged in the right season, about March or April. These will bear the rigour of the following winter, much better than those which come later. Though a sow will farrow three times in a year, it is better that they should do it only twice.

The above mentioned writers say, "It is common for sows to have thirteen or fourteen pigs at a litter: But the sow can rear no more than she has teats to suckle them with: The rest must therefore be destroyed, or put to other sows. If a sow miss the time of going to boar, that she might in course have done, give her some oats parched in a pan, in her wash, or the small end of a runnet bag, and it will cause her quickly to go to boar. The pigs which you rear, after you have chosen out the best for boars and sows, the males must be gelt, and the sows spayed."

The most eligible food for store hogs in winter ought to be known, regard being had to the cost of the food, and the advantage gained in the growth of the swine. Raw potatoes seem to be the most fashionable food in the northern parts of New England. But if swine are wholly confined to this food, they will but just live, without increasing much in their growth. But boiled potatoes will make them grow and even fatten them. Roasted potatoes are still better for them than boiled, as they are less wa-

From some late experience I have had of feeding them with raw carrots, I judge them to be a more fattening food than even boiled potatoes. The swine are exceedingly fond of them, sometimes preferring them to Indian corn. And I think the cost of raising carrots will not be found greater on the whole, where the soil is suitable for them, than that of raising potatoes.

The feeding of store swine constantly with any kind of corn, seems to be too expensive. Possibly it will be found, upon further trial, that carrots are the best substitute. Red beets are also a good food for them, and parsneps excellent: But turnips and cabbage are improper.

Mr. Young made many accurate experiments in order to find out the cheapest, and best methods of feeding swine in sties. The result of the whole was, that boiled carrots had the preference.

Sows and pigs on a farm, as he justly observes, should have the benefit that arises to swine from the dairy. The rest of the swine may be fed chiefly on clover in the summer, and on roots in the winter. If this rule be observed, the dairy farmer may keep a very great number of swine to advantage.

But it should not be forgotten, that swine are, in one respect at least, like human creatures, apt to be cloyed when confined wholly to one kind of food. They should therefore be, in some measure, gratified with variety. It has been often remarked, that potatoes suit hogs better in summer than in winter. The secret is, that in summer no hog is wholly confined to potatoes; for he gets at least some grass, and weeds.

I know not whether it has ever yet been determined, at what age it is best, or most for the owner's interest, that swine should be fatted and killed. That it is in no part of the first year, excepting the China breed, I suppose will be generally granted. For as they have not near attained to their full growth, it cannot be expected that they should be so quickly, or so easily fatted by feeding. But as the young pork is more palatable, some will prefer it on the whole, though it should be more dearly obtained.

The more common practice is, to kill them at about the age of a year and a half. But I suspect the profit would be greater, if they were kept one year longer. For it is well known, that they bear the cold of the second winter much better than that of the first. As their growth is nearly or quite completed, they are the more easily fattened; and I never could perceive but that the pork was equally good and palatable, as those killed at eighteen months old.

According to the opinion of the Rev. Mr. Eliot, the best time in the year to shut up hogs to fatten them, is the month of August. I rather prefer the month of September, when it may be depended on, that they will not suffer at all by the heat in their confinement: And there will be time enough to make them fat, before the weather comes to be extremely cold.

He that attempts to fatten his hogs in winter will be a loser: For it has been found by long experience, that they do not gain in their flesh near so fast in a frosty, as in a temperate season. I therefore take care to get them fit for the knife by the beginning or middle of December. And I should

should choose to kill them still earlier, were it not for the advantage of keeping the lean part of the pork for some time without salting; as it most commonly may be done by exposing it to frost, in the coolest part of a house.

But a very important question is, what food and management is best in fattening swine? Please answer well, when the price of them is low. But I am constrained to give the preference to Indian corn. Let them be fed in September with green ears from the field. There is nothing they will devour more greedily than this corn, and even the cobs with it.

In Indian harvest, the unripe ears should be picked out, and given to the hogs that are fattening, without delay: Or as fast as they can eat them: For it will do them four times as much good in this state, as it will after it is dried, it being difficult to dry it without its turning mouldy, or rotten; so that they will scarcely eat any of it in this state, unless they be kept shorter of food than fattening hogs should be.

After the unripe corn is used, that which is ripened must be given them.

If it be thought most convenient to feed them with corn of the preceding year, it should not be given them without soaking, or boiling, or grinding it into meal. For they will not perfectly digest much of the hard kernels; it being often too hard for their teeth. It has been thought by good judges, that the corn will be at least a sixth part more advantage to the swine, for soaking it in water. But there is, if I mistake not, still more advantage in grinding it. What new corn is given them, may be

in ears, as it is not hardened enough for grinding. I know of nothing that will fatten hogs faster than a dough of meal and water. But as this is an expensive food, the dough may be mixed with boiled potatoes, or boiled carrots. They eat these mixtures as well as dough by itself; and it appears to make no material difference in their fattening. In this mixture, barley meal will answer instead of Indian: Which should be attended to in our more northern parts, where two bushels of barley may be as easily raised, as one of Indian corn. Both kinds of meal I have found to be a good mixture with boiled potatoes: But it should by all means be a little salted, to give it a good relish.

While hogs are fattening, little or none of the wash from the kitchen should be given them. Their drink should be fair water, which they relish better than any other drink, and of which they will drink a good deal, when they are fed only on corn, or stiff dough.

To prevent measles, and other disorders in hogs, while they are fattening, and to increase their health and appetite, a dose or two of brimstone, or antimony, given them in their dough, is useful, and should not be neglected.

Some change of food may be advisable, in every stage of their existence, as it always seems to increase their appetite. But while they are fattening, laxative food in general should be avoided, as these animals are seldom known to suffer by costiveness, especially when they are full fed, but often from the contrary disorder. If they chance to be costive, a little rye will help them.

In feeding, steady care should be taken that not one meal should be

be missed, nor mistimed, and their water should never be forgotten. They should always have as much food as they will eat up clean; but never more than that quantity, lest they defile it, and it be wasted. A little at a time, and often, is a good rule.

If their skins be scurfy, or inclining to manginess, a little oil poufed upon their backs, will cause it to come off. And some say, a small mess of rye now and then, as a change in their food, is good against these and other disorders.

If the issues in their fore legs should chance to get stopped, every attempt to fatten them will be in vain. These therefore should be watched; and if found to be stopped, they should be rubbed open with a corn cob.

Rubbing and currying their hides very frequently, is of advantage to keep up perspiration. It is grateful to the animals, as well as conducive to their health and growth. A proper scrubbing post in the middle of their pen will not be amiss. And during the whole time of their fatting, they should have plenty of litter. They will lie the more dry and warm, and it will be more than paid for, by the increase of good manure.

When hogs are killed, a single one should not be left to live alone in a pen. He will be apt to pine too much after his former companions: And in cold weather he will suffer for want of lodging so warm as he has been accustomed to do.

The fat part of pork should be plentifully salted with the best and strongest clean salt. It will take three pecks for a barrel. The pork should be kept continually under pickle; for if it be

exposed ever so little to the air, it will become rusty and unpalatable. See *Hogsty*.

SYCAMORE, *false, Acer*, the maple tree. Though Mr. Miller reckons nine distinct kinds of maple, I know of but two that are usually to be found in this country.

One of these kinds is vulgarly called white maple, *Acer negundo*. It is a very quick growing tree, and therefore ought to be encouraged in forests, especially where a quick profit is desired. But the wood is soft and white, not inclined to burn well till it is dried. As timber, it is valued chiefly by turners, by farmers for ox yokes, and for cabinet work.

The other sort, called rock maple, *Acer saccharinum*, is much harder and heavier, and an excellent wood for fuel, being inflammable in its green state, and durable in the fire. Both sorts will quickly decay, when exposed to the weather; the latter is less durable than the former. The sap of the white maple is drawn by many for sugar. But it yields little in comparison with the other.

It is of the sap of the rock maple that an excellent sugar is made, which is of no small advantage to planters in the wilderness, where the trees are plenty, and the wounding and injuring them is not considered as any loss. But a farmer that wishes his trees to live and grow should not tap them for their sap; because it stunts them in their growth, and often causes them to decay and rot. The best method of tapping has been lately found to be by boring the trees: So that the discharge of the sap may be stopped at pleasure with a peg, as there may be occasion. "When a plenty of sap is collected,

lected, you should have three kettles of different sizes. Fill the largest kettle with sap. To six gallons of sap put in one heaped table spoonful of slacked lime, which will cause the sugar to granulate. Boil the sap in the large kettle, taking off the scum as it rises, till the quantity is so diminished that the second kettle will hold it. Shift it into the second kettle, and fill the large kettle with fresh sap. Let both boil till the third or smallest kettle will hold the sap contained in the second kettle. Shift it into that, and the sap in the first into the second, and fill the first with fresh sap. Boil the sap in the smallest kettle, till it becomes ropy, which you will know by taking out a little with a stick, and trying it between your thumb and finger. Put it into the cooler, and keep it stirring till the next parcel is done, and put that into the cooler, and continue the stirring. When the third parcel is ready, put that also into the cooler, with the other, and stir the whole smartly till it granulates. Put it into moulds. Earthen ones are best. Wooden ones are made by nailing or pinning four boards together, so shaped as to make the mould one inch diameter at the bottom, and ten or twelve inches at the top. The length may be two feet, or two and a half. The moulds must be stopped at the small ends. The sugar must then be put into the moulds. Next morning, the stoppers must be taken out, and the moulds put on troughs to drain their molasses. In the evening the loaves must be pierced at the small ends, to make them run their sirup freely. This may be done by driving in a wooden pin, shaped like a marling spike, three or four inches up

the loaf: After which they must be left to drain their molasses, which will be done in a shorter or longer time, according as the sugar has been boiled." *American Museum*.

It is practised in England, to plant a large sort of maple on the margins of plantations against the sea, as they thrive well in such situations, and serve to screen the plantations of other kinds.

Mr. Miller says, "All sorts of maple may be propagated by cuttings. And that if they be cut from the trees before the buds begin to swell, and before the ground be fit to receive them, they may be wrapped in moss, and put in a cool place, where they may be kept a month or five weeks without injury." The trees may also be propagated by sowing the seeds, commonly called keys.

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TAIL SICKNESS, a distemper attended with weakness and sluggishness, to which horned cattle are liable in the spring. The end of the tail becomes hollow and relaxed, but not, as some have asserted, destitute of feeling. A cure is easily effected, by the amputation of a small piece of the tail, which will be attended with a discharge of some blood. But when the tail is but little affected, and near to the end, a slit of one inch, or an inch and a half, in the end of the tail, is preferable to amputation.

TEAM, the beasts that are used together in the draught.

The right ordering and management of a team is a matter of no little consequence to the farmer, not only in ploughing and harrowing, but in carting and sledging.

In some countries, teams consist only of horses. But in a new country, where roads are bad, and the ground full of obstacles, this will not answer. A horse team travels so much quicker than oxen, that where there are many obstacles, no harness will hold them; and violent jerks would injure and discourage, if not ruin the horses.

But in fields that are perfectly cleared, ploughing with horses may be performed with much greater dispatch and advantage. An acre and a half is but a moderate day's work for a team of horses, whereas an ox team seldom does more than an acre. And there is a proportionable advantage in teaming on a good road with horses.

But when it is considered how much more expensive the support of horses is, than that of oxen, and that an ox, when past labouring, is valuable for beef, the general use of horses in the draught is not to be accounted eligible, in any country. Mr. Marshall computes that a million sterling annually is lost in Britain, by the using of horses for draught instead of oxen: And that a hundred thousand persons might be supplied with a pound of animal food per day, without consuming one additional blade of grass, if oxen were used in general.

The slowness of oxen is partly natural, and partly acquired. That excessive slowness may be prevented, care should be taken never to overload them. When their work is easy, they may be quickened without danger of hurting them; and their contracting a habit of moving slowly may be thus prevented.

It is also found, that old oxen are always apt to be slower than

young ones. It is not advisable, therefore, to continue to work them till they are old; but to turn them off at six or seven years old, at which age they will be better beef than older cattle.

Perhaps a team consisting partly of oxen and partly of horses, may be found to be, upon the whole, of the greatest advantage, especially among small farmers. For they find it needful to keep one horse or more, which will be idle most of the time, unless they work him in the team with the oxen.

The methods of harnessing a team, are so well known to farmers by their experience, that they would perhaps scorn to be instructed in it. But I would recommend it to them to take it into consideration, whether improvements might not be made in this article of rural economy. Particularly, whether the hard and heavy wooden yokes with which oxen are worked, should not give place to a mode of harnessing similar to that of horses. Collars, to open and shut at the top, with haims and traces, for oxen, are used in England, and have been recommended by some of its ingenious writers. But if this advice should be generally followed in this country, the use of two wheeled carts must be laid aside, the wooden yokes being necessarily connected with them. See the article *Waggon*.

TEASEL, *CARDUUS FUL-LONUM*, or *Fuller's Thistle*, *Dipsacus*, a species of thistle, the heads of which are of use to raise the knap on woollen cloth. They are fitter to work on fine than on coarse cloths.

This is a plant which ought to be cultivated in this country, in order to facilitate and improve
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the manufacture of woollen. And from some trials that have been made it appears that it may be done without difficulty.

Mr. Miller says, "This plant is propagated by sowing the seeds in March, upon a soil that has been well prepared." Any time in April will answer in this country. "About one peck of seed will sow an acre; for the plants should have room to grow, otherwise the heads will not be so large, nor in so great quantity. When the plants are come up, they must be hoed in the same manner as is practised for turnips, cutting out all the weeds, and singling out the plants to about eight inches distance. And as the plants advance, and the weeds begin to grow again, they must be hoed a second time, cutting out the plants to a wider distance; for they should be, at last, left a foot asunder, and should be kept clear from weeds, especially the first summer: For when the plants have spread so as to cover the ground, the weeds will not so readily grow between them. The second year after sowing, the plants will shoot up heads, which will be fit to cut about the beginning of August; at which time they should be cut, and tied up in bunches, setting them in the sun, if the weather be fair; but if not, they must be set in rooms to dry them. The common produce is about a hundred and sixty bundles, or staves, upon an acre, which they sell for one shilling a staffe."

Those who would see a more particular account of this useful plant, may consult the *Complete Farmer*.

TETHER, or **TEDDER**, a rope with which a horse is tied in the field. He may be fastened by the neck, or the foot, or head,

shifting his situation as often as needful. Where grass grows in part of a lot, with a tillage crop growing on part of it, it is often convenient to feed off the grass in this way.

THATCH, straw laid on the top of a building, or stacks, to keep out the weather. In this country it is used only for stacks, sheds and hovels.

THILL HORSE, the hindermost horse in a team, which goes between the thills or shafts.

THISTLE, *Carduus*, a prickly weed found in tillage and pasture lands. It indicates a rich soil; but it is a very troublesome weed, as it exhausts much of the strength of the soil, and easily propagates itself far and wide, by its downy seeds, which are wafted by the wind to considerable distances.

An effectual way to subdue thistles is, to pull them up by hand while they are small, or before the usual time of cutting them. It may be easily done after a considerable rain, when the ground is soft by being moistened. But the operator must have his hands well defended by gloves of stout leather. They may be taken out at any time with a strong spade. Or thistles may be cut up in autumn, about the beginning of September, and burnt before they have scattered their seed. A thorough tillage of the land, or a good summer fallowing, will subdue them.

But it signifies little for one farmer to destroy the thistles in his ground, so long as they are suffered to flourish in contiguous fields; because the seeds are wafted in the air from field to field, to a considerable distance. For this reason it is, that in France, a man may sue his neighbour for neglecting to thistle his ground

in the proper season; or may employ people to do it at his expense.

Not only the fields, but the borders and hedges around them, should be cleared of thistles, or a complete conquest over them will never be obtained. And this is the most difficult part of the work.

THRASHING, beating out corn, seeds, &c.

This is commonly done with a flail. But it is greatly suspected that many seeds are so bruised by this instrument, that they will not vegetate. That which is to be sowed, should therefore be extricated from the heads in some better method. Striking the grain by handfulls, against a beam or post, is recommended. Some sorts of seeds should be beaten out with a staff, or a slender rod.

Turning a heavy wooden wheel upon grain, by a horse, might be the means of saving a good deal of labour. This is the common method of getting out the seeds of clover: And it might answer equally well for any other kind of smooth and slippery seeds. The wheel holds the chaff in its place and drives the seeds before it.

An engine was once made by a gentleman in the state of New-hampshire, consisting of a broad framed wheel, filled with heavy fliers, which, as the wheel turned, fell out forwards upon the grain, with a considerable force. There was thus two kinds of force at once applied to the grain, the pressure of the wheel, and the strokes of the fliers.

The ancient practice of treading out corn with oxen and horses must have been exceedingly inconvenient. It is no wonder that it has been long disused in most places.

When the work is performed, with a flail or otherwise, the workman should either be bare footed, or have soft shoes, or Indian moccasins on his feet, that he may not crush the corns by treading on them. Wheat, when it is new, is particularly liable to be crushed.

Mr. Mortimer thinks it a day's work for a man with a flail to thrash four bushels of wheat, or rye; six of barley, or five of oats, beans, or pease. But Mr. Lisle says, a good thrasher assured him, that twelve bushels of oats or barley, are reckoned a good day's thrashing, and five or six bushels of wheat. But no certain rule can be given, by reason of the difference in grain. Every one knows that large plump grain is more easily thrashed, than that which is poor and blighted.

This work should be performed when the weather is dry, both on account of the ease of the labourer, and the grain itself, which will keep the better afterwards.

The beards of barley come off the more easily in thrashing, when the swaths of this corn have taken the dew before it is housed. It often requires much thrashing after it is extricated from the straw. It will keep well in a mow unthrashed, for a year, or longer.

Beans and pease always thrash best after sweating in the mow, which they are apt to do. After kiln drying, or drying in the sun, they will keep a long time in the granary, though laid ever so thick.

TIKE, a most disagreeable insect, bred in the woods, and found on sheep, dogs, cattle, &c. By drawing nourishment from animals, they swell themselves up to a large size. See *Insect*.

TILLAGE,

TILLAGE, the work or business of tilling, or working the ground, including ploughing, hoeing and harrowing. See those articles.

The same field should not be kept in tillage perpetually. It answers a better purpose to lay a field sometimes to grass. No rotation of tillage crops can be so good, as to have some years of grass taken into the course. It makes the variety greater, and it checks the increase of certain insects, as well as destroys some kinds of weeds.

High lands are usually 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, and reducing them to a barren state.

A correspondent of the editors of the *Museum Rusticum*, says, "The inhabitants of Market Weighton have five fields, two of a sandy soil, and three of a strong clayey soil: The two former destined to rye, and the others to wheat. Their sandy lands are disposed in ridges, lands, or beds to four swaths breadth: And finding by experience, that considerable parts of each land, towards each furrow, are starved by the coldness of the water dripping from the higher parts of the lands, they have for many years altered their former method: And only ploughed the half of each land, viz. the two middle swaths: So that they have now excellent rye growing on the higher and drier half of every land, and excellent meadow on the lower and wetter half, which being just two swaths, is mowed with great ease and exactness.

"It will perhaps be thought by some, that by making narrower lands, they might have more dry land, and consequently

more corn. But I apprehend that these industrious husbandmen find by experience, that when they make their lands narrower, and consequently with less descent, the water stagnates in the higher parts, and consequently spoils their whole crop. Nor could they, I suppose, sow more corn on their lands, in their present disposition, with convenience, as their present method allows them just one swath on each side.

"They have rye and meadow in one of their two sandy fields every other year, and a fallow the next year. The saving half of the field in grass affords good grass for their sheep, &c. in that year; and allows them to keep a good stock thereon; and this stock, in return, manures the ground considerably, both the fallow and the swath. One of their fields affords them plenty of spring corn; and thus they are supplied with wheat, rye, spring corn, meadow and summer grass, from their five fields, which in any other management they could scarcely be." *Museum Rusticum*, Vol. VI. page 83.

To TILLER, to spread, or multiply shoots.

Grain that is sown thin, in a good soil, will produce a considerable number of stalks and ears from one root. Winter grain will tiller more than that which is sown in the spring; for which reason spring grain should be sown thicker.

TILTH, the state in which ground is after tilling. When it is well pulverised, and made light to a sufficient depth, it is said to be in good tilth.

TIMBER, wood for building, mechanism, &c.

All kinds of timber should be felled in the right season, when the vessels of the wood are most destitute

destitute of sap. In this climate, December and January are the best months for this purpose. Timber felled in other months is more subject to be eaten by worms. The resinous woods are least injured by felling in the wrong season; but it ought generally to be avoided.

When necessity calls for felling trees when the sap is up, steeping the timber for a considerable time in water will be proper. Salt water is far better for this purpose than fresh.

But when the bark of timber trees is wanted for use, the bark may be stripped off from the trunks in May or June, while the trees are standing, and the trees felled in autumn following, or rather in winter.

M. Buffon, of the Royal Academy of Paris, has proved by a variety of experiments, that the timber of trees thus barked is more solid, hard, weighty and strong, than the timber of trees felled in their bark, and thence concluded, with probability, that it is more durable. I suspect that the increased strength and solidity of the wood were in the blea, or what is vulgarly called the sap of the tree. The surface so exposed will soon be too hard to permit the entrance of any worm. The saving of the bark for tanning is sometimes so important an object, where wood has become scarce, that it may well be worth while to go into this practice. It is doubtless better than the practice in England, where felling begins about the end of April; a statute requiring it to be done then, that the bark may be saved for the advantage of tanning leather.

The ancients chiefly regarded the age of the moon in felling their timber. Their rule was to

fell it in the wane, or four days after the new moon, or sometimes in the last quarter. But this is of little consequence. For the sap will be down when the weather continues day and night to be frosty, be the moon's place as it may.

Timber should be cut at the right age. For if the trees be too young, or too old, the timber will be less durable. It is said that oak trees should not be cut under sixty years old, nor above two hundred. Trees should however be cut in their prime, when almost fully grown, and before they begin to decay; and this will be sooner or later according to the quality of the soil, or the nature of the climate.

While timber is seasoning it should not be much exposed to the weather, or the heat of the sun, that it may not dry too rapidly, and spring, warp, or crack. Neither should pieces be piled too close on each other, but kept apart by short sticks across, to prevent mouldiness and decay, by permitting the air to pass through the pile. The same observations will apply to all kinds of valuable boards.

TIMOTHY GRASS, or *bulbus cat's tail grass*, *Phleum pratense*, a coarse grass, but very agreeable to all sorts of cattle. It grows best on low and moist lands. It is a native of America, though some say it is not peculiar to this country.

It obtained its name, by being carried from Virginia to North Carolina by one Mr. Timothy Hanso, as it is represented by the Rev. Mr. Eliot of Killingsworth, in his *Essays on Field Husbandry*.

TOBACCO, *Nicotiana*, a well known narcotick plant, which has become very important, in Europe

rope and America, since Sir Walter Raleigh imported it into England, and is very generally used, in one way or other, by persons of both sexes. It need not be told how much many abuse themselves with it. It has its name from Tobago, one of the Caribbee islands.

To cultivate this vegetable successfully, burn the surface of a piece of ground, as early as possible in the spring; rake it well, and sow the seeds pretty thin. Or if the goodness of the seeds be suspected, they may be sown a little thicker. When the leaves are as large as the nails of one's fingers, the plants may be removed.

A sandy or gravelly soil should be chosen, as most suitable to the nature of this plant, which requires much heat, and is not apt to suffer by drought; and a southern exposure is best.

The ground should be prepared for the plants, by several ploughings and harrowings; and be made rich by folding. Or, if the folding be omitted, old dung of the hottest kinds should be put in the holes.

But the common way of raising tobacco in cow pens, and barn yards, without pulverising the soil, is detestable. The taste of such tobacco is intolerable.

The ground being well prepared, let the young plants be transplanted into it in a wet day about three feet asunder, or three feet and a half.

After this it will be needful to keep the ground clear of weeds, and the plants should be daily viewed and examined, to clear them of the worms that eat them; for there is a sort which have a voracious appetite for this kind of food, though it is a sovereign antidote to all other insects.

The tops of the plants should be broken or cut off, at the height of three feet, or a little less or more, according to the greater or less vigour of the different plants; those excepted which are to bear seed, which should be some of the stoutest and most thrifty. It should be done so early in the summer, as to allow time for the upper leaves to grow to the same size as the lower ones; of which the cultivator must be his own judge, attending to circumstances. All the plants should be topped about the same time, let their height be greater or less; for if this be done too late, though their will be a greater number of leaves, the tobacco will be of a worse quality, nor will the quantity in weight be much, if at all, increased, because the leaves will be thinner and lighter.

The suckers which shoot out at the foot stalks of the leaves, should be broken off as often as they appear; that so the leaves may have all possible advantage of the sap of the plants to perfect them.

The maturity of tobacco is known by certain small dusky spots appearing on the leaves. When it is in this state, it should be cut down carefully with a strong knife, below the lower leaf, on the morning of a sunny day, and the plants laid singly in the sun to wither, which if they do not sufficiently in one day, must be in the same manner exposed the next day.

Being entirely withered, the plants should be laid in close heaps, in the barn, or some other building, to sweat, for the time of forty eight hours at least. After which let holes be made with a gimlet in the lower ends of the stems, and the plants connected by two and two, with sticks

sticks about eight inches long thrust into those holes ; then hang them upon smooth poles, placed about sixteen inches apart, in an apartment which is pretty tight.

As the tobacco turns dry and brown, the plants should be stripped nearer together on the poles. But this should be done only when the air is damp, and when the leaves do not crumble. It is often found convenient to reduce them to close order to make room for the remainder of a crop, which will be ripe later.

From the roots of plants which are cut early, suckers will arise, and give a second crop ; but it will be of an inferior quality. It may stand out till late in autumn, as a small degree of frost will not injure it.

When the tobacco has hung till all the greenness is gone out of the leaves, and at a time when the air is damp, the leaves should be stripped from the stalks, tied up in hands, packed in casks or chests, well pressed down, and kept in a dry place. But by no means in a cellar, which would soon spoil it. It will not be so fit for use the first year as afterwards.

That is the best tobacco which is raised with the least assistance from manure. And, as high manuring is required when it is cultivated in cold climates, I cannot wish to see many attempts to do it, in any place that is north of the forty second degree of latitude. In cold countries, the leaves are apt to be very thin, and so weak that they will scarcely hold together in the curing ; and it is far from being so well flavoured as that which comes from the southern states ; from whence I wish it may be always imported. For I suppose we

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ought in general to cultivate only those vegetables, to which our climate is most suitable.

TOP DRESSING, dung or other manures, spread over the surface of the ground, for the nourishing of plants that are growing in it. These manures should be well pulverised, that they may be spread evenly.

Top dressings are used with advantage for grain, grass, flax, &c. The timing them judiciously is a matter of no small importance. They should not be too freely given to winter grain in autumn, lest they unseasonably produce a luxuriant growth, at a time when it exposes the tender plants to be the more injured by frost. The right time to give this culture to grain, is just at the season when it is earing ; for then is the time when it seems to require the greatest supply of nourishment.

As to grass lands, the spring would be a very proper season to give them their top dressing, were it not for the injury they would receive from the wheels, and the feet of the cattle, in carting it, when the ground is wet and soft.

Let it therefore be applied in autumn, when the dressing is cattles' dung, or any weak compost. But peat ashes and wood ashes, foot, fowls' dung, and all the rich manures, which are to be applied in small quantities, may, and ought to be, applied in the spring. And this may be conveniently done, as these manures may be sowed, or scattered by hand, from a basket.

If the application of top dressings to mowing grounds were generally practised in this country, and yearly repeated as it ought to be, instead of the present general, or rather, universal neglect

neglect

neglect of it, it would put a new face upon things. A vast plenty of hay, double crops, two cuttings in a year, and much increase of wealth to farmers, and the country in general, would soon appear to be the happy consequences.

The materials used for top dressings are numerous, and various. See the article *Manure*.

TRANSPLANTING, removing plants from their seed bed, and setting them in other places, where they will have better room to perfect their growth.

Some vegetables indeed, need to be transplanted twice, especially some kinds of trees, first from the seed bed into the nursery, afterwards from the nursery into orchards, groves, forests, &c.

The first thing in the latter transplanting of trees is, to have the ground prepared before the trees are taken up, that so they may remain out of the earth as short a time as possible; the next is, to take up the trees. In doing this, carefully dig away the earth round the roots, so as to come at their several parts to cut them off: For if they are torn out of the ground without care, the roots will be broken and bruised, to the great injury of the trees. When you have taken them up, prepare them for planting, by pruning the roots and heads. All the small fibres are to be cut off, as near to the place from whence they are produced as may be, excepting perhaps when they are to be replanted immediately after they are taken up. But it will require great care to plant them in such a manner as not to distort, or entangle the fibrous roots, which, if done, will be worse for the plant than if they were cut off. Then prune off all

the bruised or broken roots, all such as are irregular, and cross each other, and all downright roots, especially in fruit trees. Shorten the lateral roots in proportion to the age, the strength, and nature of the trees; observing that the walnut, mulberry, and some other tender rooted kinds, should not be pruned so close as the more hardy sorts of fruit and forest trees. In young fruit trees, such as pears, apples, plums, peaches, &c. that are one year old from the time of their budding or grafting, the roots may be left only about eight or nine inches long: But in older trees, they must be left of a much greater length. But this is only to be understood of the larger roots.

“The next thing is the pruning of their heads, which must be differently performed in different trees; and the design of the trees must be considered: Thus, if they are designed for walls, or espaliers, it is best to plant them with the greatest part of the heads, which should remain on till they begin to shoot in the spring, when they must be cut down to five or six eyes, at the same time taking care not to disturb the roots. But if the trees are designed for standards, you should prune off all the small branches close to the place where they are produced, as also irregular ones, which cross each other; and after having displaced these branches, you should also cut off all such parts of branches as have by any means been broken or wounded; but by no means cut off the main leading shoots, which are necessary to attract the sap from the root, and thereby promote the growth of the tree.

“Having thus prepared the trees for planting, you must now proceed to place them in the earth:

earth: But first, if the trees have been long out of the ground, so that the fibres of the roots are dried, place them eight or ten hours in water, before they are planted, with their heads erect, and the roots only immersed therein, which will swell the dried vessels of the roots, and prepare them to imbibe nourishment from the earth. In planting them, great regard should be had to the nature of the soil; for if that be cold and moist, the trees should be planted very shallow; and if it be a hard rock or gravel, it will be better to raise a hill of earth where each tree is to be planted, than to dig into the rock or gravel, and fill it up with earth, as is too often practised; by which means the trees are planted, as it were in a tub, and have but little room to extend their roots.

“The next thing to be observed is, to place the trees in the hole, in such a manner that the roots may be about the same depth in the ground, as before they were taken up: Then break the earth fine with a spade, and scatter it into the hole, so that it may fall in between every root, that there may be no hollows in the earth. Then having filled up the hole, gently tread down the earth with your feet, but do not make it too hard; which is a great fault, especially if the ground be strong and wet.

“Having thus planted the trees, they should be fastened to stakes driven into the ground, to prevent their being displaced by the wind, and some mulch laid on the surface of the ground about their roots. As to such as are planted against walls, their roots should be placed about five or six inches from the wall, to which their heads should be nail-

ed, to prevent their being blown up by the wind.” *Dict. of Arts.*

The smaller species of vegetables, and particularly annuals, are removed but once, if at all. A rainy or damp season, if such a one happens, should be chosen for this operation, as the plants will need the less watering by hand, or sheltering from the heat of the sun.

But when it is found necessary to do it in dry weather, the evening should always be preferred to the morning, as the coolness and dampness of the night will do much to prevent the withering of the plants.

Plants which are only to be carried a few steps should be removed with a gardener's trowel, for when a good ball of earth is taken up, and put into the hole with a plant, the roots are but little disturbed, or altered, and the plant not at all affected by its removal.

But when the plants are carried to a considerable distance, and the roots are necessarily made bare of earth, make the holes with a dibble or stake, and fill them quite full of water; and if it soaks away suddenly, fill them again. Plunge the root in, while the water stands in the hole, hold the plant with one hand, and sprinkle in dry fine mould with the other, till the hole is full. Thus the smallest roots will be likely to remain in their natural positions. After this the plants will need but little watering, or shelter; often none at all. The distances at which different plants are to be set is to be found under particular articles. See *Nursery, Cabbage, &c. &c.*

TREE, a large vegetable, with one woody stem, arising to a considerable height.

Trees are distinguished into evergreens and deciduous ; the former hold their leaves during the winter, the latter shed them in autumn. They are otherwise distinguished into standards and dwarfs ; and again into timber and fruit trees.

As something further ought to be said of timber trees, in a work of this kind, I shall present the reader with the result of a number of experiments made by M. de Buffon in the propagation of oaks. It was this ; that to make a plantation in a soil of common clay or loam, the most successful method is as follows : The acorns must be preserved in earth through the winter in this manner : Let a bed of earth be made six inches deep ; in which plant a layer of acorns ; over these lay another bed of six inches of earth, and over it another layer of acorns, and so on, till as many are employed as there shall be occasion for ; the whole to be covered with earth, to preserve all from the frost. In the spring following these beds are to be opened, and the acorns, which will by this time be shot out, and are so many young oaks, are to be planted at a foot distance for a nursery. Another method which he found successful was, to lay the acorns in autumn on the surface, under the grass, which shewed themselves in so many young oaks in the succeeding spring. This last method seems to be following nature, and would answer better, were it not for the depredations of birds and vermine. If a small degree of frost were fatal to acorns, oaks would never be propagated as they are in the wilderness, in this climate. But perhaps not one in a thousand escapes being destroyed by the

frost. Those that do escape, it will be found, have had a thick cover of leaves over them, during the winter. This, together with a covering of snow over the leaves, during the whole of the frosty season, may allow them to vegetate in a cold climate.

Instead of M. Buffon's bed of earth, planting the acorns in boxes of earth, placed in a warm cellar, would be a more eligible method, Placing them under the leaves in a forest is by no means to be depended on, in this climate. See *Fruit Trees, Nursery, &c.*

TREFOIL, the general name of clover, of which there are many sorts. Mr. Miller reckons twelve different species. See the article *Clover*.

TRENCH, a channel or ditch cut into the earth. See *Ditch, Drain, &c.*

TRENCH PLOUGHING, passing the plough twice in a place to deepen the furrows. See *Ploughing*.

TROWEL, a tool which is of great use and advantage in gardening ; especially in transplanting small and tender plants, as by taking up a ball of earth about their roots, it prevents injury to the plants. It is made like the trowel used by bricklayers, excepting that it is hollowed into the shape of a large gouge.

TUMOUR, " a preternatural swelling in any part of a horse, arising from external injuries, or internal causes.

" Swellings caused by external accidents, as blows and bruises, should at first be treated with restreingents. Let the part be bathed frequently with hot vinegar or verjuice, and, where it will admit of a bandage, let a flannel wetted with the same be rolled on. If by this method the swelling do not abate, apply, especial-

ly to the legs, a poultice of red wine lees, or beer grounds, and oatmeal; or vinegar, oil and oatmeal; either of these may be continued twice a day, after bathing, till the swelling abates; when, in order to disperse it entirely, the vinegar should be changed for camphorated spirit of wine, to four ounces of which may be added one of spirit of sal ammoniac; or it may be bathed with a mixture of two ounces of crude sal ammoniac, boiled in a quart of chamber lie, twice a day, and rags dipped in the same may be rolled on.

“Fomentations made by boiling wormwood, bay leaves, and rosemary, and adding a proper quantity of spirits, are often of great service to thin the juices, and fit them for transpiration; especially if the injury has affected the joints.

“But in bruises, where the extravasated blood will not by these means be dispersed, the shortest way is to open the skin, and let out the grumes.

“If the swelling fixes under the jaws, behind the ears, on the poll, withers, or in the groins and sheath, &c. it should be encouraged and forwarded by ripening poultices, wherever they can be applied. Oatmeal boiled soft in milk, to which a proper quantity of oil and lard is added, may answer this purpose, applied twice a day, till the matter is perceived to fluctuate under the fingers, when it ought to be let out. For which purpose, let the tumour be opened with a knife or strong lancet, the whole length of the swelling, if it can be done safely, for nothing contributes so much to a kind healing, as the matter's having a free discharge, and the opening being big enough to dress to the bottom.

“Pledgets of tow spread with black or yellow basilicon (or the wound bintment) and dipped in the same, melted down with a fifth part of oil of turpentine, should be applied to the bottom of the sore, and filled up lightly with the same without warming. It may be thus dressed once or twice a day, if the discharge is great, till a proper digestion is procured, when it should be changed for pledgets spread with the red precipitate ointment, applied in the same manner.

“Should the sore not digest kindly, but run a thin water and look pale, foment as often as you dress with the above fomentation; and apply over your dressing the strong beer poultice, and continue this method till the matter grows thick, and the sore florid.

“The following ointments will generally answer your expectations in all common cases, and may be prepared without, as well as with the verdigrise.

Take Venice turpentine and bees wax; oil of olives one pound and a half; yellow rosin twelve ounces; when melted together, two or three ounces of verdigrise finely powdered may be stirred in, and kept so till cold, to prevent its subsiding.

Take of yellow basilicon, or the above ointment without verdigrise, four ounces; and red precipitate finely powdered half an ounce; mix them together cold, with a knife or spatula.

“This last, applied early, will prevent a fungus, or proud flesh, from shooting out; for if you dress too long with the above digestive, the fungus will rise fast, and give some trouble to suppress it; when it will be necessary to wash the sore as often as you dress,

dress, with a solution of blue vitriol in water, or to sprinkle it with burnt alum and precipitate. If these should not be powerful enough, touch with a caustick, or wash with the sublimate water, made by dissolving half an ounce of corrosive sublimate in a pint of water.

“ But this trouble may in great measure be prevented, if the sore is on a part where bandage can be applied with compresses of linen cloth ; for even when these excrescences regerminate, as it were, under the knife, and spring up in spite of the causticks above mentioned, they are to be subdued by moderate compression made on the sprouting fibres by these means.” See more on this subject in *Bartlet's Farriery*, page 236.

TURF, a clod filled with grass roots, taken from the surface of the ground.

That which is used as fuel in some countries, is properly the sward of a wet and boggy soil, and consists of a sulphureous earth, and the roots of aquatick vegetables.

In Flanders, they pare their turf from the surface of the earth, and cut it in the form of bricks.

The Dutch take their turf from the bottom of the canals which divide their lands ; by means of which they keep their dikes clear and navigable.

In the north of England and Scotland, turf is dug out of soft, moist, rotten earth, which they call *peat moss*. It is decayed moss mixed with moory earth, and aquatick grass roots.

Some writers confound turf with peat, as if they were the same substance. Peat consists of decayed wood, large trees in a sound state being often found in a peat soil, and those that are

changed into peat retain their shape. Nut shells and leaves are observed in it, which indicate that peat was originally wood. Turf is therefore quite a different substance, of much less value as fuel ; and yields a weaker kind of ashes.

Turf also differs from peat, as in places where turf is cut out, it will in some years be renewed ; but this is not the case with peat, which being once dug out is never renewed.

TURKEY, a large domestick fowl, brought from Turkey, and is called by the name of its country.

As many of them are reared in the farming towns in this country, I shall here give directions from a good writer, how it may be done with success.

“ Most of our housewives, says a Swedish author on husbandry, have long despaired of success in rearing turkeys ; and complained that the profit rarely indemnifies them for their trouble, and loss of time : Whereas, continues he, little more is to be done than to plunge the chick into a vessel of cold water, the very hour, or if that cannot be, the day it is hatched, forcing it to swallow one whole pepper corn, and then restoring it to its mother. From that time it will become hardy, and fear the cold no more than a hen's chick. After which it must be remembered, that these useful creatures are subject to one particular malady whilst they are young, which carries them off in a few days. When they begin to droop, examine carefully the feathers on their rumps, and you will find two or three, whose quill part is filled with blood. Upon drawing these the chick recovers, and after that requires no other care than what is common-
ly

ly bestowed on poultry that range in the court yard.

“These articles are too true to be denied; and in proof of the success, three parishes in Sweden have, for many years, gained several hundred pounds by rearing and selling turkeys.” *Rural Economy*, page 739.

Buck wheat is accounted a good food for turkeys; but insects contribute much to their living in summer. When grasshoppers are plenty, they will fatten upon them.

R. Weston, Esq. recommends fattening turkeys with walnuts, given them whole. See his *Tracts*, page 190.

TURNIP, a white esculent root.

The sorts, according to Mr. Miller, are three; the flat, or round shaped turnip, the long rooted, and the French turnip.

Of the first sort some are green topped, others red purple topped; the yellow; and the early Dutch turnip, which are not of so much value. The last sort is sown early in the spring, to supply the markets in the beginning of summer. The green topped turnip is preferred to the rest, as it grows to a larger size.

Turnips love a light sandy or gravelly soil, or a sandy loam. It should be made soft and fine, but not too rich, lest the turnips be rank and ill tasted.

Ground that has been newly cleared, yields the largest and sweetest turnips; and on such a spot there is the least danger from insects.

Next to new land, swarded ground is to be chosen for a crop of turnips; and the way to prepare it is, to plough it pretty deep in the spring, and fold it by turning in the stock for a good number of nights. For there is

scarcely any of our fields sufficiently rich to produce turnips without manuring: And folding hitherto appears to be the best method of enriching the ground for this purpose. It should be well harrowed as often as once a week, while the folding is continued, to mix the excrements of the cattle with the soil.

The ground should be cross ploughed as soon as the soil is sufficiently rotten, and reduced by harrowing to a fine tilth, before it is sowed. Where a good stock is kept, as much as an acre may be sufficiently folded. See *Folding*.

The time for sowing the seed is about the middle of July. Doing it on a set day is ridiculous: For a time should be chosen when the ground has the right degree of moisture to make the seed vegetate; and if this should happen a week earlier, or a fortnight later than the usual time, it need not be regretted; but the opportunity ought to be embraced.

I have sown them in drills the first week in August, and had a good crop. One great advantage of sowing so late is, that the turnips will escape insects. And if the crop should not happen to be quite so large as if the sowing had been earlier, the roots will not fail of being better for the table.

One pound of seed is the common allowance for an acre of land. But to guard against the fly, the quantity may be a little increased. And it is recommended by judicious writers, that it be a mixture of equal parts of new and old seed, that the plants coming up at different times, the one sort or the other may chance to escape the insects. With this view, Mr. Tull constructed his turnip drill to lodge the seeds at different

different depths, which it seems had the desired effect.

The seed sown broad cast must be harrowed in with a short tined harrow, and then rolled with a wooden roller, to break the clods, and level the surface.

In a week, or thereabouts, the young plants will be up : And if it be a dry season, the fly will be apt to destroy them : To prevent which, some powdered soot, or lime, may be sowed very thinly over them, by sifting, in a dewy morning. This will quicken the growth of the plants, as well as otherwise defend them. And the faster the plants grow, the sooner they will unfold their rough leaves, and be out of danger of the fly. Or it may answer well to sprinkle the ground with an infusion of elder, wormwood, or tobacco. But it must be done seasonably, as soon as the plants are up.

But if the young plants cannot be saved, as it may sometimes so happen, the ground may be harrowed, and sowed again, the cost of seed being but little, to compare with the loss of a crop.

When the plants have got five or six leaves, they should be hoed, and the plants cut out to six or eight inches asunder. In the second hoeing, which should be three or four weeks after the first, they should be further thinned, to the distance of fourteen or fifteen inches ; especially if they are designed for the feeding of cattle. The roots growing at such a distance will be large, so that what is wanting in number, will be more than made up by their bulk. But if they are designed for the table, they need not be more than from six to ten inches apart, as overgrown ones are not so fit for this purpose.

But few have been hitherto raised in this country, for the feeding of cattle. But if our farmers would follow the directions given above, they would find it easy to raise hundreds of bushels for their stocks. Forty seven tons have been the crop of an Irish acre, as Mr. Winn Baker testifies, under his culture. Those who have made no spirited trials, will hardly conceive how much the hoeings will increase their crops. Even without hoeing, where the weeds are suffered almost to stifle them, a crop of turnips sometimes turns out to be profitable : How much more profitable may it be expected, if they had sufficient room, and were not robbed of their nourishment by standing too near together ?

In England, the drill husbandry has been applied to turnips, and the produce has exceeded those sown broad cast, which have been hand hoed. The late Lord Viscount Townshend made a fair trial, and found that the crop of an acre of drilled turnips weighed a ton and a half more than that of an acre in the old husbandry, though the latter were well hand hoed. For two years past, I have sown turnips in the drill way, in the poorest part of my garden, where a crop of pease had grown the same summer, and never had better turnips. They were sufficiently large for the table, though they grew so near together in the rows that the roots crowded each other, and were not sown earlier than about the tenth of August. The earth was hoed into ridges three feet apart, and a single channel seeded on each of the ridges. This is the more observable, as I have often sown turnips in the broad cast way, on the

the same spot, and at the usual time of sowing fall turnips, and never before raised any that were fit to eat. I have also for several years raised turnips in the field in the drill way. The ridges were raised in May with the cultivator, about three feet apart. They were kept clear from weeds till about the last of July, by the cultivator and the hand hoe, and then sown in single drills. Nothing more was necessary afterwards, except thinning and once hoeing. The crops were so much better than I have obtained from broad cast sowing, that I am induced to persist in, and recommend this method.

A crop of turnips in the old husbandry prepares the ground excellently for a crop of wheat, or flax, the following year. But it would be in much better order, if the turnips were horse hoed.

In other countries, they feed the turnips off of the ground with sheep; or draw them up for neat cattle, through the winter, as fast as they are wanted; and even let them stand until spring, when it is convenient.

But in this country, they must be harvested in autumn, about the end of October, or even earlier in some places; and then stored in cellars, out of the way of the frost; which must needs be a drawback on the profit of this crop. Those that are designed for the table in winter, should be buried in, or covered with, dry pit sand, to prevent their becoming corky.

The most excellent mutton is fatted on turnips, and they are a good food for horned cattle. But milch cows should not be fed very plentifully on turnips, as there is some danger of their giving the milk an ill taste.

To produce good turnip feeds, some of the best roots, of the middling size, which have begun to sprout, should be planted early in the spring, in a good spot, free from shade. They should be in rows, eighteen inches asunder, and the ground must be kept clear of weeds till the seed is ripe. Stakes and laths may be needful round the outside, to keep the branches from falling to the ground before the seed is fully ripe.

The right culture of the French turnip is much the same as the above, excepting that they should be allowed more room, and that the ground should be tilled to a greater depth than is necessary for the other sort, and sowed at the end of June.

The common practice of transplanting them is not good. They get stunted in their growth, of which the insects take the advantage, as they are wont to do of other vegetables, in the same languid state. But while a plant grows rapidly it is seldom annoyed by insects, or much hurt by them.

They should not be sown in the spring; for this will make them hard and sticky; nor more than about a month earlier than other fall turnips. I have known it answer well to sow both kinds mixed together, where the soil has been mellow and deep. But I rather prefer sowing each kind by itself; because the one requires to be earlier sowed than the other.

As there are some other insects which prey upon turnips, besides the fly, while they are seed leaf or afterwards, it has led some to set plants of tobacco, perhaps six or eight feet apart, among their turnips, which is thought to have an excellent effect.

TURNIP CABBAGE, “ a species of cabbage, so called, because the stalk, at some distance from the ground, after rising of the usual thickness, and in the manner of those of other cabbages, enlarges suddenly to such a degree, that it forms a knob of a very large turnip, of which likewise it has sometimes the figure, though it is in general more oblong.

“ By this peculiar formation of the stalk, or production of the turnip like knob, together with its being perennial, this species of cabbage is distinguished from all others. From the top of this turnip rise a number of leaves, of a greenish red, or sometimes greenish purple colour; which answer to the radical leaves in other plants. They do not, though this plant is truly of the cabbage kind, ever close together, and form a compact globular, or oblong mass, as in the common species; but keep their erect growth, or turn outwards.

“ From among these leaves spring a number of other stalks, of which those that are nearer the extremity, branch, and send out flower stalks, spreading horizontally; and those that are more in the centre grow erect, and without branches. On these stalks are leaves, springing out alternately, and of the same colour with the others. The flowers are small and yellow, and succeeded by long cods, full of seed, of the size of that of mustard, and a lighter brown colour.”
Complete Farmer.

It grows wild near Dover, in England; but it is doubted whether it be indigenous. When it is cultivated in gardens, it is rather as a curious than as an excellent plant: Yet it is eatable, and is recommended by Mr. W.

Baker, for the use of seamen: And he thinks it of importance as winter food for cattle. I have not yet known trials enough of it in this country, to be able to ascertain its value. But its bidding defiance to all inclemencies of weather, after it is once firmly rooted, is a circumstance that ought to incline us to make trial of it.

“ The turnip cabbage,” says a Mr. North, “ is one of the hardest roots that grow; and I dare affirm, might be propagated to great advantage, for feeding sheep, &c. For in the most severe winter that I can remember, when cabbages, turnips, &c. have all been demolished by the extremity of the weather, the turnip cabbages have not been hurt. They are a very solid and juicy root, and do not grow spongy when they are old, as turnips do. The tops may be cut off, and given to sheep in the spring, and the root laid by in an out house, to feed them in April and May, when no other roots can be had. Sheep are so fond of these roots, that they will leave the best turnips for them. They will eat them tops and bottoms as they are growing in the fields.” Mr. North is not very accurate, in calling the turnip part of this cabbage a root, as it is only an enlargement of the upper part of the stem, and several inches above the ground.

In the Bath Society Papers is the following account of Sir Thomas Reevor's method of cultivating this root. “ In the first or second week of June, I sow the same quantity of seed, hoe the plants at the same size, leave them at the same distances from each other, and treat them in all respects like the common turnip. In this method I have always obtained

tained a plentiful crop of them. On the 23^d of April last, having two acres left of my crop, I divided them by hurdles into three equal parts. Into the first part I put twenty four small bullocks and thirty middle sized wethers, which, at the end of the first week — I shifted into the second division, and then put seventy lean sheep into what was left of the first: These fed off the remainder of the turnips left by the fat stock: And so they were shifted through the three divisions, the lean flock following the fat, till the whole was consumed. The twenty four bullocks and the thirty fat wethers were fed four weeks, and the seventy lean sheep as long. So that the two acres kept twenty four bullocks and one hundred sheep four weeks. The value, at the rate of keeping at that season, cannot be less than 4d. a week for each sheep, and 1s. 6d. a week for each bullock, which amount together to £14 10 8, for the two acres. Thus you see that in providing a most incomparable food for cattle, in that season of the year in which the farmer is most distressed, and his cattle almost starved, a considerable profit may be likewise obtained.

“The land on which I sow turnip rooted cabbage is a dry mixed soil, worth only fifteen shillings per acre.”

The Bath Society have subjoined, “That this account is as interesting as any they have been ever favoured with, and recommend it to farmers in general that they adopt a mode of practice so decisively ascertained to be highly judicious and profitable.” *Encyclopædia.*

Whether this plant, which has but newly found its way into our country, is hardy enough to bear

the frost of our winters, I suppose is yet to be proved.

V.

VALLEY, or VALE, the low ground or hollow, lying between hills or mountains.

It is demonstrably true, that the influence of the sun upon the earth in valleys is much stronger than on the tops of hills or mountains. As the air is more dense in valleys, it is capable of holding a greater quantity of heat, and this heat is communicated to the contiguous earth.

It is pleasing to observe, how the omniscient and beneficent Author of Nature has wisely made one thing to answer another. As the valleys receive a greater proportion of rain from Heaven, the heat from the sun is proportionably augmented in valleys. Thus the redundant wetness is well balanced, as increased heat causes the evaporation of water from the ground to be the more copious.

Hence the practical farmer should learn, that the vegetables which require the greatest degree of heat should be cultivated in vales, rather than on hills, unless it be on their southern slopes, and near to the bottom. *Vales for tillage, and hills for pasture*, is a good rule in general, as most grasses require a less degree of heat than the various kinds of corn, pulse, &c. But land may be too low and wet for tillage. In spots that are so, unless the wetness can conveniently be cured by draining, their produce must be grass.

VAN, or FAN, an instrument for cleaning corn from its chaff.

Wind is always the chief agent in this business, the air being so little lighter than chaff that

that when put in a brisk motion, it drives it away to such a distance, as to separate it effectually from the corn.

An artificial wind is to be preferred for this purpose to that which is natural. It blows not evenly, nor constantly; and therefore it frequently disappoints the winnower. When the wind blows, the weather is not always fair; or if fair, it is often so cold, or damp, that the health of the workman is exposed. For these reasons the common fan was invented. But the working it is laborious, and the operation of cleaning the grain is slow and tedious.

To avoid these inconveniences the Dutch have invented a machine, which may be termed a winnowing mill. It is a fan enclosed in a case or box, and occupies half its cavity. It consists of boards or flaps fastened to an axis, which is turned by a winch. The other half of the box has a sloping floor, on which the grain falls from the hopper above it. The grain passes down and runs off from the lower edge of the floor, while the force of the confined air, driven by the fan, carries the chaff over the top of the floor, which falls in a heap at a distance from the corn. The hopper hangs by strings upon four pegs, and the necessary motion is communicated to it by the hand that turns the fan. See the *Complete Farmer*, under the article *Thrashing*.

A great deal of the most disagreeable work is prevented by the use of this machine, the cost of which is but a trifle. The workman may use it within doors, in all weathers; and he will escape being stuffed and incommoded by the dust, which is found very hurtful in the old

way of fanning. Nor will he be in any danger of catching cold.

UDDER, the part of a female beast, where the milk is contained for the nourishment of her young. The udder is divided into four parts, according to the number of teats; so that if one teat is diseased, the milk in the rest will not be affected by it.

VEERING, a ridge made in ploughing, where two lands or furrows meet.

VEGETABLE, "a term applied to all plants, considered as capable of growth, that is, to all natural bodies, which have parts organically formed for generation and accretion, but not sensation." *Complete Farmer*.

VEGETATION, the unfolding and growth of plants from seeds.

As vegetables are fixed to a place, they have few offices to perform. An increase of body, and maturation of their seed, seems all that is required of them. For these purposes, Providence has bestowed upon them organs of a wonderful mechanism. The anatomical investigation of these organs is the only rational method of arriving at any certainty, concerning the laws of the vegetable economy.

"The seed of a plant, after it has dropped from the ovary, may be considered as an impregnated ovum, within which the embryo plant is securely lodged. In a few days after it has been committed to the earth we may discern the rudiments of the future plant. Every part appears to exist in miniature.

"The nutritive juices of the soil insinuate themselves between the original particles of the plant, and bring about an extension of its parts. This is what is called the growth of the vegetable body.

"With

“With regard to this increase by addition and extension, there seems to be a great analogy between the animal and vegetable kingdoms. The impregnated ovum of every animal, after it has passed down the fallopian tube, and fixed itself to the bottom of the uterus, is found to contain the tender embryo, within two membranes called chorion and amnion. In this situation the embryo could not long subsist, without a supply of nourishment. Nature has therefore bestowed upon it a placenta and umbilical chord, through which the blood and juices of its mother are transmitted, for its preservation and increase.

“Seeds are disposed by Providence, nearly in the same manner. They have two coverings, answering to the chorion and amnion, and two lobes which perform the office of the placenta. These lobes constitute the body of the seed, and in the farinaceous kinds, they are the flour of the grain. Innumerable small vessels run through the substance of the lobes, which, uniting as they approach the seminal plant, form a small chord to be inserted into the body of the germ. Through it the nutriment supplied by the placenta, or lobes, is conveyed for the preservation and increase of the embryo plant.

“In order that I may be clearly understood, it will be necessary to observe, that the lobes of farinaceous grains are fixed in the earth. They are therefore not properly termed seminal leaves, being rather the placenta, or cotyledons of the plant. On the contrary, vegetables, that have an oily seed, as rape, hemp, line, and turnip, carry their lobes upward, and spread them upon the surface, in the form

of broad leaves. These, though they perform the office of a placenta, are properly seminal leaves, &c.” *Georgical Essays*, page 37.

VENTILATOR, a machine by which the noxious air of any close place, as an hospital, jail, ship, chamber, granary, &c. may be changed for fresh air.

The pernicious effects of bad air have been long known, though not sufficiently attended to, or guarded against. But since the very ingenious and indefatigable Dr. Hales has set the evils arising from this pest in a true light, and the antidote he has provided in his ventilators has been made known, it is hoped that mankind will so attend to their own welfare, as to make use of so valuable a discovery.

Ventilating has been applied by M. Duhamel, to grain in granaries, and was found to have excellent effects. See the *Complete Farmer*, article *Ventilator*.

An easier method, and which may answer very well for ventilating grain in sacks or casks, is as follows: Prepare a tube of sufficient length, of wood, tin, or any substance: Let the lower end be stopped, and a good number of small holes, smaller than the grains, be made near to the lower end: Thrust it into the grain, so as to touch the bottom of the cask: Insert the nose of a household bellows into the other end of the tube, with something wrapped round it, to fill up the cavity, that no air may escape. In a few minutes a sufficient quantity of pure air may be thrown in to cool the grain, and allay any fermentation that is begun in it.

VERJUICE, a liquor expressed from crabbed, unripe grapes, or apples, too acid for wine or cyder.

der. It is generally made in England from the juice of the crab, or wild apple.

VERMINE, a general name applied to all kinds of noxious or troublesome animals.

VETCH, *Vicia*, a plant which is otherwise called *tare*, *fitch*, *fetch*, and *thetch*, much cultivated in England, and of which there are several species; viz. the white, the black, the Siberian vetch, and the small black summer vetch.

Vetches are a kind of pulse, with a roundish seed, contained in pods like pease, but smaller; and they are cultivated in the same manner as pease.

They are considered as an improving crop, and will grow in all kinds of soil. They are commonly sown in autumn; but sometimes in the spring.

The uses to which they are most commonly put, are, either for green fodder for cattle, early in the spring, before any grass is grown; or to make into hay; or to plough them into the soil, as a green dressing, to prepare land for a crop of wheat.

A small black vetch is found among the weeds, in some of our tillage lands, which probably may have been imported from Europe among wheat. And there is one kind of vetch that grows wild, on some of the uncultivated islands in Casco Bay. Vetches are one of the crops, of which I suppose trials ought to be made in this country. They are said to produce two crops a year in warm climates.

VINE, *vitis*, an important plant of the creeping kind, famous for its fruit, the grape, and the generous liquor it affords for the use of mankind. There is not the least reason to doubt of the practicability of cultivating

the vine to advantage in the North American states. Some kinds or other may agree very well with each latitude. The Newengland states are not to be excepted: For this plant is cultivated on a large scale, in most parts of the great Republic of France, and is so fruitful, in all parts, up to the 47th degree of latitude, that wine is a lucrative article of exportation, as well as in common use among even the lowest of its inhabitants; the latitude of which country is much the same as that of the Newengland states. The most southerly part is in the latitude of Boston. And even in England and Germany, higher latitudes, which are not favoured with so much of the genial warmth of the sun, the gardeners find that vines are capable of being cultivated with such success, as to produce large quantities of grapes, ripened to such a degree, as to afford a good vinous juice.

In the neighbourhood of Boston, in Newengland, vines are seen springing up spontaneously, in some situations, in great plenty; and many of them are loaded with fruit. And some vines are found in the forty fourth degree of latitude. Who can doubt whether the appearance of these indigenous vines indicate, that nature has designed such a country for vineyards?

I have known a very good and pleasant wine made of the juice of our wild purple grapes. But we need not be confined to those which are the natural growth of the country, for it is well known that several kinds of foreign grapes have been raised plentifully here in gardens, without any extraordinary culture.

Those who would cultivate vines in gardens, should procure those

those sorts which have been found to prosper well in cold countries : Particularly those which ripen their fruit well in Great Britain, Germany, or the northerly parts of France. The white sweet water, the Chasselas blanc, the white muscadine, and other white grapes, may be best to cultivate in gardens, as they are in general more palatable for eating.

My account of the culture of vines, shall be an abridgment of what Mr. Miller has written on this subject, in his *Gardener's Dictionary*.

“ All sorts of grapes are propagated either from layers or cuttings : The latter is preferred ; because the roots, being slender, are apt to get dried, and die by transplanting.

“ Make choice of such shoots as are strong, and of the last year's growth. Cut them from the old vine, just below where they were produced, taking a knob, or piece of the two years wood, to each, which should be pruned smooth. Then cut off the upper part of the shoots, so as to leave the cutting about sixteen inches long. When the piece of old wood is cut at both ends, near the young shoot, the cuttings will resemble a little mallet. In making the cuttings after this manner, there can be but one taken from each shoot ; whereas most persons cut them into lengths of about a foot, and plant them all, which is very wrong ; for they will not be so fruitful.

“ Cuttings, thus prepared, if not then planted, should be placed with their lower part in the ground, in a dry soil, with litter over their upper parts to prevent their drying. They may thus remain till the beginning of April (May in this country) then

take them out, and wash them from the filth they have contracted, and if you find them very dry, let them stand with the lower parts in water six or eight hours, which will distend their vessels, and dispose them to take root.

“ Then, the ground being prepared, the cuttings should be planted. Open the holes about six feet distance from each other, putting one good strong cutting into each hole, which should be laid a little sloping, that their tops may incline to the wall : It must be put in so deep, that the uppermost eye may be level with the surface of the ground.

“ Having placed the cutting in the ground, fill up the hole gently, pressing down the earth with your foot close about it, and raise a little hill just upon the top of the cutting, to cover the upper eye quite over, which will prevent its drying. Nothing more is necessary, but to keep the ground clear from weeds till the cuttings begin to shoot ; at which time look over them carefully, to rub off any small shoots, if such are produced. You must continue to look over them once in three weeks during the summer season, and rub off all lateral shoots that are produced, and keep the ground clear from weeds.

“ The Michaelmas following, if your cuttings have produced strong shoots, prune them down to two eyes. Being cut thus early in autumn, the wounds will heal before the bad weather comes on, and the roots will be strengthened.

“ In the following spring, gently dig the borders, to loosen the earth, but be careful not to injure the roots of your vines. Also raise the earth up to the stems of the plants, so as to cover the old wood, but not so deep as to cov-

er either of the eyes of the last year's wood. After this they will require no further care till they begin to shoot, when you should look them over carefully, to rub off all weak dangling shoots, leaving no more than the two shoots which are produced from the two eyes of the last year's wood, which should be fastened to the wall. And till the vines have done shooting, look them over in three or four weeks, to rub off all lateral shoots as they are produced, and to fasten the main shoots to the wall as they are extended in length, which must be shortened before the middle or end of July, when it will be proper to nip off their tops, which will strengthen the lower eyes. And during the summer keep the ground clear from weeds; and permit no plant to grow near the vines, which would not only rob them of their nourishment, but shade the lower parts of their shoots, and prevent their ripening: Which will not only cause their wood to be spongy and luxuriant, but render it less fruitful.

“As soon as the leaves begin to drop in autumn, prune these young vines again, leaving three buds to each of the shoots, provided they are strong: Otherwise shorten them down to two eyes: For it is a very wrong practice to leave much wood upon young vines, or to leave their shoots too long, as it weakens their roots. Then you should fasten them to the wall, spreading them out horizontally each way, that there may be room to train the new shoots the following summer. And in the spring the borders must be digged as before.

“The third season, you must go over the vines again, as soon as they being to shoot, to rub off

all danglers as before, and train the strong shoots in their proper places, which may be supposed to be two from each shoot of last year's wood. But if they attempt to produce two shoots from each eye, the weakest of them must be rubbed off. If any of them produce fruit, as many times they will the third year, you should not stop them so soon as is generally practised upon the bearing shoots of old vines; but permit them to shoot forward till a month after midsummer, at which time you may pinch off the tops of the shoots: For if this were done too soon, it would spoil the buds for the next year's wood, which in young vines must be more carefully preserved than on older plants.

“During the summer, you must constantly go over your vines, and displace all weak lateral shoots as they are produced, and carefully keep the ground clear from weeds, that the shoots may ripen well.”

After three years, the vines are considered as grown up; and concerning the management of grown up vines, the same writer says; “Vines rarely produce any bearing shoots from wood that is more than one year old; therefore great care should be taken to have such wood in every part of the trees; for the fruit is always produced upon the shoots of the same year, which come out of the buds of the last year's wood.

“The best method is to shorten the bearing shoots to about four eyes in length, because the lowermost seldom is good, and three buds are sufficient; for each of these will produce a shoot, which generally has two or three bunches of grapes: So that from each of those shoots may be expected six or

or eight bunches, which are a sufficient quantity. These shoots must be laid about eighteen inches asunder, for if they are closer, when the side shoots are produced, there will not be room enough to train them against the wall.

“ At the winter pruning of your vines, you should always observe to make the cut just above the eye, sloping it backward from it, that if it should bleed the sap might not flow upon the bud. And where there is opportunity of cutting down some young shoots to two eyes, in order to produce vigorous shoots for the next year's bearing, it should always be done ; because in stopping those shoots which have fruit on them, as soon as the grapes are formed, which is frequently practised, it often spoils the eyes for producing bearing branches the following year, and this reserving of new wood is what the Vignerons abroad always practice in their vineyards. The best season for pruning of vines is about the middle end of October.

“ The latter end of April, or the beginning of May, when the vines begin to shoot, carefully look them over, rubbing off all small buds which may come from the old wood, which only produces weak dangling branches, as also when two shoots are produced from the same bud, the weakest of them should be displaced, which will cause the others to be stronger ; and the sooner this is done the better for the vines.

“ After one month, go over them again, rubbing off all the dangling shoots as before ; at the same time fasten up all the strong branches, that they may not hang from the wall. Towards the middle of June, stop the bearing branches, which will strengthen

the fruit, provided you leave three eyes above the bunches ; For if you stop them too soon it will injure the fruit, by taking away that part of the branch which is necessary to attract the nourishment to the fruit, as also to perspire off the crudities of the sap.

“ But though I recommend the stopping those shoots which have fruit at this season, it is not to be practised upon those shoots which are intended for bearing the next year ; for these must not be stopped before the middle of July, lest you cause the eyes to shoot out strong lateral branches.

“ During summer rub off dangling branches, and train the shoots to the wall as before, which will accelerate the growth of the fruit, and admit the air to them, which is needful to ripen, and give them a rich flavour. But you must never divest the branches of their leaves.”

The same directions should be followed, when the vines are trained to espaliers, or to wooden fences ; and the pruning, stopping, &c. in vineyards, are the same as in gardens, or green houses.

The vines in vineyards must be supported by stakes ; by two short ones the first year, by longer ones the next, and so on as there shall be occasion. But as to those things which are most peculiar to vineyards, the above author directs that the soil which is to be chosen for the purpose, is *that* the surface of which is a light sandy loam, not more than a foot and a half or two feet deep, with a gravelly or chalky bottom ; but if the soil have a bottom of strong clay or loam, it is not fit for this purpose. As to the situation of the place, it should incline to the south, with a gradual descent, that the water may drain off ; but a steep slope

is not good, as it will not so well hold the manure.

To prepare the soil for planting, he says, "In the spring, if the ground is green sward, it should be ploughed as deep as the surface will permit; then well harrowed to break the clods, and cleanse it from the roots of noxious weeds. After this, it must be frequently ploughed and harrowed for one year, to render the surface light. The following spring the ground should be ploughed again, and after making the surface even, the rows should be marked out from southeast to northwest, at the distance of ten feet from each other; and these rows should be crossed again at five or six feet distance, which will mark out the places where the plants should be placed." But as we are favoured with a drier atmosphere, I should think the rows may as well be planted neartogether, as it will be a saving of ground and labour.

He adds, "The proper kinds of grapes should be chosen. The Vignerons abroad always observe that the grapes which are good for eating never make good wine; and therefore make choice of those, whose juice, after fermenting, affords a noble rich liquor. These grapes are always austere, and not so palatable." He supposes the sort most proper for vineyards in England, is the *Auvernat*, or true Burgundy grape; and thinks it best that a vineyard should produce only one kind of grapes; because the mixing of the juice of several together, will cause the wine to ferment at different times."

After the cuttings are planted, he recommends keeping them clean from weeds; and as the rows are at a great distance from

each other, he allows that the spaces between may be sown, or planted with any kinds of esculent roots, which do not grow tall, provided there is proper distance left from the vines, and care taken that the vines be not injured by the crops, or in gathering, or carrying them off the ground. And this husbandry may be continued till the vines come to bearing; after which there should be no sort of crop put between them, because the cleaner the ground is kept, the more heat will be reflected to the grapes!

"The ground should be yearly well dug or ploughed, and always kept free from weeds; because the roots of the vines will otherwise be robbed of their nourishment.

"When a vineyard is arrived to a bearing state, it should be so pruned, that there should be never too many branches left on a root, nor those too long; for though there may be a greater quantity of fruit produced, yet the juice will not be so good as when there is a moderate quantity; and the roots will be weakened, which is found to be of bad consequence. The number of branches which the Italians leave upon a strong vine are four; two of the strongest have four eyes; and the two weaker are shortened down to two eyes each. Shoots that have borne fruit, are either cut quite away, or reduced to two eyes.

"The ground of a vineyard should not only be constantly well tilled, but a dressing of some good manure applied to it every third year, in the spring, and well mixed with the soil.

"When a vineyard is carefully dressed, it will be as pleasing a sight, as any plantation.

of trees or shrubs whatever. If the rows be regular, and the stakes exactly placed, and the upright shoots stopped to an equal height, there is nothing in nature which will make a more beautiful appearance. And during the season that the vines are in flower they emit a most grateful scent, especially in the morning and evening. And when the grapes begin to ripen there will be fresh pleasure in viewing them."

A vineyard that is well managed will bear fruit the third year from the planting; the crops will be growing larger till the seventh or eighth year; and remain fruitful till about the fiftieth year; after which it will begin to decline, and die away.

But instead of the cutting culture of the vine some have recommended that a plantation of trees of low growth be made, placed at proper distances, with a vine planted at the root of each, which will climb up the trees, and bear fruit without cutting. The ground between the rows should be continually well tilled and manured.

Much labour might be saved by this mode of culture; and that it might answer, the fruitfulness we often observe in wild grapes may lead us to conclude. It seems to be following nature; but the fruit must be waited for, a considerable number of years after planting. And after all, it never will yield so good a wine, as vines that are kept low by cutting; for the low vineyards in France afford a much richer wine than the high ones, though less in quantity. The former are but three or four feet high, the latter seven or eight, and both cultivated by cutting.

VINEGAR, four wine. But the name is also applied to any

acid penetrating liquor, prepared from wine, cyder, beer, &c.

The process of turning vegetable matters to vinegar, is thus delivered by Dr. Shaw: "Take the skins of raisins, after they have been used in making wine; and pour three or four times their own quantity of boiling water upon them, so as to make a thin aqueous mixture. Then set the containing cask, loosely covered, in a warmer place than is used for vinous fermentation; and the liquor, in a few weeks time, will become a clear and sound vinegar; which being drawn off from its sediment, and preserved in another cask, well stopped down, will continue perfect, and fit for use."

All such things as have undergone, or are fit for, a vinous fermentation, will afford vinegar. Our common summer fruits, sap of maple trees, and other vegetables, and even the pomace from which cyder has been pressed, will make vinegar, by means of only the addition of water, and exposing it to the open air, and warmth. But some spirit should be added to weak vinegar, to give it a body, and fit it for keeping.

"Liquor to be changed into vinegar, being kept warmer than in vinous fermentation, it begins in a few days to grow thick and turbid; and without throwing up bubbles, or hissing, as happens in vinous fermentation, deposits a copious sediment. The effect of this separation begins first to appear on the surface of the liquor, which gathers a white skin that daily increases in thickness, till at length it becomes like leather; and now if it continues longer in this state, the skin turns blue, or green, and would at last grow fetid and putrefy. Therefore, in keeping down this skin,

as it grows, and thrusting it gently to the bottom of the vessel, consists much of the art of vinegar making, especially from malt."

VINEYARD, a plantation of vines. See the article *Vine*.

VIVES, a disease in horses, which differs from the strangles only in this, that the swellings of the kernels under the ears of the horse (which are the parts at first chiefly affected) seldom gather, or come to matter, but by degrees perspire off, and disperse, by warm clothing, anointing with the marsh mallow ointment, and a moderate bleeding or two. But should the inflammation continue notwithstanding these means, a suppuration must be promoted.

"When these swellings appear in an old or full aged horse, they are signs of great malignity, and often of an inward decay, as well as forerunners of the glanders.

Take of crude mercury, or quicksilver, one ounce; Venice turpentine, half an ounce; rub together in a mortar till the globules of the quicksilver are no longer visible; then add two ounces of hog's lard.

"Some authors recommend this ointment to be used at first, in order to disperse the swellings, and prevent their coming to matter; bleeding and purging at the same time for that purpose; but as in young horses they seem to be critical, the practice by suppuration is certainly more eligible and safe: For want of properly effecting which, the humours frequently settle, or are translated to the lungs, and other bowels, or falling on the fleshy part of the hind quarters, form deep imposthumes between the muscles, which discharge such large quantities of matter as sometimes kill

the horse, and very often endanger his life." *Bartlet's Farriery*, page 99.

ULCER, "a solution of the soft part of an animal body, together with the skin.

"The first intention in the cure of ulcers, is bringing them to digest, or discharge a thick matter; which will in general be effected by the green ointment, or that with precipitate. But should the sore not digest kindly by these means, but discharge a gleety thin matter, and look pale, you must then have recourse to warmer dressings, such as balsam, or oil of turpentine, melted down with your common digestive, and the strong beer poultice over them. It is proper also in these sores, where the circulation is languid, and the natural heat abated, to warm the part, and quicken the motion of the blood, by fomenting it well at the time of dressing; which method will thicken the matter, and rouse the native heat of the part, and then the former dressings may be reapplied.

"If the lips of the ulcer grow hard or callous, they must be pared down with a knife, and afterwards rubbed with the caustick.

"Where soft fungous flesh begins to rise, it should carefully be suppressed in time, otherwise the cure will go on but slowly. If it has already sprouted above the surface, pare it down with a knife, and rub the remainder with a bit of caustick; and to prevent its rising again, sprinkle the sore with equal parts of burnt alum, and red precipitate; or wash with the sublimate water, and dress with dry lint even to the surface, and then roll over a compress of linnen as tight as can be borne; for a proper degree of pressure, with mild applications,

will always oblige these spongy excrescences to subside, but without bandage the strongest will not so well succeed.

“ All sinuses, or cavities, should be laid open as soon as discovered, after bandages have been ineffectually tried; but where the cavity penetrates deep into the muscles, and a counter opening is impracticable or hazardous; where, by a continuance, the integuments of the muscles are constantly dripping and melting down; in these cases injections may be used, and will frequently be attended with success. A decoction of colcothar boiled in forge water, or solution of lapis medicamentosus in lime water, with a fifth part of honey and tincture of myrrh, may be first tried, injecting three or four ounces twice a day, or some rosin melted down with oil of turpentine may be used for this purpose. If these should not succeed, the following, which is of a sharp and caustick nature, is recommended on Mr. Gibson's experience.

Take of Roman vitriol half an ounce, dissolve a pint of water, then decant and pour off gently into a large quart bottle; add half a pint of camphorated spirit of wine, the same quantity of the best vinegar, and two ounces of Ægyptiacum.

“ This mixture is also very successfully applied to ulcerated greasy heels, which it will both cleanse and dry up.

“ These sinuses, or cavities, frequently degenerate into fistulæ, that is, grow pipey, having the inside thickened, and lined as it were with a horny callous substance. In order to their cure, they must be laid open, and the hard substance all cut away.

Where this is impracticable, scarify them well, and trust to the precipitate medicine made strong, rubbing now and then with caustick, butter of antimony, or equal parts of quicksilver and aqua fortis.

“ When a rotten or foul bone is an attendant on an ulcer, the flesh is generally loose and flabby, the discharge oily, thin and stinking, and the bone discovered to be carious, by its feeling rough to the probe passed through the flesh. In order to a cure, the bone must be laid bare, that the rotten part of it be removed; for which purpose, destroy the loose flesh, and dress with dry lint; or the dossils may be pressed out of tincture of myrrh or euphorbium. The throwing off the scale is generally a work of nature, which is effected in more or less time, in proportion to the depth the bone is affected, though burning the foul bone is thought by some to hasten its separation.

“ Where the cure does not properly succeed, mercurial physick should be given, and repeated at proper intervals: And to correct and mend the blood and juices, the antimonial and alterative powders, with a decoction of guaiacum and lime water, are proper for that purpose.” *Bartlet's Farriery*, page 253.

URINE, a serous and saline fluid, separated from the blood, and emitted by the canal of the urethra.

Considered as a manure, this is an important liquor; it is supposed to be richer than the stale of beasts. The difference may be as that of human ordure to barn dung.

Mr. Bradley relates, as of his own knowledge, that human urine was thrown into a little pit constantly every day, for three

or four years. Two years after some earth was taken out of this pit, and mixed with twice as much other earth, to fill up a hollow place in a grass walk. The turf which was laid upon this spot grew so largely and vigorously, besides being much greener than the rest, that by the best computation he could make, its grass, in a month's time, was above four times as much in quantity as that of any other spot of the same size, though the whole walk was laid on very rich ground.

And Mr. Hartlib instances a widow woman near Canterbury in England, who saved in a pail all the urine she could, and when the pail was full, sprinkled it on her meadow, the grass of which looked yellow at first, but afterwards grew surprisngly.

Human urine therefore should be considered as of great value to the farmer. A good method of using it is, to throw it upon compost dunghills which are under cover.

Also, old urine is preferable to dung for manuring of trees, as it penetrates better to their roots; and it is said to remove divers infirmities of plants.

USTILAGO, a distemper in wheat, the same as burnt grain, or the burnt ear. See *Burnt Grain*.

Grain that is infected with this distemper should not be used for feed, as it is next to impossible, even by repeated washings, to free it entirely from the black powder, the least particle of which, adhering to the kernels, is apt to corrupt them. But by washing it may easily be made fit for grinding, as all the distempered grains will swim, and may be taken off by themselves, while all the sound ones sink to the bottom.

W.

WAGGON, a carriage, or cart, mounted on four wheels.

Waggons answer much the same ends as common carts. But are greatly to be preferred, especially in journeying; and they are quite necessary for horse teams, especially when the horses are harnessed by two and two, as they ought to be in large teams. And if oxen are used they should be harnessed in the same manner as horses. The advantages of waggons are especially these two.

1. They are far less fatiguing to the oxen than carts; because they have to bear only the weight of the tongue upon their necks; whereas, in carts, and on descending ground, the oxen are crushed to death, as it were, with bearing a great part of the load; or in ascending a hill, the load pulls their necks upwards, so that they are almost choked and rendered incapable of drawing the load. Bulky loads, such as hay, and the like, produce these bad effects in the greatest degree.

2. Waggons are better for the roads, as the wheels do not make so deep impressions in the ground as those of carts. The load bearing equally on four wheels, each wheel bears but half so much weight as one wheel of a cart. Consequently, a waggon wheel presses the ground with but half the force of a cart wheel; and therefore penetrates to but half the depth; supposing the tire in both to be of equal breadth. If teamsters used only waggons upon our roads, the roads would soon be found to be greatly mended, as they would be freed from those deep ruts, which are so disagreeable and dangerous to travellers.

WALL,

WALL, the principal part of a building, serving both to enclose and support it.

The walls with which farmers are most concerned are fences of stone upon their farms. See the article *Fence*. The walls of cellars, even in the poorest farm houses, ought to be so constructed as to keep out all frost. Therefore the upper half of the wall should be laid in good lime mortar. This will render banking to keep out frost unnecessary. And banking should be avoided, as it causes the fills of houses to decay. It requires yearly attention and labour, and gives to a house an ill appearance.

When brick walls are to be built for houses, &c. particular care should be taken in laying the bricks. In summer they should be laid as wet, and in winter as dry as possible, to make them bind the better with the mortar. In summer, they should be covered up as fast as they are laid, to prevent the wall from drying too fast. In winter, they should be well covered to protect them from snow, rain, and frost, which are all hurtful to the cement. But in the coldest part of winter mason work can hardly be performed at all in this country. Walls laid in this season are not expected to be durable.

WANE, decrease, it commonly signifies the third and fourth quarters of the moon.

WARBLES, small hard tumours on the saddle part of a horse's back, occasioned by the heat of the saddle in travelling. They are usually called *Saddle Boils*.

A hot greasy dish clout frequently applied will sometimes cure them. When this fails, camphorated spirit of wine will be found more effectual; espe-

cially if a little of the spirit of sal ammoniac be added.

WATER, a simple, transparent fluid, which becomes solid with a certain degree of cold.

A general division of this fluid is into salt and fresh. But according to Dr. Shaw, it seems divisible into as many different species, as the earth is into strata or beds. Thus, there are mineral waters, of various kinds, according to the mineral substances through which they pass, and by which they are by any means impregnated. Water may therefore be as compounded a body as earth; and perhaps neither of them can any where be found perfectly pure or unmixed.

Water is of infinite use in all the works both of nature and art; as without it there could be no generation, nutrition, or growth in any animal, vegetable, or mineral bodies. The blood could not flow in the veins, the sap in the vessels of vegetables, nor the particles of minerals concrete or grow together, without water. Neither could there be any corruption, fermentation, or dissolution performed without it. But I must not attempt to speak of all its uses, being limited by my general subject.

Those however have grossly mistaken the matter, who have supposed water to be the sole food by which vegetables are nourished; though it must be allowed to be absolutely necessary to their nourishment and growth. It is an important agent in mixing and dissolving the other ingredients of the food of plants; gives them the fermentation that is necessary, and is an essential part of the nutritive steam that enters the roots and other parts of vegetables. And the purest water contains in itself many earthy particles, as appears by the crusts that adhere

to the insides of vessels in which water is often boiled.

Nor is water wholly destitute of salts and oils. It is no wonder, therefore, that a plant will live, and grow for some time, with its roots thrust into a vessel of water. For even in this situation, it partakes of every necessary ingredient of its natural food, though not in the right proportions.

Water not only serves thus as a vehicle to the food of plants, but carries with it where it runs in streams many particles of vegetable mould, &c. which enrich the soil. After heavy rains, it is found that water deposits a fertilizing sediment, which changes the surface of the soil to a dark colour.

Watering the ground also promotes the putrefaction of every substance, whether animal or vegetable, contained in the soil, or lying on the surface.

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. But the water should be perfectly under command; otherwise it may prove rather hurtful than beneficial. Too much of it would be as great an evil as too little.

Particular care should be taken that the water which is led over grass grounds, be only such as is fit to nourish plants, which chalybeate waters, or springs impregnated with a mineral acid, certainly are not. Such water is rather poisonous to plants, and prevents their growth.

The quantity of water thrown over the land should be rightly proportioned; a light sandy soil

will bear more, a stiff soil a less quantity, without overcharging the vessels of the plants, or cooling them too much.

The channels should be so made that the water may be communicated to every part, excepting where there are little hollows which are naturally wet. The main channel should be broad, and its descent but just enough to cause the water to run; and from the main channel, a great number of very narrow ones should be cut, that the water may be well spread through every part of the surface.

Watering the ground in this manner should be avoided when the air is extremely hot; because heat draws the water too hastily into the plants, which renders them weak. The night time should be preferred to the day for letting out the water, or a day that is cool and cloudy may be chosen, rather than one that is hot and dry.

No water should be admitted in the spring, till after the ground which has been hoven by the frost is well settled. But afterwards, and in a dry spring, watering may be plentifully used, till the grass begins to spring up. After the shooting of the grass, the water should be administered more sparingly, or not at all if the weather proves rainy. And when the grass comes to be tall, no water should be applied, but in case of necessity, as when a drought prevails, which would otherwise shorten the crop; for if it were applied at this time in a large quantity, the grass would be lodged; or if the water be not clean, it will foul the grass, and give the hay an ill taste.

After the second crop of hay is taken off, water may be thrown over the ground in plenty; for the

the ground is then very dry, and the weather so cool, that vegetables will not be injured by plentiful watering.

Ground that is thus watered will produce plenty of grass, unless it should happen to be too much chilled by watering; to prevent which it should have a sprinkling of some warm compost, foot, or other hot dressing, each year, in autumn.

Care should be always taken to leave off this watering before the month of December, when strong frosts are expected; because frost destroys all vegetables much more when they are full of sap, and where the soil is very wet.

When you wish to water land which is above the level of an adjacent stream, an engine may be used to raise it to the proper height. They who are willing to be at this expense may find descriptions of *Archimedes' water screw*, the *Persian wheel*, *M. Belidor's wheel*, and an engine invented by *M. de la Baye*, in the *Complete Farmer*, article *Water*.

WATER FURROWING, drawing furrows in the lowest parts of a field of wheat, or other winter grain, as soon as it is harrowed in, in order to draw off the superfluous water, that none may stand on the surface during the winter.

This piece of good husbandry is considered, in the old countries, as indispensably necessary; unless when a field is on such a declivity that the water cannot stand on it. For if water stand long upon corn, in a frosty season, or almost any season, it will either be killed, or so stunted in its growth, that it will produce nothing.

If this practice were adopted by my countrymen, the labour of doing which is but a trifle, I

am persuaded they would find so great an advantage in it, that they would not afterwards incline to lay it aside. It is probable it might prevent the winter killing of much grain, an evil that is greatly complained of.

WATERING, applying water to plants to nourish them.

Vegetables that are newly transplanted, as they have their roots more or less diminished, or otherwise injured, often need watering till they have taken new root. But this should be done with caution. If a dry season follow the transplanting, let them be watered if they appear to droop, only on evenings, and in cloudy weather, and with water that has been exposed, one day at least, to the shining of the sun; not with water directly from a well, or a cold spring, as it will give a chill to the plants. Only a small quantity should be applied at once, that it may have an effect similar to that of a refreshing rain. For water, applied too plentifully, sometimes washes away the finest of the mould from the roots; or makes little cavities about them, which admit too much air.

In a dry season, whole gardens sometimes need watering; and in doing it the above precautions are to be regarded. They are happy who have a piece of standing water in their garden, or a rivulet near at hand, from whence the garden may be watered without much labour.

WEATHER, the state or condition of the atmosphere with regard to heat, cold, wind, rain, frost, snow, &c.

Innumerable advantages would arise to the husbandman from a foreknowledge of the changes of the weather; and even from a foreknowledge of the general

characters of the approaching seasons. In the former case, he would be able to order his business from day to day in the best manner, and so as to prevent much hurry, perplexity and loss; especially in the seasons of hay making and harvesting; in the latter, he would be happily directed in his choice of crops, and the best methods of cultivating them. And as this knowledge is not to be obtained, the ability to make very probable conjectures is nextly to be coveted, as it will be found to answer very valuable purposes.

Virgil, and other early writers on husbandry, pointed out many rules of prognosticating the changes of weather in their own countries. But these will not universally, and perhaps not generally, apply in other regions. Persons ought therefore to be careful that they do not lay too much stress upon them.

Journals of the weather, winds, and state of the atmosphere, should be made and kept in every climate in this country; from the comparing of which for a course of years, it is probable that some valuable prognosticks might be formed, which have not yet been thought of.

The observations made in one climate, will not perfectly answer for another, even in the same country. In some parts of the state of Massachusetts, for instance, a south wind in a summer morning forebodes a hot day, and in other parts a cool one; and the changes of weather are not just the same in the maritime as in the inland parts. The latter are hotter in summer and colder in winter than the maritime.

That our farmers may enable themselves to form judicious

prognostications, some parts of knowledge, falsely so called, ought to be unlearned, or exploded; as weeds must be extirpated, that useful plants may be nourished.

Those who draw their prognosticks from the motions and aspects of the celestial bodies are certainly less apt to attend to more sure objects in the earth and atmosphere.

If any celestial influence is to be much regarded in this case, one would think it ought to be only that of the earth's satellite, the moon, because of its nearness. That the influences the tides is well known; and these may have a small influence on the winds and weather. And probably vapours may be more copiously raised when she is nearest to the earth, which affords a greater probability of approaching rain or snow.

But what reason can there be assigned, for supposing that her *place* in the Heavens at the moment of her full; change, or quartering, can have any influence on our atmosphere? Or that the weather in the latter quarters, should be governed by that in her former quarters? These things, though believed by many, have never been confirmed by any set of accurate observations. The few that I have made have rather tended to refute them.

Barometrical observations may be of some real use. "In general, it may be expected, that when the mercury rises high, a few days of fair weather will follow; if it falls, rain may be expected."

Birds of passage have always been supposed to indicate the nearness of approaching seasons, by their removing to different climates.

It is well known that the weather is much governed by winds. Rain is very often preceded, and accompanied by a south-east wind, and snow by a wind from the north-east, or north north-east: And an east wind, continued twelve hours, seldom fails to bring rain; and yet some rain oftentimes comes from every other quarter. When the winds blow from any point betwixt north and west the weather is expected to continue fair and dry.

The weather is oftener unsettled about the times of the equinoxes, than at other seasons: And high winds and storms are more to be expected.

Falling weather oftener happens a little before or after the full and change of the moon than at other times, especially if she happen to be near to her perigee, at the time of these changes. For the attraction of vapours from the surface of the earth is then greatest.

The redness of the sky at the rising of the sun, has ever been considered as a sign of foul weather approaching; but it is far from being infallible.

The falling of heavy dews is a sign of the continuance of fair weather.

The setting of the sun behind a black, watery cloud, betokens approaching rain.

The wading of the sun, as it is called, is a pretty sure sign that foul weather is very near.

When the disc of the sun, either at rising or setting, appears very broad and dim, the atmosphere is charged with plenty of vapour, which will soon condense and fall upon the earth. The contrary happens when the sun appears brilliant, small and dazzling, at rising and setting, as these ap-

pearances indicate a dry state of the air. The copious evaporation of boiling water is a pretty sure sign of falling weather. For I suppose this arises from the same cause, (whatever it be) as the increased ascent of vapours in general.

The wind commonly blows from the point from whence meteors are seen to shoot in the night preceding.

When swine are busy in collecting sticks and straws, foul weather is approaching.

Many more signs of changes in the weather might have been mentioned: But I study brevity.

WEDGE, one of the mechanical powers, the force of which is extremely great.

The wedge is a triangular prism, whose bases are acute angled triangles.

The wedge is a needful implement among farmers, for the cleaving of their wood and timber. It should be made of a soft kind of iron, that it may not be broken near the point, by driving it in frosty weather, or forcing it into hard knots. The head should be about two inches thick, and the length of the wedge from eight to nine inches.

WEEDING, the operation of destroying weeds among useful plants, or of freeing from weeds.

There are several methods of doing it. Where plants in beds, whether sown broad cast or in rows, are young and small, and are infested with weeds, the weeds must be pulled up with the thumb and finger; or else cut out with the weeding hook. When weeding is done by hand, care should be taken that the roots be not left in the ground. Therefore the fingers of the weeder should go into the soil more or less, according to the strength of the

the roots. The weeds may be saved in baskets, and thrown to the swine. Where the plants are larger, the weeds may be killed by a hoe with a sharp edge, which should be wider or narrower, according to the distance at which the plants ought to stand from each other after hoeing. But it is necessary that the hoeing be performed in dry weather; otherwise many of the weeds will revive, and grow: And the forenoon is better than the afternoon for this work, because a dewy night coming on before they are withered, some of them will get rooted before the next morning. Weeders should be careful that they tread upon weeds that they hoe or pull up, as little as possible; because doing this will close the earth about them, and prevent their dying.

When small plants stand in rows according to the drill husbandry, the plants in the rows must be once weeded, and thinned as in gardens; but the weeds in the intervals are to be more expeditiously destroyed with the plough, horse hoe, or cultivator.

WEEDS, useless or noxious plants, or vegetables not to be cultivated.

Weeds infest all kinds of land more or less, and occasion abundance of labour for the farmer, and the gardener, so much that we seldom find it perfectly accomplished.

Weeds are several ways hurtful to the crops that are cultivated.

1. They rob other plants of the food that should nourish them. For they require as much nourishment from the earth as better plants do; and in general they are fed with the same kind of juices: For it has been proved, that the food of all plants is near-

ly the same. So that wherever weeds are suffered to stand and grow among plants, the crop will receive proportionably the less quantity of nourishment from the earth. It will also receive the less nourishment from the air, unless the weeds are of a much lower stature than the plants that were meant to be cultivated, and nearly covered by the plants.

2. Weeds also lessen the quantity of pasture for plants in the soil. For their roots occupy and fill many of those interstices in the soil, which would have been occupied by the roots of the cultivated plants. And many kinds of weeds have such a multitude of strong and binding roots, that they render the soil stiff and hard; and so compact that the roots of tender plants cannot extend themselves in it. This bad quality is possessed, in a remarkable degree, by the quitch grass, and by some other weeds.

3. Weeds prevent plants from tillering, or branching out from their roots, as many kinds, and particularly the farinaceous, which are the most valuable, are inclined to do, when they have room. But the growing of a multitude of weeds among them reduces them to a crowded situation; the consequence is, that they shoot up only single stalks, by which means the crop is greatly diminished.

4. Weeds deprive plants of that free circulation of air about them, which is necessary to their being in a healthy and vigorous state. For want of this they run up weak, remain of a loose and spongy contexture, and bend down and lodge by their own weight, unless the weeds happen to be so strong as to hold them up.

5. Weeds, besides the general evil of taking away the food

of plants, rob the soil, particularly of its moisture, and speedily reduce it to such a dry state that neither weeds nor other plants can receive from it any vegetable food, for want of that proportion of moisture which is necessary to give it fluidity. Accordingly it is observable that the abounding of weeds brings on an early appearance of drought.

Lastly, some weeds of the creeping kind twine about the plants in such a manner as to prevent their growth, and the circulation of their sap. Others overtop them, and shut out the direct influence of the sun, and further oppress them with their unwholesome dripping on them. And there are still others, the dodder in particular, which draw their nourishment directly out of the bodies of plants, by striking their fibres into them, and cause them to languish.

So that, on the whole, the mischiefs done by weeds are so great and many, that when they are suffered to grow unmolested among useful plants, whatever culture has been given to the soil to prepare it for a crop is thrown away; and the seeds that are sown are entirely wasted and lost.

Weeds may be divided as plants in general are, into annuals and perennials; or, as Mr. Dixon has done it, into those which are propagated by the seed, and those that are propagated by the root. But I shall pursue a method which is different from both, and which better suits my present inclination: And only consider those weeds in a general way, which chiefly infest our lands that are in tillage, and those that prevail in our grass land; and how to prevent the existence, or prevalence of these kinds; and the best

methods of preventing, subduing and destroying them.

1. As to those which infest land that is employed in tillage, and which are very numerous, there are several ways to prevent their existence in fields; at least, to prevent their arising in such plenty as to be very troublesome or detrimental to the crops.

The first thing that I would insist upon is, that no seeds of weeds should, by any means, be carried into the fields. And that this evil may be avoided, no dung nor compost, should be laid upon the soil, until it has undergone such fermentations in heaps, as to allow opportunity to destroy the vegetative quality of all the seeds that are contained in it. Therefore all dunghills intended for the manuring of sowed fields, should be shoveled over two or three times in a summer; by means of which, most or all of the seeds contained in the heaps will vegetate, and be destroyed. But when land is laid down for grass, this precaution is not necessary: Because tillage weeds will not flourish in grass lands; at least not so much as to do any great damage.

But when there is a necessity of using new dung, which abounds with the seeds of weeds, on land to be continued in tillage, let it, if possible, be applied only to a hoed crop, in the tilling of which, the weeds will be destroyed as fast as they rise, during the summer.

Or, if low ground hay has been used by itself, in feeding the young part of the stock (as indeed it ought always to be) let the dung that is made of that be laid on the driest parts of the farm. There will be no danger in laying it on while it is new; for if the seeds sprout and come

up, they will not prosper, as the soil does not suit their nature, being mostly aquaticks.

As to other manures, such as marle, mud, ashes, lime, foot, sea weeds, &c. these having no seeds in them that will grow upon land, there is no danger of their causing the ground to become weedy. If they do this, in any measure, it must be only by vivifying latent seeds in the soil.

Another thing which is indispensably necessary to prevent the abounding of weeds, is, to suffer no weeds, neither in gardens nor in tillage lands, to ripen their seeds in autumn, and scatter them out upon the ground. The practice of sluggards must be laid aside: For *as a man soweth, so shall he also reap.* If weeds are thus sown on every part of a field, it is no wonder if the ground be filled with them in the ensuing year: Nothing short of a miracle, unless it be want of strength in the soil to nourish them, can prevent it. The prudent husbandman, therefore, before the seeds of the weeds are ripened, will go over his grounds, and destroy all the weeds that appear. If there should happen to be a plenty of them, let them be piled in heaps in the borders of the fields, and a little earth thrown on them; in which situation they will ferment and putrefy, and become good heaps of manure, in the succeeding year.

If any should object to the labour of doing this, let them consider whether it will not save them ten times as much labour in future, in subduing the weeds, after the ground is filled with them, besides procuring them the advantage of having much better crops.

Another good preventive of the increase of weeds, is burning

the stubble as it stands after reaping. On land that is designed to be sowed the next year, this is a good piece of husbandry; for it will destroy so many of the seeds of weeds, as to prevent the ensuing crop from being so very weedy as it otherwise would be; at the same time, it will destroy many insects, clean the ground, and render it fitter for the operations of tillage; not to mention how much the ground will be fertilized by the ashes of the stubble.

But, to prevent the increase of weeds, as well as to answer other good purposes, it is best that two broad cast, sowed crops, when it can be otherwise ordered, should not succeed each other. Where a hoed crop is well tilled every other year, the weeds are not wont to increase, in such a degree as to be very troublesome.

Another precaution, and which has not been sufficiently attended to, is taking care to avoid sowing the seeds of weeds with grain and other crops. A thorough cleaning of the seed is of great importance. This may be accomplished by winnowing, sifting, swimming and repeated washings. But the seeds of weeds are often sowed, after they have been separated from grain by winnowing. This will be the case when the chaff and rubbish at the tail of the sheet is thrown upon a dunghill, which is to be removed and applied to the soil, before the seeds contained therein have had opportunity to vegetate and get destroyed.

If a farmer begins on a farm that is not much infested with weeds, and will carefully observe the directions given above, I think he will be always favoured with clean crops, and that weeds will

will never prevail much in his tillage land.

It is true, that some seeds may be wafted by the winds from other fields into his enclosures. The best preventive of this is having close fences. But those seeds to which a light down adheres, are often mounted high in the air; so that there is no possibility of fencing against them. Of this kind are the seeds of thistles, &c. However, they seldom tarry in the places where they first fall, but are driven to the borders of fields.

But when, by means of a negligent or slovenly culture, lands in tillage are become weedy, the farmer should perfectly know, and spiritedly practise, the most effectual methods of subduing the weeds, which are his most formidable enemies. For they diminish the husbandman's crops, more than most people are aware of.

The most effectual way of destroying them is, by a good summer fallowing, alternately ploughing and harrowing the ground in dry weather, as often as the weeds appear in plenty on the surface. At each of these stirrings a large quantity of weeds is destroyed, and converted into manure; and the seeds of another crop so exposed to the air, that they will spring up, and at the next stirring of the soil be destroyed. And if these operations are continued until no more weeds arise, it may be concluded that the ground is in excellent order for a crop. It is not only cleaned from weeds, but greatly enriched: And it will not be liable to be infested with weeds, to any great degree, for several years after.

Next to fallowing, which may be thought rather expensive, the best way to get the better of weeds, is to employ the land in

hoed crops, for two or three years in succession, not omitting autumnal hand weeding. Or a crop of pease, sowed thick, or any crop that forms a close cover to the surface, may do much towards subduing the weeds. The few weeds that vegetate under such a cover are so cramped and kept under, as to be prevented from going to seed; or at least from bringing their seeds to maturity.

Extraordinary deep ploughing, or trench ploughing, has been recommended as effectual. But in this practice, care should be taken to avoid turning in too many of the seeds of weeds. The autumn, therefore, is not the right time for this, but rather the spring or summer. For if many seeds are thus buried, the next deep ploughing that there may be occasion for, will bring them again up to the air, and cause not a few of them to vegetate, though it should happen to be not till many years after.

As deep ploughing destroys weeds, or rather puts them out of the way, so, on the other hand, nothing can more encourage their growth than the shallow ploughing, which is commonly given for sowed crops in this country.

But if all other methods were to prove ineffectual for the destruction of annual weeds, laying tillage land down to grass, and sowing it with cleaned grass seeds, will not fail to subdue these weeds; the most of which depend upon tillage to promote their growth; and the rest will be overtopped and stifled by a good crop of grass. And a strong sward will soon be formed, through which the tender kinds of annual weeds will not penetrate, of which sort the most are, that are found in land that is tilled.

Even the quitch grafs, one of the moſt vexatious of all weeds, is thus either deſtroyed or rendered harmleſs : For when it flouriſhes in-graſs ground, it makes an excellent hay.

2. The weeds that appear in *grafs lands* in this country, may be divided into upland weeds and aquaticks, ſome few of which are annuals, but a greater number, eſpecially of thoſe that are moſt noticed, are perennials.

Of the upland weeds thoſe which have proved to be the moſt troubleſome are the upright crow foot, *Ranunculus*, commonly known by the name yellow weed ; ragweed, ragwort, or Roman wormwood, *Senecio*; the greater daiſy, ox eye, or piſs abed, *Chryſanthemum* ; yarrow, dandelion, dock, thistles, ſorrel and John's wort.

Some of theſe, particularly the two laſt, and the daiſy and ragweed, are conquered by a plentiful manuring of the ground ; for where the land is rich they are not found to flouriſh. Paſturing the land with ſheep is ſaid to be fatal to the daiſy, and the crow foot.

But the moſt effectual way to deſtroy theſe weeds, is to break up the land, and employ it in tillage.

When it is not found convenient to take this method, the weeds may either be dug out or elſe pulled up by hand, which, when the ground is moiſtened by rain, may be eaſily done. It is to be remembered, that this ſhould be done at or before midſummer, that none of their ripened feeds, or any that may poſſibly vegetate, may be ſcattered on the ground.

The aquatick weeds, ſuch as flags, ruſhes, and the like, are not eaſily ſubdued by any of the above methods, ſome of which have often been tried in vain.

Draining the land, which deprives them of that degree of wetneſs which is ſuitable to their nature, is an infallible method, and, perhaps, the only effectual one, of deſtroying them. But liming the ground at the ſame time, renders the operation more ſudden and effectual. Or if lime cannot be had, aſhes and ſoot are good ſubſtitutes.

But the moſt ſpeedy method of getting rid of theſe weeds is, digging out the roots, or uſing the land in tillage.

WEEVIL, an inſect of the beetle kind, reſembling the Maybug, with a long ſharp pointed head, to the hinder part of which are fixed two antennæ. It is black, and therefore eaſily diſtinguiſhed in any corn ; but its principal and favorite food is wheat, of which, either old or new, it devours great quantities, without however communicating any bad ſmell to it.

Upon thruſting one's hand into a heap of corn, one may eaſily perceive by its heat, whether it contains many of theſe inſects, which generally lie pretty much collected ; and the particular places where they are moſt numerous, feel much warmer than the reſt.

This obſervation led M. Duhamel to think, that a conſiderable heat is probably neceſſary for the hatching of their eggs ; and that in this caſe, even if they ſhould live, they will not be able to breed in his ventilating granaries.

To prove this he made repeated experiments, the reſults of which made it evident that this inſect cannot multiply in corn that retains a proper degree of coolneſs, which it may be made to do by frequent ventilating. When corn is ſifted in a ſieve

fine enough to retain the grain, the weevils then agitated shrink up their legs, and are in that posture so much smaller than the grain, that most of them drop through the sieve.

But of all the methods M. Duhamel tried, that which he preferred was, to dry the corn on a stove, or oven, heated to eighty or ninety degrees of M. de Reaumur's thermometer.

WHEAT, *Triticum*, the most useful of all farinaceous plants, the seeds of which are the best grain for bread.

The different species of wheat, according to Mr. Miller, are, the winter wheat, without awns, or beards; the summer, or spring wheat; grey pollard, or duck bill wheat, with long beards; the cone wheat, so named for the shape of the ears, which resemble a cone; and the polonian wheat. Other kinds he supposes to be only varieties occasioned by culture and soil.

The Smyrna wheat is very different from all other, producing one large central ear, and several smaller lateral ones from the bottom of the large one. This suits a rich and strong soil, as there is no danger of its being overfed. It seems to be better adapted than any other species of wheat to the horse hoeing husbandry.

The only species or varieties that are cultivated in this country are, the winter and spring wheat, the bald and bearded, the red and white, and the Siberian wheat, which is bald, or without awns.

About a bushel and a half of seed is a sufficient quantity for an acre. Oftentimes it produces very large crops from a less quantity. The larger and fuller the seed is, the greater quantity by measure will

be required; the smaller, the less quantity: For the number of grains is to be regarded more than the measure, or weight.

Changing the seed yearly, or at least every other year, is proper, or even necessary: For it has always been experienced, that the same seed, sown several years in succession, degenerates; so that the crops continually grow worse. But seed should not only be shifted from one place to another, but also sown on a soil that is different from that on which it grew. It should be taken from a stiff soil for a light one, and from a light for a stiff one.

As seed wheat cannot always be procured from distant countries in season, farmers at a few miles distance should at least change with each other. But in the northerly parts of this country, bringing seed from the southward will not do well, as it ripens the later.

A soil of good loam, well warmed, and stirred, is proper for wheat. But other soils, well prepared, sometimes answer well enough. Wheat succeeds upon the strongest lands well tilled, when they have been drained, and laid dry.

The way of preparing the soil for a crop of wheat (I mean that which has been most practised in the old countries and has succeeded well in this) is, by a good summer fallowing. Three or four ploughings, and as many harrowings, at proper intervals, will bring almost any soil, that is not very stubborn, into a good tilth. And if it be thought needful to apply any manure to the soil before sowing, let it be old dung or compost; and let it not be laid on till just before the last ploughing, or seed furrow, as it is called; so that the corn may

have the greatest possible benefit of the steam produced by the manure in the soil.

Where summer wheat is intended to be sown, the ground being previously clear of weeds, by means of a hoed crop preceding, one good ploughing in autumn, and two in the spring, may be sufficient.

But another good method of preparing the land for a wheat crop, is sowing it with clover. After it has borne two crops of clover, it will be in excellent order for wheat. Give only one ploughing, sow the seed and harrow it in.

But whether you sow winter or spring wheat, let the seed be always well washed before sowing. I need not here repeat what has been said on the affair of steeping the seed. See the article *Smut*.

The time of sowing winter wheat admits of some latitude. Some time about the latter part of August, or beginning of September, is to be chosen. It may be a little later or earlier, provided the ground have the right degree of moisture for tillage, and for promoting vegetation. The latter should be carefully attended to, and the seeds should never be sowed in ground when it is very dry. Rather than do this, rain should be waited for as much as two or three weeks.

Wheat that is sowed in autumn, a clover lay excepted, should, instead of harrowing, be covered with a shallow furrow, and the surface left rough. It will be less in danger of being killed by the frost in winter, and less injured by drying winds in the following spring. The furrows should be left without harrowing; for, the more uneven the ground is, the more the soil

will be pulverised and mellowed by the frost. But it will often be of advantage to pass a roller over the ground in the following spring, to close the earth about the roots, and prevent the earth from being dried by the spring winds, to too great a depth.

Wheat sown in the spring should be only covered with the harrow, as it has no time to lose, and ought to be up early. For the same reason it should be sowed as early as the ground can be got into the right order to receive it.

If weeds arise in plenty among the wheat, they should be destroyed in the spring; otherwise the crop will be much robbed of its nourishment. This matter has not yet been sufficiently attended to in this country; though in other countries, particularly in Scotland, the people make as much account of weeding their fields of grain, as their gardens. This should by all means be performed before the time when the plants begin to send out their ears; because, after this, they will be the more in danger of being hurt by people's passing among them. Especially the wheat ought not to be touched while it is in blossom. As it is in the critical season of fecundation, it may be very detrimental to the crop. And if the weeds be not taken out before the grain is become large and tall, many of them will be covered and hidden under the plants; so that only the largest weeds will be pulled out, while the rest are suffered to stand and perfect their seeds. For these reasons, Mr. Miller recommends to farmers a practice among kitchen gardeners, which he says has been found to be of great benefit to crops, and has also been a great saving to them in the

the operation of destroying weeds, which is, making use of a small kind of hoes for cleaning the wheat early in the spring, before the ground is covered with the blades of the corn. By this instrument, all the weeds, small and great, will be cut up; and if it be done in dry weather, will die. He recommends a second hoeing about three weeks after the first, which will subdue those weeds which happen to remain alive. And at the time of hoeing, he recommends thinning the plants, where they happen to stand too thick, which he thinks will do much to prevent the lodging of the corn, and render it less liable to be smutty. Whether these hoeings will greatly increase the crop I think there can be no reason to doubt, unless they should cause it to ripen so much later as to expose it to blight. But I should not expect it from such a superficial hoeing.

Some farmers are apt to think there is no inconvenience in suffering sheep to feed on the young plants of winter wheat, in autumn, or winter, or even early in the spring. But who can rationally suppose, that the blades with which nature has furnished these plants, are not of use, to draw in nourishment from the air and dews, for the increase of the stalk and the ear? In order to be satisfied of this, the above mentioned writer cut off some plants of wheat alternately, early in the spring, and always found the stalks of these plants much smaller and shorter, and the grain poorer, than those of the intermediate plants whose blades were not cut.

There certainly is but one case in which it can be right that winter grain, whether wheat or rye, should be fed in autumn; and

that is, when, by being sowed very early, it is in danger of earing before winter; for this should by all means be prevented. But in no case should a beast be suffered to feed on it in the spring.

“Wheat is ripe for cutting when the straw is turned yellow, its ears hang, no greenness appears in the middle of them, and the grain is hard when bitten.”

The farmers in England cut their wheat greener than they did formerly, because they find it makes a rather whiter flour, which sells at a higher price. One of their skilful farmers, who cuts his wheat early, says, that he found upon trial, his wheat early reaped was heavier by the bushel, than the same wheat when it stood till it was thoroughly ripe. This might be owing to its greater smoothness, by means of which it lay closer in the bushel; for it is hardly credible that the whole crop will be heavier for cutting it green. But as loss by shattering out the corn is thus prevented, it may be a balance to its shrinking the more, as I think it certainly does. The prudent farmer must use his own judgment in this matter.

Wheat and other grain that is lodged, may, and ought to be, cut the earlier: For after the straw is broken or corrupted, it conveys no nourishment to the grain, or as bad as none.

The ancients reaped their corn, as Pliny says, before it was fully ripe. And it is certain that great inconveniences arise from letting some sorts of grain stand till they come to their utmost maturity. The chaff and straw are the worse fodder. And if such corn chance to take wet in harvesting, it suffers the more for being very ripe. But corn cut in a greener
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state will bear a good deal of wet without damage.

When corn is blighted, it should be cut the sooner, or even before it is half ripe. For though it ceases to receive nourishment through the straw, it is said it will improve by lying in the ear, and that it threshes out the more easily.

One acre of grain is a large day's work for the reaper. The usual price of reaping an acre in this country, has been a bushel of the grain.

From three to four quarters, that is, from twenty four to thirty two bushels of wheat on an acre, is reckoned in England to be a good crop.

To prevent loss by shedding, the corn which is laid in grips, is to be bound up in sheaves, either in the cool of the evening, or before the dew is quite gone off in the morning. And it should never be removed either into the shock, the barn, or the stack, in the middle of a sunny day, but rather at a time when the slight dew is just sufficient to prevent its shedding. See the article *Harvest*.

As to sowing wheat in drills, see *New Husbandry*.

But setting of wheat is reckoned by some of the English as a great improvement in husbandry. A Norfolk farmer one year set fifty seven acres. The superiority of his crop, both in quantity and quality, was so great that it induced him the following year to set three hundred acres, and he has continued in the practice of setting ever since. This noble experiment was the means of introducing the practice in the vicinity, and to a considerable extent. Though the set crops appear very thin during autumn and winter, the plants tiller and spread prodigiously in the spring.

The ears and the grain are larger, and specifically heavier per bushel than other wheat.

The lands on which this method is most prosperous are, either after clover stubble, or on which trefoil and grass seed were sown the spring before last. These grounds, after the usual manuring, are once turned over by the plough in an extended flag or turf, ten inches wide; along which a man, who is called a dibbler, with two setting irons, somewhat bigger than ramrods, but considerably bigger at the lower end, and pointed at the extremity, steps backward along the turf, and makes the holes, about four inches asunder each way, and an inch deep. Into these holes the droppers drop two grains, which is quite sufficient. Thus three pecks of grain is enough for an acre. The regularity of its rising gives opportunity for weeding or hand hoeing.

This method is advantageous when seed corn is dear. Sir Thomas Bevor found the produce to be two bushels per acre more than from sown wheat, having much less small corn mixed with it; and it fetches a higher price three pence per bushel. The expense of dibbling an acre is 10s.

Another new method of cultivation is, propagating wheat by dividing and transplanting its roots. "On the second of June 1766, Mr. C. Miller sowed some grains of the common red wheat; and on the eighth of August a single plant was taken up and separated into eighteen parts, and each part planted separately. These plants having pushed out several side shoots, by about the middle of September, some of them were taken up and divided,
and

and the rest of them between that time and the middle of October. This second division produced sixty seven plants. These plants remained through the winter, and another division of them, made between the middle of March and the middle of April, produced five hundred plants. They were divided no further, but permitted to remain. The plants were in general stronger than any wheat in the fields. Some of them produced upwards of one hundred ears from a single root. Many of the ears measured seven inches in length, and contained between sixty and seventy grains.

The whole number of ears, which, by this process, were produced from one grain of wheat, was 21,109; which yielded three pecks and three quarters of clear corn, the weight of which was 47^{lb} 7oz: And from a calculation made by counting the number of grains in an ounce, the whole number of grains was about 576,840." *Encyclopædia*.

Though this method is curious, it is attended with so much work, that few or none will be disposed to follow Mr. Miller's example.

WHEEL, a simple machine, consisting of a round piece of matter, revolving on an axis. It is one of the principal mechanical powers.

As the farmer has much occasion for using wheel carriages, something ought to be said of wheels in a work of this kind. And perhaps the following observations may be advantageous to those who have been most destitute of information.

1. The wheels of carriages must be exactly round. For if the nave were out of the centre, the wheel in turning would be affected in the same manner up-

on plain ground, as other wheels are where the ground is uneven; and the difficulty of the draught is in the same manner increased. For this reason, wooden wheels, which are designed to go on the roads, should always be shod with iron; because those which are not, by wearing faster in some parts of the rim than in others, soon lose their circular form, and become harder to draw, jolting up and down on the most level way.

2. The felloes or the rim, must be at right angles with the naves, or hubs, notwithstanding the inclination of the spokes; for otherwise the wheels will not move regularly in the ruts, but form a crooked track upon the ground, just as it does when the axis is too small to fill the hole, or boxes, in the nave. This is as really detrimental to the going of wheels as their being out of round. The spokes, in this case, will not be all equally inclined to the nave, and the wheel will have the less strength, and will be more liable to be broken in moving upon an uneven place.

3. The spokes must be so set in the nave as to incline outwards. This would be needless and wrong, if wheels were always to be moved on a perfect plane; for they would bear the load perpendicularly. But as wheels must often go upon uneven places, and fall into holes and ruts, and as the wheel that is lowest bears a greater part of the load than the other, and sometimes almost the whole of it; it is necessary that the wheel should become perpendicular at the moment of its sinking in the part under the nave. Dishing wheels are also less liable to be overset than perpendicular ones. But this might be prevented by using a longer axle.

4. The

4. The axletree must be at right angles with the shaft, or tongue, of a cart or waggon. Otherwise it will not move straight forwards in the track, or directly after the team, but sideways. But the axle should be so set in the naves, that the wheels may be gathering forward, as it is called, that is, that the fore parts of the rims may be a little nearer together than the hinder parts. Otherwise the wheels will not so easily keep in the ruts, as will appear evidently to any one that takes notice of their going. And the axle is usually so inserted into the naves, that the wheels gather at the bottom. This evidently gives an advantage to the axle; as the wood, in fitting it to the holes of the naves, is not cut across the grain on the under side, it is not so liable to be broken by the weight of the load. Whether there be any other advantage in it, I do not determine. But it is certain that, in this case, the spokes in the lower part of the wheel, which have the whole pressure of the load, will be the nearer to a perpendicular situation, while on level ground, which seems to be some advantage. But the lower spokes ought in no part of a sideling road, to lean outwards. For this will put both the axle and the wheel to a great strain.

5. High wheels are more easily drawn than low ones. They have less resistance from friction, supposing the axle to be of the same size as in low wheels, which ought to be supposed, the load being the same. For a wheel that has double the circumference of another, will make but one turn while the other makes two; consequently the first will have but half so much friction to overcome as the second. High

wheels have also the advantage of low ones in surmounting obstacles, as every spoke acts as a lever, in moving the wheel forward, and as a longer spoke removes the power to a greater distance from the weight. And high wheels easily pass over holes into which small ones would sink; and the impression they make upon soft ground is not so deep as that which is made by small ones, as a greater portion of their rim is always in contact with the soil.

It is objected, that a cart with high wheels is more apt to overturn. This inconvenience might be easily removed, by fastening the lower timbers of the cart to the under side of the axle, as in some parts of this country has been practised for a long time, particularly in coal carts.

Another objection to high wheels is, that they make the cattle draw too high. This may receive the same answer as the former. Or they may be made to draw low, by fixing the traces to arms made for the purpose, reaching as far below the axle as any one pleases.

6. The fore and hinder wheels of a waggon should be of equal height, in order to render the draught as easy as possible, as Dr. Defaguliers proved by experiments.

7. All persons who use the same roads should place their wheels at the same distances from each other. For he who does not observe this caution, but makes them go two or three inches wider or narrower, will find that he must carry a less load than others do, in proportion to the strength of his team.

Lastly, broader rims than those which are in common use, would be more conducive to the
goodness

goodness of the roads, if all who drive teams in the same roads would agree to be confined to the same breadth. For the broader the rim, the less the wheels will sink into the soil; but the narrower the rim, the deeper ruts will be made. See the article *Cart*.

WHEEZING, or **PUR-SIVENESS**, a distemper in horses, otherwise called *Broken Wind*, in which the horse makes a hissing or whistling sound in his throat in breathing, and has a greater heaving in the flanks than in common colds.

This disorder is commonly caused by surfeiting, violent exercise when the belly is full, or by being rid or driven into the water when he is hot and sweaty; or from an obstinate cold not well cured.

For the cure of this disorder, Dr. Braken advises, "that the horse should have good nourishment, much corn and little hay, and that every day the water given him be impregnated with half an ounce of salt petre, and two drams of sal ammoniac." Some say the hay made of white weed will cure this distemper.

WHELP, the young of a dog, fox, lion, or any wild beast.

WHEY, the serous part of milk, or that which remains fluid when the curd is taken for cheese.

Whey is an important liquor for swine. They are extremely fond of it, and it conduces much to their growth and fattening. It is particularly proper for sows that suckle pigs, as it greatly increases their milk. But care should be taken not to overfeed swine with this liquor; for it has often happened, that after drinking plentifully of it, especially in very hot weather, they swell up and die.

WHITE SCOUR, a disease with which sheep are often affected, and is fatal to them in other countries, though I have not known it to be so in this.

"The following medicine has been often given with success, provided the sheep are at the same time removed into a dry pasture.

Take a pint of old verjuice, half a pound of common or bay salt, dried well before the fire, pounded, and sifted through a sieve. Then mix the verjuice with the salt by degrees; and add half a pint of common gin, and bottle it up for use. When any of your sheep are seized with this disorder, separate them from the flock, and give each of them three large table spoonfuls of the mixture for a dose, repeating it two days after, if they are not better." *Complete Farmer*.

WHITE WEED, or **PISS-ABED**, a hated weed in our mowing lands and pastures, which answers to the description of the *Greater Daisy*, or *Ox Eye*, mentioned by British writers, and called by some *Maudlin wort*. See *Weeds*.

It has a five cornered stalk. The leaves are jagged, and embrace the stalk. The flowers are discous, large and radiated. The ray is white, and the disk yellow; the seeds have no down. It flowers in June, and is perennial in the roots.

When this weed has got possession of the ground, no good grasses grow with it; because, perhaps, the roots bind the soil in such a manner as to cramp other roots. Or, being a strong feeder, it deprives other roots of their food.

When it is in its green state, neither neat cattle nor horses will eat it. But if it be cut while in blossom, and well dried for hay, the cattle will eat it freely in winter, and live well on it. The crop however is always thin and light. If it is mowed late, or not well cured and preserved, the hay will be of very little value.

Dunging the ground is an enemy to this weed; and it is said that pasturing with sheep kills it. But to conquer it effectually, there can be no better way than to use the land in tillage, for hoed crops, several years in succession.

WILLOW, *Salix*, called also *fallow* and *ofer*, a well known tree, of which there are many species.

Some willows may be propagated to great advantage for fire wood, as they are very rapid in their growth.

Other kinds have twigs that are long and tough, and are useful for hoops, basket work, &c. These are commonly kept low by cutting; when this is neglected they grow into large trees.

A wild shrubby willow, natural to this country, is common in our wet lands. This is called white willow, *Salix alba*, and in medicine is a good substitute for the *Cortex peruvianus*.

The *salix viminalis*, the toughest kind of willow, has not, that I know, been yet propagated in this country. The weeping willow, so called, has been imported from Europe: But whether it prospers I am unable to say.

No more than two sorts of foreign willow have been much propagated in this country, a yellow and a green sort. The former

grows well, even in a soil that is pretty dry. The latter flourishes finely in a wet situation.

Mr. Miller says, "All sorts of willows may be easily propagated by cuttings or sets, either in the spring or autumn, which readily take root. Those sorts which grow to be large trees, are cultivated for their timber, so are generally planted from sets which are about seven or eight feet long; these are sharpened at their larger end, and thrust into the ground by the sides of ditches and banks, where the ground is moist; in which places they make a considerable progress, and are a great improvement to such estates, because their tops will be fit to lop every fifth or sixth year. This is the usual method now practised in most parts of England, where the trees are cultivated, as they are generally intended for present profit. But if they are designed for large trees, or are cultivated for their wood, they should be planted in a different manner; for those which are planted from sets of seven or eight feet long, always send out a number of branches toward the top, which spread, and form large heads fit for lopping: But their principal stem never advances in height; therefore, where regard is paid to that they should be propagated by short young branches, which should be put almost their whole length in the ground, leaving only two, or at most but three buds out of the ground. And when these have made one year's shoot they should be all cut off, except one of the strongest and best situated, which must be trained up to a stem, and treated in the same way as timber trees. If these are planted with such a design, the

the rows should be six feet asunder, and sets four feet distance in the rows: By planting them so close they will naturally draw each other upward; and when they are grown so large as to cover the ground and meet, they should be gradually thinned, so as at the last to leave every other row, and the plants in the rows, about eight feet asunder. If they are so treated, the trees will grow to a large size, and rise with upright stems to the height of forty feet or more.

“When these cuttings are planted, it is usual to sharpen those ends to a point, which are put into the ground, for the better thrusting of them in; but the best way is to cut them horizontally, just below the bud or eye, and to make holes with an iron in the ground where each cutting is to be planted, and when they are put in, the ground should be pressed close about the cuttings with the heel, to settle it, and prevent the air from penetrating to the cuttings.

“The after care must be to keep them clear from weeds the two first seasons, by which time they will have acquired so much strength, as to overpower and keep down the weeds: They will also require some trimming in winter, to take off any lateral shoots, which, if suffered to grow, would retard their upright progress.”

WIND GALL, “a flatulent swelling, which yields to the pressure of the finger, and recovers its shape on the removal thereof. The tumour is visible to the eye, and often seated on both sides of the back sinew, above the fetlocks, on the fore legs; but most frequently on the hind legs; though they are met with in various parts of the body,

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wherever membranes can be so separated, that a quantity of air and serosities may be included within their duplicatures.

“When they appear near the joints and tendons, they are generally caused by strains, or bruises on the sinews, or the sheath that covers them; which, by being overstretched, have some of their fibres ruptured; whence probably may ooze out that fluid which is commonly found with the included air; though where these swellings shew themselves in the interstices of large muscles, which appear blown up like bladders, air alone is the chief fluid; and these may safely be opened, and treated as a common wound.

“On the first appearance of wind galls, their cure should be attempted by restringents and bandage, for which purpose let the swelling be bathed twice a day with vinegar, or verjuice alone, or let the part be fomented with a decoction of oak bark, pomegranate, and alum boiled in verjuice, binding over it, with a roller, a woollen cloth soaked in the same. Some for this purpose use red wine lees, others carriers’ shavings wetted with the same, bracing the part up with a firm bandage.

“If this method, after a proper trial, should not be found to succeed, authors have advised that the swelling be pierced with an awl, or opened with a knife; but mild blistering is in general preferred to these methods; the included fluids being thereby drawn off, the impacted air dispersed, and the tumour gradually diminished. A little of the blistering ointment should be laid on every other day for a week, which brings on a plentiful discharge,

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but generally in a few days is dried up, when the horse may be put to his usual work, and the blistering ointment renewed in that manner once a month or oftener, as the horse can be spared from business, till the cure is completed. This is the only method to prevent scars, which firing of course leaves behind, and unless skilfully executed, too often likewise a fullness of the joint, with stiffness. The mild blistering ointment, where the sublimate is left out, is the properest for this purpose." *Bartlet's Farriery*, page 276.

WINE, a general name given to any brisk and cordial liquor drawn from vegetable bodies, and fermented; but it is the more appropriate name of the juice of the grape.

My general design will permit me only to give an abstract of the making and management of wines, as practised in France.

The wine presses that are used in that country are similar to the screw presses that we use in making cider, but of more nice and exquisite workmanship.

"In order to make good wines, the grapes of the same vine must be gathered at different times. The first gathering should be the ripest clusters, cut close to the fruit, to avoid the sharpness and austerity of the stalk, and all rotten and green grapes should be taken away from the branches.

"The second gathering is some time after the first, when all that are ripened are taken. The third and last gathering will consist of the refuse of the two former; but no rotten grapes should be admitted in either.

"A method of making wine in the greatest perfection is, to strip the grapes from the stems,

before they go into the vat. Wine thus made is the mellowest, best coloured, soundest, and fittest for keeping.

"The wine of black grapes may be made of almost any colour; and the French make all their wines, both white and red, from black grapes.

"They who make white wine go into the vineyard in a damp misty or dewy morning, with a sufficient number of hands to gather a whole pressing of grapes in a few hours, beginning very early that they may not be belated. They cut off the best bunches, lay them gently in hand baskets, in which they carry them to the panniers, and in the panniers on gentle beasts to the press, taking care not to tumble nor bruise them. The dew increases the quantity of the wine, but renders it weaker. When the heat is not great, the vintagers continue their work till eleven o'clock, otherwise they leave off at nine because of a hot sun.

"As soon as the grapes arrive they are thrown into the press, and the first pressing is given without delay. The wine that runs from this pressing is the most delicate of any, but not the strongest.

"After this first pressing, which is gentle for fear of discolouring the liquor, the press is raised, the scattering grapes are laid up upon the cake, and the second pressing is given. The press is screwed down with greater force than before; and this second running is but little inferior to the first, in flavour or colour. It has the advantage in this; that it has a stronger body, and will keep a longer time. Sometimes they mix the wine of the first and second pressings.

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“After the two first pressings, the sides of the cake of grapes are cut down perpendicularly, with a steel spade, so far as they exceed the breadth of the upper part of the press, which is let down upon the cake. The grapes that are cut off are laid on the top of the cake, and the third pressing, commonly called the first cutting, is given. The juices of this first cutting are excellent

“A fourth pressing, a fifth, &c. which are called a second and third cutting, &c. are afterwards given, the sides of the cake being cut down and laid up each time, till the grapes cease to yield any more juice.

“The liquor of the cuttings becomes gradually more red, because the press becomes more forcible on the skin of the grapes, particles from which render the wine red.

“The wines of these different cuttings (as the latter pressings are called,) are collected separately, and afterwards mixed according as they contain more or less of the quality that is wanted.

“The pressings for white wine should be performed as quick as possible one after another, that the grapes may not have time to heat, nor the liquor remain long upon the mark. Particular attention is paid to this for the two first runnings, because they are the finest wine.

“Of the same black grapes, the black morillons, the pineaus, and the auvernats, of which white wine is made in Champaign, red wine is made in Burgundy.

“As much as the heat of the sun is avoided by the vintagers who make white wine, so much it is sought after and chosen by those who make red wine. These gather their grapes when the sun

shines hottest; because its action on the outside of the berries has more effect than several days' sleeping in the vat, as the grapes then ferment very speedily. The other cautions in gathering grapes for white wine are observed here.

“Some express the juice of these grapes in the open air, in the vineyard, or near it, by throwing the bunches into large tubs, and there mashing and bruising them to pieces with sticks, or putting children into the tubs, to tread out the juice. Others carry them home, observing not to bruise them by the way, and put them in a vat, in which they are trodden and mashed. This is repeated, in either case, till the vessel is full; after which the broken grapes lie in the liquor more or less time, according to the heat of the weather, the flavour of the must, and the degree of colour intended to be given to the wine. During this time, the whole is frequently stirred together, the better to raise a fermentation, and tinge the liquor with a due degree of red.

“Some say the grapes should lie in the liquor forty eight hours, while others talk of letting them infuse seven or eight days, or longer. But the authors of the *Maison Rustique* say that the duration of the infusion of the husks should be proportioned to the heat of the weather, the quality of the grapes, and the intended colour of the wine. For the Coulange wine four hours only are allowed. The wine is apt to contract a roughness from the stalks, if it remains too long on them; and too much fermenting of the must renders the wine harsh and coarse, depriving it of its most volatile parts. Others make

make it a rule not to draw off their must till its head begins to fall ; but this is evidently wrong, because a great part of the most active spirits of the liquor is thus evaporated.

“ Indeed, for thicker, heavier and coarser wines than those of Burgundy and Orleans, which are chiefly intended above ; such, for example, as the Bourdeaux claret, a whole day is frequently allowed for steeping of the husks, and sometimes more, before the press is recurred to.

“ When the must has fermented upon the husks in the tubs or vats, as long as is thought proper, it is poured or drawn off, strained, and put into casks. Afterwards the murk, that is, the remainder of the grapes at the bottom of the tub or vat, is collected together, and put into the press, and pressed three or four times, till it is perfectly dry, the sides being cut down each time, as in making white wine. The liquor thus obtained, especially if the press be screwed so tight as to crack the seeds of the grapes, has a stronger body than the former running, but not any part of its fine, high and delicate flavour. Some, however, mix a little of it with their other wines, to strengthen them, and make them keep the better.

“ Others, from a spirit of economy, pour as much water as they think proper upon the murk in the vat, immediately after the must has been drawn off. They do it without delay, lest the murk should turn sour, as it is apt to do. Then they stir it about, and leave it upon the murk, a longer or shorter time, according to the heat of the weather, till they find it pretty high coloured, and judge that it has incorporated all the remain-

ing particles and spirit of the wine. They then draw this water off into another vessel, and carry the remaining murk to the press, where they squeeze it till no moisture remains in it. The liquor thus expressed is mixed with that which was drawn off before, and is then barrelled. This is chiefly intended for common use, or rather for servants ; but it will keep no longer than during the following winter, though it is brisk and pleasant enough while it keeps good.

“ Another use the French make of the murk, is, to mend such of their wines, whether old or new, as are deficient in colour or strength. They turn them out of the casks into the vat immediately after the must has been drawn off, stir the murk up so as to mix it thoroughly with the wine, and let it stand twenty four hours if it be new wine, and twelve hours if it be old. When they find it has taken a sufficient degree of colour, and that it is not sweet to the taste, but agreeable to drink ; they draw it off ; barrel it up separately, that they may know it again, and put the remaining murk to the press.

“ The white unripened grapes, that were rejected at the former gatherings, are to hang on the vines till the latter end of October, or beginning of November, that they may be a little bitten by the frost. They are then gathered, and a wine is made of them, which is sold quite warm from the vat, and does well enough to mix with a coarse red wine.

“ When the murk has undergone the utmost dint of pressing, it will be as hard as a stone ; but even then it will yield, when diluted with water, fermented and distilled, a spirit for medical and domestick uses.

“ In several parts of Germany, where the grapes seldom come to full maturity, the makers of wine have iron stoves in their wine cellars, and keep a constant fire in them during the time of their fermentation. This, by heightening the fermentation, ripens and meliorates the wines, and renders them more palatable. Exposing the casks to the sun will have the same effect on wines that are too acid to ferment sufficiently.

“ As the wines of the last gathering are backward in fermenting, the people of Champaign and Burgundy, after their wines have been drawn off from their first lees, three weeks after being first put up, practise rolling them backwards and forwards. They do this five or six times a day, for four or five days successively; then two or three times a day for three or four days; afterwards twice a day for four days; then once a day for about a week; and afterwards once in four or five days. If the grapes were pressed very green, rolling in this manner is continued, in all, for about six weeks. But if they were tolerably ripe, rolling once in four or five days, for about a month or six weeks, is found to be sufficient. This rolling supplies the defect of the first fermentation.

“ New wines will generally ferment of themselves, in a few days after they have been put into casks. Those that do not may be helped, by putting into them a little of the froth, or yeast, which works from the others. The finest wines will work the soonest, and the fermentation will continue for about ten or twelve days, according to the sort of wine, and the season of the year.

“ While the wine ferments the bung hole of the casks must be left open, or only covered with a thin linen cloth, to prevent any dirt from falling in; and this cloth should be laid hollow, so that the froth arising from the fermentation may work off.

“ When the fermentation is abated, which is known by the froth's ceasing to arise so fast as before, the bung may be closed down, after filling up the cask with liquor to within two inches of the top, and a vent hole should be opened and left, to carry off whatever may be thrown up by any subsequent fermentation. This filling up of the cask should be regularly performed, every two days, for about twelve days; for the fermentation will continue a considerable time in some degree: And if the casks be not kept so full as that the foulness thrown up by the fermentation may be carried off at the vent hole, it will fall back again into the wine and prevent its becoming clear. Afterwards it must be filled to within an inch of the bung, every fifth or sixth day for a month: After this, once a fortnight for three months.

“ Though the fermentation will be over in a shorter time, yet the casks must be filled up once a month, so long as they remain in the cellar. For as the wine will insensibly waste in them, it will grow flat and heavy, if it be not constantly kept filled up. They should be filled up with a wine of the same kind, kept in some small vessel, or in bottles, for this purpose; and the vent holes must be stopped when the fermentation is over.

“ The first drawing off from the lees is done about the middle of December. The casks should stand without the least shaking or other

disturbance, till the middle of February, when it will be right to draw the liquor off again into other casks. If the quantity of lees is then found to be so considerable as to endanger their contracting a putrid taint, by remaining too long mixed with the wine, it may be advisable to draw it off again, after a proper interval of time : Or sometimes it may be necessary to repeat the racking many times. But in racking, though care should be taken to keep the casks full, wines of dissimilar qualities should not be mixed.

“ The lees of several casks that have been racked off may be collected together, and when the thicker part has subsided, a spirit may be drawn from the thinner.

“ When wine is to be transported, and thereby necessarily exposed to a warmer air, brandy is often added, to check the propensity to a new fermentation. It is also sometimes done to give strength to the wine ; but the practice is not to be recommended, unless applied before the fermentation is completed.

“ It is necessary for the preservation of some wines, which are apt to be on the fret, to fumigate the casks with burning brimstone. This resists fermentation. But the colour of red wines is said to be destroyed by it. The colour of wine is frequently artificial. A deep yellow is made by burnt sugar : A deep red, which is not natural to any wine, is almost always made by red woods, elder berries, bilberries, &c.

“ Turbid wines are fined by a mixture of the whites and shells of eggs, powdered alabaster, and isinglass. The shells and alabaster may correct a small degree of acidity. Isinglass alone will fine it in a few days.

“ If wine is grown very sour, the best way of correcting it, so as to preserve the spirit and flavour, is, adding a quantity of salt of tartar, sufficient to neutralize the acid, just before the wine is used.

“ If it be intended that wine should not froth, the best time for drawing it off, whether into bottles or casks, is when the weather is extremely fair and clear, the barometer high, and the wind northerly ; because the air is then coolest, and the wine least apt to be upon the fret.”

Raisin Wine is a wine made from raisins steeped in water.

“ Take thirty gallons of soft water, either rain or river water, in as clear a state as possible. Put it into a vessel at least one third bigger than will contain that quantity ; and then add to it one hundred weight of Malaga raisins picked from the stalks. Mix the whole well together, that the raisins may not remain in clotted lumps : And then cover it partly, but not entirely, with a linen cloth ; and let it stand in a warm place, if the season be not hot. It will soon ferment, and must be well stirred about, twice in four and twenty hours, for twelve or fourteen days. It must then be examined by the taste, to try if the sweetness be nearly gone off ; and if that be found so, and the fermentation be greatly abated, which will be perceived by the raisins lying quietly at the bottom, the fluid must be strained off, and pressed out of the raisins, first by hand, and afterwards by a press, if it can be easily procured. But, instead of a press, two boards may be used, with the assistance of a large weight, or other strong force, which must be continued as long as any fluid can be made to drop from the mass.

rafs. The fluid being thus separated from the skins of the raisins, must be put into a good sound wine cask, well dried and warmed, together with eight pounds of Lisbon sugar, and a little yeast. But some part of the liquor must be kept out, to be added from time to time; as the abatement of the fermentation, that will come on again, may admit, without the wine rising out of the cask. In this state it must continue for a month, with the bung hole open: And then, the whole of the liquor kept out having been now put into the vessel, it must be closely stopped up, so that no air may enter: And in this state it must be kept a year, or longer; then bottled off.

“The wine may be drunk, and will be very good, at the end of a year and a half: But it will be much better, if kept longer, and will improve for four or five years. When it has a proper age, it will equal any of the strong cordial foreign wines; and may, by the addition of proper substances to flavour and colour it, be made to resemble them.”

“This is the most perfect kind of what may be called artificial wine; but others may be made cheaper. Expense may be saved two ways: One is, substituting sugar for raisins, leaving out four pounds of raisins for one pound of sugar added. Or the proportion of sugar and raisins, and a proportion of clean malt spirit added, when the bung of the cask is closed up.

“Any other kind of large raisins may be used, instead of the Malaga. The thinner the skins are, and the sweeter the pulp, the stronger the wine will be.”

WINNOWERING, clearing corn from its chaff by wind. See the article *Van*.

WINTER, one of the four quarters of the year.

According to some, winter begins at the time when the sun's distance from the zenith of the place is greatest, and ends at the vernal equinox. But it is more usually considered as including December, January, and February. Notwithstanding the cold of winter, it is proved by astronomers, that the sun is nearer to the earth in winter than in summer. The reason of the cold is the increased obliquity of the rays of the sun, together with the increased length of the nights.

Winter is the season when the days are shortest: But the shortness of the days is little regretted by our farmers, as they have then the most leisure, or are least hurried in their business. For, in this country, the ground is so continually frozen in winter, that none of the operations of tillage can be performed. The good husbandman, however, is not idle; his trees in the beginning of winter are to be pruned, and his stock must be daily and carefully tended: Stones which have been piled may in the easiest manner be removed on sleds to the places where they are wanted, for fencing or other uses. Such of the produce of his farm as he can spare may be carried to market; which may be more easily done than at any other season. See the article *Employment*.

WINTER GRAIN, see the articles *Wheat* and *Rye*.

WITHE, a twig or shoot of tough wood, used instead of a rope, to tie things together, &c.

Young shoots of walnut wood are proper for withes; those of birch, and of some kinds of willow, answer well enough. Withes in fences will last only two years at the longest; and some of them are

are apt to fail sooner. Those which are cut in autumn, after the leaves are fallen, will last considerably longer than those which are cut in the spring or summer. If they lie for a day or two exposed to the sun, after they are cut, they grow tougher, and are more easily twisted. Steeping them in salt water will render them more durable.

WOAD, called by botanists *Isatis sativa, vel latifolia*. The leaves of this plant are cut off in their full sap, sweated in heaps, and ground to a paste, made up into balls and dried, to be used in dying blue.

WOLF, a wild beast of the dog kind.

This animal is very fierce, equal in size to a large mastiff, and has much the same appearance.

Wolves are gregarious, go in droves, and surprize the nightly traveller with their hideous yelling. No beast of prey in this country is more formidable; they sometimes attack men.

Newengland, even from its first settlement, has been much infested with wolves. And, notwithstanding the bounties that have been given by government for destroying them, the settlements bordering on the wilderness are still subject to their mischievous incursions; so that there is little safety for sheep in these situations. Almost whole flocks in a night are sometimes destroyed by them. This exposure to wolves is equal to a heavy tax upon our frontier plantations.

To secure the sheep from this enemy, it is necessary that they be pastured in the open fields by day, and housed in strong places every night: And even these precautions do not always prove effectual.

Some say, that smearing the heads of sheep with a composition of tar and gun powder will prevent their being attacked by the wolves; but I cannot certify this from my own experience.

WOOD, a solid substance, of which the trunks and limbs of trees, as well as their roots, consist.

“The wood is all that part of a tree included between the bark and the pith.”

Dr. Grew has discovered, by the assistance of the microscope, that what we call wood, notwithstanding its hardness and solidity, is only an assemblage of minute pipes, or hollow fibres, some of which rise from the root upwards, and are disposed in form of a circle; and the others, which he calls insertions, tend horizontally from the surface to the centre; so that they cross each other, and are interwoven like the threads of a weaver's web.

Each year's growth in wood is marked by circles visible to the naked eye, by counting of which circles the age of a tree is known.

WOOD LAND, ground covered with wood, or trees. They are mostly designed for fuel and timber. In felling them, care should be taken to injure the young growth as little as possible. Fire wood, as well as timber, should be felled, when the sap is down. Otherwise it will hiss and fry upon the fire, and not burn freely, although it should be ever so long dried. To thicken a forest, or to increase the number of trees in a wood lot, it should be well fenced, and no cattle be permitted to be in it. And something may be done, if needful, by layers and cuttings.

WOODY, abounding with wood, or of a ligneous consistence.

WOOL, the covering of sheep.

Each fleece consists of wool of several different qualities. The English and French usually divide wool into three principal sorts; 1. that of the neck and back, which they call mother wool; 2. that of the tails and legs; 3. that of the breast and belly. These different kinds should not be mixed in spinning.

The two best qualities in wool are length and fineness.

To improve the wool of our flocks, no lambs should be kept for breeders, but such as bear the best wool; and fine wooled rams should be procured from distant places, or from foreign countries.

It will also conduce to the improvement of the wool, if the sheep are kept in dry pastures, upon short and sweet grass in the summer, and upon the best hay in the winter. Great care should also be taken to prevent their being overheated, either by obliging them to feed in the hottest part of hot days in summer, or by housing them in too hot, small, and close places, at any season. They should also be kept, as much as possible, from fouling their fleeces, by lying on their excrements, without litter.

The Spanish wool is preferred to any other that is produced in Europe. A writer in that country says, "There are two kinds of sheep in Spain, namely, the coarse wooled sheep, which remain all their lives in their native country, and which are housed every night in winter; and the fine wooled sheep, which are all their lives in the open air, which travel at the end of every summer from the cool mountains of the northern parts of Spain, to feed all the winter on the south-

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ern warm plains of Andalusia, Manca, and Estremadura. It has appeared from very accurate calculations, that there are not fewer than five millions of the fine wooled sheep in Spain. Special ordinances, privileges, and immunities, are issued for the better preservation and government of the sheep, which are under the care of twenty five thousand men. These sheep pass the summer in the cool mountains of Leo, Old Castile, Cuença, and Arragon. The first thing the shepherd does when the flock returns from the south to its summer downs, is, to give the sheep as much salt as they will eat. Every owner allows his flock of a thousand sheep twenty five quintals of salt, which the flock eat in about five months. They eat none in their journey, nor in winter. From the territory called the Montana, at the extremity of Old Castile, from whence they set out, to Estremadura, is one hundred fifty leagues, which they march in less than forty days. As soon as April comes, the sheep express, by various uneasy motions, a strong desire to return to their summer habitations. The sheep of Estremadura, which never travel, have coarse, long, hairy wool. The itinerant sheep have short, silky, white wool; the fineness of which is owing to the animal's passing its life in the open air, of equal temperature; for it is not colder in Andalusia or Estremadura in winter, than it is in Montana or Molina in summer." The sheep, by these judicious removals, are grazing both in summer and winter, and are never exposed to extreme heats or colds. Next to this management insular situations in temperate climates are the best places for the constant feeding of sheep, where the extremes of heat and

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and cold are not so great as on a continent in the same latitude.

WORMS, a well known species of insects.

Fields and gardens are often infested by worms. The best antidotes are, dressings of sea manures, wetting the ground with sea water. Soot, lime, and ashes sprinkled on the ground, oppose their ravages. The refuse brine of salted meat, or water in which walnut leaves have been steeped for two or three weeks, sprinkled on gardens, will subdue the worms. The water of salt springs may be used with great advantage by those who are near them. Those who are remote from them, and from the sea, may use salt and water, and such other antidotes as they can most easily procure.

When worms breed in horses, it arises from weak digestion, or a vitiated appetite. To cure a horse of bots :

“ Take quicksilver two drams ; Venice turpentine half an ounce ; rub the quicksilver till no glistening appears ; then take an ounce of aloes, a dram of grated ginger, thirty drops of oil of savin, and syrup of buckthorn enough to make the whole into a ball.

“ One of these balls may be given every six days, with the usual precautions with regard to mercurial physick : And the following powders intermediately.

Take powdered tin and Æthiops mineral, of each an ounce ; and give it every night in a mash, or in his corn.

“ These medicines, or any of the various preparations of antimony and mercury, should be continued several weeks together, in order to free the animal entirely from these vermine.”

Bartlett's Farriery.

WOUND, a hurt given by violence.

“ In all fresh wounds made by cutting instruments, there is nothing more required than bringing the lips of the wound into contact by suture or bandage, provided the part will allow of it ; for on wounds of the hips, or other prominent parts, and across some of the large muscles, the stitches are apt to burst on the horse's lying down and rising up in the stall. In such cases, the lips should not be brought close together. One stitch is sufficient for a wound two inches long ; but in large wounds may be at an inch or more distance ; and if the wound is deep in the muscles, care should be taken to pass the needles proportionably deep, otherwise the wound will not unite properly at the bottom.

“ Should the wound bleed much from an artery divided, the first step should be to secure it, by passing a crooked needle underneath, and tying it up with a waxed thread. If the artery cannot be got at this way, apply a button of lint or tow to the mouth of the bleeding vessel, dipped in a strong solution of blue vitriol, styptic water, oil of vitriol, or hot oil of turpentine, powdered vitriol, or colcother, &c. and remember always to apply it close to the mouth of the bleeding vessels, and take care that it is kept there by proper compress and bandage, till an eschar is formed ; otherwise it will elude your expectations, and frequently alarm you with fresh bleedings.

“ In a healthy and sound constitution, nature furnishes the best balsam, and performs herself the cure, which is so often attributed to medicine. When it is otherwise, and the blood is deprived of its balsamick state, as will appear

pear from the aspect of the wound, and its manner of healing, it must be rectified by proper internal medicines, before a good foundation for healing can be laid by any external applications.

“The lips of the wound being brought together by the needle or bandage, it needs only to be covered with rags dipped in brandy, or a pledget of tow spread with the wound ointment, and the wounded part kept as much as possible from motion.

“Remember to dress all the wounds of the joints, tendons, and membranous parts, with ter-ebinthinate medicines: To which may be added honey and tincture of myrrh; and avoid all greasy applications whatever. Fomentations and poultices are also generally here of great use; the former thin and attenuate the impacted fluids, greatly promote a free perspiration of the limb, and facilitate the unloading the surcharge of the vessels, by quickening the motion of the fluids; while the latter, by relaxing the vessels, abate their tension, and relieve the obstruction by promoting digestion.” *Bartlett's Farriery.*

X.

X, as Dr. Johnson observes, begins no word in the English language. How then can it be expected to begin any article in this volume?

Y.

YARD, a measure of three feet.
YARD, a small enclosure for cattle. See the article *Barn Yard.*
YEAR, the time the sun takes to go through the twelve signs of the zodiack.

YELLOW WEED, meadow crow foot, *Ranunculus.*

This weed is known in England by the names, king cob, king cup, gold cups, gold knobs, butter cups, and butter flowers. The flowers, which appear in June, and are of a bright yellow colour, give our mowing lands and pastures a very gay appearance. It is of a very hot and acrid nature, and is eaten in its green state by neither neat cattle nor horses. Therefore, the opinion of its increasing the yellowness of butter in summer is groundless. See the article *Weeds.* This weed, when dried, is so good fodder, that hungry cattle seldom leave any part of it.

YELLOWWS, a disease incident to horses and neat cattle, more properly called the jaundice. The vulgar name of this disease in neat cattle is, *the Overflowing of the Gall.* See that article.

“Horses are frequently subject to this distemper, which is known by a dusky yellowness of the eyes: The inside of the mouth and lips, the tongue and bars of the roof of the mouth looking also yellow. The creature is dull, and refuses all manner of food; the fever is slow, yet both that and the yellowness increase together. The dung is often hard and dry, of a pale yellow, or light pale green. His urine is commonly of a dark dirty brown colour; and when it has settled some time on the pavement, it looks red like blood. He stales with some pain and difficulty, and if the distemper is not checked, soon grows delirious and frantick. The off side of the belly is sometimes hard and distended; and in old horses, when the liver has been long diseased, the cure is scarce practicable,

icable, and ends fatally with a wasting diarrhoea : But when the distemper is recent, and in young horses, there is no fear of a recovery, if the following directions are observed.

First of all bleed plentifully, and give the laxative clyster, as horses are apt to be very costive in this distemper ; and the next day give him this purge :

Take of Indian rhubarb, powdered, one ounce and a half ; saffron two drams, succotrine aloes six drams, syrup of buckthorn a sufficient quantity.

“ If the rhubarb should be found too expensive, omit it, and add the same quantity of cream of tartar, and half an ounce of Castile soap, with four drams more of aloes. This may be repeated two or three times, giving intermediately the following balls and drink :

Take of Æthiops mineral half an ounce ; millepedes the same quantity, Castile soap one ounce ; make into a ball, and give one every day, and wash it down with a pint of this decoction :

Take madder root and turmeric, of each four ounces ; burdock root sliced, half a pound ; Monk's rhubarb four ounces ; liquorice sliced two ounces : Boil in a gallon of forge water to three quarts ; strain off and sweeten with honey.

“ Balls of Castile soap and turmeric may be given also for this purpose, to the quantity of three or four ounces a day, and will in most recent cases succeed.

“ By these means the distemper generally abates in a week, which may be discovered by an alteration in the horse's eyes and mouth ; but the medicines must be continued till the yellowness

is entirely removed. Should the distemper prove obstinate, and not submit to this treatment, you must try more potent remedies, viz. mercurial physick, repeated two or three times at proper intervals ; and then the following balls :

Take salt of tartar two ounces, cinnabar of antimony four ounces, live millepedes and filings of steel, of each four ounces, Castile or Venice soap half a pound : Make into balls of the size of pullets' eggs, and give one night and morning, with a pint of the above drink.

“ It will be proper, on his recovery, to give him two or three mild purges, and, if a full fat horse, to put in a rowel.” *Bartlet's Farriery.*

YEOMAN, the addition of the first or highest degree among the plebeians of England. The yeomen are properly freeholders, who cultivate their own lands.

YEST, or YEAST, or BARM, a head or scum rising upon beer, or ale, while it is working or fermenting in the vat.

It is used as a leaven or ferment by the bakers, serving to swell or puff up their dough, which renders the bread lighter, softer, and more wholesome, as well as more palatable. But when there is too much yeast in bread, it gives it a bad taste.

YEW TREE, the name of a tree, well known and common in England. Mr. Miller says, it grows naturally also in North America.

Yew trees may be easily propagated by sowing the seeds in beds, and removing the young plants into nurseries, as many other trees are managed. It is an evergreen,

ergreen, and a tonfile tree, that may be easily cut and pruned into any form that is desired. The trees grow slowly, but sometimes come to be large trees; and their timber is highly valued for various uses.

YOAK, or YOKE, a wooden instrument, with which oxen are coupled together by their necks, and by which they draw.

The parts of a yoke are the cross tree, which should be made of white maple, the bows, and the staple and ring.

The cross tree should be of a crooked form, that the oxen may draw partly by the bows; for if it were straight the bows would not press their shoulders at all.

If one of the oxen be stronger than the other, as it commonly happens, the staple should not be inserted in the centre, but a little nearer to the bow of the stronger ox.

Short yokes are best for the ease of drawing: But if the oxen learn to crowd, or to draw from each other, they should be put to work in a long yoke till they are cured of such ill habits.

The bows should be made of the toughest of wood, and that which is very strong and stiff when seasoned, such as hickory or white oak, and be well fitted to their necks. And a bow should be large, about an inch and a half in diameter for large oxen, not only for strength, but because it will be easier to the ox.

The principal use of the ring is, to receive the end of the tongue of a cart or sled. This gives the oxen command of the carriage.

Z.

ZAPETINO, the Italian hoe.

This instrument is a small hoe at one end, and has two prongs at the other. It is sometimes made with an eye for the insertion of the handle; sometimes with a shank to drive into the handle. With one end of this instrument, weeds are cut up in gardens; with the other, roots are drawn out, and the ground loosened to the depth of five or six inches.

ZEA, a name given to Turkey corn, or maize. See the article *Indian corn*.

ZEBRA, the wild ass.

This animal is said to be extremely beautiful. It is in size about equal to the common ass, but of a much more elegant figure. The whole animal is partly coloured, or beautifully striped in a transverse direction, with long and broad streaks, alternately of a deep, glossy and shining brown and white, with some black. It is a native of many parts of the east.

ZEPHYR, the west wind.

ZEST, an apartment in a barn, where corn to be thrashed is laid up.









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