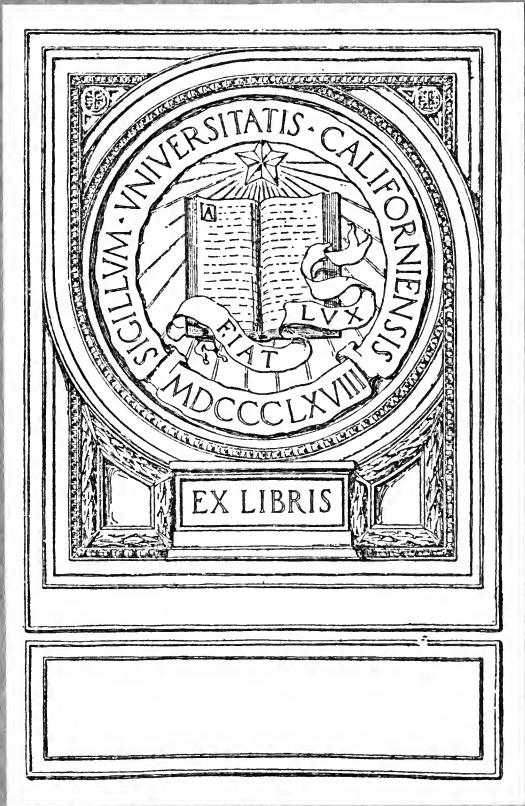


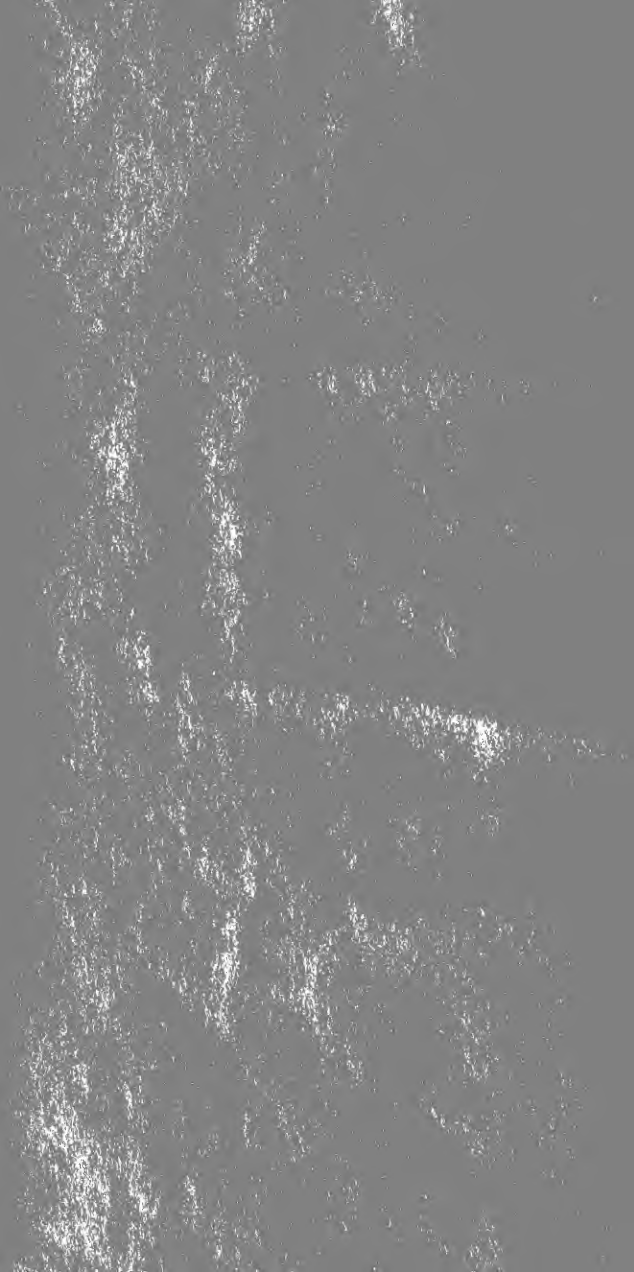
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THE
FARMER'S MANUAL;
BEING
A PLAIN PRACTICAL TREATISE
ON THE ART OF
HUSBANDRY,
DESIGNED
TO PROMOTE AN ACQUAINTANCE
WITH THE
MODERN IMPROVEMENTS
IN
AGRICULTURE;
TOGETHER WITH REMARKS ON
GARDENING,
AND A TREATISE ON THE MANAGEMENT OF
BEES.

BY **FREDERICK BUTLER, A. M.**

AUTHOR OF THE "CATECHETICAL COMPEND OF HISTORY,"
"HISTORICAL SKETCHES," &c.

HARTFORD:

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DISTRICT OF CONNECTICUT, ss.

L. S. *****
BE IT REMEMBERED, That on the twentieth day of October, in the forty-fourth year of the independence of the United States of America, SAML G. GOODRICH, of the said District, hath deposited this in the title of a Book, the right whereof he claims as proprietor,

"The Farmer's Manual; being a plain Practical Treatise on the art of Husbandry, designed to promote an acquaintance with the modern improvements in Agriculture, together with remarks on Gardening, and a Treatise on the management of Bees by Frederick Butler, A. M. author of the 'Catechetical Course of History,' 'Historical Sketches,' &c."

In conformity to the Act of the Congress of the United States, entitled, "An Act for the encouragement of learning, by securing the copies of Maps, Charts, and Books, to the authors and proprietors of such copies, during the time therein mentioned."

CHAS. A. INGERSOLL,
Clerk of the District of Connecticut.

A true copy of Record, examined and sealed by me,

CHAS. A. INGERSOLL,
Clerk of the District of Connecticut.

PREFACE.



THE great object of this work is to collect all the most valuable improvements in husbandry, both in Europe and America, as they stand recorded by the most learned and approved authors, and reduce the whole to one plain practical system of American farming, adapted to our climate, the state of our markets, and more particularly, to the high price of labour in our country.

Having been engaged in farming upon a large scale for about thirty years, and in the course of that time, tested by my own experience most of the European systems; I enter with some confidence upon the labours before me; but with what success, the public alone can decide.

By abridging the learned work of Mr. Huish on the Culture of the Bee, as an addition to the work, together with a few practical remarks on Gardening; I have endeavoured to compress into one cheap volume, all that is both valuable and useful in the science of husbandry, and for the special use of the plain practical American farmer. The whole is interspersed with occasional remarks of the Author.

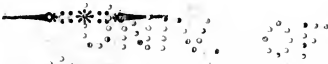
Farming has generally been considered, in our country, as a rustic, old fashioned business, that any man of common sense could do, if he chose; and what was really below the attention of a gentleman; but happy is it for our country, such sentiments are daily passing under the lash of public opinion, and the true worth of the farmer, and the art of farming, are rising to their true scale of public estimation.

The Agricultural Societies of our country, will in a few years excite an emulation, that will make our farms, in some measure, resemble the *Salem Alms-House farm*, and our farmers become the *Paul Uptons* of their country.

The numerous benefits resulting to every family from

the productions of a well cultivated Garden, are too evident to need any remarks by way of illustration. The health they afford to the family, not only in the luxuries which they furnish for the table ; but in the exercise, amusement, and enjoyment they impart in their cultivation, exceed all description : in fact, the fruits and vegetables of a garden are the life of a family, upon every principle of enjoyment and economy. I have wholly omitted all remarks upon the flower-garden, and confined myself to the plain and useful remarks of the sauce, or kitchen-garden, with a few hints upon garden-fruits generally.

INTRODUCTION.



Venerate the Plough.

HUSBANDRY was the first employment of man, therefore, the most ancient, the most honourable, and, above all, of Divine appointment.

The earth is not only the Parent of man, under God, but the Parent of all his support. Husbandry is, therefore, not only the basis on which the existence of the community depends, but the source from whence the wealth of the community is derived.

The prince and the peasant are both fed, clothed and warmed from the field. The arts and sciences are alike supported by the labours of the Husbandman; and the merchant derives all his wealth from the exchange of the productions of different countries: all are the productive labours of the cultivator, and the common bounties of our parent Earth. Husbandry is, therefore, not only the most ancient, and most honourable employment, but the most independent; and yields the greatest quantum of enjoyment to the industrious sons of labour.

These facts being settled, let us examine the science of husbandry, and draw from thence such a system of practice, as shall enable us to cultivate and manage all the variety of soils to the best advantage, and draw from them the greatest amount in a given time, with the least possible expense, and yet preserve the strength and fertility of the soil. This is not only the true art, but the whole mystery of farming.

We are all sensible that two great evils have uniformly obstructed the attainment of this great object; the one is, when the farmer runs too hastily into new and visionary schemes; and the other, when he adheres too obstinately to such old practices as are obviously bad. The design of this work is, to correct, as far as possible, both of these

INTRODUCTION.

errors, by exhibiting a plain practical system of farming, derived from the best, and most approved practical writers, and cultivators; together with my own practical experience for more than thirty years.

I have arranged this treatise in monthly order, embracing the several descriptions of husbandry that belong to each month, to enable the practical farmer, at one view, to derive the greatest advantage from such truths as may be found useful. To impress this the more forcibly, I have introduced each month with a general recapitulation of such improvements as should have been made, or such labours as should have been performed the preceding month.

THE

FARMER'S MANUAL, &c.



MARCH.

You have now collected your wood and fencing stuff for the next season; your hemp and flax are in great forwardness, and your threshing was all closed early in February. You have cut your scions for grafting. Cut up your wood, and house it, or pile it up for the summer, and next winter; the difference in the saving, between green and dry, or seasoned wood, will nearly pay the expense of sledging, besides the extra trouble of kindling fires; both which are objects worthy attention.

If you have neglected to sow clover, at seed-time, upon your winter grains, you may now sow to advantage, as soon as the ground is bare, (the sooner the better,) or upon a light snow—both will answer well. You may harrow down your corn-hills, or light potatoe grounds, as soon as the surface is free from frost, and sow your spring rye, it will generally do better, than after a ploughing as late as the first of May.

Dress with stable, compost, hog-pen, or such other well rotted manure as you have, such grass grounds as you have neglected in autumn; three loads now may be equal to two then; but it is best to secure a good crop even now. Your winter-grain should now be dressed with plaster, if it was neglected at seed-time; your mowing grounds, which are upon a dry soil,

will pay you well for a bushel or two of plaster, or a few bushels of lime, or leached ashes, to the acre.

Your orchards continue to claim your attention, finish trimming as fast as possible, and cart or sled off the brush before the ground becomes soft and poachy—give to each tree a top-dressing of your best chip, stable, or compost manure; your fruit will richly repay, besides the extra profits upon your grass under your trees, whether mowing or pasture, together with the growth of your trees. No farmer ever paid too much attention to his orchards, nor probably ever will.

Look to your fences, and see that they secure your orchards, grass and grain lands against your horses, cattle, and sheep. If your fences are bad, you have toiled in vain; all is at hazard; all is bad.

Commence setting your fruit and shade trees; these, if omitted in December, generally succeed best (when set in the spring) as soon as the frost is out of the ground. Whenever the frost will permit, plough your hemp and flax ground, together with such land as you design for peas. Frequent ploughings greatly benefit these crops, and your peas cannot be sown too early to prevent the effects of the bug, and insure you a good crop.

Look to your water-courses, and change their direction, to receive the benefit of the spring rains; the frequent changing of your water-courses will render your mowing even, and prevent one part from becoming too rank, and lodging, before the other part is grown fit to cut, and thus turn to your best profit, that which if neglected, would become waste and damage.

Now is the time to nurse your stock with potatoes and carrots; and even your cattle and cows will pay you as well for the use of the curry-comb as your horses, and if you nurse them well in the spring, they will repay you with interest through the summer. Let your sheep range upon your old stubble fields, where you have not sown clover for mowing—green

herbage is the most natural feed for this animal at this season; but if you have no such range, potatoes and carrots, (not turnips,) may be used as a substitute. Secure them carefully against your grain, mowing, or young clover grounds, which you design for mowing, the damage they will do you by feeding on these, would be greater than they could repay.

Some farmers complain that red clover, when sown for mowing upon their orchard grounds, causes the trees to wither and decay. This may be remedied by sowing plaster of Paris upon your clover; your orchards will flourish as well as upon English mowing; one bushel to the acre in the spring, or fall, annually, will answer. It is of no consequence to inquire, why a crop so fertilizing as clover, should injure the orchard, nor why the plaster should prevent it; facts are stubborn things, and are generally, all that are of importance in good farming. Others have found from experience that red clover may grow to advantage upon orchard grounds, without injuring the trees, provided the clover is fed off before it blossoms; and thus fertilize their orchard grounds by feeding their clover. From this it appears, that the injury arises from the heads, or blossoms of the clover; but the manner in which the blossom produces this effect, is again inexplicable, and so in fact are all the operations of nature. One useful fact that shall enable the farmer to produce two spires of grass where only one had grown before, is of more real value, than a whole volume of nice philosophical disquisitions upon the operations of nature, in producing this grass; the first may be done; but the latter no man ever discovered, and probably never will.

Ploughing.

The season is now opening to commence your ploughing; every farmer, and even farmer's boy, feels as if he knew how to hold and drive plough, better than the man who writes books; all this may be

true ; he knows that he should never turn his furrow wider than the plough-share will cut clean ; but always as much narrower, as the stiffness of the soil shall render necessary, to lay his furrows smooth and light, and free from clods ; in all such cases of narrow furrows, the extra expense of ploughing, will be saved in the expense of harrowing, with this advantage to the crop, that the harrow pulverizes only the surface ; but the plough, when properly directed, renders the earth mellow, to the whole depth of the furrow. This again involves the question, How deep is best ? To this I shall reply particularly, as it has become one of the most important questions in field husbandry. When you turn in a stiff, or clover sward, for corn, or potatoes, let your plough cut to the depth of 8 or 10 inches, if the substratum is not an impenetrable substance ; you will thus lay the foundation for a deep soil for ever, in your after tillage. Your corn, or potatoes, when planted, will lie below the dead earth raised from the bottoms of your furrows, and will strike their roots into the rich mould which you turned down from the surface. The sun, air, and rains, together with such manure as you may apply, either in the hill, or by way of top-dressings, about the hills, will all fertilize the dead earth so turned up, and render it food for plants. The frosts of the next winter will further improve this dead surface, and thus, by the next season, when commixed with the original mould, by a deep ploughing of the same depth, the whole will become a deep, rich, and fertile soil, and may ever afterward be ploughed to the same depth for the culture of any crops. The same is true, in a degree, of stubble grounds, ploughed, or ridged in in the summer, after harvest ; or of turnip ground fed by sheep, or of clover, or buck-wheat grounds, ploughed in, as fertilizing crops ; but where you plough your fallows for wheat, rye, oats, barley, or turnips, you will never succeed in deepening your soil below the natural mould, unless you have first

begun as above; because these crops strike a shallow root, and will be left to feed on the dead earth which you have brought up to the surface. These are the outlines, or first principles of good ploughing, and the minute attention of every farmer, will soon discover the mode which shall be best adapted to his different soils, and different crops, with this general principle, to deepen his soil at every ploughing, as far as the nature of the substratum, or under soil, and the safety of his crop will admit; and in this way, he may soon bring his farm into a deep tillage. The success of one half of any one of his fields, under a regular deep tillage, compared with the other half under a shallow tillage, will be the most convincing argument in favour of deep ploughing, that can be laid before the practical farmer. Try and see.

This being the life of a farm, it is impossible to be too particular in improving it. I shall conclude this article with the following remarks.

1. The depth of your soil being determined as before, plough flat, or ridge, directly according to the *nature* of your soil.

2. If your soil is naturally dry, plough flat, and as level as possible, this will give an equal diffusion of moisture throughout your field; but if your soil is moist, plough into wide ridges of 18 to 24 feet, and if it is a wet soil, let your ridges not exceed 6 to 12 feet. The object of ridge ploughing, is to improve the furrows between the ridges, as drains for the water, therefore multiply your drains, by narrowing your lands, or ridges, according to the moisture of your soil; and so *vice versa*. This is the best, if not only method of equalizing moist and wet lands.

3. In ploughing high hills, and steep acclivities, it is generally practised to plough directly up and down, with a furrow both ways, (up and down,) this is attended with two evils; 1st, it is very fatiguing to the team to carry a furrow up the hill; and 2d, it exposes the lands to be washed, and gullied in the furrows, which is sometimes ruinous.

4. These evils may be remedied by carrying a furrow down the hill only, and by inclining this furrow to the left hand, directly in proportion to the descent of the declivity—and suffering the team to re-ascend the hill without a furrow. This will lessen your day's work, not one half, but about one third, because your team will travel so much faster, both up and down the hill, when they carry but one furrow.—In this way, the steepest hills may be ploughed without a single furrow left open to the wash, except the last one, and the saving in the strength of the team, and in the value of the crop, which will arise from the extra goodness of the ploughing, will doubly compensate for the loss of time. In this way, the steepest hills, on which cattle can travel, may be ploughed to advantage, by striking the furrows transversely, or in a direction inclined to the left hand, directly in proportion to the steepness of the declivity.

5. In this way, one third or one half the strength of team will perform the work.

6. Where the descent is gentle, and not exposed to wash, let your ridges range exactly with the descent, that the surplusage of moisture may pass off easy, and regular, in the furrows.

7. If your business drives, and your land is light, you may fully compensate for the loss of time by widening your furrow slice; your plough-share will cut one fourth, one third, or even one half more, than in ploughing directly up and down, according to the steepness of the declivity, and the obliquity of your furrows.

8. All this, together with the general width of your furrow slice, must depend upon the judgment of the husbandman, directed by the quality of the soil. If the soil is hard and stiff, cut narrow; but if it is light and loose, cut your furrow slice as wide as the share will cut clean, and no further; all beyond this is cut, and cover, which is bad ploughing.

9. Plough all your lands as much as possible when

the dew is on, in the morning, especially sandy, or light loamy lands, (when ploughed in summer,) and even in moist weather, if the season is dry; but as a general rule, improve a dry time, both for your ploughing, hoeing, and for your seed-time; your crops will always repay your attention, some extraordinary in your soil excepted, and the surface will derive most benefit from the harrow in dry weather.

Harrowing.

No instrument of husbandry requires the judgment of the farmer more than the harrow: it is capable of doing the most good, and hurt, at the same time, of any other instrument.

1. The harrow in field husbandry, answers to the rake in gardening, and cannot be made to pulverize your tillage lands too fine; but if this is done after your seeds are sown, it will cover them often too deep, and thus injure your crop; and in flax and hemp, often double the labour and expense in pulling; and in your grass seeds, by covering too deep, will destroy their growth.

2. Make it a general rule to level, and pulverize, as much as is necessary with the harrow, before you cast your seed, and then cover lightly with the harrow, according to the hardness, or stiffness of the soil—when the lands are light, once over will answer; but when they are stiff, twice may be necessary.

Rolling.

The field Roller is an instrument much used in Europe, and in some parts of our own country; and its good effects much extolled by the best writers, and upon the following principles; viz.

1. When used upon sward ground broken up for corn, it compresses the furrows to the earth beneath, and thus guards the corn against the effects of droughts, by equalizing moisture.

2. When used upon a stiff soil, it breaks the clods, and thus pulverizes that surface which could not be done with the harrow.

3. When used upon stony grounds laid down to mowing, it presses the stones into the earth even with the surface, at the same time that it breaks the clods, and thus prepares the way for the sythe in a cheap, and easy method.

4. When used upon a light, sandy, or loamy soil, at seed time, it gives permanence, and consistence to the surface, which guards against drought.

5. When used in the spring upon such winter grains as are exposed to be winter-killed, by the heaving of the frosts, it presses the earth to their roots and thus secures the crops.

These and many other advantages are ascribed to the roller; but upon this subject I have no experience,—so far as it goes to break clods and press in stones, it will doubtless do well.

Remarks on the General Principles of Husbandry.

1. Whatever may be the nature of your soil, and situation of your farm, remember, that there is no soil so good, but it may be exhausted, and ruined by bad tillage, and that there is none so bad, that cannot be rendered fertile by good tillage, even barren heath, if it can be ploughed, and swarded.

2. The true art of husbandry consists, in suffering no crop to grow upon your land, that will so far exhaust your soil, as to lessen the value of your succeeding crop, whatever profit such a crop may afford you.

3. To avoid this, suffer no one crop to grow two years successively, upon the same piece of ground, excepting grass, and buckwheat, without the fertilizing aid of rich manures to support the strength of the soil; and even then, a change of crops will generally do best, excepting onions, carrots, and hemp.

4. Every plant derives from the earth for its growth, such properties as are peculiar to itself; this plant, when followed successively for two or more years upon the same ground, will exhaust the soil of those properties peculiar to itself, without lessening its powers to produce some other plants; this fact is most striking in the article of flax, which will not bear to be repeated oftener than once in seven years, and is common to all crops, with the exception of those noticed as above.

5. To avoid this evil, arrange your farm into such divisions as will enable you to improve all the variety of crops your lands may require, in such regular succession, as to form a rotine of 5, 6, or 7 years, according to the nature, quality, and situation of your farm.

6. This method will make poor land good, and good land better. Try and see.



APRIL.

Semination.

The European writers make very nice and curious disquisitions and calculations upon the drilling system, and generally extol and condemn the practice at the same time, as requiring a great nicety of judgment, both in its operation, and the different soils on which it will, and will not answer. I shall leave them to their own methods, both in theory and practice, and treat this subject entirely upon the broad cast plan.

1. Because this plan answers well, and our common seeds-men can sow any quantity they choose to the acre, with great precision, from three quarts, to three bushels, and give every cast its due proportion.

2. This answers best on both smooth, and stony soils, and the harrow may be made to answer best, either for a light, or deep covering.

3. Weeds will not so readily grow upon a broad cast seeding, as between the rows upon a drill seeding.

4. All unnecessary expense of tools in husbandry, goes so far to lessen the profits, and increase the cares of the farmer.

5. By the broad cast method, the seeds-man can best apportion his seed to his different crops, and different fields, or even different parts of the same field, and this mode may therefore be accounted the best.

Peas.

Plough such a light sand, or sandy loam, as you design for the white, green, or blue boiling pea, as early in March, or April, as the frosts will permit; the earlier the better; (once will generally answer,) and sow your peas upon the furrows, about 2 bushels to the acre, and cover with the harrow. Experience can be your only guide whether your land will produce good boilers, and when you have proved which fields will answer for this pea, you may always cultivate it with success in the regular succession of your crops, and with a good profit, because the pea does not exhaust your soil.

Peas when sown early in April, with oats, or in May with beans, say one bushel of each to the acre, come forward early, and give a handsome profit, to bring forward your hogs in summer, and thus save your corn in autumn for the profits of a spring market.

This crop may be mown, and threshed in the common mode, and the straw will answer both for winter feed for young stock, and litter for your horses and cattle, or perhaps to a better profit, as litter for your hogs in summer; such litter will enable you to cart in an extra quantity of rich earth into your hogs pen, and thus increase the quantity of this best of manure.

Sow flax and oats as early in this month as possible, seed with 2 to 3 bushel of seed upon a strong soil. Begin to plant potatoes.

MAY.

Beans.

Plough in May, or early in June, such lands as you design to plant with beans; your poor sand, or sandy, or gravelly loams will answer; provided you wet your beans, and roll them in plaster, at planting. Set your rows two and a half feet distance, and your hills from one and a half to two feet distance in the rows, and seed with 5 beans in a hill; the crop will always pay you well, both as a tillage, and a fallow crop for wheat, or rye, provided your bean lands can bear those crops, with the aid of plaster, or such other dressings, by the stronger manures, as you can give them. Under this head I will insert an extract from the New-York Daily Advertiser upon the Heligoland Bean.

“A friend of mine handed me the following interesting account of the Heligoland bean. I am induced to make it public for the benefit of those who have possessed themselves of some of this valuable article. They appear peculiarly calculated for the Northern States, and I have no doubt will prove an advantageous substitute for corn, where frost is apt to injure the crop. A small quantity have been sent for the benefit of the Agricultural Society of New-York, by J. Barclay of London; they arrived a few weeks since, and have been distributed in various parts of the State.”

“The merits of those beans consist in their extraordinary prolific quality, their perfect fulness of form and thinness of skin, and in their ripening much sooner than the common sorts; they are short in their straw, and the pods which grow in bunches, commence very near the ground. They will succeed on soil not considered stiff enough for the common bean, and have produced generally, without extra manure, from 64 to 80 bushels the acre.

“At the annual meeting of the Agricultural Society of Wiltshire, held at Devizes, July 20th, 1814, Mr. Phillips produced two stalks, which had on them two

pods, yielding 490 beans. In the spring of 1813, Mr. Phillips planted a bushel and a half of these beans, on half an acre of land, (a poor day,) at one ploughing, without manure, and they produced the astonishing quantity of 52 bushels, Winchester measure.

“Several stalks of these beans were produced, and the Committee declared them to be infinitely superior, in point of productiveness and quality, to any other sort ever introduced into the country, and felt it their duty to recommend them not only to their own members; but to the public at large, who they were certain would derive great benefit from their introduction.”—*New-York paper.*

Remarks.

The value of the white field bean has been generally known and approved in our country, both for the table and for stock, particularly for sheep and hogs; but the improvement of the Heligoland bean as above, surpasses any thing of the kind heretofore known, and will give an additional value to our tillage, and to our farms, in facilitating the means of increasing our stock of pork, and thus increasing our stock of the very best manure.—Beans have generally been admitted as a good fallow crop, in keeping the ground clean without exhausting the soil; but it has been a serious objection to beans as a fallow crop, that they ripen too late, and thus delay the sowing of the winter grains beyond the proper seed time, to the damage of the crop.—This objection, when true, is a serious one; but this it is now found may be obviated by cutting off the top of the bean vines, as soon as the first blossoms begin to drop; but not before, as they will sprout again.

For the truth of this remark, I am indebted to Sir John Sinclair, who states, that the practice was introduced into field husbandry by John Lowther, Esq. M. P. through his Bailiff, or overseer, George Lane,

who had been a Gardener, and that in 1804, more than 200 acres had been tested by this experiment, at an expense of about 3 shillings per acre, and that as soon as the tops were cut off, the pods began to swell, and increase in their size, and that the period of ripening was generally accelerated at least a fortnight.

The fact above stated is of the highest importance, because it goes to secure the bean crop amongst the fallow crops, with a handsome profit, on its culture, without injury to the soil, or the after crop. To be able to select the soil which is best adapted to the crop you wish to cultivate, and to prepare this soil by manure and tillage to the best advantage, and thus by a regular process to bring your crop to its highest productive state of perfection, is truly a very important part of good farming; but it is only a part. To combine the cultivation of crops with a regular succession of other crops, so that each in succession shall yield the greatest possible product, with the least possible expense, and yet raise the productive value of your soil, constitutes a second part of good farming; but the great art of the whole is in disposing of these crops in such a manner as shall insure the greatest aggregate value to the farm, and the stock, and secure the greatest and most permanent annual revenue; this comprises the most difficult, and important art of good farming. All these combined; the fallow crops are calculated to produce, particularly the potatoe, and the Heligoland bean, not excepting the white bean, particularly the 1000 for one, (so called.) The Bean should be harvested as soon as the eye has attained a deep colour, or the leaf turned yellow, and cured in the nicest manner; it may be housed, or threshed in the field, if the weather is fair.

Gypsum.

No one article of rural economy has proved so useful, and no one has excited so much speculation and

inquiry, as Gypsum, or Plaster of Paris. When it was first introduced, its immediate effects were so striking as to excite alarm; and it was soon pronounced a dangerous drainer of the soil, or present benefit, attended with an after evil; a manure that would make rich fathers, and poor sons; this alarm has in some measure subsided, (though not altogether,) and this most valuable enlivener of vegetation is now coming into general use.

The nice investigations of the learned Dr. Davy, have proved Gypsum to be the most natural food for plants, of all the manures in use; by showing by a chymical analysis, that Gypsum is the only substance taken into circulation in its pure state, and forming a component part of vegetable substances. This fact being proved, and disclosed by so high an authority, has led to further inquiry into the *modus operandi*—or the manner in which this is done.

Chymists reason thus;—Gypsum will not dissolve in less than five hundred times its weight of pure water, therefore it cannot enter the bodies of plants by solution; and again, it cannot be by solution, because this would destroy its being, and it would be no longer found in the plants in its pure state. One of the properties of plaster is, that it may easily be reduced to an impalpable powder, and thus taken up into the circulation of plants—hence the general remark, the finer the better, as a manure. Another of the properties of plaster is, that by a moderate heat, it readily passes into a state of calcination; becomes liquid, and boils like water. This is also a test of its quality—the best will most easily calcine; and in that state it imparts to the tongue the stythtic sensation of quicklime. It is the opinion of some, that under this operation, by the heat of the sun, Gypsum becomes an exciter of vegetation, passes into, and forms a component part of plants. Another property of Gypsum is, that by chymical analysis it is

found to be composed of sulphur, oxygen, and lime, as its most essential properties; these being the first principles, or most powerful excitors, or promoters of vegetation, give to this substance the first rank in the system of rural economy.

All the experiments which have been made with this first of manures, unless upon a cold, dead, wet soil, have gone fully to prove, that Gypsum is not only the best, but the cheapest manure, and most to be depended upon, for general use, of all the manures.

Oxygen is the great vivifying principle in the animal world, and is therefore styled, by way of distinction, vital air. This vital air composes 28 parts of a hundred of atmospheric air, and thus gives life, not only to the animal, but to the vegetable world. Abstract, or remove these 28 parts of vital air from the atmosphere, and neither animals, nor vegetables can live an instant; they both die. Animals inhale the vital, or oxygen air into the lungs, this commixes with the blood, and gives that florid, or vermilion hue to the blood in the lungs, and thus passes into circulation, giving vigour, life, and energy to the whole system, and again passes off through the secretions of the body, and commixes with common air. It is a well known fact that the foliage of plants and trees, produces in constant succession, and emits into circulation, this vital, or oxygen air, and of course it must follow, that by the inhaling vessels, both of the roots, trunk, branches, and foliage, this oxygen, or vital air is admitted into circulation, and becomes the essential, or vital principle of vegetation.

Whatever renders the earth loose, so as to admit a free circulation of air to the roots of plants, will best promote the great system of the economy of nature, and thus render it active and vigorous, by the free circulation of vital or oxygen air; the same as in the animal world. Whatever causes the greatest degree of fermentation, when buried in the earth, best promotes this economy of nature, by rendering the

earth loose, for the free admission, and circulation of air and moisture, and thus by their chymical combination promotes the growth, and forms the substances of plants and trees; hence the reason why animal substances produce the best effects in the promotion of vegetation, because they cause the greatest degrees of fermentation, in their dissolution; and hence the reason why the growth of trees and plants never exhausts, or diminishes, the weight of earth in which they grow.

Electricity has its full share in producing the above effects, both in the animal and vegetable kingdoms; but not upon the same principles of oxygen, because electricity is the most subtle and powerful of all substances, and pervades with equal ease all bodies, whether hard or soft: not so with oxygen, it cannot commix with the earth, and thus become food for the roots of plants, any further than this earth is rendered light, or pervious, for the admission of common air; hence the reason why frequent ploughings, and fermenting substances promote vegetation; hence the reason why plaster, when mixed with the seeds which are planted in the earth, gives the greatest vigour to vegetation; because it imparts, both its oxygen, and substance, to the absorbant vessels of the roots, and thus stimulates the vital principles of those plants.

All this is true as far as it goes, and yet all this without the heat of the sun, amounts to nothing; and all this combined with the heat of the sun, amounts to but very little, without the light of the sun: but the rays of light from the sun are not oxygen, nor electricity, and yet they constitute one of the essential causes of vegetation, yet *what* effects they produce, and *how* they produce them, are altogether concealed from our research, therefore I conclude as before, that one fact in good husbandry is worth two hypotheses.

Experience has proved Gypsum to be one of the best manures, and taught us how to use it.

From the Pennsylvania Farmer.

“ MR. HOLBROOK OF DERBY.

“ I have used Gypsum, or plaster, for several years, as a manure. I have put many tons of it upon my own land, and have furnished my neighbours with it, both they, and I, have derived great benefits from it. One of my neighbours sowed a quantity upon his upland mowing, and his crop of grass was greatly bettered, as well as increased to three times as much as the crop upon his adjoining land. I dressed a piece of land with it, on part of which I used to spread a run of water. Where the water was spread, I could not perceive that I derived the least advantage from the plaster, but the other part of the field produced white clover in abundance. I had four times the quantity of hay in proportion from the land dressed with the plaster, that I had from the land adjoining, on which none had been put; and the land on which the plaster was put had no advantage over the other; but merely what it derived from the plaster.

“ In the year 1790, I dressed my land with plaster on which my wheat was sowed. I could not perceive, at any time, that the wheat derived the least advantage from it. In September 1791, I sowed rye, and in April 1792 I sowed clover. The rye appeared to receive but little advantage; but the clover was fine and was materially benefited. In 1793, the crop of clover was very good. In 1795, I sowed the same piece with rye, and had a very good crop. Whether the plaster sown in 1791, benefited the rye, or whether it was through the assistance of the clover that the crop was so much improved, I am unable to say; but I am persuaded that I never did before receive so great benefit to my wheat or rye, from the same quantity of clover, as my crop now received from some cause. In 1796, I sowed it with rye, and harvested in 1797; but perceived no difference between this part

of my field, and that on which no plaster had been sown.

“ In September 1791, I dressed with plaster a field of clover which was sown in 1790 ; but no rain fell in a long time. I received no benefit from it. In September 1791, I strewed plaster upon part of my wheat fallow, and ploughed it in, but cannot say that my wheat received any benefit. In 1793, I planted the field with indian corn, and put a quantity of stable dung on that part of the field which had not been dressed with plaster, and left a small adjoining corner on which I put nothing. That part dressed with plaster in 1791, was much better than that on which no manure had been put, and as good as that recently manured with stable dung. In 1794, I sowed the field with barley and clover. I could discover no benefit derived from it to the barley, but soon after the barley was taken off, the clover on that part of the field dressed with gypsum, appeared much better than any part of the field which had been dressed with stable dung. The soil was a brown loam, mixed with a ragged slate-stone.

“ In April 1792, I dressed part of a dry spire-grass meadow with plaster, just before a rain ; it produced a fine growth of white clover, and much increased the natural grass. I judged my crop was double to that produced upon the adjoining field, which had been manured. In 1793, the product was equally great. In 1794 the effects were apparently gone.

“ In April 1792, I dressed two adjoining pieces of spire-grass meadows : one with unleached ashes, the other with plaster ; they both produced a fine growth of clover ; that dressed with ashes I thought had some little the preference ; but in 1793, that dressed with plaster had manifestly the preference.

“ In April 1795, I dressed a part of a poor field, which lay for pasture ; but bore little, except five-finger. It was thin poor land. I discovered no effects until September, when white clover began to

appear; and before winter, there was a material difference between this and the other part of the field. In May 1796, I ploughed the field for buckwheat and turnips, and sowed it in July, extending into the part which had not been dressed with plaster. There was a great difference between that part of the field on which the gypsum had been applied, and the part on which there had been none; both in the buckwheat and turnips. The part dressed with plaster produced nearly double to that which had not been dressed. In 1797, I planted the field with potatoes; they appeared to derive some advantage from the gypsum; but it was not great.

“In the month of April 1795, I dressed with plaster part of a field covered with a turf of natural grass; in September the clover appeared amongst the natural grass. In April 1796, the difference between that dressed, and that not dressed, was apparent. I then ploughed the whole in ridges for indian corn; on part of the field I put plaster before the first hoeing; on a part soon after the first hoeing; and a small part was ploughed and planted without any plaster; and that part of the field on which I put plaster in 1795, I left without applying any thing. In a short time, the part of the field on which the plaster had been put in 1795, appeared to have the advantage, and in the course of the summer, the difference could be discerned at a very great distance. At harvest I thought I had double the quantity of corn on the land dressed in 1795, that I had on that dressed in 1796, though the crop in this appeared greatly benefited. The land which was not dressed at all, did not yield more than half as much as the land dressed in the hills of corn with the plaster in 1796, and not more than one fourth as much as that dressed with plaster upon the sward in 1795. In 1797, I put a bushel of plaster upon an acre of this field, before planting; then planted all the field with indian corn and put plaster in the hills; except upon the acre as above; at harvest I could discover no essential difference.

“ In April 1797, I dressed part of a spire-grass meadow with plaster, there then being a light snow upon the ground, which soon went off: ten or twelve days after, I dressed the other part of the meadow with plaster; there was soon a material difference between the two parts, and it continued through the season. The part first dressed received much the most benefit.

“ From my experiments I have found that scattering gypsum over the whole land was better than putting it upon the hills of corn; that my pastures have been greatly improved by it, and that when I have ploughed them afterwards, on which plaster had been strewed, the crops and grasses have derived more benefit from the plaster, than if it were applied the same year that the crops and grasses were sowed. The land on which I have used plaster is loamy. My neighbours have derived much benefit from it upon their sandy river land. I have been as successful with the Nova-Scotia plaster as with any, and think it as good as the European. I used to put as much as three bushels to the acre, I now do not apply more than two, and I am persuaded that two bushels answer as well as three. I have never used so good, and cheap manure as the plaster, and I look upon my land as double in value by its discovery.”

I have extracted this report of Mr. Holbrooks at large, because it goes to prove with more nicety, and precision, the real value, as well as the true, and best methods of using Gypsum, of any series of experiments that I have seen. The fact that plaster sown upon grass, or even pasture lands, gives an immediate profit, is of importance; but that the same lands when ploughed for tillage, two or three years afterward give an additional value to the crops from the plaster thus sown, is doubly useful, both from its immediate, and subsequent effects: this is reaping the profits of the manure twice over, and is an undoubted evidence of its durability. Whoever reads this re-

port of Mr. Holbrook, can never doubt of the value and utility of Gypsum, when properly applied as a manure.



APRIL.

Your hemp and flax are all dressed; your wood cut and housed, or piled up; and your sleds housed safe for the next winter. Your orchards are all pruned, and the brush removed and cut up for summer's use. Your fences are in great forwardness; your mowing-grounds are dressed from your barn-yards, and your hemp, flax, oats and barley grounds, together with your spring-rye, and wheat lands, now claim your attention. This is one of the most important months of the twelve, for the farmer. Harrow down your ridges; plough and cross-plough for your hemp, flax and barley, and dress after the first ploughing with well rotted manure from your stables, barn-yard, or hog-pens, at the rate of 10, 15, or 20 loads to the acre, according to circumstances, and sow from two to three bushels to the acre, of each, and harrow in the seed, not upon the furrows, this will bury your seed to deep; but upon a surface made smooth and even by the harrow. Your land cannot be pulverized too much with the harrow after your seed is sown. Your wheat two bushels, and rye one and a half bushels to the acre will do best; when dressed with plaster, one, two, or three bushels to the acre, or with lime or leached ashes, sown, and harrowed in with the grain. Your crops will be more secure against the rust, and blast, and smut, than when sown upon the stronger manures, especially if soaked in a strong pickle of sea-salt, or saltpetre, rinsed clean, and rolled in plaster, or live ashes, when sown. Plaster and ashes answer well, also, when sown upon your hemp, flax, barley and oats.

The time of sowing all your spring grains will depend much upon the season, with this general rule, the earlier the better, with proper security against frosts; be sure to catch a dry seed-time if possible, the difference in the value of your crop, will richly repay a strict attention to this part of good farming. Hemp will do to be repeated successively, for many years, with high manuring; but all the other crops as above, should be sown after corn, or potatoes, or upon stubble land, ridged in in the fall, and perfectly free from weeds, or their seeds, or upon turnip grounds after stubble. Select a warm rich piece of ground near your dwelling, of 1, 2, 3, or 4 roods, render it rich with horse or hog manure; plant this with English white potatoes, they will answer to begin to dig in July; these, when steamed, or boiled, will serve for early food for your hogs, and bring them forward for early pork, and save your corn in the fall. I can say that 4 pigs, which averaged 27lbs. in the middle of July, by this mode of feeding, averaged 180lbs. at Christmas following, with a very trifle of corn, excepting the last month, they then had corn altogether, to harden the pork. This will be found one of the cheapest modes of bringing forward pork-hogs. If the expense of fuel in boiling is an objection, let it be remembered, that one or two gallons of water are sufficient to steam a hogshead of potatoes, if they can be placed over the steam, and covered with bran, or Indian-meal, which is perfectly dry, of 4 or 5 inches thick, so as to prevent the escape of the steam: before one gallon of water is exhausted, the whole hogshead will be boiled fit for the table; let these be mixed in your swill-barrel, or tub, with the bran, or Indian-meal, and placed near your hog-pen for ready use; a good pen full of fat hogs in the fall, makes the purse and the family rich through the year; and the rich manure they will afford you, with a little attention in carting in earth and litter, will increase your next crops more than the hogs expend-

ed in their fattening ; thus you have your pork clear, besides the increased value of your lands. Try it and see.

Now is the time to begin the arrangement for your routine of crops, which will best promote the revenue of your farm, with the best fertilizing improvement for your lands. Hemp, carrots, onions and buck-wheat, may be cultivated successively upon the same grounds for many years ; but clover, potatoes and Indian-corn, oats and barley, wheat and rye, will not answer well for more than two years, without high manuring ; and even then, they do best under a change of crops ; flax will not succeed well upon the same ground oftener than once in seven years, therefore, arrange your farm in such order as to have a regular routine, or succession of crops, once in 4, 5, 6, or 7 years, according to the nature and circumstances of your farm. Whenever you sow flax, oats, or barley, sow clover, as a fertilizing crop, or clover and timothy, or orchard-grass, (which by many is preferred to timothy,) and stock down ; if with clover only, for two years ; but if with clover and timothy, or orchard-grass, for four years ; then turn in your clover for wheat, either with one, two, or three ploughings, according to the quality of the soil, or other circumstances, and sow one and a half bushels to the acre in the fall, or two in the spring, and dress with plaster.

When your grass land has lain 4 years, turn in your sward by deep ploughing, (say 8 or 10 inches deep if possible,) and plant corn or potatoes, with a good dressing of compost, or yard dung in each hill ; this will subdue your sward for a second crop of corn, or potatoes, the next year ; or any of the spring grains you may choose ; thus you may have a succession of all the crops you may choose, without exhausting your farm, even without manure ; but if you use the clover as a fertilizing crop, your lands will rise in their value under every routine, and increase your revenue. Buck-wheat may be one of your ro-

tine of crops, if ploughed in when in full bloom, before a wheat, or rye crop; but before corn it will not answer. I have generally done best with buck-wheat, by selecting some particular piece of land, (unfit for the winter grains,) and devoted it to the culture of buck-wheat, successively, for many years. To illustrate my ideas of the succession of crops a little more clearly, take the following: viz.

- 1st Yr. Barley, oats, flax, or spring wheat, or rye
with clover, or clover and timothy, &c.
- 2d do. Clover, or clover and timothy, or orchard-grass.
- 3d do. do. do. do.
- 4th do. Wheat or rye upon the clover-sward, with 1,
2, or 3 ploughings, with clover again, with
or without a potatoe fallow, &c. as at the
first.
- 5th do. Corn, or potatoes upon the timothy-sward,
then barley, oats, &c. as at the first.
- 6th do. Or corn, or potatoes again, or beans as fal-
lows for wheat or rye; or for the spring
crops, as at the first.

Under this management, every farmer can apportion his farm so as to have an equal portion of each successive crop, and never exhaust his soil.

It is common for farmers to argue thus: This land must bear corn again; this ground tills easy, and bore good crops the last year, and the year before: without reflecting, that after the third crop, the land will have sunk one half of its value for the next year's tillage, or will require a length of time, or an expense of manure to restore its fertility, which will greatly reduce the value of the preceding crops. The same farmer would not say, Take such a horse from my stable to perform such a journey, he has just returned from a second of the same length, and he has done well; but he would rather say, Feed such a horse with particular care; for he has just performed two long journeys, and take a fresh horse for the next long journey; the other horse with proper care, will do the business of

the family until he is recruited. Just so with your land; all the animal principles peculiar to your horse, or your ox, are common to your land, (except locomotion,) and require the same attentive care and nursing, to render it profitable.

Flax is generally considered a poor crop, and with poor husbandry it is correctly estimated; but with 2, 3, or 4 ploughings and rich manures, flax will produce 4, 5, or 6cwt. to the acre, with 8 or 10 bushels of seed; this is no mean crop; say 5cwt. at 12 cts. \$ 60
10 bushels seed at 1 dollar, - 10

\$ 70

If your land is suitable for flax, the season favourable, and you manure with 10, 15, or 20 loads of well rotted, rich manure, and dress, and harrow in with 4 or 5 bushels of fine salt to the acre, or 1, 2, or 3 bushels of plaster, and sow clean seed, three bushels to the acre; you may always expect 4 to 6cwt. to the acre; whereas even two would pay you handsomely; 6cwt. of flax to the acre, have been raised from five pecks of seed, after hemp five years in succession, with about 13 bushels of seed; this proves that hemp and flax are not incompatible with each other, and that flax is no mean crop.

Gypsum.—Soils.

From the experiments made upon Gypsum, as a manure, by Mr. Holbrook, of Derby, it clearly appears, that it answers best upon both grain and grass grounds, (if sown in the spring,) to be sown in this month. His reports to the New-Haven County Agricultural Society, have given full demonstration of this fact, as has been quoted. One of the objections to Gypsum as a manure, has been, and continues to be, that it will not answer upon but few soils, and those of a sandy, or gravelly loam. This objection is now

found from the best experience, not to be true. Gypsum answers well upon all grounds where clover will flourish, and this may be considered as a criterion, notwithstanding it answers best upon a sandy, gravelly, or a loamy soil, and so does clover. If your soil is a stiff clay, you may reduce it to a loam, by dressing the surface frequently when under a sward, or covered with herbage, with plaster, sand, and rich manures, until you obtain a rich sward, then turn in your sward for tillage, and stock down as soon as possible, and dress again as before; in a few years, the stiffest clay may be reduced to a rich clay loam. If your land is a coarse, sharp sand, and even a blowing sand, you may reduce it to a loam by sowing plaster, with red-top, or other fibrous rooted grasses, until you can obtain a sward, then dress with plaster; with strong clay loam; marl; or even with a stiff clay, laid on in the fall, and well spread, and the clods well broken with the harrow and roller; these dressings will commix with the sward, by the assistance of the frosts and rains of winter and spring. When your sward has become strong and rich by the aid of rich manures, break up by deep ploughing; take one crop of potatoes, or grain, then stock down again, and proceed as before; you will in a few years obtain a rich sandy loam. It must be remembered, that the texture of these opposite soils can be changed, only, by dressing upon the surface, when under a sward. The success of this mode of tillage depends very much upon the attention of the farmer, in avoiding a tillage with the exhausting crops, when his lands are ploughed; and in stocking down again as soon as possible, that he may continue the means of changing the soil, by raising the strength and fertility of his land.

The clay soil, when under tillage, cannot be ploughed too frequently, to obtain the best crop; and on the other hand, your light sandy soil will do best under one ploughing, and that should always be as deep

as the furrow which buried the sward, when broken up, and no deeper. It is therefore of importance, to obtain a deep soil by burying the sward under a furrow 8 or 10 inches, upon all sward-grounds, when broken up. You may sow turnips to advantage, as a tillage crop, upon either of these grounds, in their changing state, provided you feed them off with sheep, by hurdles, upon the ground; but not as a crop to be pulled and removed; because they are one of the most exhausting crops; they will impoverish your soil, and thus defeat, in some measure, your object. Clover, and buck-wheat may be used upon both, if ploughed in when green, as a fertilizing crop, when the soils begin to mix, and become fertile; both these soils may thus be reduced to a rich profitable tillage, for every description of crop. The farmer must always preserve this caution, that if he exhausts their strength by bad tillage, they will both revert to their original state, and become clay and sand again; but by good tillage, they will continue to improve, until the one becomes a rich clay loam, and the other a rich sand loam, fit for clover and wheat for ever. It is worthy of notice, that the substratum of sandy soils, (even dead blowing sands,) is most generally a strong clay; thus nature furnishes the means of perfecting her works for the use of man, upon the same grounds; the upper surface of sand may be removed, upon one side or corner of your field, and the substratum of clay be dug and carted on, sufficient for all the purposes required, and at very little expense.

I am fully sensible that the high price of labour in our country, is a very serious objection to any very extensive improvements in reclaiming lands in this mode; but such lands as are near to our dwellings, become more immediately the objects of our attention; try these first, and you can then determine how far it will be for your interest to continue the improvements.

Ruta Baga.

I have seen in the month of June, the yellow Sweedish Lapland turnip, known by the name of *Ruta Baga*, as fair and clear from pith, as when dug in autumn. This turnip is a rich, well flavoured, nutritious root, and an object worthy the attention of the farmers of our country. They are now becoming common, and seed, or the roots for seed, may easily be obtained. Let every farmer set in this month, in his garden, as many roots as will stock such lands as will answer for this turnip, their extra price and demand in market, together with the extra advantage of their keeping fresh and sound over to summer, render them valuable, both for the table, and for cows, hogs and ewes. Every means which the farmer can multiply upon his farm for the support of animal life, goes so far to save his corn and grain, and these become ready cash in the best market, and thus increase the means of raising the value of the farm, by manure and tillage.

This turnip may be raised to advantage upon such stubble lands as you may wish to turn in, as a fertilizing tillage, without much damage to such land, if you sow 1, 2, or 3 bushels of plaster to the acre, at the time of sowing your turnips; provided also, that you soak your seed in train-oil, (a sure preventative against the fly,) and mix it with plaster, so as to render your casts free: provided also, that you sow but half a pound of clean seed to the acre.

Since writing the above, I have seen a treatise written by Wm. Cobbet upon the culture, uses, &c. of the *Ruta Baga*, published in New-York, in the year 1818.

As Mr. Cobbet has taken the lead, in America, in the culture of this most valuable root, and as his mode of culture, together with his remarks on its uses, exceed any that I have seen; I shall give a general summary of his treatise by way of extracts from its most essential parts.

RUTA BAGA.

Description of the Plant.

“The Leaf of every other sort of turnip is of a *yellowish* green; but the leaf of the Ruta Baga is of a *blueish* green, like the green of peas when of their full size, or like the green of a young and thrifty Yorkshire Cabbage; hence it is called *the Cabbage-Turnip*. The characteristics that most decidedly distinguish this root are these: the outside of the bulb of the Ruta Baga is of a greenish hue, mixed towards the top with a colour bordering upon the red; and the inside, if they are true and pure, is of a *deep yellow*, nearly the colour of gold.”

Mode of saving and preserving the Seed.

“The Ruta Baga is apt to degenerate, if the seed is not saved with care. In England, we select the fairest roots, and of the best form, for seed, rejecting all such as are of a whitish colour, or greenish towards the neck, preferring such as are of a *reddish cast*. These, when selected, should be carefully preserved over the winter, and set in the month of March or April in a rich soil, remote from any roots of the Turnip, or Cabbage kind, to preserve the seed pure and unmixed. Two or three roots, if they do well, will yield seed sufficient for an acre of land. Let the seed remain in the pods until the time of sowing.”

Time of Sowing.

“The time of sowing may be from the 25th of June to the 16th of July, as circumstances may be: as the result of all my experiments will fully show.”

Quality and preparation of the Land.

“As a fine, rich, loose garden mould, of great depth,

and having a porous substratum, is best for every thing that vegetates, except plants that live best in water, so it is best with Ruta Baga. I know of no soil in the United States, upon which this root may not be cultivated with the greatest facility, excepting a *pure sand*, and a *stiff clay*, which are very rare in this Country." Mr. Cobbet here goes on to state his successful experiments in obtaining a good crop of Ruta Baga, with very little manure, (and that of an inferior quality,) upon an exhausted soil.

Manner of Sowing.

"My Ploughman put the ground up in little ridges, having two furrows on each side of the ridge, so that each ridge consisted of four furrows, and the tops of the ridges were about 4 feet from each other; and as the ploughing was performed to a great depth, there was of course a very deep gutter between every two ridges.

"I took care to have the manure placed so as to be under the middle of each ridge, that is to say, just beneath where my seed was to come, which was sown principally in this manner: a man went along by the side of each ridge, and put down 2 or 3 seeds in places of 10 or 12 inches distance from each other, just drawing a little earth over, and pressing it lightly upon the seed, in order to make it vegetate quickly, before the earth became too dry. In this method, four pounds of seed sowed 7 acres. Two men sowed the whole 7 acres in two days.

"Broad-cast sowing will however generally be preferred; but when I have spoken of the after culture, I shall compare the two methods, that the reader may decide for himself."

After Culture.

"When the plants were fairly up, we went with a

small hoe, and took out all but one in each 10 or 12 inches, and thus left them to stand single. We next went with a hoe, and hoed the tops of the ridges, about 6 inches wide on each side of the rows of plants, and then horse-hoed between the rows with a common horse-plough, after the manner of tilling Indian-corn, or potatoes; by first turning the earth from the plants, and next towards the plants, at the second hoeing. There is no ground lost in these wide intervals, for the lateral roots of the large turnip, as well as the Ruta Baga, will extend 6 feet from the bulb of the plant; and my crop of thirty-three tons, or thirteen hundred and twenty bushels to the acre, taking the whole field together, had the same intervals; and less than this, as was practised by my neighbours, always diminished the crop. Wide as my intervals were, the leaves of some of the plants would nearly meet across the rows, and I have had them frequently meet in England.

“Now I think no farmer can discover in this process any thing more difficult, or more troublesome, and expensive, than in the process absolutely necessary to the obtaining a good crop of Indian-corn; and yet I will venture to say, that in any land capable of bearing fifty bushels of Indian-corn upon an acre, more than one thousand bushels of Ruta Baga may, in the above described process, be obtained.

“In the broad-cast method, the after culture must of course be confined to hoeing, or as Tull calls it, *scratching*.

“In England, the hoer goes in when the plants are about 4 inches high, and hoes all the ground over, setting out the plants at the distance of about 18 inches; and if the ground becomes foul, he is obliged to go in again in about a month afterwards, and hoe the ground again. This is all that is done, and a very poor all it is, as the crops on the very best grounds invariably show, when compared with the ridge crops.”

Transplanting.

“ This is a third mode of cultivating the Ruta Baga, and in certain cases far preferable to either of the others. My large crops at Botly, (England,) were from roots transplanted.

“ I prepared one field of five acres, and another of twelve, with ridges in the manner described for sowing, and on the 7th of June, in the first field, and on the 20th of July in the 2d, I set my plants, as in sowing, 12 inches asunder. I ascertained to an exactness, that there were thirty-three tons to the acre, throughout the whole 17 acres, and after this, I have never used any other method.

“ In my usual order, the rows 4 feet asunder on the ridges, there are ten thousand eight hundred and thirty turnips on each acre of ground; and therefore for an acre of ground to produce thirty-three tons, each turnip must weigh nearly 7lbs.

“ From a large field I afterwards set on the 13th of July, I weighed one waggon load, which averaged eleven pounds each, and several weighed 14lbs. which would probably give fifty tons to the acre.

“ I will now give a full account of my transplanting at Hyde-Park, (Long-Island, in America,) between the 21st and 28th of August; the season remarkably dry.

“ The plants will succeed best when set in fresh earth, or *earth recently moved by the plough.*

“ When we have our plants, and hands all ready, the ploughman begins, and turns in the ridges, (which have been prepared as before stated;) that is, he turns the ground back again, so that the top of the new ploughed ridge, stands over the place where the deep furrow was before he began. As soon as he has finished the first ridge, the planters begin to set, while he is ploughing the 2d, and so on through the field. This process is not very tedious, for in 1816, I had fifty-two acres of Ruta Baga planted in

in this way, and a crop of more than fifty thousand bushels. A smart lad will set half an acre per day, with a girl, or boy, to drop the plants, and I had a man who would set, often, an acre a day.

“Observe well what has been said about fresh earth, and never forgetting this, let us talk about the art of planting. We have a setting-stick, which should be the top of a spade-handle cut off about 10 inches below the eye, and pointed smoothly: the planting is then done in the manner of setting cabbages. Choose a dry time for your transplanting, and for this reason; if your plants are put into wet ground, the setting-stick squeezes the earth up against the plant in a *mortar like state*; the sun comes and bakes this mortar into a hard, glazed clod; the hole also, made with the stick, is smooth upon its sides, and presents an impenetrable substance to the roots and fibres of the plant, and thus the vegetation is greatly checked; but when plants are set in dry earth, the reverse of all this is true, and the fresh earth will supply proper moisture under any degree of drought. The hole thus being made in dry weather, set your plant *without bending the point*; support it with one hand, firm in the hole, and with the other hand, apply the setting-stick to the earth on one side of the hole, so as to form a sharp triangle with the plant, then thrust the stick down a little below the bottom or point of the plant, and with a little twist, press the earth up to the plant, at the point, or bottom of the root, and it is done. But if a vacancy remains below the bottom of the plant, it will not thrive well. This is true in all transplantings, both of roots and trees.” Mr. Cobbet here goes on to state his reasons in favour of transplanting, which are these:

1. “Time may be gained for one or two extra ploughings, between the 25th of June and the 25th of July, or even the 25th of August.

2. “This transplanted crop may follow some other

crop, such as early June cabbages, early peas, or potatoes, kidney beans, white peas, onions, &c.

3. "It saves much of the expense of after culture.

4. "It fixes a sure and regular quantity of plants upon the field."

Time and manner of Harvesting.

Mr. Cobbet here recommends, (after stating a variety of experiments,) "that the earth be turned off from the roots by an ox-plough, in dry weather, before the hard frost sets in, and then gathered by hand, which will save the expense and trouble of loosening them by the spade, and greatly expedite the work.

"The crop when pulled, may be secured over the winter in the usual manner of securing potatoes, either in the cellar, or in pits dug in some dry part of the field, and covered close and secure."

Uses and mode of applying the crop.

Under this head, Mr. Cobbet goes on with a lengthy statement, to show the following valuable uses to which this most excellent root may be applied to great advantage.

1. "As feed for cattle, cows, sheep and hogs, both raw and boiled, or steamed, (which is preferable,) or even poultry, when boiled or steamed.

2. "Cows that give milk, breeding sows, ewes with their lambs, and even pigs at weaning, are greatly benefitted by the use of Ruta Baga, especially when boiled, or steamed.

3. "This root far surpasses the turnip when fed off by sheep with hurdles, or otherwise, or by hogs upon the field.

4. "The tops, when cut before the roots are gathered, are valuable as green feed for all the stock mentioned above. An acre will yield about 4 waggon loads."

Mr. Cobbet next proceeds with an ingenious calculation upon the profits of a farm of 100 acres, with 12 acres of Ruta Baga, 15 acres of Indian-corn, 12 acres of orchard, under grass, three acres of early cabbages, an acre of Mangel Wurtzel, (or scarcity-root,) an acre of carrots and parsnips, together with such white turnips as can grow conveniently with his corn, after the last ploughing and hoeing; and forms this result.

“With these crops, which would occupy 32 acres of ground, I should not fear being able to keep a good house in all sorts of meat, together with butter and milk, and to send to market nine quarters of beef, and three hides, a hundred early fat lambs, a hundred hogs, weighing twelve score each. These altogether would amount to about 3000 dollars, exclusive of the cost of 100 ewes, and three oxen; and I should hope the trees in my orchard, and the other 56 acres would pay the rent, or interest, of the farm and labour, with the taxes.”

It will be noticed here, that Mr. Cobbet calculates to spend all his crops upon his farm, and thus secure to himself the advantages arising from the manure they would make. If any one should doubt the practicability of this plan, let him turn back to the Salem Alms-House Farm, and compare for himself; that farm had not the advantages of the Ruta Baga crop.

As Mr. Upton has not given to the public his particular mode of managing his farm, and feeding out his crops, I will supply its place by continuing this extract of Mr. Cobbet's proposed process, in detail.

“My feeding should be nearly as follows. I will begin with February; for until then, the Ruta Baga does not come to its sweetest taste; it is like an apple, that must have time to ripen; but then it retains its goodness much longer. I have proved, especially in the feeding of hogs, that the Ruta Baga is never so good, till it arrives at a mature state. In Februa-

ry, I should begin with my Ruta Baga as above ; my three oxen, which would have been brought forward by other food, to be spoken of bye and bye, would be tied up in warm and commodious stalls, well littered and cleaned frequently. The Ruta Baga, chopped into small pieces with a spade, and tossed into their manger, say two bushels per day, would make them completely fat, without the aid of hay, corn, or any other thing. If I killed one ox at Christmas, one in March, and one in May, they would consume about 260 bushels of Ruta Baga.

“ My 100 ewes would begin upon Ruta Baga at the same time, (February,) and continue until July. They will eat about 8lbs. a day each ; so that for 150 days, it would require 120,000lbs. of Ruta Baga, or 2400 bushels.

“ Fourteen breeding sows to be kept the year round, would bring 100 pigs in the spring ; they and their pigs would consume about the same quantity.

“ Three cows and 4 working oxen, would, during the 150 days, consume about 1000 bushels. I should then want 500 bushels of Ruta Baga upon each of my 12 acres ; (I have this year raised 600 ;) which may easily be done.

“ I am now come to the first of July. My oxen are fattened, and disposed of. My lambs are gone to market, a month ago or more. My pigs are weaned, and of a good size, and now my Ruta Baga is gone ; but my ewes, kept well through the winter, will soon be fat upon the 12 acres of orchard, and hay ground, aided by my three acres of early cabbages, which are now ready to begin cutting or rather pulling. The weight of the crop may be made very great indeed. Ten thousand plants will stand upon an acre, in 4 feet ridges, and every plant ought to weigh three pounds at least. I have shown before, how advantageously a crop of Ruta Baga might follow these cabbages, and so might a crop of buckwheat. My cabbages, together with my hay fields,

and grain fields after harvest, with about 40 or 50 waggon loads of *Ruta Baga greens*, would carry my stock well till December, (cabbages being planted at different times,) and from December to February, Mangel Wurtzel, or scarcity, with white turnips, would keep my sheep, cattle and breeding sows plentifully; and my 100 fattening hogs, would be more than half fat upon the carrots and parsnips; or I should keep my parsnips over till spring, and supply their place with corn for the fattening hogs; which would consume about 3 bushels to each hog to complete their fattening, the remainder should be reserved for sows when giving milk, or the ewes occasionally. Thus all my hay and oats, and wheat, and rye, might be saved and sold, leaving me the straw for litter; these surely would pay the rent or interest, and taxes and labour.

“ If it should be objected that I have taken no account of the mutton, beef and pork my house would consume, neither have I taken any account of the 100 summer pigs which the 14 sows would bring, and which would be worth 200 dollars.”

Mr. Cobbet goes on to state, “ that his stock would, in one shape or another, give him more manure than would amount in utility to a thousand tons weight of common yard manure, which would give 10 tons to the acre annually;” and thus concludes; “ It is better to have one acre of good crop, than two acres of bad. If the one acre can, by double the manure, and double the labour in tillage, be made to produce as much as two other acres; the one acre is preferable, because it requires but half the fencing, and little more than half the harvesting, with half the interest and taxes, as two acres.

“ A heavy crop upon all the ground that I can put a plough into, is what I should seek, rather than to have a great quantity of land.”

N. B. Mr. Cobbet has not noticed the profits upon young stock, with which he might have consumed his

hay, nor the culture of pumpkins, which are certainly a nutritious and valuable crop. Neither has he noticed the *method* by which he proposes to supply his farm with manure: doubtless his hogs would produce an abundance for all his purposes, if properly littered, and this would also surpass in value his earth, when burnt into ashes. These two manures, when combined, would support his system of farming for ever, without exhausting his farm. Mr. Cobbet very justly excludes the horse from the profitable stock upon his farm, and treats him as an article of luxury and convenience only. This doubtless will stand as a general principle, with very few exceptions.

If Mr. Cobbet had combined the profits of the dairy with the improvements of his other 56 acres, (as mentioned before,) his farm would doubtless have been more complete. This every farmer can do to suit his convenience.

In my former remarks, I have not noticed particularly the several rotines of crops used in England, because the crop of Indian-corn, which is so valuable in this country, is not known to them, and is not admitted into their system; they substitute barley, oats, peas and beans, in their fattening, for the Indian-corn, and arrange their crops accordingly.

I have given but one example, which includes Indian-corn, and every farmer can vary this example to suit his own convenience, or the particular state of his farm. He will readily see the necessity of preserving the due proportions, and regular succession in his variations. I shall conclude this remark on the routine of crops, with the following remark of Sir John Sinclair. "The most effectual mode of increasing and preserving the fertility of weak soils, is, by having a division of them in pasture, thrown out of the usual rotation for 3 or 4 years; and then brought in again, so that in the course of a 21 year's lease, each division, in its turn, remains in grass for a pe-

riod of time. Every part of a farm thus derives a proportional share of the advantage of being kept in grass, which is preferable to the plan of preserving one part of a farm constantly in grass, and the other in tillage. On the whole, the convertible system of husbandry, where a large proportion of a farm is cultivated for grain, and the remainder for grass and green crops, is in general to be recommended. By the grain crops, a sufficient quantity of straw is provided as food for cattle, or for litter to be converted into dung; whilst at the same time, a fair profit is to be derived from the grain. The superior advantages of that system, can only be questioned by those who have had no advantages of obtaining accurate information.

“ These departments of husbandry, when conjoined, (instead of being kept separate,) reciprocally contribute to the support of each other's prosperity.”



MAY.

Your Spring grains are now all sown, or about closing; and your Indian-corn now claims your first attention. I have before remarked that corn generally has been found to do best when planted upon one-bout ridges, with a deep ploughing, either upon long dung spread at large, before ploughing, or upon yard, compost, stable, or hog dung, put in the hill, (say one shovel full to the hill,) and the corn horse-hoed between the ridges, and hand-hoed upon the ridges, and thus preserving the ridges unbroken through the season. As this mode is seldom practised, being an innovation upon the ancient custom, I will cite a few reports to the Agricultural Society of New-Haven County, to show the practical correctness of my remarks.

INDIAN-CORN.

Mr. Mallet, of Milford.

“ When I plough my land for Indian-corn, I always lay it in ridges, whether it be sward or mellow, and plough the balks up to the ridges, and those ridges I never disturb by cross ploughing, while my corn is upon the land. I am fully convinced by my own experience, and that of almost all my neighbours, who pursue the same method, that one fifth more corn, at least, will be raised in this manner than in any other upon the same land.”

Mr. Holbrook, of Derby.

“ Upon experiment, I find the method of ploughing land for Indian-corn, heretofore recommended to the Society by Mr. Mallet, to be the best I pursue. I lay all my land, of every kind, in ridges, when I intend it for Indian-corn, and plough the balks clean, lay them to the ridges, before planting; I never disturb those ridges by cross ploughing. Any person can see by looking at the part of my field which I have treated in this way, and at another part of the same field, that was cross ploughed, that the part lying in ridges has much the advantage. I have always had full evidence the same way upon experiment.”

Judge Chauncey, of New-Haven.

“ I have planted 2 acres of Indian-corn this year. I ploughed in the manner mentioned by Mr. Mallet. The land has been mowed for five years past, and the sward is very tough. My crop is better than any of my neighbours have; and they agree with me that this method has increased it one third. From three years experience of this mode of ploughing for Indian-corn, I am fully confirmed in the opinion, that its tendency is highly beneficial.”

This mode of tillage saves about one half of the ploughing, and a very considerable expense in hoeing: it is therefore worthy of notice. Indian-corn is one of the most exhausting, as well as one of the most expensive, crops; therefore select your best lands for corn, and spare no pains to fit your land at planting, so as to get the greatest possible crops from a little land; this is the only mode that can render this crop profitable. It is always best for your corn grounds, to spread your dung at large, and plough, or ridge in; but this does not always insure so large crops as to dung in the hill. Farmers are generally agreed that one large pace, or three feet distance, for the rows of corn, is best; but they are not all agreed as to the distance of the hills in the rows. I have seen experiments made upon the hills, from two to six feet distance, and have heard them all extolled. I have generally found three feet distance of the hills, to be about right. If you take the precaution to steep your seed-corn 24 hours before you plant it, in strong tar-water, with salt, and roll it in plaster, it will fully repay your expense and trouble; besides the tar will keep off the crows and blackbirds, and save your corn from being pulled up. If you throw your corn promiscuously into the hill, it generally falls together, and will not admit of more than three stalks in a hill, to advantage; but if you place your seed at the distance of 4, 5, or 6 inches in each hill, you may let 4 or 5 stalks stand to advantage; children can drop your seed-corn, and thus save all extra expense. I have seen a publication of Mr. Benjamin Fowler, of Hartford, in which he states, that he raised 160 bushels of corn upon 155 rods of ground, dunged in the hill, at the rate of 6 loads to the acre. The one half of this corn was planted at the distance of 20 inches, and the other half 18 inches distance of the hills, with only one kernel in each hill, and the 18 inch hills did the best. This goes to prove the importance of

separating at some distance the kernels when planted in the hills, at the usual distance. This mode of Mr. Fowler's, gives only two kernels to the hill at the distance of 36 or 40 inches, whereas, by placing the kernels at the distance of 4, 5, or 6 inches as above, 3 or 4 stalks may be permitted to grow without interfering with each other, excepting by their shade, and if the suckers are removed at the third hoeing, (as was done by Mr. Fowler,) the shading would be greatly remedied.

It must be remembered, that Mr. Fowler rolled his seed in plaster, and ashed his corn at the first hoeing.

Indian-corn is an exhausting, expensive crop, and deserves every attention that will promote its increase, especially one that will give 160 bushels to the acre. Whenever ashes or plaster are put upon corn at the hoeings, they are found to do best when strewed around the hills, in a circle of 8 or 10 inches diameter, with the greater quantity near the stalks.

The best seed-corn, together with the best method of collecting, or saving it, you will find under October, the harvest month.

I have seen some good farmers plant potatoes with their corn, alternately, and with such success as induced them to follow the practice; I could never succeed in this mode, and cannot recommend it, unless the land is very highly manured, and from my own experience not even then.

Pumpkins are a rich food, for your hogs in September and October, and for your cows and cattle; they may be planted promiscuously with your corn, and do well; but as they are often too thick, in this way, to be profitable, they may be planted between the hills of corn, of every 4th row, and every 4th hill, upon a shovel full of rich manure, 2 seeds in a hill; they generally do best in this way.

Some authors recommend to sow turnips, thin, upon your last hoeing, and have confidence in it as

a successful practice, without damage to the corn ; upon this I have no experience.

Continue to plant potatoes through this month, as you may have leisure, to stock your fallows. A potatoe patch, with pumpkins near your hogs pen, you will find very useful, and convenient, in bringing forward your hogs. A very little attention through the summer will bring forward your hogs, so as to save your corn in the fall, and thus save your cash.

Your cions which you cut in February for grafting, now begin to expand their buds, and claim your attention. Select the most thrifty stocks, either in your field, or nursery, of 1, 2, or 3 inches over ; put two cions into each stock, and if they both grow, remove one the next year, this will give as much head to your tree as the two, and will heal over sound ; but if you suffer both to stand, they will never unite where they grow, and meet, and when they become loaded with fruit, they will open, or separate, so as to admit the rains, and thus rot, and ruin your trees ; you cannot be too cautious upon this head. Never graft two upright limbs upon the same stock, for the same reason ; either cut off the one, or cut and graft below both. Graft always as high as possible, to guard against cattle, and to raise the head of your tree, so as to admit the sun and air, as free as possible upon your undergrowth, whatever it may be ; it will also improve your fruit, both in size, and quantity. Mr. Forsythe recommends heading down large bearing trees, to change their fruit by grafting ; this will sometimes answer ; but I have suffered severely in the loss of thrifty, full bearing trees, of 10 or 15 inches over, in obedience to Mr. Forsythe, and cannot recommend the practice, unless you graft your tree partially, the 1st, 2d and 3d years, until you have accomplished your purpose, and I can say, that even this is not always safe.

Guard your orchards carefully against the nest-worms, at this season ; and if you discover any of

your fruit-trees to be unthrifty, or hide-bound, slit the bark with the point of your pen-knife, upon 4 sides, through the outer, but not through the inner bark (particularly stone fruit, which will destroy your trees,) from the ground up, as high as you can reach, and dress with a corn-basket full of chip dung, about the roots and near to the trunk of the tree, you will soon perceive the good effects.

Open, and ventilate your cellars, and clear them out for the season, and rinse clean, and bung tight all such cider-casks, as you wish to preserve sweet in your cellars over the summer, and free from must.

Weeds.

These are our common enemy, and nature has arrayed a host against us, consisting of more than fifty different nations of weeds, as marauders, to destroy our labours, and rob us of our crops. They enter our gardens and corn-fields unobserved, by night, and by day; they pillage, waste and destroy, more of our property than all the rest of our enemies, excepting rum and tobacco. Let us set our faces against them, watch them close, and extirpate the first, radically from our corn-fields, and the latter from our houses; then, and not till then, shall we have peace and plenty, with the voice of health, both in our borders, and in our dwellings.

Weeds are a noxious growth, quicker and more succulent than any of the grains, they therefore exhaust the soil more, and quicker than the grains, and they also rob all plants in their vicinity, of the fertilizing properties of the air, and thus doubly destroy your crop and interest. If you wish for any illustration upon this idea of nutrition afforded to plants from the air, examine such small trees as grow contiguous to large ones, or such corn or other herbage as grows near to a tree, or other corn, or herbage, which is greater; the lesser will take their growth in a di-

section from the larger, for the purpose of drawing from the air that nutrition, which the larger robs it of upon the side next to it.

Thus we see, that every weed that springs up in our corn-fields, becomes a tax upon our industry, or upon our profits, the first is necessarily so; it is a part of the original curse; the latter, which is not only the worst; but may become ruinous; is the immediate effect of our own neglect.

Weeds, when watched and extirpated in season, are subdued at a small expense, with little damage; but when neglected, their extirpation is attended both with expense and damage; thus, by neglect, we suffer a double loss. Worse than this.

One year's neglect, will cause seven years toil, and a seven year's damage; so, on the other hand, one year's close attention at weeding, will give seven years ease, with their profits: take your choice. To guard against this common enemy as far as possible, let me recommend the following attention.

1. Plant such fallows with potatoes, as are infested with wire-grass and noxious weeds. The plough and hoe together, can alone destroy this enemy.

2. Suffer no weeds to seed your fallows, either in autumn, or summer.

3. Be careful that your seed-grain is clean, and free from all foul seeds.

4. Observe the same in your grass-seed, when you stock down.

5. Pull out the docks upon your mowing grounds, before they seed and ripen, that they may not further foul your mowing, or be carted into your barn, and fed out with your hay, and thus foul your dung.

6. Remove every noxious weed from your hedges and fences, which can expose your fields to the effects of their seeds. Of this class, are the thistle, the dock, and burdock, &c.

7. Suffer no old tired field to lie waste, as a nurse-

ry for weeds ; the expense of ploughing will bear no proportion to the after expense of weeding.

8. Weed your corn with the plough and hoe ; not after the weeds are grown, but as soon as they begin to appear ; one crop is enough for one piece of land at one time, and if you suffer weeds to grow with your corn, you will in fact have but one crop, and that will be *weeds*, your corn will be only a nominal crop.

9. Weed your wheat, rye, barley, oats, flax and hemp ; the profit will be as great upon either of these crops, as upon your corn, and the expense comparatively small, (generally.) Try it and see.

Irrigation.

In my monthly remarks, I have noticed this species of tillage generally ; a few remarks a little more particularly, may be useful in this place. It is not my intention to give my remarks upon irrigation their full scope ; but to confine myself to such, only, as are adapted to the practical state of our own country. To make the most of this subject will many times require a large capital, even in England where labour is cheap ; but the expense of labour, together with the limited capitals of our own country, will not enable the farming interest generally, to extend their improvements by irrigation beyond such wash as they can convey from gentle descents in the highways, on to their adjoining mowing grounds, and such wash as they may occasionally turn on to their meadows, from brooks, or other small streams, by obstructing them with dams suitable for the purpose. This method of irrigation is both useful and valuable, and, when turned on to sloping grounds, may be multiplied very extensively at small expense, upon the catch-work plan, (so called.) Upon this plan, when the wash is carried over the higher parts of the field, (upon sloping grounds,) lead it back and forth at suitable distances ; remembering always to keep

your trenches as near to a water level as possible, and yet suffer the water to run, excepting at the turnings, where the water descends from one trench to the next below. Upon this plan, you can flow your grounds even, by cutting small openings from your trenches, and even obstructing your trenches occasionally, to promote the flow through these openings. The expense of this mode of irrigation is small; but the profits are doubly great, both in the quantity and quality of your hay; beside, both these profits will increase annually. No manuring will give such profits upon mowing grounds as irrigation, and the expense, generally, may be considered cheaper than plaster. Here let me repeat my former remark; make the most of this method of tillage in the winter and spring; it is then most valuable. Be careful to keep your cattle, horses and sheep, from your watered meadows: the first will injure them by poaching, and the feed will give your sheep the rot, and even their hay may be unfriendly to sheep, if flowed by great rains in summer. I shall close this article with a remark of Sir John Sinclair; "A productive water meadow, is probably the true mark of perfection in the management of a farm."—*Sinclair's Code.*

Remarks.

1. It is the easiest and cheapest mode of fertilizing *poor land.*

2. It promotes a perpetual fertility without the expense of manure.

3. It may be made to yield the greatest possible products, both in hay and pasturage.

4. It will greatly increase the means of the farmer to multiply stock, and thus enrich the other lands with manure.

5. It is within the power of almost every farmer to derive some advantage from irrigation; this, when better understood, will be more generally improved.

All alluvial lands enjoy the benefits of irrigation, and such as are upon the borders of large streams, that annually overflow their banks, derive a fertility from a warp, or sediment, which the waters deposit, which is peculiar to that description of land, and renders them peculiarly rich and valuable; such are the lands of the Nile in Egypt, the Mississippi, the Connecticut, &c. in America. The warp has formed by its deposit a large district of country in Egypt, called the Delta, and is constantly forming large and extensive tracts on the above rivers in America. Wherever this can be promoted by the assistance of art, it should never be neglected*.

* Since my remarks upon the culture of Indian-corn were in press, I have seen in the *Connecticut Courant* the following successful experiments upon the culture of that most valuable grain, which appear to be worthy of notice.

“*From the Cooperstown Journal, Oct. 25.*”

“*Agricultural.*—We are pledged to publish the mode of culture adopted by those who were the successful candidates for premiums on corn, &c. at the late fair in this County. We have accordingly selected the descriptions given by Mr. Hayden and Mr. Brightman, the former having raised 125 bushels and 26 quarts of corn to the acre, and the latter 109 bushels and 4 quarts.

“*Mr. Hayden's Statement.*”

‘The land upon which the crop was raised, had been occupied several years as a meadow, is of a flat surface, was ploughed first in October, 1818; in the spring following harrowed, and soon after ploughed and harrowed—then furrowed; the furrows being about 2 feet 3 inches apart. The seed was prepared by steeping it in a strong lye made of hog manure, for 24 hours; after which, the lye was drained off, and I added to half a bushel of seed, a half peck of plaster—stirring it until the corn was covered with plaster. The seed was then suffered to stand until it had grown an inch, when I planted in single kernels promiscuously at the bottom of the furrows, and then filled the furrows about half full of barn-yard manure, to which had been added about five loads of hog manure. In weeding time, I pulled out many stalks, leaving those remaining about seven inches apart. It was succoured once, and hoed three times.’

“*Mr. Brightman's Statement.*”

‘The ground is clayey loam and had been many years in meadow. About the middle of April it was ploughed very shallow, just cut-

JUNE.

Your whole business of Spring husbandry, both in the field and the garden, is now closed, and your fences are all in good repair. You will now enter with spirit upon the culture of the Potatoe. You have doubtless planted a good supply for the table and early feeding; and the time is now come when you have an opportunity to enter extensively upon the culture of this most valuable root, as a part of your field husbandry, for the use of stock and the market; particularly upon your fallow grounds. It is true, the potatoe may be planted at any time after the ground is free from frost, but it will not vegetate until the ground becomes warm. It is also true, that the potatoe called the English white, may be planted with success upon rich ground, as late as the 20th of July; very extraordinary frosts excepted.

My remarks on this most important branch of good farming will be; 1st, On the value of the different kinds of potatoes, and their use; 2d, The different soils to which they are adapted; 3d, The manner of planting and hoeing; 4th, The time and manner of digging and housing them.

1. The English white, Irish yellow, common red, red rusty-coat, yellow rusty-coat and purple potatoes, are the most farinaceous, produce the greatest

ting through the sward, I then carried on to about an acre and a quarter, thirty waggon loads of good barn-yard manure, and ten waggon loads of chip manure, then gave it a deep ploughing and harrowed it down. The whole of the ploughing was 4 times, and harrowing was performed as often. About the middle of May, I disposed the land into ridges about 3 feet apart. After levelling the ridges with the hoe, I planted the corn on the ridges at the distance of eight inches per grain apart. It was hoed in the usual manner 3 times. Previous to hoeing the last time, the succours were all taken off, immediately following with the hoe, and covering up the wounded stalks, which I think was of essential service to the crop by preventing them from emitting their juice. The corn that I planted was the small 8 rowed white corn, intermixed in a slight degree with the yellow.' "

quantum of starch, and are the mildest and best for the table; the Spanish or hog potatoe, (so called,) is the most inferior, both for the table and market, and is fit only for stock. The coloured potatoes require the strongest soils, and will not admit of late planting, as they require the longest time for their growth; they should generally be planted between the first of April and the middle of June; the white and yellow potatoes will do well as late as the 20th of July; they will obtain a good size by the 20th of September. It must be understood, that this late planting requires a rich soil. I have generally found, that lands of any description of soil, that will produce 20 bushels of corn, will produce 100 bushels of potatoes; allowing 1 dollar per bushel for the corn, gives \$ 20 00
 25 cents per bushel for the potatoes, gives 25 00

Leaving a balance in favour of the potatoes of \$ 5 00

This, in the same ratio, if the land will yield 40 bushels of corn, will give a balance in favour of the potatoe crop of \$ 10; together with another advantage, too important to pass unnoticed. Indian-corn may be considered as one of the most exhausting crops, and potatoes one of the least.

When it is considered, that the true art of farming consists in obtaining the greatest profit from an acre of land without exhausting the soil, or rather by culture to increase its fertility, the balance will be found, in an increased ratio, in favour of the potatoe crop.

No field culture admits of a greater variety than that of the potatoe; some farmers select the largest for seed, and plant one in a hill; others select the smallest, and plant several in a hill; some divide the largest potatoe into two parts, and plant one half in a hill; others both halves; some divide both the large and small potatoes into four parts, and place the four pieces in the hill at 4 to 8 inches asunder; others cut out the eyes of the potatoe, and plant them

promiscuously, as they plant Indian-corn, 4, 5, or 6 in a hill, and thereby save the potatoe for their stock; I have found all these modes to answer well, and have heard good farmers extol each of these modes as being the best, according to their practice. To illustrate this subject, I will give an extract from the Pennsylvania Farmer:

“On the 2d day of May, I had six large potatoes that weighed 2lbs. and 2oz. cut into thirty-three sets, with two eyes each, which were planted in a stiff, deep soil, with a small quantity of rotten dung scattered under and over the sets, which were placed about 6 inches deep, at the following distance in the rows, divided by pegs:

No. 1, 11 cuts, at 6 inches distance.

No. 2, 11 do. at 9 do. do.

No. 3, 11 do. at 12 do. do.

They were hoed twice. On the 10th of October, the earth was carefully drawn from off the plants, which were extended across the rows. The produce was as follows:

No. 1 contained 124 potatoes, which weighed 28lbs. 10oz. and occupied 6 feet in length.

No. 2 contained 130 potatoes, which weighed 32lbs. 2oz. and occupied 9 feet in length.

No. 3 contained 145 potatoes, which weighed 31lbs. 2oz. and occupied 13 feet in length; total 91lbs. 14oz. or 123cwt. to the acre*.”

* All Nature is governed by fixed and immutable laws, or principles, and the true art of husbandry consists in a correct knowledge of the laws, or principles, of each plant, either separately, or collectively, in connection with other plants, and in adapting the culture directly to the assistance of nature.

By this example it will be seen, that the potatoe does not strike deep in the earth; but extends horizontally, at a given distance, beneath the surface, where it can derive its proper nutriment from the sun, air and rains; if you plant below this natural state, or earth up your plants by hilling too much, you counteract nature, and check the growth of the first settings, by covering them below their natural depth, and if you hill up your potatoes too often, you will increase the number of potatoes in your hills; but they will be small, for they will form new sets at each hoeing; therefore, hoe but twice, if it is possible to keep down the weeds without a third hoeing.

This result corresponds with my own experience for many years, and deserves attention, by its saving in the expense of seed. If 4 sets were placed in the hill, at the distance of 5 or 6 inches asunder, and the hills 3 feet apart, they would probably produce as many pounds of potatoes, with a handsome saving of expense at digging. Some farmers cart on 10, 15, or 20 loads of long dung, and spread it on the field, and ridge it in, by lapping two furrows together, and plant their potatoes on the ridges in hills, from 2 to 3 feet asunder; hoe the potatoes twice, upon the ridges, and keep the ground clean with the plough, between the ridges, in the furrows; others plough up the land smooth, and strike out the ground into furrows of 3 feet asunder, set the potatoes (when cut into one or two eye sets) at 10 or 12 inches distance, in each furrow; cover them lightly with the plough, and keep the land clean by ploughing up to the rows two or three times, as the season may require. In autumn, they turn off the earth from the rows with the plough, and dig with the hoe, this answers well; but I have found an increase of labour in digging. Some farmers plough up their land smooth, and strike it out with a plough into squares of 3 feet, rank and file, after the manner of planting Indian-corn, and plant at the corners, and cover with the hoe; others make holes with the hoe, from two to three feet distance, manure with farm-yard, or hog manure, or roll the potatoes (when cut and wet,) in plaster of Paris, or throw into the hill with the sets, about a table spoonful of plaster; this upon a gravelly, or sandy soil, answers well. I have found this mode produce from 1 to 300 bushels the acre. Should you neglect either of these modes of manuring at your planting, you may dress your potatoes with a table spoonful of plaster, or a handful of live, or leached ashes, at the first, or second hoeing, with great advantage, upon a dry soil. These are the common modes of cultivating the potatoe.

Two important modes of cultivating this most valuable root, claim the particular attention of the farmer, who is in earnest, and regards the best interest of his farm. The first is as a fallow crop. Many years experience enables me to say, that land which will produce 8 or 10 bushels of rye, will produce 100 bushels of potatoes; the difference of expense between one ploughing and two hoeings, for an acre of potatoes, exclusive of the seed and digging, and two ploughings for a fallow, is not very great; the profit is 100, 150, or 200 bushels of potatoes, according to the quality of the soil; with the assurance, that the grain crop will rather be increased than diminished by the potatoe fallow, provided the potatoes are dug, and the rye sown, early in the month of September, or the wheat before the 1st of October, which may always be done with the English whites, if planted before the 20th of June. The true value of this mode of tillage, will consist in the increased quantity of stock it will enable the farmer to keep, and the increased value which he may derive from his manure from this stock in his general tillage. Potatoes, when planted on the same ground successively more than 2 years, will not do well; but when used as a fallow crop will continue to do well.

The second mode alluded to as above, is, that clover lands, or even English-sward, after the first cutting, may be turned over, and planted with potatoes, with assurance of a good crop, provided the land be in good heart, and the seed of the English whites, and the planting be finished between the 1st and 20th of July, with one or two hoeings, as the season may require. This mode of tillage, gives the farmer not only a double profit upon his ground, but a double advantage in keeping his stock, and prepares his ground for a spring crop, as he may choose; or he may even sow wheat to advantage after the potatoes, if the sward is not too stiff.

Although the potatoe originated in America, and

was not known in Europe, until after the discovery of Columbus in 1492; it was little known in the husbandry of our forefathers; so late as 30 years ago, if a farmer raised 100 bushels of potatoes in a season, it excited particular notice; and now they are become one of our best crops, and our farmers often raise 1, 2, or 3000 bushels the season, which always command a ready market, and a fair price. The value of the potatoe in feeding beef cattle, hogs, sheep, horses and cows, is found, by the experience of the best farmers, to exceed in value any other feeding; even the Indian-corn. No feeding will afford that strength and support to working cattle, and enable them to bear the heat so well, as the potatoe. When I come to treat of stock particularly, I shall show in minute detail the practical calculations of the best farmers, both in England and America, upon the use and value of this most excellent root. Now is the time to prepare for your fall and winter feeding; no farmer ever raised too many potatoes, and probably too many never will be raised.

The farmers of our country have too much good sense and judgment, to render it necessary for me to say, that great care should be taken to select the best of every crop for seed, and that the several kinds be kept pure and unmixed. The good, resulting from this, must be too evident to have escaped the notice of the most ordinary farmer.

The carrot is the only root that can vie with the potatoe, both in the profits of its culture, and utility for feeding; but this requires that nice mode of husbandry, which renders it too difficult and expensive to be extensively raised, so long as the price of labour is so dear in our country. A few hundred bushels may be easily raised by farmers generally, in the kitchen-garden, with very little extra expense, under a proper management; but as the season for the culture is past, I shall defer my remarks upon this root, together with the mangel wurtzel, and other roots.

until I come to treat on gardening generally; I shall then give the subject a particular discussion, both as to the best practical modes of culture, and the best practical calculations upon their value and use in feeding.

Let me close this number with one general exhortation. Plant as much of your fallow grounds with potatoes, as possible; break up, after mowing, such sward as you design for tillage the next season, or such as you would wish to sow with winter-wheat, and plant it with the true English white potatoes; you will find your advantage in it. One hoeing will answer upon the sward ground; but two hoeings are best for both sward and fallow grounds.

Clover and Tillage.

This has become a most valuable and important branch of husbandry, both as an article of tillage and feeding, particularly for the use of horses; but I shall defer all remarks upon its value in feeding, until I come to the subject of Stock, and treat only in this number upon the value of clover as an article of tillage, and the mode best adapted to its cultivation. The red clover strikes a deep tap-root like the carrot, and when designed for tillage, should be sown separately, without herds-grass, or any other mixture, 4 or 5 quarts to the acre; it may be sown broad-cast, after the manner of wheat, in autumn, with the winter grains, or in the month of March, upon the winter grains, or with the spring grains, or upon the spring grains after they have made their appearance, or even with buck-wheat at midsummer: long experience has proved all these modes to do well; but the buck-wheat is the most uncertain; when the crop is thick and stout, it is very apt to check and smother the young clover, and leave its tender fibres exposed to the frosts of winter, which often prove fatal to it. If you are constrained to sow your clover with buck-wheat,

sow the buck-wheat thin ; and what you sacrifice upon the buck-wheat crop will be gained upon the clover. Never cut your clover the first season, nor feed it too close, both are an injury to it ; but the second season cut your clover when in full bloom, when not more than one fourth of the heads begin to turn brown, which will generally be in the month of June. The cutting and curing of clover is very nice and critical farming, and demands the first attention. The heads and leaves of clover are its principal value, the stalk when coarse, is of little use ; therefore, in order to preserve the most valuable parts, cut your clover in dry weather ; and when the dew is dried off from the first swaths, turn them over gently, without spreading, until you come to the swaths which are free from dew, let those lie untouched until noon, unless showers, or a storm become threatening ; in this case, break off your mowers, and get your clover from the swath into small cocks. Let the cocks be made with the fork, with only once or twice rolling ; but if the weather continues fair, let your mowers keep on and your haymakers follow with their forks, and put all the swaths into small cocks. The next day let these cocks stand, and go on cutting as before ; proceed thus until you have secured your clover. In two, three, or four days, as the weather may be, the clover first cut will be fit to cart, if the weather proves fair, if not, the rains will never penetrate farther than the winds and sun will dry ; the clover will be injured only upon the surface. Should a long cloudy, or moist turn of weather succeed, you may give your clover air, by taking off the top of each cock and placing it for the bottom, and thus with your fork change the order of your cocks by bringing the bottoms to the top, this mode will cause your cocks to shed rain better than the common mode of turning them over at once with the fork. When you find your clover sufficiently cured for housing, take the first good hay-day, turn over your cocks in the

morning when the dew is off, and as soon as the moisture is dried from the bottoms, clear your field as fast as possible; thus you will secure all the valuable parts of your clover: viz. the heads and leaves, in full blossom, and as perfect a green as when growing; and your horses will hold their flesh and do more service on this clover, without grain, than on clover cured in the common method with the usual quantity of grain, and you will readily experience the saving in expense, which, although of importance, will be found to be of minor consideration in this mode of husbandry*.

A few loads of clover may always be housed in this mode with safety; but if your fields are large, some precaution will become necessary to guard your mows against heating, which is not only injurious to the clover, but will prove injurious to your horses, and give them a cough. To prevent both these evils, let your

* If you sow your clover thin, with only 2 or 3 quarts of seed to the acre, (as is the practice of some,) it will be of an inferior quality; the stalk will grow large and rank, and require more attention in curing; therefore, never sow less than 5 or 6 quarts to the acre. Whenever your clover has sweat and cured in the cock, so that you can select the largest stalks, and twist them like a string, without their emitting any moisture upon the surface, when twisted, you may then house your clover; it is in its most perfect state. If you sow timothy, or herds-grass with your clover, you may manage in this way, for the first year, with safety—the second year it will become about one half timothy, or herds-grass, and must be spread and turned gently, to preserve as much as possible the heads and leaves of your clover: the third year, your clover will disappear, and the herds-grass must be spread and cured in the common mode; I say the common mode, for I presume that every farmer spreads his hay into 3 swath winrows; (unless it be heavy English grass, of 2 or 3 tons to the acre, which will occupy all the surface of the field on which it grew, to cure it;) this saves the expense and trouble of one raking, and that he spreads in the forenoon all the swaths cut before 12 o'clock, (leaving the swaths cut after 12 o'clock, to continue in the swath until the dew is off the next morning,) and that he gets into cocks, before 5 or 6 o'clock in the afternoon, all the hay spread upon his field. The fermentation which hay undergoes by standing in the cock over night, not only sweetens the hay, but prepares it for a more rapid evaporation of its juices the next day, and will doubly pay the expense of cocking, besides the security it affords against bad weather.

clover stand in the cock a day or two longer; open it carefully when you are ready to cart, *without spreading*; let your bays be open under the bottom, for a free circulation of air; fill several large bags with hay, set them erect upon the floor of your bays, mow the clover around them with as little treading as possible; raise up the bags with the rise of your mow, and when your mow is finished, remove the bags; these openings will serve as ventilators, and secure your mows from heating. If you reserve your wheat or rye straw for this purpose, and cover your clover occasionally, as you mow it, with straw; your straw will not only prevent your mow from heating, but imbibe the moisture of your clover, and become valuable feed for your horses and cattle, and thus become a double saving. One bushel of salt sprinkled upon your clover as you mow it, will preserve it against heating, and doubly repay you in the value it will give to your hay. When your clover is housed, you may turn in the sward the first or second year, and plant potatoes for a wheat fallow, or feed lightly the second growth; but never mow it, if you intend to cut it again the next year. The first and second years, your crops will be good, the third will fail, and the clover will die, unless you dress it with manure that will bring in other grasses. The death of your clover, leaves your land enriched by the decay and putrefaction of the roots, and thus, after the crops have rewarded liberally your expense and labour, your land has risen in the value of its tillage, and is better prepared for the next routine of crops than before.

All farmers of celebrity are agreed, that the true and first principles of good husbandry, consist in manuring, ploughing, and a proper routine of crops. I shall defer my remarks upon manuring until I come to treat upon the subject of compost, and manures generally, and confine my remarks in this number to the article of clover and tillage. If it is your wish to combine the improvement of your stock generally

with the improvement of your tillage, sow with your clover 4 or 5 quarts of herds-grass seed to the acre; dress it in the fall or spring with about 3 bushels of plaster of Paris to the acre, if a light or gravelly soil, or with 8 or 10 bushels of live ashes to the acre, sown upon your grass, or 10 or 15 loads of good yard, stable, compost, or hog manure, if a clay or moist soil. If it is your wish to continue your field for mowing, dress it again the 3d year as at the first, and so on successively; but even in this case, be careful to avoid a second cutting until the 3d year, (and even then, you will do well to omit it,) and feed lightly in the fall; a good coat of feed upon your mowing grounds over the winter, is next to a good coat of manure, and should be preserved as far as possible. Let not a hoof enter your grass grounds in the spring, particularly sheep and horses; the damage will be greater than in June. Whenever you turn up your grass grounds for tillage, be sure to plough as deep as possible, this will not only give a good depth for your corn, or potatoes, to extend their fibres, but will lay your sward deep to rot, and thus give you a deep rich mould that will not soon be exhausted by tillage, and insure you more successful crops. The value of clover, when cut and fed green in summer, or when housed and fed in winter, together with the most approved method of feeding with it, either with or without straw, I shall consider under the article Stock.

Manures.

The basis of good husbandry, are labour and manure; these rightly applied, will always insure good crops. You have disposed of all your winter manures, from the farm-yard and hog-styes, undoubtedly, to the best advantage; the time has now come to attend to your summer manures; to dress your lands in autumn. Let your hogs be enclosed in an open

pen, near to, or in one part of your barn-yard; throw into this the scrapings of your barns, together with every vegetable substance that will putrify and rot through the summer: plough up and cart in occasionally, such earth as can be collected from your ditches, or old sward balks; your hogs will root and mix them together, and thus, with a little attention, you may obtain 20 or 30 loads of the best manure, or much more if your hogs are numerous and receive your attention. You will find an advantage, both in the growth of your hogs, and in the quantity of manure, if you sow half an acre, or an acre, of clover on a rich soil near the barn-yard, and begin to cut early for feed for your hogs; it will be found both cheap and profitable. According to the best practical calculations, it will give a profit of \$ 30 per acre, when cut green and fed in the barn-yard, either by horses, cows, cattle, or hogs, besides the profits upon the manure. If you are in earnest about your farm, you may carry this mode of making manure to any extent, by mowing and carting in your stout stubble; collecting and carting in your coarsest hay, pumpkin and potatoe vines, corn bottoms, husks, &c. The same materials will yield you a stronger and richer manure from your hog-pens, than from the stercorary, (as is practised in England,) and without the expense of shifting, or changing it by hand, as in the stercorary practice. Your hogs will do better than in a close pen, and the same land, in clover, will yield them more and better feed, than in pasture; and the manure thus obtained from the clover-field, will give you a handsome profit. A little experience will soon lead every farmer to make the most advantage in this way, which may be rendered very extensive.

Most farmers yard their cows at night, through the summer; their manure should be collected into a heap, in some convenient part of the barn-yard, to prevent its being wasted by the sun and rains; a few minutes attention in the morning, when the cows

are turned out to pasture, would collect a heap of several loads in a season, ready for your wheat, or grass grounds in autumn. If you should cart on, and cover your heap occasionally, with a load or two at a time, of rich earth, (where it could be spared,) it would commix with the manure by fermentation, and become rich compost, and thus increase your quantity and your wealth. If you stable your horses occasionally, or generally, in summer, let this manure also be conveyed to your heap, it will improve its quality, by being mixed with the other manure and the earths. Four good loads of this manure, will dress in the hole an acre of Indian-corn, or potatoes, and upon an average double your crop; this is no small advantage; and a careful farmer will not neglect it. Ten loads of such manure, spread upon your grass grounds in autumn; may be considered equal to 15 or 20 loads of farm-yard manure, laid on in the spring, especially if the season in the spring, or summer following, should be dry. The best form for constructing your farm-yard, either with or without sheds, and the best mode of preparing the farm-yard in autumn, to receive the stock for winter, and collect the greatest quantity of manure, I shall treat of at large under the article Stock.

Indian-Corn.

The season is now past for planting your Indian-corn, and it is to be hoped that you have ploughed deep, upon a well spread coat of manure, or planted your corn with a shovel full of rich manure in the hill, or rolled your corn in plaster of Paris, or put in a large spoonful of plaster into each hill; but if you have neglected all these sureties for a good crop, you may correct your error in this month of June, by dressing your corn-hills at the several hoeings, with a handful of plaster, or of live, or leached ashes, which will greatly benefit your crop; particularly upon

lands of a light and gravelly soil. This practice of dressing the hills, does best when applied at the first hoeing, and repeated again at the third hoeing; the first brings forward the stalk, and the last the ear. When you weed your corn at the first hoeing, turn off the furrows from the hills with your plough; this will leave a ridge of light loose earth between the rows, which will be prepared to dress your corn with, by ploughing it up to the hills at the second hoeing. At your third hoeing, or hilling, strike a deep furrow between the rows, and haul up the earth to the hills with the hoe; but keep your plough as far from the hills as possible, that you may avoid the extended fibres of the roots, which, if cut with the plough, would injure your corn. Avoid the corn-harrow at your first weeding, as is practised by some; this leaves the earth close, or heavy, and dead between the rows, and injures your crop. Be sure that you finish hilling before your corn begins to silk and tassel, (or blow out, and set for the ears;) nature should then be left to herself undisturbed, or your crop will be injured. The *farinæ*, or blossom, upon the tassel, is as small and light as the finest flower; this, when ripe, falls off gently, and lodges upon the silk, which surrounds the cob; this again, the husk by its progressive growth, covers and protects from the weather, or other injury; each particle of *farinæ* becomes a kernel of corn, adheres to, and is nourished and supported by the juices of the cob; whatever disturbs the corn in this state, shakes off the *farinæ* irregularly, and renders the filling out of the ears irregular. The *farinæ* of Indian-corn are so extremely small and light, that they have been known to float in the wind, and mix in other fields of corn of different kinds, at the distance of 80 or 100 rods*.

* If your corn is planted on ridges, upon manure spread at large upon the ground, and covered with the plough, preserve your ridges unbroken through the season; horse-hoe the furrows, (a plough with

Pasture grounds and Fencing.

These articles are of high importance in good farming; but perhaps of the smallest consideration in the estimation of the American farmer. If ten, fifteen, or twenty acres of rough, half-fenced, undrained, or dry and unwatered pastures, were, by clearing, draining, watering and fencing, rendered as productive as one hundred acres now are, in their present neglected state; 80, 85, or 90 acres of the remainder might either be applied to tillage, with advantage, or bring an additional revenue in the same ratio, if continued in pasture; both by the increased number, and value of the stock they would feed.

Fencing is a certain ratio of expense, rent and interest, the farmer pays for the use of his lands. If the profits upon an acre of ground, exclusive of the expense of tillage, give \$ 24, and it costs the farmer \$ 6 per annum to maintain the fence; then his clear profit will be \$ 18; but if with the same expense of fencing, his field brings him but \$ 12 clear upon his tillage, he then gains but \$ 6; this is paying interest with a witness. If he neglects his fencing, his whole crops, however valuable, may be destroyed; this is sinking both principal and interest; therefore, enclose no more land than you can both fence and improve well.

Would you make the most of your farm, apportion as small a part as possible to pasture, and multiply the value of this, by intersecting it with cross-fences into as many enclosures, of 2, 3, 4, 5, 6, 8, or 10 acres each, as may be found best, according to the situation and size of your farm, and the number of your stock; and according to the situation of your brooks, springs, or other conveniences for watering; thus you may mul-

a double mould-board would answer well,) and earth up your corn on the ridges with the hoe, the roots of your corn will extend upon the ridges unbroken by the plough, and derive the greatest possible benefit from your manure; the labour will be less, and the crop much better than in the usual mode of ploughing across the ridges.

tiplify the value of your pasture grounds by frequent changings, and your stock will have a regular succession of fresh feed, untrodden, and otherwise uninjured; the advantages of this will soon be perceived in your stock generally; but will be most evident in your dairy. Your cows are the prime object of your pasture grounds; therefore never suffer your horses or sheep to enter your dairy pastures; they not only crop close, and thus protract the time for the regular successive croppings; and also, expose your pastures to the scorching rays of the sun, especially in time of drought; but they also select the finest and choicest feed, which will afford the greatest nutrition to your cows, and thus destroy your best interest. Your division fences in your pastures, designed for your cows, or cattle, and horses, may be made light, with two or three rails only, if of a good height; no adjoining crops of tillage will induce your stock to break out of their enclosure; but your fences dividing off your pastures from your tillage enclosures, cannot be too secure; you may then till with safety, and rest with security, without damage, or anxiety. Where water is scarce and difficult to be obtained for your pastures, (when multiplied as above,) you may select some small stream, spring, or pond, or even a reservoir of water, such as an artificial pond, or large trough, supplied from some neighbouring spring, and enclose your pastures so as to have four or more enclosures centre in, or upon the brook, pond, or reservoir, and thus secure water for the whole. I have seen careful farmers, water 50 or 60 acres, or more, (from one pond or spring,) when divided into separate enclosures in this manner. A little experience will soon show the value of this mode of improving pasture grounds, and lead to a practical knowledge highly interesting, and valuable to our country.

Plaster, or live ashes, sown upon your pasture grounds, will not only repay a handsome profit, by

increasing the quantity and value of your feed, by bringing in the finer grasses, such as white clover, &c. but will greatly improve your lands for a potatoe fallow, and a succeeding wheat crop, whenever you may wish to take a proper advantage of a rotine of crops.

In some parts of our country, the pasture grounds are infested, and too often overrun with the white birch, thorn, and other noxious shrubs; my own experience will not enable me to say, what are the best and most effectual methods of clearing, and preventing a successive growth; the owners of such lands might soon ascertain this, and carry it into effect; this is the most slovenly part of our husbandry, and must be cured. Bushes cut in the old of the moon in August, and the sign in the heart, generally die.

Such arable lands, as are worn down by bad tillage, and upon the dry and hilly parts of your farm, you may reclaim by sowing white clover with oats, two or three pounds to the acre, and devote them to the pasture of your sheep; half a bushel of plaster, or a bushel to the acre, sown in the spring, or fall, would richly repay the expense and trouble, both in your feeding, as well as in your successive fallow and grain crops. The value of this mode of husbandry in fattening your sheep, and bringing forward your lambs, I shall consider under the article Stock.

One more hint upon pasturing, will close this number. If your pasturing is short in proportion to your stock and arable lands, break up early in the spring, such fields as you design to fallow, (without a fallow crop of potatoes,) and sow a bushel of spring, or winter rye, or one and a half or two bushels of oats to the acre; they will spring quick and yield you a rich and profitable early feed for your sheep, or cows; in July, or August, you may feed close and cross-plough as usual, without any apparent injury to your successive grain crop; particularly if you dress your field at sowing, either in the spring, or autumn, with one or two bushels of plaster to the acre.

This, amongst many others, goes to assist the farmer to take every possible advantage of the several parts of his farm, at each successive season of the year, with the greatest success, and profit.

Coarse or bog meadow, by draining, may be converted into pasture grounds, which for a time will become more profitable; but with a little attention in cutting up the bogs, and keeping them down smooth, with a common bog-hoe, such lands may be greatly improved in their pasturage state, and by the assistance of manure, they may be reduced to mowing of a good quality, at a very small expense; 10 bushels of lime to the acre would do well. If it should be necessary to carry your drains across your plough lands, where an open ditch would obstruct your ploughing, waste your grounds, and become foul with noxious weeds, which by their seeds would also foul your lands; you may lay a cheap covered drain to prevent these evils, in the following manner, viz. dig your drains with as much descent as possible; lay upon the bottom an oak or chesnut plank, 12 inches wide or more; cover it with two others, 6 or 8 inches wide or more; let the covering pieces rest together at the top over the centre of the bottom plank; fill up your ditch, and till as before; such a drain is both cheap and easy to be laid, and also to be kept free; the tillage upon the ground where it passes, will soon repay, and if your drain is conveyed into other mowing, this also will richly repay.

Arable Lands.

In the course of my remarks, I have noticed particularly the subject of pasturage, mowing, and the tillage of arable lands, with a reference to their general and particular cultivation; both in regard to their present profit, and future improvement in value.

The subject of arable lands, as regards the general improvements of a farm, shall now claim some attention.

Here, let me repeat again my former remark. Labour and manure, are the basis of good farming.

Is your farm so situated, that it may be cultivated upon the principles of a general routine of crops, (as before laid down,) enter immediately upon this system, and let this be your plan :

1. Assign so much of your farm to the purposes of the plough, as you can manure well, either with plaster, or the stronger manures, as before mentioned, (*see article Manure.*)

2. Keep no more lands under grass, for mowing, than you can consume upon your farm with profitable stock, unless in the neighbourhood of some large town, where the sale of your hay will buy you manure.

3. Keep no more stock upon your farm, than you can keep well, either by pasturage, or soiling, and for the following reasons :

1. Because one acre of plough land, well manured, will yield twice or thrice the product, as when tilled without manure. For instance, suppose you have 20 acres of rye and wheat fallows, in a steady way. Put 5 acres to clover, with plaster, the first year; and put 5 acres more to clover the second year; cut the first 5 acres of clover, and feed it upon your farm; continue to feed out your clover upon your farm, and put the dung your clover has made, upon such part of the remaining 10 acres as may need it most; sow grain as usual, and the next year, viz. the third year, stock down 5 acres more with clover, and turn in the first five acres of clover, which you stocked down, to supply the place of the third 5 acres you have now stocked down. Thus you will have 10 acres of clover, and 10 under the plough, or in grain in a steady way. After one rotation in this way, your 10 acres kept under the plough, will yield you more grain, and of a better quality than the 20 did before; continue this practice, and, in a few rotations, the 10 acres will yield you double, or treble to what the whole 20 did

at the first, in the old way. Should you increase your stock, in this way, beyond the extent of your pasturage, multiply your pasturage, as much as possible, by division fences, (*see pasturing*,) and convert a part of your clover fields to a temporary pasturage; this will improve their quality when under tillage again. In a few years, you may derive more profit from the stock *only* upon your farm in this way, than the whole product yielded before, and a double profit upon your tillage grounds at the same time, together with the aggregate rise upon the value of your farm generally; in addition to all this, you will live better and much easier; try it and see.

I am sensible that it will require some capital to enter largely upon this method of farming; let this be no bar to the system; if you possess the means, enter upon it with spirit and liberality; its principles are founded upon the broad basis of common sense and common practice, both in England and America; it will repay you faithfully and liberally. If your means are small, enter upon it by little and little, as you can proceed without getting into debt, (I here repeat again, *farmers must never be in debt*.) When you buy stock for your purposes, buy cows; they will increase your stock with the least expense, and the *best*, as well as most *immediate profit*.

It is a common reflection of our country, upon the general system of bad farming, now in common practice, that we run over a great deal of land, half fenced; half ploughed and half tilled, at great labour, toil and expense, without order, calculation, or method; and finally, without profit; and that we obstinately persist in this, because our *fathers did so before us*. The truth of these reflections I acknowledge, and have offered a system which will completely correct the error; but the reflection upon our *fathers*, I resent with spirit and indignation, as both cruel and unjust. Our fathers were the wisest, most virtuous, hardy, industrious, economical and valiant race of

men, that ever constituted a community. Would you realize the truth of this remark, look at the face of the country which they subdued; the foes they vanquished; the civil, religious and literary institutions they founded, and transmitted down to us, and which we so richly enjoy. These reflections upon our fathers, are used indiscriminately to prejudice our minds against the characters of our fathers generally, and as much against their excellent institutions, as against their system of husbandry. Vindicate their excellent characters, by preserving their wise institutions, as well as by correcting their system of husbandry; not because this was bad in them, but because it has become bad in us, under the changes the face of the country has undergone since their days, and under our bad tillage. Let us remember, that this system of husbandry which I have laid down, would have no more, and no better, applied to our fathers, than to the present inhabitants of the fertile wilds of Illinois. The soil was alike with both, in a rich virgin state, the more corn they could plant, and the more wheat they could sow, the more profits they derived from their farms; so, that what in them, under that rich state of soil, was good farming, has become to us, under the exhausted state of the soil, bad farming. Let this apology pass to the credit of our fathers; but let it not be used as a cloak to cover the obstinate practices of imitation, in any of their descendants. The times are changed; the face of the country is changed; the quality of the soil has changed; and if we will live as well, and become as rich and respectable as our fathers, we must cultivate their virtues; but abandon their system of farming, and reclaim their lands, which have become exhausted by bad tillage, in passing down to us; this can easily be done by labour and manure, under a regular routine of crops, with large and flourishing stocks of cows, cattle, sheep and hogs, with as few horses as the nature of things and circumstances of our

farms will possibly admit. The horse is a useful and valuable animal in the service of man, and his services are indispensable to his comfort and convenience; but he is the most unprofitable stock upon your farms.

1. Because his high price exceeds all proportion to his productive labours.

2. His expense in raising, exceeds all probable calculations upon the profits of his sales in market.

3. His support requires such feed as robs your dairy; your beef-cattle and hogs, for fattening.

4. He yields you no substitute for your dairy, beef and pork.

5. He is more liable to disease and accidents than other stock, and at his death, becomes a dead loss. He does not, like the sheep, even leave a fleece in payment.

Whenever you keep, or raise a horse, let him be a good one; such, and such only, will afford you any profit, either upon your farm, or in market.

I shall conclude my remarks upon arable lands, with the following observations of Sir John Sinclair.

“The advantages to be derived from the alternate, or convertible husbandry, cannot be too much dwelt on. None but those who have tried it, can be fully aware of the vast improvements effected, by laying down old ploughed lands into grass, as well as converting old pasture lands into arable; (*see my remarks, article Pasture.*) If one million of acres of old tillage lands were gradually laid down into herbage, and the like extent of old pasture, broken up and put under a judicious routine of crops, it would probably be the means of supplying the public market with two million of stones of beef and mutton additional, and three millions of quarters of grain. Under that system, the crops are always abundant, and the soil is kept in a constant state of increasing fertility.”—*Code of husbandry.*

Again, “If one half of a farm be kept under artifi-

cial grasses and other green crops, as much live stock may be supported and fattened upon their produce, as if the whole farm were in pasture; while the other half, enriched by the large quantity of dung produced by the consumption of these crops, will furnish as much disposable produce, for supplying the markets with the various sorts of grains, as if the whole farm had been kept under tillage. Hence the superior advantages and profit, derived from a conjunction of stock and corn husbandry; by such a union, the grand system of husbandry can be more extensively and substantially improved, than upon any other plan hitherto discovered."—*Sinclair's Code.*



JULY.

Indian-Corn and Haying.

You doubtless have half hilled your Indian-corn, and cut your clover in the month of June. Every careful farmer will now dress his hills with ashes, or plaster, to render his earing heavy and full, and get through with his hilling as far as possible, before his English mowing claims his attention: any interruption in time of haying, is both unsafe and perplexing. Some farmers delay their hilling until haying, to husband time, calculating to hill when the weather is foul and unfit for haying; this is the worst calculation possible. The damage to your corn by such delay, is bad; to hoe or hill when your land is heavy, or wet, is bad; it leaves your land tight, excludes the free circulation of air to the roots of your corn, and is a waste in the delay of hoeing, both in time and strength; all which are bad. Select, therefore, the finest weather for your several hoeings; your land will plough easy, hoe easy, your weeds will wilt and die in the sun, and your corn will be refreshed with a

warm, loose, or light earth, which will readily receive the air and moisture, to nourish your corn. The manner in which these unite, or combine in producing vegetation, I have considered under the Article Gypsum.

Your corn being dressed and hilled; watch your English meadows critically; cut your English spire-grass when green, as soon as the blossom appears, it is then the best of hay; if you suffer it to stand until the seed begins to form, and the stalk turns yellow, it becomes tough and wery, and from being the best, it becomes very soon, in this state, the worst of hay; therefore, I repeat, watch it critically, and when it comes to perfection, suffer no possible avocation to delay your cutting.

Your timothy claims also alike attention; this, when cut in early blossom, is the best horse, or stock hay, next to the English spire-grass, and by some is preferred for horses, even to this; but if you suffer it to stand until the blossom falls off, and the seed begins to form, and the stalk, or even the under leaves, begin to turn, the true value of your crop is lost, and your hay becomes comparatively bad; therefore, cut your English and timothy when in blossom, and cure, by spreading into three swath winrows, all swaths cut before noon; turn it lightly as often as your time and hands will permit; and get into cock by 5 or 6 o'clock, all the hay spread upon your field; this is both safe and profitable, both as to time and expense, as well as in the value of your hay. You may take a second cutting to advantage from your English spire-grass, but never from your timothy, or herds-grass, without an injury to the crop the succeeding year; therefore, be content to take the second growth, by feeding lightly, and suffer as great a coat to lie on the ground over the winter as possible; the next year will repay you with interest.

Your common meadows of mixed, wild and coarse grasses, will claim your attention in regular succes-

sion, after you have turned up and planted with potatoes such rich swards as you design for wheat tillage in autumn, or for spring and summer tillage the next season; (be sure to accomplish this by the middle of July, if possible.)

When your potatoes are planted, and your harvest is cut and housed, enter with spirit upon your late haying; let nothing interrupt your progress; if the weather is foul, but not rainy, continue to mow; when the sun appears, your swaths will be ready for turning, and in this way, your haying will progress rapidly; unless you are slovenly, by putting off the evil day, and prophesying smooth things, and leave your hay in the winrow, or spread about your fields, until the thurgusts and storms overtake you; your business is then obstructed and thrown into confusion, your expenses increased, and your hay ruined. These evils, a careful farmer always avoids, by keeping his hay always under his control, *very extraordinary excepted*, and thus his hay is good and commands the first price in market; his barns are sweet, his expenses are light, and his purse is heavy.

As soon as your harvesting is through, plough in such parts of your richest stubble fields as you intend for turnips; dress your turnip ground with plaster, live, or leached ashes, or well rotted manure from your stercorary, and sow, and harrow, or bush in, one pound of seed to the acre. This process, will insure you a good crop, and guard your soil against the bad effects of this exhausting root. If you can take advantage of feeding off your turnip crop with sheep, by hurdles, upon the field, you cannot raise too many; the feeding will enrich your soil and your flock; but if your calculation is to pull for market, you cannot raise too few; the profits upon the crop will not repay the expense of tillage and damage to your land.

You have doubtless given your buck-wheat lands one fallow ploughing in June; cross-plough and sow

half, or three quarters of a bushel, or if your land is poor, one bushel to the acre at this time; it is a poor crop when considered in point of tillage, (unless rolled down and ploughed in as manure, for a fallow for winter grain,) or for the value of its grain; but it makes up one of the varieties of husbandry, will answer upon some poor soils, in place of some other crop, and may with safety precede any of the crops in a regular routine, excepting Indian-corn; this grain will not flourish after buck-wheat.

No insect will injure your buck-wheat crop; but your turnips are often exposed to the destructive fly, which frequently ruin the crop. To secure your turnip crop decidedly against the fly, steep your seed 12 or 24 hours, before sowing, in fish, or train-oil; drain off the oil from the seed, and roll the seed in plaster; this will separate the seed from the glutinous adhesion of the oil, render the casts free, and enrich your crop; all other steeps at times are said to fail; this is not only cheap and easy, but is said never to fail; it will always preserve the crop.

The value of turnips as feed, either upon the ground, or when pulled and housed, either for sheep, or cattle, I shall consider at large, under the article Stock, when the season for tillage is over, and the farmer has more leisure to read, and when his stock will necessarily claim his particular attention.

Wheat.

I have said very little upon the cultivation of wheat by the use of compost, barn-yard, or other strong manures; they generally answer well upon a moderate soil, for one or two crops; but when continued upon the same fields, or used upon a rich soil, the crops of wheat are generally ruined by the rust on the straw, (commonly called the blast.) Farmers are all full well acquainted with the fact; but even the best writers are not agreed as to the manner in which the rust is produced. They are generally agreed in this, that

at the time of the filling of the kernel in the ear, the warm rains, or warm moist weather, cause an exhalation from the surface of the earth on which the wheat grows, which lodges upon the straw, and forms fungus excrescences, of the toadstool kind, and that these excrescences absorb the juices of the straw, for their support, and thus check their natural course to the support of the kernel, which causes it to shrink, or blast.

Remarks.

So much of this is true, that the rust on wheat generally commences at this time, and under these circumstances, viz. in warm rains, or a long season of warm, moist weather. But does not this combination of heat and moisture at this time, bring into action the rich manures, and thus force into the straw, (which has now finished its growth,) more juices than the kernel, (already filled out) can take up, or than can pass off by natural perspiration, or evaporation? and do not these juices force open, or burst the straw, and thus suffer the sap to exude through these small fissures, or openings, or even through the natural pores of the straw, or stalk? and do not these exudations, when exposed to the air, become glutinous, and form that excrescence upon the straw called rust, and thus rob the kernel of its natural support, and cause it to shrink, or blast? It is not so essential in this instance to know the manner in which the effect is produced, as to know the true cause and the best remedy. The true cause is the application of rich manures to the cultivation of wheat upon a strong, or rich soil; or their too frequent application, or too long continuance upon light, or moderate soils; both are dangerous, and admit of but one remedy, and even that a partial one. Cut down your wheat as soon as the kernel becomes affected, and begins to shrink, and let it cure in the gavel; the exuding fissures, and pores, will immediately close, and the remaining

juices will support the kernel in the same state as when you cut the grain; it will rather swell than shrink, after cutting. This is always safe, and must not be neglected, if you regard the value of your crop. The same causes often produce the same effects upon rye, and the same remedy will always prove effectual. I have said nothing in particular of the several kinds of wheat in common use. I have sown the white bald wheat and the red-bearded wheat, generally, and when free from rust, they have done well*. The red-bearded spring wheat, when the seed can be obtained from Canada, or Vermont, I have found to answer well, for one or two years; but never the third, from the growth of the same seed; it then runs out, and must be renewed from the northern country. I have generally found my spring wheat more inclined to smut than the winter wheat, unless I use the precaution of steeping and rinsing it, as before observed. The stiff straw wheat, which is now coming into use, may become a safe crop against the Hessian fly, which alone will render it a great acquisition to our country; should it prove equally safe against lodging, when grown too stout and rank, as well as against the rust, and the fly, it will soon become of universal use—upon this we hope much; but I can say nothing from experience, and have seen no authentic experiments on which I can rely.

Steeping and rinsing seed-wheat to prevent rust, have been fully noticed. Several other remedies are noticed by Sir John Sinclair, as practised in England, viz. selecting the red wheats generally, as being hardier than the white. Sowing earlier than the common mode, say on or about the 1st of September, instead of 1st of October, that the wheat may become ripe before the usual times of rust come on. Sowing thicker also at the same time, he remarks, will some-

* In all the recent experiments in the Agricultural Society of Hartford County, a great preference has been justly given to the red-bearded wheat.

times answer. Exchange of seed, either from foreign countries, or different sections of the same country, will sometimes prevent rust, and will otherwise well pay the expense and trouble. Crossing the different kinds of wheat, by sowing the seed comixed upon the same field, and thus obtaining a new kind; this will generally prevent the rust.

The same writer recommends a top-dressing upon wheat of sea-salt, or a manuring of salt ploughed in with the wheat, or even with a turnip crop as preparatory to a wheat crop, as a sure remedy against the rust. Whenever lands become too strong by the rich manures, they will always occasion the rust, and they should be invariably tilled with corn, or potatoes, as a preparatory crop for wheat, and then dressed with salt, or plaster only; but never with the rich manures; this process will generally succeed, if the seed is pure. The same writer goes on to observe, that wheat sown with rye, by way of meslin (so called) is never subjected to rust, either in England, or in Italy, and closes all his ingenious remarks upon the causes of rust, with this conclusion, "That the disease is taken up at the roots." This conclusion goes to confirm my former remarks, which were drawn from my own experience and observation.

The same writer has given us some nice calculations upon the value of straw generally, as well as the comparative value of the several kinds of straw, and draws this general conclusion; that straw generally, either for feeding, or litter, is of one third, or one half the value of hay, and should be as carefully preserved, and used for both these purposes; but observes, at the same time, that straw, used for feed, should be given out as soon as threshed, otherwise it will become dry and of little value.

Remarks.

Straw when used for feeding cattle, is most valuable when fed out with clover, or when sprinkled with strong pickle, and fed alone; unless when cut fine

and mixed with provinder for horses, or mixed with boiled flax-seed for fattening beef-cattle, as will be shown by Mr. Landon of Litchfield. All these modes of using straw, fully show its value as an object of importance to the careful farmer; but the improvement of Mr. Landon, gives it a value of the first importance. When straw is used for litter, either for hogs, or cattle, or horses, it is generally allowed that one ton (the usual product of one acre of wheat or rye) will produce four tons of manure; this will dress one acre of corn, or potatoes, in the hill, and thus give a profit on the crops of 10 or 15 dollars; whereas 5 dollars may be considered as a fair market price for straw for feeding: leaving a balance in favour of littering, of 5 to 10 dollars, besides the benefit from the warmth derived by the cattle and horses: allowing the increased value of the land to pay for carting, &c. By this value of straw, when used for litter, may be seen the value of stubble when mown, and carted into the hog-pen, or barn-yard, or even housed for litter for the winter; the undergrowth which generally may be mown with the stubble, will both increase the quantity and value of the stubble, for litter, if applied in its green state to the hog-pen, or barn-yard, or even cured and housed for the winter's litter. The difference between the value of such stubble, when mown and used as above, and when left to waste on the ground, will not admit of a comparison. Try it and see. Although the practice of ridging in stubble and its undergrowth, immediately after harvest, may be accounted good husbandry, especially when labour is difficult to be obtained, yet if the farmer can find time to collect his stubble as above, he will always find it to his interest, provided it be done immediately after harvest, before the straw has suffered waste.

Tillage.

Should you have been under the necessity of driving your arable lands too fast with Indian-corn, or

other exhausting crops, without resting and refreshing them by a regular routine, or succession of crops, and thus have reduced your fallow grounds below the advantage of tillage with a potatoe fallow; you may recover such lands in one season, by sowing early in June, or July, from one to two bushels of buck-wheat to the acre, upon a deep ploughing, and when your crop is in full bloom in July, or August, roll down the buck-wheat with a common farm roller, or where this is wanting, you may perform the same operation with the back of your harrow, (giving it an additional weight as occasion may require.) This should be done by laying off your field into lands, as you intend to plough, so that your plough may not be choaked by crossing, or meeting the heads of your buck-wheat. Care should be taken to bury your crop as deep as possible, that the buck-wheat may all be covered, and the depth of your soil improved by the fermentation. The heads of the buck-wheat which may appear uncovered upon the field, may be prevented from seeding by one or two light harrowings. This crop will undergo a strong fermentation, and prepare your old tired fallows for a successful crop of winter grain. If your field is of a light sandy soil, you may sow rye, or even wheat upon the tops of your buck-wheat furrows. In the season of sowing, drag in your seed with a long toothed drag, or cover your seed with the plough, as you choose. If you have a clay, or stiff soil, you may cross-plough in August, and proceed in the usual way of sowing; both will answer well. This process will prepare your field for a clover crop, (*see article Clover,*) which may be cut for hay, or rolled and ploughed in when in full bloom, after the manner of the buck-wheat, and thus prepare your fields for any successful tillage you may choose. I cannot say from experience, that the English white potatoes may be planted with success upon the top of your buck-wheat dressing; but as the potatoes will not exhaust

your soil, or lessen the value of your wheat, or rye crop, the experiment may be tried with safety, and with strong probability of success. Before that most valuable article, plaster of Paris, came into use, or the mode of tillage, by deep ploughing, with buckwheat, or clover, were known as above, I have recovered my old tired fallows by suffering them to lie for pasturing, 2 or 3 years; and then, after a summer's feeding, have turned over the sward, and sown rye with good success upon one ploughing, when I could catch a dry seed-time, so as to render my field mellow with the harrow; and with bad crops under a wet seed-time, when my land was heavy. This mode of tillage would be greatly improved by sowing one or two bushels of plaster upon the first year's pasturing, and by tilling with a potatoe fallow with plaster, when you plough up your field. If you sow plaster broad-cast upon your furrows, before you plant your potatoes, it will best improve both your potatoe and rye crop, or if you choose to sow plaster, either in or upon the hills of your potatoes, you may sow your plaster with your grain at seed-time, and cover it lightly with the harrow, or upon your grain without covering; both will answer well.

How to preserve your lands in the highest possible state of cultivation, at the least possible expense, I have attempted to show under the article Rotine, or change of Crops.

Harvest.

For this most important business, you have had a whole season, or I may say nearly a whole year to prepare. I presume, not one single farmer has left this employment to be attended to collaterally, when some other jobs may be finished; but has had his eye upon it as a work of the first moment, and is now ready with hands, and tools, and teams, provided. Your rye harvest first claims your attention; is the

straw all turned, excepting at the joints? and is your kernel become so hard, that you cannot mash it between your thumb and finger? or is the straw below the ear become so dry, that no juice can be forced out by twisting it? you may put in the sickle, if the weather is fine, and cut, and bind, and shock as you go, generally; but if your stalk is very stout, and your ear full and heavy, let your gavils lie until the after part of the day, (thundergusts excepted;) you may then bind and shock, stack, or cart, with safety, provided you house your grain where it can have free air, or your mows do not become too large; in this case, your grain will need more curing. The advantages of beginning early upon your harvest, are several.

1. Your grain will yield more and whiter flour; will waste less by shelling; your harvesting will be expedited, so as to prevent the waste of shelling, by having your last cuttings become too ripe, as is common when the first cuttings become fully ripe, at the commencement of harvest. You will have more time to attend to your turnip crops, upon your stubble lands, before the wheat harvest, or after the wheat harvest. You will also be in readiness for your wheat harvest, which you may cut and manage, as in your rye harvest. If you take the same precautions against heat in your grain, as in your clover, by having your mows ventilated underneath, with proper openings up through the mow, for the circulation of air, the trouble will be trifling, compared with the safety and benefit. When your harvest is housed, you have secured the prime object of your farm; bread—this is truly the staff of life; the basis of good husbandry, and good living.

If you discover a rust upon the straw of your rye, or wheat, as is common upon lands highly manured with rich compost, or yard dung, you may conclude vegetation is checked, and that your grain, either begins, or will soon begin, to shrink.

Lose no time with your sickle ; cut down your grain, if the kernel is formed into a consistence ; the juices in the stalk will afford more nutriment to the kernel in the gavel, than when standing, and your crop will be saved from ruin. This method is always safe, and must never be omitted. When your straw is cured, shock, stack, or house it, as before. One or two days, in good weather, will cure your grain in this state ; but if the weather proves foul, bind and stack, or shock, for security, and open your stacks in fair weather, until they are fit to house. Every consideration must give place to the saving of your crop. Ridge in with one bout ridges, such stubble lands as you design to winter fallow for spring crops.



AUGUST.

Your harvest is housed, your late potatoes are planted, and your turnips are generally sown. Your late haying, and your oats, now claim your particular attention. Proceed with your late haying as with your English and timothy ; if you gather it in a careless and slovenly manner, and suffer it to be exposed to the rains, as being of little value, and not worth a careful expense, it will repay you in your own way, and will become truly of little value ; but if you collect and house it with proper attention, it will be the more valuable, and will repay you with interest. Be sure to finish before the 20th of August.

Watch your oats, as you have done your English harvest ; cut them when the straw is partially green, and as soon as the oat has formed into a consistence. The grain will be better, the straw more valuable for feeding, and a handsome saving in the shelling ; but when you house them, use a little more caution than with your grain, in ventilating your mows ; the oats will pack closer, and be in more danger of heating, than your grain.

Your haying being closed ; your oat harvest secured ; your cross-ploughing finished ; your early planted potatoes will now claim your attention. Your white, and yellow potatoes, are first ripe ; take them before the vine is entirely dead, and haul them out of the hills with a three-tined hook-fork : in this state, they will generally adhere to the vines, and by one stroke of the fork, the hill will be nearly cleared ; but if you suffer your potatoes to stand until your vines are dead, the coats of the yellow, and white potatoes, will soon begin to rust and grow defective ; they will also sever from the vines, and the expense of digging with the hoe, nearly, or quite doubled. To save expense and labour, is ready money, in all business ; but in farming, it is ready money with interest, because it saves time, which is more valuable to the farmer, who is engaged about his farm, than money. I can say from my own knowledge, that one man, with such a fork as above, can throw out of the hill, after two hoeings, and when the vines are partly green, more than 100 bushels of potatoes in a day ; but how many the same man could dig with the hoe in the same time, I have no knowledge.

Your potatoes should be gathered, and housed, as soon as dry, to preserve them from injury, from cattle, and the weather. Your early potatoes generally command a good market, and a fair price ; but one of your best markets is your hog-stye. The value of this root, when boiled and mixed with bran, corn, or oat-meal, and given to hogs to bring them forward to fatten, may be fairly estimated at 2s. or 2s6 the bushel.

Gather your potatoe-vines, coarse hay and stout stubble, and fill your hog-pens. Cart in turf and other rich earths, and cover the vegetables in your hog-pens ; the great heat and warm rains in dog-days, will bring your manure forward fast. Spare neither time nor expense ; it will prove a rich mine.

Flax and Hemp.

Your flax next claims your attention ; this, if you design it for the nicest domestic manufacture, you will

pull when the blossoms begin to turn and fall off, after the Irish method, and rot it in the water after the manner prescribed for rotting hemp; (*see hemp process.*) If you let it stand for seed, observe when the stalk begins to turn, and the under leaves fall off, then pull your flax, and in both methods bind up as you pull, in small bundles, and set up your bundles in small bunches, to dry; or spread it upon the ground for several days, if the weather is good, and then bind, and stack against the rains, in long stacks, with the butts, or roots out, and cover your stacks carefully with loose flax, that will shed off the rains, or your flax will be injured: the better way is to house your flax as soon as dried, as carefully as you have done your harvest. You may rot it in the water, or dew rot it, by spreading it upon your grass grounds, in September, after the seed is carefully beat off by the flail, in the usual way of threshing, or beat off by hand, by whipping each sheaf across a barrel, or some other permanent body, such as a flax, or hemp brake, &c. The seed when cleaned is valuable, either for the home, or foreign market, and commands a fair price and good pay. No time can be fixed for rotting your flax, either in the water, or on the grass, both depend upon the warmth of the weather, and the latter upon the moisture of the season*. The success of your crop depends very much upon a suitable rot; to obtain this, you must frequently dry a handful, and try it in your brake, and when the rot is perfect, lose no time in turning again your flax to dry and take up; and when dried, lose no time in housing it; the least delay may expose it to a rain at this season of the year; this, if the weather is warm, or if cold and long, will injure, if not ruin your crop; the same is equally true with your hemp.

Next to your flax, your hemp claims your attention; this requires a process somewhat dif-

* When you rot flax in the water, a pond or pit answers best; this confined water renders the flax soft, but will not answer for hemp.

ferent. When you observe the under leaves upon your male hemp begin to turn yellow, and fall off, after the period of blossoming is over, divide off your hemp field into rows, 4, 5, or 6 feet wide, by pulling up the hemp clean in alleys of 2 feet wide, in the intermediate spaces; bind up the hemp as you pull, and carry it out, and set it up to dry, 10, 15, or 20 bundles in each bunch, and house it as soon as it will answer without heating. You may then go on to pull out the male hemp from the female, (which bears the seed,) by passing in the alleys, and reaching into the rows, and pulling up each male stalk separately; bind, and carry out, and stack as before, until you have separated the male from the female hemp; house when dry as before. After 10 or 15 days, when the burs in your seed-hemp begin to open, and the black seeds appear, lose no time in pulling, binding and stacking your hemp, as before; the hemp-birds will become numerous and busy in quest of seed: your hemp will shell, and your loss will be great. In binding your hemp, select two spires of the shortest of the best coated hemp for bands; for if you use the short undergrowth, which has but a thin coat, your bands will fail you in rotting, and your hemp will suffer waste by becoming loose, besides the difficulty, trouble and expense of binding over again your bundles when wet and heavy. When you are ready to put your hemp into water, say about the first of October, (which should always be in some river, or brook, where the water changes often, and not in a pond, or any stagnant water; this will become foul and putrid, and the stench so great, that few persons can be found to draw your hemp,) you may thresh off the seed with a flail, as in flax, or hold a bundle with one hand across a flax or hemp brake, and whip out the seed with a hand-staff, upon a tight floor: the seed is valuable for the same purposes as your flax-seed; either for the home consumption, or a foreign market. The rotting of your hemp is also critical, like your flax,

and must be watched and tried, when dried, in the same manner. If you draw your hemp from the water in October, or even in November, and the weather proves warm, it will over-rot before it can dry in the bundle; you must spread and dry it as soon as possible, and house it for the winter; but if the weather should be cold, you may set up your hemp across your fences; and if it gets dry before the frosts of winter set in, house it as before, if not, and your bundles become frozen, you may let them stand over the winter, and house and dress in March, or dress from the field as they stand. The difference between the dressing of your hemp and flax, is this; your hemp-brake must be about twice the size of your flax-brake, in all its proportions, for the first braking; and then if it is run through a flax-brake for a second braking, it will greatly expedite the swingling. Your swingling-knife must be about half the length of the flax-knife; the swingling-board about 4 or 5 feet high. The shives must be separated from the hemp, by stroking gently with your knife, instead of whipping with a full stroke, as in flax, and by gently shaking the hemp, between the strokes, and all without the hatchel, as in flax. There is a great slight in dressing hemp; an expert hand will swingle clean about 100 lbs. per day. When your hemp is dressed, it must be bound up in bunches of 20 or 30 lbs. each, and then it is ready for market.

Hemp is a great exhauster of soil; requires the strongest lands, and richest manures, in great quantity; requires also, much labour, and is of course an unprofitable crop in our country. In time of war, it has proved profitable, and may become so again; of course, its mode of culture should be correctly understood. Your hemp, as well as flax grounds, should be turned up into ridges in autumn; the ridges should be levelled with the plough in the spring, as soon as the frost will admit; your ground then dressed with 10, 15, or 20 loads of your best manures, well spread and covered

with the plough, your furrows smoothed gently with the harrow, and your seed, say from 2 to 3 bushels to the acre, sown early in May, and covered lightly with the harrow. If you sow on the furrows and cover deep with the harrow, or sow on a stiff soil, your hemp will pull very hard.

Paring and Burning.

This mode of culture in England, appears to stand high in the estimation of Sir John Sinclair, and all the best English writers; and where labour is cheap, as in England, it doubtless, in many instances, will answer well; but the true result of this mode of tillage appears to arise from the fertilizing powers of the ashes derived from the sward, when pared and burnt*. So far as this goes to show the value of ashes sown upon land to increase the value of tillage, leads me to inquire, whether the sward, when turned in to rot, under the furrows, together with one half of the expense of paring and burning, when laid out in wood-ashes, and sown upon the tops of the furrows, would not, in this country, answer a much better purpose for the succeeding crops, and give a more permanent and lasting value to the land for an after tillage? If any one can be at a loss for an answer, let him try and see.

Summer Fallowing.

This is one of the most important branches of good farming, and upon which has arisen a great variety of opinion and practice. Some farmers are of opinion that the ploughings for a summer fallow, cannot be too frequent, and that all *fallow crops* are injurious to the land, and particularly to the succeeding crops.

* *Quere.* Whether lime sown upon the sward before ploughing, and the crop then dressed with ashes, would not be more valuable than paring and burning.

Others consider all naked fallows as a waste of expense without any adequate benefit, and insist upon some fallow crops either of turnips, to be fed off by sheep, or of potatoes, to be dug for stock, or of buckwheat, or clover, to be ploughed in as a fertilizing crop. Both probably are in an error, and run into the opposite extremes. A strong stiff clay, or a hard gravelly soil, cannot be ploughed too often for a fallow; but a loose sandy soil may be greatly injured by too frequent ploughings. The latter may be tilled to advantage, with a potatoe fallow; and the former by a turnip fallow, to be fed off by sheep; or after several ploughings, with the fertilizing fallows of buckwheat, ploughed in: but a rough stony soil cannot be tilled with a fallow crop to advantage; this land, and perhaps this only, requires a naked summer fallow. The great advantages to be derived from a summer fallow are these:

1. Frequent ploughings destroy the herbage upon the fallows, and the roots and seeds of herbage, and thus render the grounds clean for the following crops.

2. This is greatly promoted by a potatoe fallow, both in hoeing and digging.

3. The plough renders the earth light and mellow, to receive the seed when sown, and to admit the extension of the roots of the grain, when it vegetates.

4. At each ploughing it changes the soil, and exposes a new surface to receive the benefits of the sun, air, rains and dews, with their fertilizing powers.

5. It renders the earth light and pervious, for the admission of the sun, air, rains and dews, and opens a free circulation for them to the roots of the grain, (or plants, whatever,) and thus they impart their fertilizing properties to the vital principles of the crop you cultivate.

6. The green fallow, when ploughed in, as well as the potatoe fallow, greatly promote this benefit, by meliorating the soil. Upon this principle, the plough, with the fertilizing crops, upon a summer fallow,

low, are the only substitute for manure, under tillage; because the effects are the same, with this exception, that the meliorating effects arising from the fermentation of strong manures, are both greater for the time, and more permanent and lasting. The manure, also, will continue to assist the plough, in meliorating the soil for after crops, by causing a new fermentation upon every new exposure of surface to the air, until the strength of the manure is wholly exhausted. Hence again, the value of your potatoe fallow, to increase your number of stock, and quantity of manure.



SEPTEMBER.

Begin the second cutting upon your English mowing grounds; but let your timothy stand for feed; remember that rowen requires double the drying of the first crop, or the hay will be bad, and give your horses a cough, and the heaves.

Top the stalks upon your Indian-corn close to the ears, as soon as the ear becomes too hard to boil; when the weather is fine, bind in small bundles and stack in small stacks, the same day, to secure against rains; your corn will ripen the faster and receive no injury, and your stalks will be more valuable. If your hay is short, or you wish to sow winter grain after your Indian-corn, or secure your corn against the effects of early frosts, you may cut up your corn-hills close to the ground, in fair weather, with a sharp knife or sickle, and lay two rows into one, in small bundles, as when you top and secure your stalks; bind your bundles above the ears, and stack the same day in small stacks, either upon the borders of your field, or upon an adjoining field; you may then plough and sow as upon fallow grounds; secure your stacks by doubling down the tops, and binding the

heads with a pliable stalk; this will exclude the rains, which otherwise would damage your corn. This corn will be ripe at the usual time, without the least diminution in its colour, weight, or value: but in the opinion of some of the best farmers, (who are in the steady practice of this mode from choice,) with an increased value to the grain. The increased quantity and value of your stalks, will richly pay the expense; you may in this way, bring forward the sowing of your winter grain, 2, 3, or 4 weeks, which will again at harvest repay the expense of clearing your corn-fields. If you house your corn-stacks before you husk your corn, the pitching will be heavy, and your bundles often break, and your places for housing, be difficult and inconvenient, and often exposed to your cattle; therefore, husk your corn on the field, and empty your baskets into your cart as you husk, always remembering to leave the husk upon the stalk, by breaking off the cob; these will again repay your expense in feeding. The difference in the mode of husking, will at first be considerable; but a little practice will soon remove this, and render them equal. It is of high importance for every farmer to know every mode of culture, that will afford him successful advantage in managing his farm, and in this point of view, this does not rank as one of the least. If you plant the Canada corn, (so called,) it will, by early ripening, bring forward your sowing 10 or 15 days earlier than the great tucket, or common corn, with crops of equal, if not of superior, value, which is also of some importance.

Enter with spirit upon your potatoe fallows; dig, house, or market, with all the help you can muster. One man can throw out of the hill, with a hook-fork, as many as 5 or 6 hands can pick up and cart; children can be of great use in gathering your potatoes.

Clear your poorest lands first, and sow your rye upon them in the first week of September, if possible; say one bushel to the acre: your rich grounds

will bear to sow as late as the last week in September, and be as forward when the frosts of winter set in, as your poorest lands, sown in the first week. If the weather is fair, and your grounds dry, at seed-time, you may cover with the harrow, unless upon a clay, or stiff soil, which is apt to bake, your crop will then be best when covered with the plough, upon narrow lands, with deep furrows; also, when the weather is moist, and your lands wet and heavy, cover with the plough: in both cases, the harrow, after covering, leaves the land close and dead, and your grain will lack roots sufficient to insure you a good crop. I have said, say one bushel of rye to the acre, because this is the common practice, and it does well; but some farmers sow only half a bushel to the acre, others again only one peck to the acre, where the soil is light, and not exposed to be killed by the winter. I can say from experience, that I have sown 1, 2, 3 and 4 pecks to the acre, upon a light soil, and upon the same field, and could not discriminate correctly the difference in the appearance of the grain at harvest; yet I practice the common mode of one bushel to the acre. Let experience be the only guide to your practice.

This is the time to ensure your crop; let your lands be well prepared, and rendered as mellow as possible, by deep ploughing; let your seed be steeped for 24 hours, before you sow it, in a strong pickle of sea-salt, with saltpetre, or in any rich liquid manure; then rolled in plaster, and sown immediately; then dressed with one bushel of plaster to the acre, sown on the furrows, if your seed is covered with the plough, or it may be sown and brushed in lightly with the harrow. With this practice, and the blessing of God, you may expect a good crop, if your fences are good; but if they are bad, you have no right to expect a blessing; this is your own wilful neglect.

Your orchards, at the same time, claim your attention; your early apples, which fall, will soon rot

and waste, if not gathered and made into cider. Children can do the business of gathering apples; they are the farmers richest blessing, and when trained to habits of industry, become the best members of society, when they grow into life. Let your children pick up your potatoes, when dug, and pick up and house your apples, it will be doubly profitable; first to you, and next to themselves. If your fruit is made up when ripe and sound, you may generally have good cider, in the common practice; but if your fruit is either rotten, or hard and unripe, like the gleanings of your winter apples, no possible process can ensure you good cider. I will wave all the various modes practised and recommended by the nice and curious, and conclude my remarks upon the orchard, by the following extract from Thompson's Notes on farming.

“The care of orchards, and the making good cider, are so very profitable, that it will necessarily draw the attention of every good farmer. Mr. Anderson, a gentleman in England, famed for good cider, gives the following account of his approved method of making it.

‘I should first tell you that my orchards are upon a clay soil, which I think conduces much to the goodness of my cider. I will be short in my practical account, making but few observations, and leave the curious to draw speculative reflections from it. I permit my fruit to remain on the trees, until a great part falls by ripeness; then gently shaking the trees, take in the apples in dry weather, laying them in heaps of equal ripeness in a loft over my press. There they remain until they have perspired, and that perspiration ceases. As soon as convenient afterwards, I grind my apples, and press out the juice; if it casts a pale colour, I suffer the pulp to stand 12 or 24 hours, which will heighten the colour of the juice. As soon as it is expressed, I pour it into vats, through a sieve, (some filtrate through a hogshhead of

clean sand, after the manner of a leach, and place a large strainer, or sheet, or table-cloth over the hogshead, to strain out the pumice,) where it remains about two days, according to the state of the weather, and the nature of the apple, (the longest when frosty, or cool weather,) till a thick head, or scum, rises upon it. Then I draw off a little into a glass to see if it is fine, and as soon as I catch it so, I rack it off without delay into open vats, or into hogsheads. If the juice is racked into vessels larger at top, than the bottom, and I rack it off as soon as fine, I need not take off the head, or scum, it will not mix with the cider; but if the cask is straight, or I have neglected to draw off until the cider begins to become foul again, I find I do best to take off the head with a wooden skimmer, and then draw off as soon as possible. Whenever the brown head begins to open in the middle, or elsewhere, and a whiteness appears at the openings, I am certain it is time to begin to draw off; but I find from experience, that the surest token is to observe its state by what is drawn off in a glass, and this method should be closely attended to. I have drawn a glass of cider out of a vat at 3 o'clock, foul; another at 10, fine, almost candle bright, without any appearance of the heads opening, as above observed: at 11, it was growing foul fast, without high winds, or any extraordinary event that I could perceive, to occasion it. If then drawn off into open vessels, a fresh head may arise in 24 hours, then it may be racked into a close hogshead, or other receiver, where it will begin to ferment after a day or two, according to circumstances; I then permit it to ferment 3 or 4 days, (never exceeding a week, for the hardest fruit,) then I fumigate a clean sweet hogshead, with matches of coarse cloth, dipped in melted brimstone, and rack off my cider into the cask as quick as possible. If the fermentation still goes on, I give it one more racking in this way, and cover the bung with a tile, until I am sure the fermentation has

ceased; I then bung close for the winter. Sometimes I have had the fermentations continue, and force me to 5, 6, 8, 10, or a dozen successive rackings, after I begin to fumigate, and yet the cider has proved good. Many other modes are practised with good success; but wherever this method is attended to, I will answer for its doing well.'"

Remarks.

The most important parts of this method of making good cider, are,

1. The time and manner of gathering the fruit.
2. The care and attention in assorting it, by separating the hard from the mellow.
3. The rackings which separate the liquor from the lees, or fine pumice, which causes the fermentation.



OCTOBER.

You have now dug and housed your early fallow potatoes, and finished sowing your rye; enter with the same spirit upon your late planted fallow crops, (such as were planted upon your clover, or English swards,) and proceed in gathering your potatoes and preparing your wheat lands as you have done your rye; plough deep, with small furrows. Steep your wheat as you have done your rye, and roll it in plaster, and sow plaster with your wheat, plough in, or cover with the harrow, as with your rye. Sow your wheat broadcast, one and a half bushel to the acre; this seeding is most generally approved. If your wheat appears to be smutty, wash it clean in some open vessel, where you can rinse it by stirring; skim off the smutty, and light wheat, and then go on to steep as before directed; this will guard against a future smut upon your crop.

Look to your field beans; pull such as you design to follow with wheat or rye, and remove them to the borders of your field, or on to the field adjoining, in small heaps, to cure; or your sowing may be unnecessarily delayed, to the damage of your crops. Beans are a rich, healthy food for the table, occasionally in winter, are valuable feed for your hogs and sheep, are easily raised, and do not exhaust your lands. Even the poorest light lands, or the stiffest clay, with a little plaster, either in, or upon your bean-hills, will give you a profitable crop, which, if pulled, and cured as above, may serve as one of your fallow crops, if you use plaster at sowing as before directed. One of the great mysteries of farming is to suffer nothing to remain idle, but to make every article of your farm, both animate, and inanimate, produce some steady, and substantial profit: this a careful farmer may always do.

Your orchards claim your steady attention through this month. Gather your winter apples by hand, from your trees, and put them into your spare flour-barrels, or any dry barrels, directly from the trees; head them up, and let them remain in the open air, either upon the field, or in some other safe place, until the weather becomes so severe as to endanger their freezing; then house in your cellar, such as have not been marketted; the saving in this way will doubly repay the extra expense of picking by hand, and the cost of the barrel. Children can do the business of picking, with small baskets, or with bags slung over the shoulders, (as the seeds-man slings his bag at sowing,) with the assistance of a careful hand to move their ladders, and fill and head up the barrels. I have, in some seasons, gathered 3 or 400 bushels upon my farm, in this way, in a few days, and always with good success. If you design your apples for the Southern or West-India market, you may pack them in your barrels with clean dry sand, at little expense, and always with good advantage. I have often done this with my winter's store, and with a saving.

Some persons construct shelves in a cellar secure against frost, and place their apples separately upon the shelves, and find an advantage in saving their fruit over to the spring, which fully repays the expense. This does well, and may be considered in the end cheaper than barrels, as the shelves (if properly constructed) will last many years; but the barrels, by neglect, are soon gone. Try both.

I need not say that great care should be taken with your orchards to cultivate the best fruit; this every farmer knows, who deserves the name of farmer, and the manner of effecting this by grafting has become common to our country. I shall treat upon this subject more particularly in my remarks upon gardening, *article fruit*. Finish gathering your late fruit for cider, make it up as fast as possible; make some trial of Mr. Anderson's plan, or method, to begin with; if it pays the expense this year, you may reap advantage from it the next, besides the enjoyment of drinking good cider. In Newark, in New-Jersey, they have become famous for good cider, by such kinds of management, and their cider always commands the first sales, the highest price, and best pay, in market; often a double price, when scarce in market. This is a consideration which no careful farmer will neglect.

Look to your flax, and turn it when necessary, as the upper surface will rot faster than the under side. Look to your hemp, or flax, in the water, and see that it is well covered with the water, and that it lies safe, (not being washed away with the great rains.)

Dig and house your carrots and other roots, you design for feeding; excepting your turnips and cabbages, these may stand to close your field crops.

Draw your flax from the water as soon as it will answer, (upon trial as above,) spread it to dry; and bind and house it the first moment it will answer: one extra rain may ruin your crop, or destroy your profits. Observe the same with your hemp.

Watch your corn in your corn-lofts, turn it often, that it may dry even, and not mould, especially if the weather is warm and rainy; bin up your first corn in narrow bins, as fast as it will answer with safety, to give room for your late husking; this valuable crop requires nice attention; select the fairest and ripest ears, as you are husking, for your seed-corn, particularly those with the smallest cob and best filled out at the ends. Now is the time to improve your next crop. By pure seed, and by selecting the earliest, or the ripest, you may bring forward your after crops 10, 15, or 20 days; this will secure your Indian-corn against early frosts, and ought not to be neglected; or will enable you to cut up by the bottoms as before observed, 10, 15, or 20 days earlier, and thus improve your late sowing*.

It is of the highest advantage to the farmer, not only to know how to cultivate in the best manner, each particular crop separately, but how to combine this cultivation with the improvement of other crops, so as to be able to make the greatest advantage from the seasons of seed-time and harvest.

The same is as true with the seed of your potatoes, and all other crops, as of your Indian-corn, and may as easily be attended to, and improved, and to as good advantage.

Get your flax all in from rotting, in the course of this month, if possible, and house it snug and dry; secure your hemp as fast as it will answer, before November; the season becomes critical for such crops. Finish making and marketing your cider, and place such casks as you may reserve for domestic

* This improvement may be extended still further; you may select your seed-corn from your field, taking the ripest ears, at different stages of your corn, (beginning early in September,) and from the most thrifty stalks; this will bring forward your next crop; but if you select your seed from such stalks as produce two or more ears, you may, by pursuing this practice, double, or treble your quantity of corn upon the same grounds, with the same tillage.

consumption, at the north side of your buildings, where it may be kept cool until the frosts of winter set in, then stow it away in your cellar.

Plough into one bout ridges (with deep ploughing) such grounds as you design the next season, for hemp and flax; the extra benefit you will derive from the frosts of winter, and the rotting of the herbage, will richly repay the expense, in your succeeding crops.



NOVEMBER.

Your carrots, potatoes, and other roots, together with your Indian-corn and flax, must now all be secured and housed; and your hemp is also housed, or under a proper management, and in a good way. Your orchards are cleared and your cider all made, and your ridge-ploughing for winter generally through: now let your farm-yard claim your first attention. Cart on to your mowing grounds all the manure collected in your barn-yard and in your stercoraries and hog-pens through the summer, spread it in moist weather, or before a rain, as even as possible, and brush it down thoroughly with a light harrow, or a thorn-bush, or any other bush that will answer the purpose; your moist grass grounds which cannot be washed by drains, or enriched with plaster, and your young clover, claim your first attention for fall manuring. Two loads of dung well spread on grass lands in the fall, are equal to three in the spring, in ordinary seasons; but if the following May and summer should prove dry, two loads in the fall are equal to four in the spring. This is too serious an advantage to be neglected. After all your care and attention to this most important branch of good farming, through the summer and autumn, if your dung should fall short of your demands, you may now supply the defect, by reserving your high and dry gravelly and sandy lands

for your plaster of paris, and dress with one, two, or three bushels to the acre, as the tillage may require; and upon your moister grounds, you may spread your live, or leached ashes, in broad-cast, according to the quantity you can collect; they will richly repay for several successive seasons.

Drains which convey a wash on to your mowing grounds, are of the highest value, and now claim your serious attention; therefore, repair, mend and secure your dams; dig or plough out your drains, change their directions on to a new surface, (otherwise the parts last washed will be injured by becoming too rich and rank, and your grass will come forward and lodge, and rot at bottom, before the other parts of your field are fit to (mow) cut, and thus you suffer a two, or three-fold waste from your inattention.) One gallon of water in winter, from the rains and melted snows, will exceed in value many gallons of summer water, when applied as a wash to your mowing grounds. Your barn-yards being cleared as above, and your drains well secured, and as well directed; your stabling and sheds to receive your stock, next claim your attention. If you are ready for the expense without injuring your other improvements, or contracting debts, (*a farmer should never be in debt,*) let your barn face the south, enclose one rood of land, or less, (according to the number of your stock,) in a square form, erect low and frame sheds upon the east and west sides of your yard, with a single roof, that shall convey the water, or rains, off from the yard; let the sheds extend as a side fence upon two sides of your barn-yard, from the corners of your barn, with cribs, or racks, for your cattle to feed. Next to good feeding, are warm and dry coverings for your stock. Let your barn-yard form a gentle descent, at or near to one corner, where the heavy rains may settle; throw into this the coarse clearings of your cribs, refuse straw, buck-wheat straw, &c. these will ferment, and form a reservoir of

long dung in the spring to dress your corn and potatoe grounds. Let your barn-yard be furnished with separate racks standing in the open air; into these, throw your loose straw when you feed out your clover in your cribs; your horses and cattle will eat up your straw clean in this way, and to good profit, by passing alternately or successively from the cribs of clover, to the racks of straw, and thus mixing them to their liking.

In stabling, it is of the first importance that your cracks be battened, your windows and doors snug and tight, your floors tight and secure, your mangers strong and tight, that you may feed with carrots, potatoes, or turnips, as occasion may require; thus you will have the double advantage of good feeding, and warm stables; both which are of the first importance in good farming.

If you cannot afford the expense upon your barn-yard as above, you may make cheap sheds for your stock upon the sides of your yard as above, by setting substantial crotches, at proper distances, as supporters; place such poles as you can conveniently collect, upon your crotches, with others extending across, with a gentle slope, or descent; cover with coarse hay, or straw, as is most convenient: a few boards, of any quality, tacked upon the back sides, will shield your cattle from the winds, and make a cheap fence, at the same time. You may reserve from your fences, when you repair them, such posts as are sound at top, and have rotted off at bottom, and set with these a crib fence three rails high, and of a suitable width: they will stand well several years, and make you the same saving of hay as the nicest cribs. You may also construct straw racks in your yard, by setting down two posts, with one rail fixed in the posts of a suitable height, and place a number of old refuse, or broken rails, upon each side, alternately, to rest upon the rail fixed in the posts, as a supporter, and extending its whole length, fixing the bottoms

of the cross rails firm in the ground, with a slant to your liking, to form your rack. These cribs, and racks will be both cheap, and of a great saving in your feeding.

Draw your late rotted hemp and set it up across your fences, for a winter's drying. Cart into your barn-yard every thing that may be converted into manure. Crop lightly your late feeding grounds, such as clover, timothy, or English mowing, both by your cattle, horses and sheep. Feed off your turnips with your sheep, as they stand, by the use of hurdles, if possible, and in the following manner, viz. collect a number of chesnut stakes 6 feet long, and about 3 inches square, and sharpen them at the bottom; nail on to two of these stakes five strips of boards, (sawed for the purpose,) of about 4 or 5 inches wide, and 10 or 12 feet long, fasten each strip with two 10 penny nails, in each stake, thus nailing on the five strips at such distances as will be of sufficient height to secure your sheep in their enclosure. When you have prepared a sufficient number of hurdles to enclose one or two roods of your turnip field, let two hands set the hurdles for the enclosure, with a crow-bar, or a wooden bar sharpened for the purpose; this may be done quick, and at very small expense, in the following manner; let one hand (after the hurdles are laid round the place of enclosure,) hold up a hurdle erect, and the other with the bar strike into the earth the holes for the stakes, (at the foot of each stake,) then plant the hurdle; then the next, and so on in succession until the enclosure is finished; then turn in your sheep, cows, or cattle; when one enclosure is fed off and you have a desire to enrich that particular spot, for any special purpose, as for onions, carrots, scarcity-root, &c. you may pull the rest of your field and cart on your turnips and feed them upon the spot; but if it is your wish to enrich your whole field for wheat and clover; you may remove your hurdles, and set again, and thus feed off the whole crop;

this easy way of enriching your farm, together with its profits, needs no comment. One set of hurdles will last, with careful usage, and careful housing, 20, 30, 40, or 50 years, provided they are taken up and secured before the frosts of winter fix them in the ground, and thus expose them to the weather unnecessarily over the winter. Cover with deep ploughing the manure of the first enclosure, as soon as you have changed your feeding; this will secure against all loss from evaporation by the sun, and give your land an immediate advantage from the fermentation, before the frosts of winter set in. Plough in this manner successively, at your several movings, until you have fed and manured your whole field; thus your land is prepared for any crop you may choose, and at a small expense, with a handsome profit. Your fat sheep are now ready for market, and your lambs and store sheep are prepared to winter, safe and cheap. The growth on your wool will repay all your expenses, both in its quantity and quality.

Plough up clean and deep such stubble, or sward grounds as you design for Indian-corn the next season, particularly such as are accustomed to be eaten by the cut, or grub-worm; you will find this practice an effectual remedy. Salt when sown on the sward, will produce the same effect.

Harrow your land, when ploughed, as fine as possible; this will prepare it to receive a benefit from the air and frosts of winter, that will richly repay your trouble in the next crop, whatever it may be.

House your cabbages; set out in some convenient part of your cellar such as you design for the table, and place those intended for stock in some open shed, or loft, where they will lie secure against heating until they are fed out.—*See Stock.*

Pull and house your turnips designed for market, and the table, or winter feeding, and secure them in your cellar against frost.

DECEMBER.

Your farming is now all done, and I trust well done; no man has thrown away a dollar unnecessarily upon new and visionary schemes, by making experiments upon *English* farming in *our* country; or lost two dollars in saving the expense of one cent in not increasing his stock of manure, ploughing, and tilling his fields, draining and bogging his wet mowing grounds, or not manuring, plastering, or washing his dry mowing grounds, or by not rinsing and steeping his seed-wheat, or by sowing too sparingly, or by not steeping and plastering his seed-rye, oats, barley, &c. or by neglecting to steep his Indian-corn at planting, and rolling it in plaster, or even by not plastering or ashing the hills, or even by neglecting to plaster his potatoes at planting, or at hoeing; or what is worse than all, by neglecting to plaster his young clover, and suffering his fences to be out of repair, and thus waste his crops; with all the train of evils which follow; poverty, disgrace, distress and ruin. I am persuaded that every farmer who reads this work, has applied his money liberally, and to the best advantage, and is now prepared to amuse himself in the care of his stock, in the social enjoyment of his friends, his family, and his fire-side, through the long approaching winter, with his heart full of gratitude to that God who is the parent of Nature, and of all her productions, and who has thus enriched him with the bounties of his common providence, rewarded liberally the labours of his hands, and given him all things so richly to enjoy.

Farmers, you are, under God, the lords of this lower creation; in obedience to the command of God, you till the earth, nature's vast store-house; into your hands she pours her wealth, through a thousand tributary streams, and from your stores are fed the inhabitants of the palace, and the cot. This high, this elevated, this ennobled rank in life, is calculated

to show you your dependence upon God, the author of nature, of nature's laws, and of nature's works; to teach you such humility as will necessarily result from these conclusions, that although you can plough and plant, sow and reap, yet of yourselves, you cannot produce one spire of grass, or explain how it is produced; you cannot effect the formation of one shower, or explain its effects upon the vegetable world; this should teach you love to God, and benevolence to men; freely you have received, freely give. From the vast store-house of nature, your cup overflows with her richest blessings; it becomes your duty to use them without abusing them. Select a full share of the best for your own comforts; impart in fair market, for the support of the community, such as the consumption demands, and the reasonable support of your revenue requires; and, with the remainder, be liberal to the virtuous and industrious poor. These are plain practical duties; but sources of incalculable satisfaction and enjoyment.

In my remarks under September, the care of your orchard was noticed; let me call your attention to an important article of this valuable and productive part of good farming. Select some convenient part of your garden, or field, contiguous to your house; plough it early in this month; harrow and strike it out with your plough into rows four feet asunder; strew these furrows with pumice from your cider-mill, (select the pumice from such fruit as you would wish to cultivate,) and cover it lightly with the plough; keep down the weeds for 2 or 3 succeeding years, until your trees have acquired the height of 3 or 4 feet; thin out and transplant, at the same time, leaving the trees in your rows 6, 8, or 10 inches asunder. At this stage of your nursery, (2 or 3 years growth,) you may propagate such fruit as you may choose, by budding, (a mode more safe and expeditious than grafting,) without checking the growth of your trees. For particulars on budding and grafting, see *Garden-*

ing. Such trees as have already come to maturity for field setting, may be removed to the best advantage in this month, for three important reasons, viz.

1. The farmer generally has more leisure time, than in April.

2. If the trees are taken up when the top of the ground is slightly frozen, so as to hold the earth about the roots of the trees, they will be sure to live.

3. In setting, be sure not to plant your trees below the rich mould; fill in with the richest of the mould, and give a top dressing. With this, they will be more sure than when set in the spring.

Now is the time to form your orchards to the best advantage; therefore, never suffer your trees to begin to head short of six feet, and even ten would be better than six; this would admit the sun and air, to warm and fertilize the ground under your trees, which will not only cause them to yield more, and better fruit, but enable you to obtain about as much grass under the trees, as in the open air; and in dry seasons, you may obtain more. This culture will also repay double for manuring, both in the products of the orchard, and the hay.

Stock.

Your fences are all in such repair, that neither your own, nor your neighbour's hogs, sheep, or cattle, can take advantage of an open winter to feed on your mowing grounds, or your winter grain, or injure your crops in the spring before the frost is gone sufficiently for you to repair your fences. This is an article of the first importance, and which no careful farmer will neglect.

Your carts, harrows and ploughs, together with all the implements of the summer's tillage, are securely housed. Your wood-house is well stored with wood kept over the summer, to last you until the season of good sledding arrives. You have plied your hogs.

since the first of September, with pumpkins, or carrots, and potatoes well boiled and mixed with bran, or meal, and you are now driving them with Indian-corn, either shelled and boiled, or boiled upon the cob; this mode of boiling your corn, has been proved to exceed in value the same quantity when ground, and given in the usual way; and thereby the expense of toll, and going to the mill, are saved; the pork will be equally hard and good. No more expense will be necessary, in boiling a kettle of corn or potatoes, that will hold a barrel, than in boiling your tea-kettle, for the same time; one gallon of water will be sufficient, provided you cover your corn, or potatoes close with dry bran or meal, so as to prevent the steam from escaping: where fuel is scarce, this saving will be an object of attention.

You have now collected all your stock from your pastures, and closed your fields for the winter. You have selected such cattle as you have designed for market, and are now closing your sales, particularly all horses, not immediately useful and necessary. This animal is of the least value to winter over, of any of your stock. He requires your best feed, and gives you very little productive labour in winter; yields you neither beef, nor wool, in the spring, and never advances his price in the spring market, equal to one-fourth of the expense of wintering, exclusive of risk and trouble: both which are very considerable. Let your working cattle, cows, sheep, and such young stock as you can be sure to feed well over the winter, be selected as the special objects of your winter's care; and be sure to market to the best advantage all the supernumeraries. The difference in the value between either of these articles of stock, which are full fed, and well kept over the winter, and those half fed, and poorly kept, is greater than I should dare to name; not only in its value the ensuing spring, but for all succeeding purposes of such stock.

Your barn-yards are cleared of their summer's manure, all which is well spread upon your mowing grounds; (*see article manure*;) your sheds and racks are all prepared; your stables are rendered tight and warm; your barns, as well as your houses, are all patched wherever a shingle is missing; the glass is all set in your houses; your house-doors, and barn-doors, are all rendered tight and secure; your cellars, are all banked up where it is necessary, and thus rendered secure from the frosts of winter. Your cider is all got in, and put up upon the stalls; such apples as you put up in barrels for the use of the family, are now snug in your cellar; your turnips are dug and housed, and your cabbages are all pulled, and such as you intend for the table, are carefully set out in the driest part of your cellar; such carrots, beets and parsnips, as you design for the table, would pay you well in their relish and flavour, if you will pack them in sand, in dry casks. Such turnips as you wish to keep late, and preserve from being pithy, cover under a heap of loose potatoes, where you can conveniently draw them when wanted; you will preserve them pure over to the spring. Your French and Swedish turnips, will then supply for the summer.

In selecting your stock for the winter, you have been careful to reserve such, and such only, as are of the best size and form, and such as show the greatest disposition to fatten, at the least expense, and are the most orderly and manageable; having disposed of all the ill-shaped, unruly, unmanageable, and of a lean disposition; in this way, you will in a few years have under your care a perfect stock, if you are careful at the same time to select the best size and form of each kind, to propagate with, or encourage your neighbours, by propagating from theirs if they surpass yours. The cultivation of your farms, by good husbandry, has not only taught you how to raise the value of your lands, and increase the profits upon your

crops, at the same time, by tillage, but has taught you, also, that the same attention to your stock, will enable you to derive the same profits from this source of winter's husbandry.

The general hints given as above upon the necessary attention to your stock, will be sufficient to excite the farming interest generally to their stock; but the best mode of effecting this, may be learnt from the practice of Mr. Bakewell, the noted reclainer and cultivator of the Diskley farm, (so called,) in England.

“The choice of the best breed of horses, cattle, sheep and hogs, which is too little regarded, is of great importance to a farmer, and deserves his nicest attention. The expense is as great, nay, many times greater, in keeping a creature of a bad breed, as of a good, and the value is very different. It appears that the Canada breed of horses would be found excellent for the plough, or draught, and the Esopus breed for the carriage. In the choice of horses, the form should be particularly attended to. The Canada breed comes the nearest to the form of horses in the highest esteem in England, for draught, viz. that of a true round barrel, remarkably short, and lower over the forehead than any part of the back, the legs also short. The Esopus breed, of a proper size, are slightly horses for a carriage; they are gentle, tractable, and easily broke, and yet have a proper degree of spirit, have a good carriage, are easily kept, and hardy. The Narragansett breed have been accounted excellent for the saddle. A cross breed with the Narragansett and Esopus, or with the English, (known by the name of the old Ranger breed,) have been accounted the best for the saddle in New-England.”—*Thompson's Notes on Farming.*

These breeds are nearly extinct in Connecticut; but with proper attention they might be restored.

“Mr. Bakewell (of the Diskley farm in England) has rendered himself famous by his breed of cattle.

His principal aim is to gain the best, whether sheep or cow, which will weigh the most in the most valuable joints; and at the same time that he gains the shape which is of the greatest value in the smallest compass, he finds by experience that he gains a breed much hardier and easier fed than others. In his breed of cattle, his maxim is, the smaller the bones the truer will be the make of the beast; the quicker it will fatten, and the weight will have a larger proportion of valuable meat."

The shape, which should be the criterion of an ox, bull, sheep, or cow, is that of a hogshead, or barrel, truly circular, with small, and as short legs as possible; upon this plain principle, that the value lies in the body, and not in the legs. All breeds whose backs rise in a ridge, are bad.

By proper management, Mr. Bakewell brings up his cattle in amazing gentleness; his bulls stand still in the field to be handled; they are driven from field to field with a small switch. His cattle are always fat, and this he insists is owing to their breed.

The small quantity, and inferior quality of food, that will keep a beast perfectly well made, in good order, is surprising. Such an animal will grow fat in a pasture which would starve one with great bones and ill made.

Mr. Bakewell is equally curious in the breed of his sheep. The bodies of his rams and ewes are as true barrels as can be seen; round broad backs, and the legs not more than six inches long. An unusual proof of their kindly fattening, is their feeling quite fat between the fore-legs, upon the ribs, where the common kind never carry any fat.

He finds that hardly any land is too bad for a good breed of cattle, and hardly any good enough to make a bad breed profitable.

With regard to the rot in sheep, Mr. Bakewell thinks it is solely owing to their feeding on lands which have been flooded: hence it appears, that sheep

should not be suffered to feed on watered meadows. Water flowing over grass-grounds after the first of May, is sure to give your sheep the rot, whatever be the soil.

Mr. Bakewell is remarkably attentive to the point of wintering his cattle. All his horned cattle are tied up in open, or other sheds, all winter, and fed according to their kind, on straw, turnips, or hay. The lean beasts have straw alone. Young cattle, which require to be kept in a thriving state, and fattening ones, are fed with turnips; and in the spring, when the turnips are gone, hay is their only substitute; by these means, he is able to keep a large stock. His farm, in all, consists of 440 acres; 110 of which, are arable, and the rest is grass; and he keeps 60 horses, 400 large sheep, 150 horned cattle, and has generally 15 acres of wheat, and 25 of spring grain.

It deserves particular notice, that Mr. Bakewell pays a yearly rent for this farm; and when he came into possession, the farm was so low, from bad management, as to render it very difficult to rent it at any price.

The first attention of Mr. Bakewell, upon entering this farm, was turned to the improvement of his stock; this he effected in a gradual manner, by procuring the best breeds for their general propagation, until he raised the reputation of his farm, and of his stock, to a rank of the first eminence in England.

The method of littering horses and cattle, as is often practised both in England and America, not only renders the animals so much more warm and comfortable, as to lessen the expense of food, but greatly increases the quantity of manure, by preparing 10 or 15 loads of long dung to each creature, in a winter, so stabled and littered, either with coarse hay, straw, &c. and thereby furnishes the means of saving the whole (or nearly) expense of wintering, in the next year's tillage. Now if we take into considera-

tion, the extra number of stock the same farm would keep by the culture of the potatoe, as a fallow crop, and thus increase the quantity of manure, by consuming the straw, &c. for litter, and thus again, by the help of the manure to increase the quantity of hay, grain and straw, as well as potatoes, &c. it will at once be seen, that under this management, all our farms may become Diskley farms, and all our farmers gain the wealth and reputation of Mr. Bakewell; besides, the pleasure of managing such a farm, will, of itself, doubly compensate all extra care and attention.



JANUARY.

Your pork hogs are all now killed, and doubtless marketted to the best advantage, excepting a good supply of the best, which you have carefully reserved for your own use. Your hams and chops, are all put into a strong pickle, to prepare them for smoking; if you have saltpetre, put it into the pickle with your hams, and if the barrel or tub is crowded, turn them often; and at the end of 4 or 5 weeks, hang them up for smoking. If by any means your saltpetre should not be dissolved in your pickle with your hams, you may pulverize it at the time of taking the hams out of pickle, and with a wet cloth rub over the hams with the saltpetre, particularly at each end, around the bones, say 1oz. to each ham; it will strike through immediately, and your hams, when smoked, will be as high coloured, and as tender, as when preserved in the saltpetre pickle. Entire accident discovered this method, and frequent practices has confirmed it. Your beef is also all marketted, or put up for your own use, excepting such as you design for your winter's feeding. If you feed with carrots, your cattle will require some water, but if upon potatoes, they will do best, after the first week, to be fed without

water; the moisture of the potatoe will be found sufficient. You may now begin to realize the value of your potatoe fallows; your beef-cattle will fatten faster than in the usual method, upon meal and provinder, and your corn may be saved over for the spring and summer markets, which always commands cash, and a good price. Your cattle kept for labour, will pay you in their appearance, in their extra labour, and in the saving of your hay, if you give them one peck a head each day. Your cows, also, will repay you in their milk, as well as in their appearance, and saving of hay, if you give each one a peck of potatoes each day: but this is not all, they will make you more butter from the same milk, and pay double the next summer in your dairy*.

I have before me an experiment upon fattening beef, published by Mr. Nathan Landon, of Leichfield; in which he states, that he fattened an ox, and a three year old heifer, without either corn, or potatoes, for a less expense than even a common feeding, and in the following manner, viz. "I boiled about two quarts of flax-seed, and sprinkled on to cut straw, which had been previously scalded, and seasoned with salt, together with some oil-cake, and oat-meal; working them in a tub, with a short pitchfork, until the whole became an oily mush. I fed the heifer regularly in this way, about two months, when she had eaten about one bushel of flax-seed, with the other ingredients in proportion. When she was butchered, she weighed 584lbs.; 84lbs. of which was tallow. She would not have sold for more than

* One acre of potatoes properly fed out to your stock, will afford you manure to dress two acres well the next year; the profits on your stock, and on your extra crops, from your extra manure and tillage, will be your second profit; the increased value of your land, will be your third profit; and again, the increased quantity of stock this will enable you to keep, and thus, in a chain, augment your wealth, together with the value of your farm, will be a constant profit; this may not only be witnessed in the case of Mr. Bakewell, but in the case of every farmer who will practise it. Try and see.

\$16 before fattening. I sold two quarters of her for \$13 13. She cost me not more than \$10, exclusive of the hay she ate, which was chiefly scalded, as above. On the first of February, I began with the ox. I fed him about three months, but not altogether as well as I did the heifer. He digested about one peck of boiled flax-seed per day, prepared as above, which I suppose formed about one half of the fat in these two cattle. The ox was short, measured 7 feet 2 inches, and when killed, weighed 1082lbs. and had 180lbs. of tallow. He cost me when fattening, 25 cents per day: he had previously cost me \$35. My nett gain in fattening these two cattle, was more than all I have cleared before in fattening oxen and cows, for fifteen years, and this is owing I think chiefly to the use of flax-seed*."

Since writing the above extract, I have seen an extract from the Berkshire Star, recommending the use of flax-seed in raising calves, as follows, viz.

"Boil half a pint of flax-seed in two quarts of water ten minutes, to a jelly; then add skim-milk enough for three calves, or in the same proportion for any number of calves. This food, given twice a day, or thrice, will make them healthy and vigorous. The jelly may be used with hay-tea, without the milk."

This method is now coming into general use, and it will enable dairy farmers to enlarge their stock, without injuring their dairies.

Your horses, kept either for the saddle, or the harness, will perform more service when fed upon potatoes, than upon oats, or grain, and will not readily have the bots, or heaves. Even your young cattle and horses, will richly pay you for a few potatoes occasionally, both in their appearance and growth.

* *Quere.* Whether potatoes, or carrots, steamed, or boiled, as one of the ingredients, will not be found to be an improvement; and whether flax-seed mixed in this way, with boiled corn, carrots, or potatoes, will not improve the fattening of pork hogs.

Whatever multiplies feed for your stock, enlarges the quantity of your hay, and enables you to increase the quantity of your stock. Whatever will enable you to increase the quantity of your stock, increases the value of your property directly, and the subsequent value of your farm indirectly, by increasing the quantity of your manure, and thereby the quantity and value of your crops; thus you see that your potatoe fallows, which do not exhaust your soil, may be made the source of great improvement and wealth to the farmer*.

Your sheep should be fed daily upon potatoes; no article of stock will repay you with greater profit; the quantity of their wool will be greater, and quality finer; they will be free from ticks, unless kept in too warm a covering, and too many in a fold; they will never shed their wool, and seldom lose their lambs, when fed daily upon potatoes. The saving of hay will be as great as with your other stock in the same ratio. The rage of our country has been great for the merino breed of sheep; this has now subsided, and the farmers generally calculate to keep a due proportion of the English and merino breeds, to suit the mutton and wool markets. Experience can only be the true guide upon this subject.

Your affairs are now all snug, and well arranged; let your accounts claim your particular attention. They should all be posted by the first of this month, and all balanced and closed, before the month is out; the saving you will make in yearly reckonings with your merchants, mechanics, labourers, &c. will richly repay your attention. Perhaps there is no one thing in which farmers generally are more slack, than in their accounts, and it is of importance that it should be corrected.

* From the best calculations made by the best feeders, carrots and potatoes, are found to be worth 2s. per bushel boiled and given to hogs, or given raw to beef cattle, or 1s. when given to hogs, raw, or unboiled.

Improve the first turn of good sledding to draw home your wood and fencing stuff, for the next season; the winters are so precarious, you may not have another. It is of the highest importance that you provide in winter for the next season, as well as to provide in summer for the next winter. Think of ease, but work on; the rich improvements before you, should be your ample reward, together with the flourishing state of your families. The example of every thriving merchant, or mechanic, is before you; if they did not lay in their stock in due season, they would soon run out, and so will you.

Look often to your water-courses; see that the wash is properly directed, by not flowing too long, or too much, in one place, to the damage of your field, and see that your banks and dams are not broken, and washed away; this is both a cheap and rich manure, and such as no prudent farmer will neglect. The wash of the roads may be turned on to your sloping grounds, with very little expense and trouble, and afford you a handsome profit.

Two most important things now claim your attention; the first is, see that your children are not only steady at school, and well supplied with useful, and valuable school books; but improve every possible opportunity to improve your own minds by reading history, geography, biography, and the sciences generally.

Converse with, and examine your children often upon their studies at school; you will not only discover the state of their improvements, but you can do more than the master, by encouraging and exciting their ambition. One hour's instruction by conversation, is worth two by reading, upon the same subject.

In vain you toil to become rich, if your children are not educated properly, to take good care of it after you are dead. In our children we live again after we are dead, and all the good there is in acquiring more wealth than is necessary for our support, is to

enable us to educate them in such a manner, as to give to them the means of improving to the best advantage, the surplusage of our earnings, and thus continue the family name with respectability, to the latest generation.

No man was ever too old to learn ; and a correct expansion of the mind, and information of the understanding, is more precious to the owner, than silver, and renders him more valuable to the community, than gold.



FEBRUARY.

Your stock are now snug and warmly housed ; your beef-cattle, cows, sheep and working cattle, are regularly fed with potatoes, or carrots ; your clover is at proper times regularly apportioned in your racks, with straw, that your stock, by passing from rack to rack, may feed on clover and straw alternately, as they choose. Your threshing is now progressing as fast as possible, and every possible opportunity improved to finish your sledding for the next season. Your hemp and flax, are also the objects of your particular care ; get them forward as fast as possible ; the market, and the spinning-wheel, will now begin to urge the work. Every cent you save in domestic manufactures, is three cents gained ; first, from its extra durability, and next, from the saving of your money, and above all, the promotion of domestic industry. One piece of handsome domestic manufacture, will go further to raise the reputation of the young ladies, than the most expensive foreign dress. If you have stored more turnips than are sufficient for the use of the table, give them to any stock that will eat them, except your sheep ; give to them potatoes, but not turnips, at this season ; they will injure their lambs. It will be needless to give any directions for the preservation, and manage-

ment of weak and feeble lambs; the best nursing for such lambs is, by keeping the ewes well, either upon your best English hay, particularly rowen, with potatoes, carrots, or white beans; these will ensure you strong lambs, with a plenty of milk, and save all the trouble of nursing. Should any one be so unfortunate as to want the proper means of ensuring strong lambs, as above, or neglect a proper use of such as he may have, (for even barley, oats and corn, will answer as substitutes for the potatoes, carrots, or white beans, if given in small quantities, so as not to excite fever, and thereby cause ticks, and the shedding of the wool,) let him remember that such weak lambs should be treated, in all respects, as if they had been drowned, and you would restore them to life. Apply gentle and regular warmth; give warm milk, frequently, in small quantities, (the milk of the sheep is best,) and if the ewe has milk sufficient for its support, you may generally raise them; but if not, they generally die. It is more work to nurse one such lamb for 24 hours, than to feed regularly 100 sheep for the same time; take your choice.

Your breeding sows are now about to bring your pigs for the next season; keep them well, and in good flesh, but not fat, and salt them often to prevent their eating their own pigs, which often happens if they are too fat, and you neglect to give them salt. Now is the time to lay a proper foundation for your pork harvest, and in order to show you the value of this part of good farming, I will at this time lay before you sundry extracts upon this important subject.

Extract from the Boston Centinel, March, 1819.

“All Europe boasts of Leaden-Hall*;
But Yankee products beats them all.”

“*Day of fat things.*—Of the numerous improvements of which our country can boast, that made in

* Noted flesh-market in London.

rearing hogs, is perhaps the most extraordinary; and ought to confer on the individuals who have been instrumental in introducing and promoting, in our country, breeds so capable of improvement, the proud title of Public Benefactors. This remark occurred on learning, that, during the last week, one of our merchant victuallers purchased no less than sixty thousand weight of pork, principally raised in New-Hampshire and Vermont. We saw about thirty of the hogs which composed the purchase, and which, for whiteness of flesh, smallness of bones, thinness of skin and ears, and plumpness of body, could not be exceeded. Some of them, we learn, before they were slaughtered, could scarcely see, were unable to rise upon their hind legs, and were fed in a recumbent posture. We were told by the drovers, that a farmer, in one of the upper towns in New-Hampshire, had in his pen twenty pigs, which, when slaughtered, are supposed to weigh eight thousand weight; and that one of his neighbours has twelve others, which are supposed to weigh six thousand weight."

From the last Massachusetts Agricultural Repository and Journal.

"One of the most successful experiments in Agriculture that we have ever known, is that of the Alms-house Farm, in Salem, which is under the care of Mr. Paul Upton.

"This farm consists of about 35 acres, (as we are informed,) and was, two years since, in a state of nature, and very rough land. It has been brought too, and the produce during the year 1818, was as follows, viz. pork killed, weighed seven thousand nine hundred and sixty pounds. Twelve live pigs, sold for thirty-two dollars. On hand, fifty-seven pigs. Corn, four hundred bushels. Potatoes, two thousand two hundred and fifty bushels. Turnips, nine hundred bushels. Three tons of squashes. Fifty tons

of pumpkins, together with all the common summer vegetables for the Alms-house.

“ We doubt whether any farm in the United States, has produced more, in proportion to its size; and it is a proof what well directed industry can effect.”

South-Berwick Mammoth Hog.

“ February 17, 1819.—Mr David Nichols, a worthy member of the Society of friends, has this day killed a hog aged 21 months, 13 days, half blooded, of the Newbury whites; his girth 6 feet 5 inches; unusually short in proportion to his size; weighing with the rough fat 670lbs. precisely; having gained at least 1lb. per day since he was littered; he was sold for 12 1-2 cents per pound.” *Kennebunk Paper.*

Poughkeepsie, Dec. 16, 1818.

“ We learn that five hundred and twenty-five waggon loads of pork were brought to this village on Saturday last, which will probably give our farmers \$ 15000.”

Mammoth Hog.

“ A hog was lately killed by Capt. Joel Lull, of Windsor, Vermont, which weighed 582lbs.; only 19 months old.”

Instances of the improvements of our country in Agriculture, might be thus extended to a very great length; but these would only swell the expense of this work unnecessarily. The above are sufficient to show what has been done, and what may be done again, by every farmer who is in earnest about his farm, and will learn how to work it right.

You see that upon the Salem farm were raised about eight thousand weight of pork; besides live hogs marketted, and fifty-seven reserved for stock the next

season; also, 400 bushels of corn. You also see, at the same time, more than two thousand bushels of potatoes. These, when boiled, produced the pork; this again, produced the manure, which in its turn, will produce corn again, and, at the same time, raise the productive value of the land; and thus you see how my former remarks (under the articles, *Manure and Stock*) are verified. The size of this farm, also, shows how great wealth, with a little expense, can be drawn from a small farm, with proper management. The profits and the reputation, are worthy of the first attention.

Cut your cions for grafting, from such fruit as you wish to propagate; be sure to select from the ends of the most thrifty, and best bearing limbs, upon the most thrifty, and best bearing trees, and of the last year's growth only, excepting so much of the growth of the preceding year, as may be sufficient to fix in the earth to preserve them moist; let this be done by tying in separate bunches, the several kinds, with labels, and fix the bunches in the ground, in some dry part of your cellar, where they will stand secure until wanted for use.

If the weather is warm at the close of this month, commence the pruning of your orchards and fruit-trees, generally. Cut off all the old dead limbs from your old trees; but preserve the young shoots; they will come forward and bear, when the standing parts of your trees are dead. When you trim your young trees, cut off such limbs as incline to droop, are defective, or intersect each other; a little attention in pruning your fruit-trees, will carry them up in a handsome, regular shape, and both improve the quantity and quality of your fruit and your tillage underneath. To effect these two objects, it will become an object of your attention to accompany your trimmer, and both watch and direct his trimming; a person on the ground can generally judge better than one upon the tree. I need not repeat, that your orchards

are objects of prime importance upon your farms, not only for the revenue which they afford, but for the expense of rum, and other liquors, which your good cider will save, and for the saving, more especially, in your time and doctor's bills, in using cider in the place of rum, or other ardent spirits. I am sensible that all arguments against the use of rum and tobacco, are lost upon those who have long been accustomed to their use; but I hope to be believed, by those whose habits are not irrevocably fixed, when I say, that I have in the course of my life used both rum and tobacco, and for many years have disused both, with a full conviction, that my health is better, and my strength more permanent and durable when I labour, than when I used either—mark the difference of expense—yes, of useless expense—an expense that would pay the taxes and clothe the families of many farmers, and how much more, I dare not say—let such farmers calculate, and see for themselves, if they dare look the evil in the face. All this, and more too, your orchards will remedy, with one barrel or two of good malt, or hop beer, for the warmest of the weather. Try this mode as I do, and if you find me in an error, correct my error, and I will yield to your better judgment. But if you are satisfied with the improvement, let this waste of money, which costs you so much toil and sweat, be placed at such interest as shall ensure a quiet life, a tranquil old age, and a happy and peaceful death. Neither of these were ever obtained by rum and tobacco, nor ever will be.

For remarks on your other fruits, *see Gardening.*

Here let me repeat again the remarks I made in January, upon education. The news-papers are the great vehicles of general information; they give us a general knowledge of men, their political connections and movements; their commercial relations, agricultural improvements, &c. To understand properly this important source of information, a general knowledge of Geography is absolutely necessary.

This may now be easily acquired by the assistance of the small school Geographies, with their Atlases, which cost about 75 cents; and thus your winter evenings may be converted to the pleasure and importance of acquiring the valuable science of Geography, so that when you read in your newspapers the events, occurrences and transactions of foreign nations, you may, by the assistance of these school maps, bring those countries before you, and thus render them as familiar to your minds as the towns, or societies, in which you live. In this way, this news-paper foreign intelligence will be both interesting and useful. In this way, the general instruction of your families will be greatly improved, and a free and pleasant social intercourse heighten the enjoyments of a winter's fire-side. The study of Astronomy and Natural Philosophy, should also make up a part of these useful and social enjoyments. Philip's Lectures on Astronomy, and Blair's Grammar of Philosophy, are cheap and valuable books adapted to the capacities of children as well as men, and will impart all the knowledge upon these important subjects, useful or necessary in common life. This system of instruction your children cannot obtain in your common schools; but with your encouragement and assistance, they may become ambitious to obtain it, and by a proper spirit of emulation, they may be made to excel in these sciences; this will not only render them familiar to your own minds, and thus become a source of enjoyment to you, but they will afford you the lasting satisfaction of witnessing the improvements of your families. In this way, a laudable emulation amongst children of the same family, and of the same neighbourhoods, may be excited, and thus the most valuable improvements of the mind become the medium of the most social and familiar intercourse. It must be understood, that the farmers of all countries are the pillars of the State, and that the wealth, support and well-being of all communities, depend on

them. It must also be remembered, that virtue, industry, economy, and a well informed mind, constitute the basis of their wealth, strength, or influence, and respectability; and that the want of any one, or all of these virtues, will subject them to the cunning, intrigue, arts and duplicity of such ambitious speculators of the community, as are more knowing; such as infest all communities, and feed on the labours, and depend on the virtues of others, to maintain and support the interest and tranquility of a State, which their own pride, indolence and vices would otherwise ruin and destroy.

Farmers, let me repeat again, you are the lords of the soil and the pillars of the State, spare no pains to give to your minds that expansion, which alone can be derived from an enlarged education, that you may become the guardians of the State; that the liberties of your fathers may be preserved inviolable, and transmitted down to your children to the latest generation.

In the course of the successive months, I have endeavoured to place before the farmer the most valuable and useful crops, with the best practical modes of improving those crops, with a general reference to their use at this season of the year, both in feeding and improving stock.

It has now become your care to convert to the best use and profit, every article that will promote the growth, and better the condition of your horses, cattle, sheep and cows. Give out all such coarse fodder as you design for feeding, before this month is out; when the spring opens, it will become useless excepting for litter, and to this use, all should be applied, that can possibly be spared. Every load of manure you can possibly make, becomes better to you than so much value of cash in the bank; because the next crops will pay you a much greater interest, and the increased value of your lands, by the means of this manure, will render this better than compound interest. Here let me repeat again, apply every dry

substance you can collect and spare for litter for your stock, it will not only keep them warm and thus save hay, but be the means of giving life and vigour to all parts of your husbandry, by the manure it will make.

The long winters of New-England are generally considered as being a great damage and expense to the farming interest, generally; this is true to all such as choose to make them so; but directly the reverse to all such as consult their true interest. Our northern winters are not longer than are best for the improvement of the mind, education of our children, cultivation and improvement of our stock, threshing out our grain, dressing our hemp and flax, making and collecting manures, the provision of fencing stuff, fuel, &c. together with the promotion and enjoyment of that social intercourse, which is the life of society, the enlivener and polisher of manners, and the basis of the good order and best interest of the community. Now is our time to combine all these advantages, and reap the benefit of them.

Let the merchant and the artist boast of their nice calculations, their stocks in business well laid in, and contemplate their profits, amounting to vast stores of wealth, in expectancy; the success of all their schemes, and even their own personal support, depend on the farmer.

As well might the Apiarian construct his splendid hives, and stock them well with bees; if the fields yielded no blossoms for their support, his stock would all perish; his fine calculations would all fail, and his vain expectations end in disappointment. Just so the calculations of the merchant, the artist, and even the government, and the nation itself would fail, without the labours of the husbandman, and the blessing of God, to crown those labours with success.

These are the plain practical truths of common sense, and common experience; let me call on every description of character in the community, and say,

thou art fed and clothed, and warmed from the field—venerate the plough.

Farmers, I have before remarked, ye are the lords of this lower creation, and I have shown you this by clear demonstration; reverence yourselves, by your industry, economy, temperance, sobriety and punctuality, with all the christian virtues, and you will compel the world to reverence you. Should any one order, rank, station, or individual in society, withhold from you the tribute of respect, justly due to your rank, and worth in society, *let him alone*; reflection will correct his error. Let no advantages of improving your knowledge in the science of husbandry, escape your attention; apply this improvement in knowledge, to the improvement of your farms, by little and little, as circumstances, and your means may afford you opportunity; a well directed industry, with the blessing of God, will enable you to surmount all difficulties, and will make you both rich and independent, and your families after you. Remember the Salem Alms-house Farm; the example is before you, go and do likewise, and become the Paul Uptons of your country. Under such husbandry, the merchant will flourish; the artist, and the labourer will flourish; the agriculture and commerce of our country (those handmaids of nations) will flourish; our country will become the garden of the world, and America the store-house of the world. Enjoying, as we do in America, the advantages of every clime, which constitute the delight of the temperate zone; blest, as we are, with a variety, and fertility of soil, unrivalled in the geography of Nations; together with the privileges of civil and religious liberty, unparalleled in the history of nations; let us remember that the eyes of God, and of the world are upon us; in proportion to the distinguished magnitude of our privileges, so let us fill up our duties to ourselves, to the world, and to our God.

Let us keep free from debt, and once more I say, we are of all men the most happy and independent.

ON

GARDENING.



MARCH.

In New-England, we are excluded, generally, from our gardens, by the frosts of winter, from the middle of December, to the middle of March, and often from the first of December, to the first of April.

Whenever the frost subsides, we begin to prepare our hot-beds, for the purpose of forcing vegetation, and in the following manner.

Hot-Beds.

Mark out your bed, to the size of the frame you design to cover it, which is generally six feet in length, and three in breadth, covered with glass set in sashes of 12 panes each, of 7 by 9 glass. These sashes are hung with hinges upon the back side, to admit of their being raised up, and let down in front, at pleasure. The front side of the sashes to incline from the back side about six inches. The frame, or box, is tight upon all four of its sides, and generally, about 12 inches high in front, and 18 inches on the back side.

Dig your bed thus marked off, and cover it with litter from your horse-stable; stamp down your several layers, until your bed is raised to the height you wish, then cover the bed with a layer of rich earth, from 6 to 12 inches thick, and set on your frame; in 8 or 10 days, it will generally be ready for planting.

if the weather is mild. If the fermentation is too powerful, and the heat too active, give it air by raising the lights in your frame, until you have obtained a right temperature; (which you may determine by placing your hand upon the bed, or even thrusting your hand into it.) You may then plant your early cucumbers, radishes, sallads, &c.; these plants will soon come forward, and may be transplanted on to other hot-beds, not so powerful, or promiscuously, into the garden, and covered with other small frames, of 1, 2, or 4 panes of glass according to circumstances, and the remainder may stand for use. These plants may be brought to perfection, generally, about one month earlier than in open ground.

Asparagus may be forced in hot-beds to advantage, in the following manner. Draw, or dig from your asparagus-bed, as many roots as will fill your hot-beds, and set them in rows that will admit the hoe between, and from one to three inches asunder in the rows, (roots of four years old, and that have never been cut, answer best;) cover with your frame, and when you pick for use, cut within the ground.

Peas.

Prepare your pea-ground as soon as the frost is out, by digging and raking, until it is completely pulverized; if your soil is weak, manure with live or leached ashes, or chip-dung, and rake it in; then plant your early hotspurs in double rows, 4 or 5, or even 6 inches asunder, and set your peas by hand, about half an inch distance in the rows; cover lightly, and press down the surface of the earth upon the rows with the hoe. Hoe them gently as soon as they come up, and when you set your brush for supporters, set one row in the centre between the double rows. Be sure to select for this crop the driest and warmest soil in your garden, particularly, such as is secured from the north winds, by a tight fence, or a wall.

When your hotspurs are up, plant, in the same way, early turners, nonpariels and marrowfats, &c. in succession, and in this way, you may continue your peas until autumn.

Cabbages.

Select from your cellar the best of your cabbages with heads, and set in some secure place, to stand for seed; set different kinds remote from each other, to prevent their mixing their seed at the time of blossoming. Set, at the same time, your best cabbage-stumps for early sallad and greens. If your ground is moist, set fleet; but if it is dry, set deep; say six inches or more.



APRIL.

Remove the covering from your strawberries, and hoe them lightly.

When your early planted peas are all up, continue to plant marrowfats, or other rich peas, and go on to bush your early peas as directed before.

Set rareripe onions; sow late onions; and plant, at the same time, beets, carrots and parsnips, for summer's use; sow sallads and radishes with your onions, they will be fit for use when your hot-beds are done.

Cover your asparagus-beds with rich manure, (if you neglected it in the fall,) dig over the surface lightly, and rake it until the earth is mellow.

Set garlies, plant Scarcity, or Mangel Wurtzel, sow cabbages, turnips, radishes, &c. Set all your seed roots, if you have not set them before; such as ruta бага, beets, carrots, turnips, both long and flat. Sow sage, thyme, mint, summersavery, &c. with spinach, parsely and cellery.

Plant English white potatoes, on a rich warm soil.

Asparagus.

Select the driest and warmest part of your garden for your asparagus-bed, as you have done for your early peas; render it a deep rich mould by frequent digging, and high manuring; lay it off into beds of four feet wide, and sow your asparagus-seed as you have done your onions and carrots, in rows of about 10 inches asunder. When the plants come forward, hoe and weed as often as may be necessary to bring forward the plants free from weeds, through the first season.

In April of the next season, stir, or dig the ground lightly upon your asparagus, and give a top dressing with rich manure; continue to hoe, and keep down the weeds, as before. At autumn, cover your bed with long-dung, or litter, from your horse-stable; and in April, rake it off, and dig and rake as before. When the plants come forward, you may now begin to select a few of the most thrifty, for use; remember always to cut just beneath the surface of the ground. Continue this process, with occasionally a little salt strewed over your beds in the spring, and you may enjoy the luxury of good asparagus.

You may now set a bed of horseradish in the same way, if you have not done it in March.



MAY.

Plant bush-beans and pole-beans of various kinds, upon a warm soil, and manure with horse, or hog-dung; (to set the poles first, and then plant the beans round the pole, is generally preferred;) be sure to plant fleet. Hoe and bush such peas as have come forward; hoe and weed your onions, rareries, garlics, sallads, &c. Plant your cucumbers in open ground, upon a rich, warm soil, and manure with

horse, hog, or chip-dung in the hill. Continue to plant late peas. Plant early corn, such as the small tucket, sweet corn, Canada corn, and great tucket.

Sow cabbages, cauliflowers and broccoli; plant early squashes, musk-melons, canteloupes and water-melons. Begin to cut asparagus for use. Continue to sow celery, spinach, parsely, sage, thyme, and other aromatics, with beets, carrots, &c. Continue to plant potatoes; plant broom-corn, holcus bicolor, or chocolate broom, and close your seeding before the 25th.

Culture of the Carrot.

Select a deep rich garden mould for the culture of this root; a warm sandy loam answers best. Prepare this land with high manuring, by the richest and best rotted manures, and deep ploughing. Let the earth be nicely pulverized with the harrow, and struck out into beds of 3 1-2, or 4 feet wide. In striking out these beds, let the plough pass up and down, or return back, in the same furrow; this will turn the earth equally up to each bed. When the beds are thus struck out, haul in the loose dirt from the furrows on to the beds, either with a hoe, or a rake, and let it meet on the centre of each bed; this will lay the beds crowning; then break all the clods upon the beds fine with the back of the hoe, or with a wooden clod-knocker, made for the purpose, and finish the beds by pulverizing as fine, and as deep as possible with the rake; (a rake with sharp iron teeth is preferred.) When the beds are thus prepared, mark them off into rows 10 inches asunder, with a large heavy rake made for the purpose, with 3 or 4 teeth placed at that distance, and about 5 or 6 inches in length, well sharpened at the points.

The beds are now ready for sowing; prepare your carrot-seed by rubbing it with the hands, after it is shelled, until the seeds are all separated, so as not to stick together; then mix them with plaster of Pa-

ris, or live ashes, or both, or with a dry loam, and strew your seed in the rows so as to have them fall at the distance of 3 or 4 inches apart; this will give them room to grow without crowding, so as to obtain a good size. If you mix a small quantity of onion-seed with your carrot-seed, the onions will come forward first, and assist in finding the young carrots at the first weeding; they will also serve for early family use without injury to the carrots. The carrot must be kept perfectly clean, and free from weeds through the season; 3, 4, or 5 hoeings and weedings will be necessary, and in October, they may be dug with the spade, or dung-fork: 500 bushels to the acre is a good crop, and I have known 2500 bushels to be raised upon an acre, or in that ratio. The carrot is worth 2s. when given raw to hogs, cattle, sheep and cows, or 2s6 when boiled, or steamed, and mixed with bran; no feed makes richer pork, beef, mutton, or butter and cheese, than the carrot. The same culture is required for beets and parsnips.

Mangel Wurtzel, or Scarcity Root.

This root requires the same culture as the carrot, but as it grows much larger, it is necessary to place the seeds in the rows at the distance of about six inches, and when the roots have obtained a good size in July, and August, you may begin to pluck the under leaves as feed for your hogs and cows, without injury to the roots; if you begin to pluck upon one side of your patch, say one rood, you may have, from the time as above, a regular succession of plucking through the season; for by the time you have gone over the patch, the roots first plucked, will be ready to be plucked again, and so on. This food is very nutritious, and may become a profitable saving of your corn. The value of the roots you may experience in your winter's feeding, either for hogs, sheep, cattle, or cows, the same as the carrot, or they may be kept over until spring, as you choose. This

root may be rendered much more productive than the carrot, and its summer's croppings give it a preference to that root. Onions may also be sown with this root without injury to the crop.



JUNE.

You may plant cucumbers to advantage the first of this month; they will often be as early as those planted the middle of May, and generally bear better. Clip off the runners on strawberries.

Weeds are the common enemy of man; they now begin to infest your garden. Remember, that as you till, so you will reap. Hoe and weed your plants as soon as you can do it with safety. One crop is sufficient for one piece of ground, at one time, and if you suffer it to be weeded with your plants, you will have only weeds. Nurse your plants with your hoe frequently; remove the dry earth, and give them fresh earth, especially if the season is dry: early in the morning is the best time, both for your own health, and the health of your plants. Under this management, you may enjoy the luxuries of a good garden, without impeding the labours of the field, or abridging your field husbandry. Continue to hoe and weed out your onions, and all other plants, even if possible, before the weeds appear; this is good economy, both in time and labour, as well as profit to your plants. Hoe and bush your late peas; plant more potatoes; sow more turnips; continue to plant bush and pole-beans; plant gourds, squashes and melons, of all kinds. Continue to plant cucumbers for pickling. Top all such bush-beans as are in blossom, by cutting off the top of the vines near to the blossom, they will be earlier, and bear better. Watch your vines, and destroy worms, bugs, &c. by ashes, lime, soot, or a strong solution of hending. Thin out, and earth up all your plants; re-

member that frequent hoeing, is both rain and manure to your plants, especially in dry weather, if done in the morning. Cut your sage, mint, &c. when they begin to flower, and spread to dry in an airy place. Plant out your cabbages, cauliflowers, broccoli, &c. in moist, or cloudy weather, but not when the ground is wet and heavy. Thin out your beets, carrots and parsnips, and fill up such rows as may be vacant. Transplant your ruta baga into long rows of 4 feet asunder, and 12 inches distance in the rows, and manure the rows with rich manure, or live ashes, or plaster of Paris. Continue to gather herbs when in full bloom, and dry as before.



JULY.

You may continue to plant the white potatoe, until the 20th, on rich ground. Continue to sow broccoli. Continue your transplanting, particularly your celery, and in the following manner. Dig your trenches one foot wide, and one foot deep, or more, if on a warm soil; and of any length you may choose; lay the earth upon both sides of the trench; then dig up the bottom of the trench 5 or 6 inches deep with a dung-fork, and manure, at the same time, with rich hog, or horse-dung, or compost. Set your plants in the trenches (in the centre) about 5 or 6 inches asunder; earth up the plants as they continue to grow, from both sides of the tops of the trenches, until they are even with the surface of the earth, then continue to earth up your plants as they continue to grow, say 10, 15, or 20 inches above the surface, until they have acquired their height; be careful not to bury the plants, at any time.

Pull rareripes, garlicks, and even late onions, as they come forward and ripen; house them in dry weather, and bunch such as you choose to keep for use.

Continue to watch your vines, and destroy worms, bugs, &c. Continue to nurse your plants with the hoe in the morning; this must not be omitted, until the frosts and snows come. Your garden should be as free from weeds as your drawing room. Continue to sow ruta бага, turnips, &c. Continue to clip your strawberries.



AUGUST.

Continue to transplant late cabbages, broccoli, ruta бага, celery, &c. Continue to gather seeds as they ripen, and dry them carefully; see to such seed-peas as were not gathered last month, and plant a new crop for autumn. Continue to pull late onions. Continue your hoeing in the morning when the dew is on. Let me repeat it, this is the best way of watering and manuring, unless it becomes very dry, a little water may then become necessary, early in the morning, or at evening, upon a dry soil. Continue to earth up your celery, and nurse such potatoes as are not fit to dig. Dig such as are ripe, or have dead vines. Begin to sow turnips for winter's use, and transplant your ruta бага on to your early pea and potatoe ground, in rows 4 feet asunder, as before directed. In digging your ground, leave an open trench at each 4 feet distance; manure in these trenches plentifully, with rich manure; cover it with earth, and set your roots over the manure, when the earth is fresh dug; keep your plants clean with the hoe.



SEPTEMBER.

Continue to earth up your celery; gather your late seeds, and dry them carefully; sow onions to

stand over the winter; nurse your late potatoes; weed turnips; hoe and weed ruta бага, &c. Finish digging early potatoes. Finish pulling late onions. Continue to clip your strawberries. Continue to gather your seeds as they ripen.



OCTOBER AND NOVEMBER.

Gather from your garden all winter vegetables, before the hard frosts commence, particularly winter squashes; dry and house them carefully. When the frosts commence, let not a weed, nor the seed of a weed have a place in your garden. Gather your celeri in dry weather, and pack it in boxes with dry sand, in a warm cellar, leaving the tops and leaves open to the air. Gather ruta бага, beets, carrots, parsnips and turnips, and secure them in a warm dry cellar. If you pack in casks, or boxes, such as you design for the table, they will richly repay your trouble in their extra relish and flavour, particularly your turnips, which may thus be kept sweet over until spring. This may sometimes be done, by covering them under a heap of potatoes, upon the ground. Ruta бага will not become ripe, and obtain its best relish, until February, or March; it will then supply the place of the turnip, and hold its relish through the summer. Transplant strawberries on to rich beds, in rows of 10 inches asunder, and in hills 10 inches distance in the rows, and cover the beds lightly with straw, or other litter, and this with horse-dung.



DECEMBER.

Continue to transplant such strawberries as you have neglected the last month; this must be repeated

again the third year to root out the grass. If you set a fresh bed every year, either in August, or in autumn, you may always have this fruit in high perfection. Plant such peach-stones as you wish to propagate, and where you choose to have the trees grow. Transplant all such vines and trees as you wish to remove, and secure them with stakes.

Ploughing.

If you have been accustomed to till a rich garden mould under a *shallow ploughing*, now is the time to begin to *correct the error*.

Put in your plough, and turn up your garden to the depth of 8, 10, or 12 inches, and give the dead earth you turn up, a dressing of your best manure, well spread and mixed with the earth by the harrow. In the month of April, turn in with the plough this manure *to the same depth you ploughed in autumn, or winter, and no deeper*. Your rich mould will again appear upon the surface, ready for tillage. Repeat this process again at autumn, and you will, in a few years, have a deep rich mould, equal to the original surface, which will give you nearly double your former crops, especially in dry seasons, and only with the expense of one extra ploughing in autumn. If your soil is light, and you wish to push it into a state for high cultivation, you may dress the surface (after the spring ploughing) with live, or leached ashes, or plaster, and harrow the ground until it is well mixed; or you may spread on a coat of rich manure, and cover it lightly with the plough, and then go on to till either with or without your top dressing, as before. This process will soon make poor land rich.

Fruit-Trees, Vines, and Shrubbery.

MARCH AND APRIL.

Cut and set all such fruit as you wish to propagate by the slip; such as currants, goosberries, raspberries, &c. Plant out such fruit-trees as you wish to remove, together with your grape-vines, particularly such as you have propagated from your standing vines. Prune your currants, goosberries, raspberries, &c. remove all dead stalks, and support your bushes by frames.



MAY.

Set by grafting such cions as you may have collected in February; choose for this purpose the most thrifty stocks, if you expect good success; place two cions in each stock; but do not suffer more than one to grow and come forward. Bend down such branches of your grape-vines as you can bring to the ground; open a small trench 5 or 6 inches in length, place in it your vine, (leaving the growing end open to the air,) then cover over the vine with rich mould, and cover it with a stone; this will both steady your vine and keep it moist. In this position it will take root in summer; and in autumn, or winter, it may be separated from the standing vine, and in March, or April following, be removed to such a place as you may choose. This is the surest and easiest way of propagating the grape.

JUNE AND JULY.

Your strawberries, cherries, &c. now begin to reward your labours, and if you have rightly arranged your Fruiterie, you may now enjoy a rich succession without intermission, until the frosts commence; and with a little attention by preserving, you may enjoy it round the year. Go on to enjoy the fruit of your labours; you alone have the best right. Let the hoe rank amongst the delights of the morning; nature's school is full of variety that never cloy, when rightly used, and richly repays for all our care and toil. Gather your currants and goosberries, and make up your wine.



AUGUST.

Propagate fruits generally by inoculation; choose a cloudy or moist time, when the sap in your stocks is in full spring. Stone-fruit will heal over best when propagated by inoculation. The process of grafting and inoculating are both so simple and common, that it must be unnecessary to describe them here; every farmer's boy of 14 years of age may be capable of propagating fruit in this way, with ease and safety. Transplant such strawberries as have become foul with grass, and give them a rich fresh bed, as directed in November, (under *Gardening*.)



SEPTEMBER, OCTOBER AND NOVEMBER.

Continue to enjoy the fruits of your labour; pears, plums, nectarines, apricots, cherries and peaches,

with raspberries, strawberries, currants and goosberries; not forgetting the choicest apples and grapes in the richest variety and profusion, have rewarded your labours from early in June, without intermission, down to this time, and your grapes, if carefully packed in clean sand, or saw-dust, may be preserved on the cluster, fresh, round the year.

Make up your stock of grape wines for the year, in October; it is less expensive (on account of sugar) than the currant, and far superior.



DECEMBER.

Plant out your vines, strawberries and raspberries, and prune such as stand, and give your garden a thorough preparation for the next season. Prune your stone-fruit generally this month, particularly your vines. Remove from your vines part of the bearing wood of the last season, and all straggling shoots; preserve such shoots of the last summer's growth as you wish to have stand for fruit the next season; from these only will spring the bearing shoots. To improve this fruit as much as possible, shorten those shoots of the last summer's growth, down to about six joints, and cut from half an inch to an inch from the eye, when you divide the shoot. All unthrifty branches must be removed.

Plant out of your nursery, such trees as you wish to have stand for fruit, and plant such peach-stones as you wish to propagate, and where you would choose to have the trees stand, and guard them by stakes. Take up such shoots as have sprung from your quince-trees, and other trees and vines, and place them where you wish them to grow. Dress all your fruit-trees and vines with rich compost, or

chip-dung; but avoid all long-dung, this will harbour mice, which may ruin your trees. Let your example of industry and enjoyment, be an example to all others, to go and do likewise.

ON BEES.

THE native instinct of the Bee, offers to the use of man one of the first and greatest examples in nature.

1. By her uniform habits of industry in all her labours.
2. By her unrivalled habits of economy.
3. By her wisdom and sagacity in constructing her cells, which constitute both her habitation and store-house.
4. By the peaceful regularity of her little communities.
5. By her temperate use of the choicest luxuries of nature.

She also offers to man a rich reward for all the care and attention he may bestow in cultivating her species, and in promoting their improvement.

“ The Bee observe,
She too an artist is, and laughs at Man,
Who calls on rules the rightly hexagon to form :
A cunning Architect, that at the roof
Begins her golden work, and builds without foundation.
How she toils ! and still, from bud to bud, from flower to flower,
Travels the live long day. Ye idle drones,
That rather pilfer, than your bread obtain
By honest means like these, look here and learn
How good, how fair, how honourable 'tis
To live by industry. The busy tribes of Bees,
So emulous, are daily fed with Heav'n's peculiar Manna,
'Tis for them, (unwaried Alchym'ists,) the blooming world
Nectarious gold distils ; and bounteous heaven,
Still to the diligent and active good, their very labour, makes
The certain cause of future wealth.”

Impressed as I am with the truth of these remarks, I shall consider my system of husbandry as imperfect, without some general knowledge of the cultivation of Bees to accompany it, and every farm as being incomplete, until the labours of the Bee are added to its regular profits. I can say nothing upon this interesting and valuable subject from my own experience, and shall therefore annex to my work an abridgment of a learned work upon Bees, published in London, in the year 1817, by the celebrated Apiarian, Robert Huish ; Author of the *Peruvians*, a poem, &c. Fellow of the University of Arts and Sciences of Gottingen ; Honorary Member of the Imperial Apiarian Society of Vienna, and Corresponding Member of the Agricultural Societies of Bavaria and Silesia.—*Second Edition, with additions.*

INTRODUCTION.



DEMOCRITUS, who died 361 years before Christ, aged 109 years, is the first Apiarian whose works have come down to us. The knowledge of the Bee at that age, was confined to the speculative knowledge of Natural History, rather than a practical knowledge of the economy and value of this most useful Animal.

Alexander De Montfort wrote the two first modern Treatises upon the Bee, about the middle of the 17th century, entitled "the Portrait of the Honey Fly, its virtues, form, &c." Also, "the spring of the Honey Fly," divided into two parts; in which will be found a curious, true and new history of the admirable and natural conduct of the Bee, &c. De Montfort notices a long catalogue of ancient writers upon Bees, particularly, Aristotle, Columella, Varro, &c. and adds the first practical touch to their visionary speculations. Virgil says, that a Bee is a ray of the Divinity; Plutarch, that it is a magazine of the Virtues; Quintilian, that it is the chief of the Geometricians; and De Montfort, the Bee surpasses, in architecture, the skill of Archimedes. Plato, who flourished about forty years before Democritus, ascribes to the Bee a certain portion of that angry Divinity which inspires Poets, and cautions his Disciples against disturbing either of them.

At the close of the 17th century, appeared Swammerdam, Maraldi and Ferchault, all men of science, who opened to our view the natural history of the Bee; but Hodierna, of Totria, first disclosed the fact, that all young swarms spring from the eggs of the Queen Mother. These men laid the foundation of the true Apiarian science, and were translated into every language.

This interesting subject engrossed the attention of a host of writers through the 18th century, and at the close of it by Huber, (though blind nearly,) most visionary of them all.

Bonner, a Scotchman, is the first good practical Apiarian that has appeared, and his valuable conversation has greatly assisted the labours of t's work, with what success the public must judge.

PRACTICAL TREATISE ON BEES.



CHAPTER I.

On Bees in general.

I SHALL wave a description of the different species of Bees disseminated throughout the natural world by the great Author of Nature, and confine my remarks solely to the common Bee, or honey fly; particularly, as the most social, sagacious, interesting and useful, of all the instinctive tribes of animals.

The Abbe Rosier, one of the best informed of the French agriculturists, particularizes four species of the domestic Bees. The first species are very long and brown; the second are less, and almost black; the third are still less, and of a grey colour; the fourth are still less, and of a bright yellow, shining and polished, and known only in Flanders.

The Bee rises with the dawn, and rests only at the dusk of evening, and continues her industry throughout the year, in all countries where the frosts of winter do not impede her labours. The Bee is the only insect whose sagacity has taught us, that honey constitutes the essence of the blossoms of plants, and by her industry has imparted to man the luscious boon. The whole vegetable world is the garden of the Bee, and her cell her store-house.

The community of the Bees is the first, the greatest, and best example in nature, of a perfect community. In their harmony and good order, mutual enterprise, and efforts to promote the general good, in their ardour of pursuit in quest of stores, to load

their legs, back, and wings, and flit away to the store-house of common deposit; and in their mutual aid in assisting each other to unload their burthens, together with their nice economy in feeding out the common stock. The community of the Bee is not a republic, but a brotherhood, a monarchy with a community of goods, and governed by a queen. The queen is not the tyrant of the swarm, but the mother of the swarm. She is not the dispenser of laws to the swarm, but the subject of the same fixed and immutable laws of nature, which govern every Bee in the swarm.

The Bees know each other, and are armed with a sting for common defence. They know their keepers, and generally respect them. They possess a natural disgust, which has not yet been fully accounted for, and attack, and sting the objects of this disgust wherever they meet them; *invariably*. The Bee is very sagacious in judging of the weather, and avoids the storm by retiring to her hive, or sheltering herself under the foliage of plants and trees. The whole swarm manifest an affectionate attention to the queen mother, unexampled in nature, and are constantly employed for her support and preservation. The natural period of the life of the Bee is not yet known, but they are more generally the victims of the casualties of nature, rather than old age. The dysentery is their most common and fatal malady, and they destroy by violence all the lame and infirm, together with the drones, by banishing them from the hive; thus illustrating the sacred maxim, "He that will not work, neither shall he eat;" with the addition of their own natural law, "He that cannot work, neither shall he eat." The first is perfectly conformable to the principles of humanity, and common sense; the latter is repugnant to both. A general, as well as particular system of cleanliness pervades the community, and no dead Bee is suffered to remain in the hive.

The particular laws of instinct, begin to govern the Bee as soon as it quits its nymphal state, and is capable of action; and one uniform system of order regulates his movements, in union with the whole swarm, throughout all the instinctive operations of them. As well might the wise man have said, Go to the *Bee* thou sluggard, consider her ways and be wise.



CHAP. II.

Description of the Queen Bee.

In our last chapter, we noticed the character of the Bee, and the instinctive character of a swarm, or community, with its queen Bee, as the mother and ruler of the family; as an elective monarchy, upon the death of the queen, and a monarchy with a community of property, and nature's immutable instinctive laws as their only guide. This chapter describes the queen mother as not formed by nature for labour, but formed only to rule, and to breed. Her teeth and her wings are unfit for labour, being much shorter than the common Bees and the drones. The body of the queen is much longer and slimer than the other Bees, her belly of a bright yellow, and her back and wings, of a brighter hue. The queen possesses an astonishing fecundity, unequalled by any thing in nature, except the fish; her body is replete with eggs, arranged in two ovaria, and prepared for the breeding season. These she deposits in her cells, so long as a cell is vacant, and thus lays the foundation for the young swarm. I say lays the foundation, but whether perfect, or imperfect, is yet a question; the fecundity of the Bee after all the elaborate research of man, is yet a mystery unsettled

by Apiarians. Mr. Huish is decidedly of opinion, that the queen knows not coition, that she is a virgin mother, and that her eggs are impregnated by the drones, after she has deposited them in the cells; but a whole host of Apiarians are opposed to the sentiment, yet all agree in this, that the act of coition has never been discovered. The queen is not only the mother and queen of the hive, but the soul of the hive. All is order whilst she lives, and all is confusion the moment she is dead; hence the reason why she seldom if ever ventures abroad, and why the whole swarm so cheerfully and affectionately support and protect her in the hive. Thus nature provides for their peace and order, by giving the queen Bee short and feeble wings for flight, and short and feeble teeth for labour, fitted only for her own feeding, together with a feeble sting, and a mild temper to shield her from exposure to violence and death. The queen not only governs the swarm by their affections, but she leads them wherever she goes, and is their rallying point, both in and out of the hive, whenever she ventures abroad. All this, together with every movement and operation of the Bee, is the result, not of their particular municipal laws, but of that general law of instinct, derived from God their Creator, at their first formation. Much visionary speculation has infested the brains of Apiarians upon the fecundation of the queen Bee, but all are agreed in this, that the cell in which the queen Bee is born, is perpendicular and circular, whereas all the others are hexagonal and horizontal, and the queen mother knows what will be the offspring of the egg that she lays in the circular cells. The cell of the drone is different still, being neither circular, nor hexagonal, but irregular; this has again led Apiarians into much hypothetical disquisition, without demonstration, and all fraught with more theory than profit.

CHAP. III.

On the Drones.

The wings of the drone are shorter in proportion to his body than the males, or working Bees, which occasions that humming sound which distinguishes them in their flight. Nature has regulated the number of drones in each hive with a direct proportion to the number of working Bees, from 4 to 8 and 1200, and the fecundity of the queen according to the number of cells. The drone has no sting, and gathers no food; he, therefore, neither works nor fights, but his whole utility in the hive consists in being an instrument of fecundating the eggs when deposited in the cells, or otherwise as may be.

The antenna of the drones possess eleven articulations, and the other Bees have fifteen. Their eyes cover all the upper part of the head, and the other Bees have one oval eye upon each side of their head. Their teeth are smaller, and their probosces shorter than the common Bees; and thus nature has prepared them for useful inoffensive animals in the hive. Whenever you discover that a hive becomes deficient in drones, (which sometimes happens,) you may replenish such hive by catching a few from some other hive, as they pass and repass, generally about mid-day; confine them until evening, and you may then introduce them to a general acceptance. Where a want of drones is not sensibly felt, the new intruders are sometimes murdered, by a general assault. For safety, two or three may be introduced, and their reception will decide what is best. When the season of fecundation and gathering food are over, the working Bees assemble, and commence a general assault upon the drones, drag them out of the hives, and destroy the whole, by a general slaughter. Thus the whole system of nature is finished for the season, in the community of the Bees.

CHAP. IV.

On the common Bees.

The term common Bees, working Bees, or mules, will apply to all the others in the swarm, excepting the queen and the drones, because they form the mass of the community, and do the labour, by laying in stores for the hive, and nourish the brood, and are neutral in their propagation. Much curious hypothesis has appeared amongst Apiarians, upon the order and regularity in apportioning the employments and tasks of labour in the community, but this is now generally exploded, and each Bee is left to the government of his own instinct, in apportioning and performing his several duties.

The whole field of nature abounds with the inexplicable mysteries of providence; and the Bee, by her wonderful sagacity, has unlocked one of those mysteries, by extracting honey from plants, and flowers, and converting it to the support of herself, and the use of man; but how this honey is produced in the operations of nature, in the growth of the plants, and how the Bee extracts it in exclusion to the other juices of the same plants, is all inexplicable to us, and is one, amongst the millions of nature's works, to show how little of nature man can know.

I shall continue this chapter with a description of the Bee by Mr. Huish. "In regard to the physical description of the Bee, the most remarkable parts of it are the head, the breast, and the belly. On the former, are observed two wonderful eyes placed in the side, two antennæ, two hard teeth, or jaws, which play on opening and shutting, from the left to the right. These teeth enable it to collect the wax, to knead it, to construct the cells, and to remove from the hive every obnoxious thing. Below these teeth we observe a proboscis, which has the appearance of a thick fleshy substance, of a very shining ches-

nut colour. This substance is divided into two parts very supple at the end, and it is only seen at its full length when the Bee is employed in collecting honey in water. If the teeth be separated, we observe at the orifice of the proboscis an opening, which is the mouth, and above it a fleshy substance which is the tongue; their use will be explained in the sequel. The breast is attached to the head by a very short neck; it carries four wings upon it, the two last are longer than the two first. It has six feet, on the two hinder of which, are two triangular cavities, in which the Bee by degrees collects the farina from the plants. At the extremity of the six feet, are two sorts of fangs, with which the Bees attach themselves to the sides of the hives, and to each other. From the middle of these fangs, on the four hinder legs, project four bushy substances, the use of which are to collect the dust of the flowers, attached to the hairs of their body, and are of the same use as hands. The body, properly called, is united to the breast by a species of thread, and is composed of six scaly rings. The whole body of the Bee appears, even to the naked eye, to be well clothed. Age makes a little difference with them in point of colour; those of the present year are brown, and have greyish hairs; those of the preceding year, have reddish hair, and the scales less brown, rather inclining to a black. Their wings are often torn and fringed at the ends, occasioned by their former flights. On the wings, and on the breast, are observed small orifices, or pores, in the shape of a mouth, by which the Bee respire, these are the lungs of the body, (technically called stysmates;) this part, which is of a wonderful construction, is both common to the Bee, and all other insects. The interior of the body consists of four parts; the intestines, the honey-bag, the venom vessel, and the sting. The honey-bag is as large as a pea, when it is filled; transparent as chrysal, and is the store-house of the Bee, when collecting the

honey, and which she transports, and lays up for the use of the swarm in winter, in the common stock.

“The vessel which contains the venom is at the root of the sting, and is conveyed with the wound of the sting. The sting is a sharp, barbed, hard substance, at the extremity of the belly, and is both the offensive, and defensive weapon of the Bee.

“The Bee easily inflicts a wound with her sting, and from its barbed surface, often leave the sting behind, which generally proves fatal to the Bee. The sting of the Bee effects persons very differently, some with much pain and injury, others with very little sensible effect. Many remedies have been suggested for the sting of the Bee, but the best remedy may be found in extracting the sting immediately, and apply a little laudanum. To prevent the swelling arising from the sting of the Bee, I know of no remedy more efficacious than Venice Treacle, or olive-oil. In regard to the former, it is well known to be a specific against the bite of the viper. In the Archipelago, it is customary to keep a bottle of olive-oil close to the Apiary, and apply it instantly to the puncture of the Bee; the mischief is generally prevented. The juice of the onion, mixed with common salt is also a good remedy.”

All these details can only produce on the rational mind a more distinct and extensive knowledge of that infinite intelligence, who has arranged the creatures of this earth, presided at their organization, and regulated their existence and configuration. There is nothing in nature which can so fully demonstrate to us, an equally wise and powerful Being.

The insects, the most vile, are, perhaps, more admirable in their structure than the sun, and the most brilliant stars. What proportion! what harmony! what correspondence in every part of the Bee. How many combinations, arrangements, causes, effects and principles, which tend to the same end, and concur in the same design! What exactness. what symme-

try in its little body, apparently contemptible, and so little admired by ignorant and inattentive persons! As in the greater number of animals, so we observe in the Bee, vessels without number, liquids, motions, often united in an imperceptible point; all the organs of life, the instruments of labour, weapons to command victory when attacked, or the instruments of escape from a superior foe, with a thousand that adorn its exterior form. Every thing in these insects announces that supreme Wisdom, that presided at the formation of a work so perfect, so industrious, so superior in structure and sagacity to every thing that art could ever produce. All this, when combined with the rich blessings which they impart to man, call for his homage, gratitude, admiration and love.


CHAP. V.*On hives in general.*

The forest is the original and natural dwelling for the Bee, and the recess of some cavern, or hollow trunk of a tree, the ancient and most natural residence, and place of deposit for this sagacious insect. It is the art of the Apiarian, which has taught the Bee to become domesticated, and yield part of his labours and rich treasure, for the comforts and conveniences of man. To assist the Apiarian, the farmer, and even all classes of people, who may possess the advantages and the disposition, in deriving the greatest possible good from this store-house of nature, is the immediate design of this Treatise, or rather of these extracts. In order to invite the Bee into our domestic employment, it became necessary to substitute a new dwelling in place of the hollow tree of the forest; hence the reason why hives were first made of a section of a hollow tree. The difficulty of obtaining this,

led to the expedient of weaving the straw hive, which continues in common use to this day. The many objections which have arisen to both these hives, have led the Apiarians, through nice and curious research, to ascertain the best materials for constructing the hives for Bees, and the best forms to construct those materials into, to obtain the greatest profit from the labours of the Bee, with the least expense to ourselves, and loss and damage to the Bees: for the solution of this question, we must resort to the experiments of the Apiarian. Happy would it be for us and them, if their labours could furnish an answer to the inquiry promptly; but unfortunately this is not the case, their own experiments have deceived them, and this should lead us to be cautious that they do not deceive us. Mr. Huish admits, that no serious objections can lie against straw as a material for the construction of bee-hives; but objects only to the common form, viz. the bell-hives, as being unhealthy to the swarms, and difficult to extract any portion of the honey from, without suffocating the bees, which he very justly abhors: he therefore explodes the bell shaped hives. Our author goes on to object to the glass hives, constructed to gratify the curious, as being unfriendly to the labours of the Bee. He adds, "I have kept glass hives of every sort in hopes to obtain some clue to the developement of their secrets; but I candidly confess, that light was no sooner admitted, than the utmost confusion prevailed in the hive, in that particular part, and the Bees were seen running about in the greatest consternation; consequently I never attained to the knowledge of a single operation of the Bees by means of a glass hive. I therefore, call in question all facts stated as the discoveries of a glass hive. Although the Bee will work in any hive, of any shape, yet the choice of that shape is of importance to the health and profit of your Bees. The great body of the people continue the common hive, and the common practice of smo-

thering the swarm, when they take their honey—both are bad; and the latter is not only bad, as being unprofitable, but absolutely cruel, and unnecessarily so. To remedy these evils, the Apiarians in all countries have been led to the improvement, both in the form of the hive, and method of dividing the profits of their labours with the Bees, and yet preserve the swarms. Happy for the cause both of interest and humanity, they have succeeded. Had these Amateurs been agreed in one result, as being the best of all their experiments, I might now say so, and close this chapter with their joint recommendation; but their decisions are so various, it may be useful to sketch a few of their improvements, as exemplified in the form of their hives.

The storying system has been, and is now, greatly approved in France, and was invented by Gelieu; yet this system has its opposers now, even in France, and with some severity. All are agreed, that the storying system has its advantages, as well as some disadvantages; yet one thing is certain, it divides the labours, or profits, of the Bees, without injury, or disturbance, to their lives, or labours. This system has also been strongly approved and recommended by Bonner, in Scotland; also by Ducouedic, of the Canton of Maure. This is the common straw hive placed on a pedestal, or table. The Bees it contains were a swarm of the 21st of June, 1812. In this state, they passed the summer, autumn, and winter, and on the 21st of March, 1813, it would be nine months old. On the 21st of March, 1813, the first story will be added to it, and this is called a Scotch hive, in compliment to Bonner. This hive will remain in the state of a single story, for an entire year, to the 21st of March, 1814. If the population of the hive has been considerable, and the season favourable, during the first year, it may be expected in the second to throw off one or two strong swarms. On the return of the

spring, 1814, this hive will be 21 months old; nine months as a simple hive, and twelve with one story. It commences, on the 21st of March, 1814, its pyramidal form, at the age of 21 months. These three hives are plastered with mortar, or clay, at their junction, by which they appear to form but one distinct hive, and the Bees can only enter and depart at one opening in the lower story. By means of holes bored in the top of the lower stories, the Bees can pass from one story to the other freely. This colony will exist in the state of a two storied hive from the 21st of March to the 21st of September of the same year; it will then be 27 months old. Several swarms will have been obtained through all the different stages, from the single one, to the pyramidal one. The swarms of the latter are considerable; especially those of the second and subsequent years. They generally weigh from twelve to twenty pounds. On the 21st of September, as soon as the drones have been destroyed by the Bees, you may remove the first story of the colony, it will be found full of wax and honey, without Bees and brood; the honey will be of the present year, as the Bees will have consumed that of the preceding years. When, on the 21st of September, the first story is removed, the hive will cease to be pyramidal, and will return to its former state of two stories; in this state it will pass the 6 months of autumn and winter; but on the return of March, another story must be given to it, and it again becomes a pyramidal hive. The Bees of a pyramidal hive never perish with hunger, nor cold. It is too rich to want provisions, and too numerous to be effected by the severity of winter, and by their heat, they bring forward their spring brood one month earlier than a single hive. Such is the character given by Ducouedic of the storied hive. Let me remark that their swarming one month earlier in spring than the single hive, is no small advantage in the es-

timation of all such as are acquainted with the value and economy of Bees.

An advocate of the storying system says, "No cause exists why a certain number of stories should not be placed, for several months, and even for a year; that much is gained by it, provided, for this period of time, the boxes are made of a convenient and proper size," &c. To this system, Mr. Huish is lengthy and particular in his objections; the amount of which is, that the flat hives used in this process, are injurious to the health, and even life of the Bees, and principally on account of the moisture which the swarm emits by perspiration, being collected upon the tops of the hives, and there being condensed by the influence of the cold air, falls again upon the Bees, and occasions their worst malady, the dysentery. These vapours, Mr. Huish found actually frozen to a sheet of ice in the top of one of his glass hives, in the hard winter of 1814, and at once concludes this vapour to be both noxious and destructive to the swarm. He then proceeds, "Hives with convex tops conduct this condensed vapour down the sides of the hives, and thus screen the swarm from the falling drops, and preserve them dry." The writer concludes this chapter with the following description of a hive of his own invention, for his own particular use, which pleased him, and has the strength of his recommendation added to its value.

"Having now examined the different hives which are now in use in this country, (England,) and upon the continent, it barely remains for me to describe the hive, which, although its general principles are of an early date, yet its improvements have been entirely suggested by myself. As it has always been my invariable study to preserve the lives of these valuable insects, and, at the same time, to reap the greatest possible advantage from their labours, the selection of a proper abode for them, was a matter of no secondary consideration; for on this must depend

the success of the undertaking. My first object was to select those materials which I judged most suitable for the purpose, and, after repeated experiments, I was convinced that none were more suitable than straw. This I know is denied by Huber; but I must be allowed, in this instance, to differ from that celebrated Apiarian. The shape of the hive was my next consideration. I had been so often defeated in my expectations regarding the deprivation of the common straw hive, and especially by the sticks with which they are superfluously furnished, to keep the honey from falling, that I was persuaded it was a shape suited only to the use of those persons who suffocate their Bees; but to the depricator, it was the most inconvenient and unmanageable sort that could be devised. It was a flower-pot which first gave me an idea of the shape, and which appeared to possess peculiar advantages. It would, in the first place, supercede the necessity of sticks, for the comb then acting like a wedge, being larger at the top than the bottom, would not fall on to the board. One only method now presented itself of extracting the comb, and this was at the top; and this I knew could not be effected, if the combs were all constructed in one mass, upon one basis, which is common to the generality of hives. I reflected that a Bee will never work upon an unstable foundation, and that my plan would succeed, if I could insert some network between the pieces of wood. Having obtained seven pieces of well seasoned wood, about one and a half inch broad, and about a quarter of an inch thick, I laid them equidistant on the top of the hive; and having fastened them to the outer band which serves as their basis, and covered them with network, over which I placed a circular board, the whole size of the hive. I then divided the circular board into five pieces, which are attached to each other by hinges; each one can be opened separately upon occasion. To obviate the objection of this

flat top, (on account of the moisture as before noticed,) I made six holes in the top board, and closed them with plates of tin, perforated with small holes. The whole I covered with a convex straw cover, constructed in the same manner as the hive. This guarded the swarm from moisture, without and within. Whenever I require some honey-comb, at any season of the year, I open the top, by removing the cover, and take out one of the side boards, (as above,) cut off the comb, and replace the board again, as before, or clap in another of the same dimensions, if the Bees prove troublesome. This operation is quick done, without disturbing the middle combs, and often without the loss of one single Bee. In the month of August, 1810, I obtained from one of my hives 18lbs. of beautiful honey-comb; by the 10th of September, the void was filled again, and I took out 10lbs. more, leaving a sufficiency to supply the swarm through the winter. This hive will never require any enlargement to give the Bees more room; this may always be done by extracting the comb as above. It opens the whole interior of the hive for your inspection, whenever you wish to search the hive for moths, mice, or other destructive evils to your Bees."

Mr. Huish goes on to observe, that from his experience in the management of Bees for more than twenty years, from his very extensive correspondence and personal acquaintance with most of the learned Apiarians in Europe, he concludes that no form of hive can be constructed, which will ensure great harvests of wax, honey and swarms. These are chimeræ which it is in vain to pursue, because the whole depends upon the season, the face of the country, and the general supply of honey; all which, have a peculiar influence on the fecundity of the queen Bee. To these causes it must be ascribed, why the mode of treatment which answers well this year, will not answer well the next, or is so variable under the

same appearances. This difference of seasons has occasioned all the various construction of hives, which serve only to show, that the Bee will work in any hollow vessel, that will conceal her from view, and guard her from the weather. To illustrate this fact, I have sketched the form of several different hives, as well as to illustrate a more important fact, that every system is bad, that destroys the Bees to rob the hives, and that all the systems are good, which preserve the Bees, and divide their labours for the use of man, without injury to the swarms; but more particularly to show, that the storying system, is one of the best modes; and that his new invented hive is the very best*.



CHAP. VI.

On the position of the Apiary, or Bee-House.

This is the place where the hives are assembled, whether in the open air, or under cover, called the bee-house. In southern countries, Mr. Huish observes, the aspect should always be to the east, to give the Bees the first light of the dawn. In northern countries, the aspect should be between south and east, to enjoy the morning dawn, under a shelter from the north winds. In England, he observes, the aspect is often in all directions, but adds, they should be secure against the winds. The hives should always stand upon a right line, in a single row; that rows one above the other do well, but seldom when double upon the same shelf—as they are more exposed to robbery from each other; that the Bee, in

* *Quere.* Whether the new invented hive of the author, with its convex top, might not be applied to the storying system, and thus complete its perfection. It may be worth an experiment.

his flight from the hive, generally takes an elevation of 45 degrees with the horizon, therefore, the hives should stand low, say two feet from the ground. This elevation will guard the Bees against the moisture of the ground, the toads, mice, ants, &c. and prevent their gaining such an ascent in their flight, when they swarm, as to prevent their lighting, and thus occasion their loss to the proprietor. To establish this remark, Mr. Huish cites a memoir addressed to the Society of Agriculture of Paris, illustrating the fact. He then observes, that the board on which the hive stands, should be carefully secured against warping, as the wasps, &c. will rob the hives at such openings, under the bottoms of the hives, and that every shrub, plant, or weed, should be cleared away from the Apiary, that can obstruct the flight of the Bees, or give the mouse, the ant, &c. access to the hive; that great cleanliness should be observed in and about the Apiary, generally. He concludes, that the neighbourhood of large towns, and large rivers, are unfavourable situations for an Apiary; the first, from the destruction the Bees suffer from smoke, the swallows, particularly the chimney swallows, and the last, from often being drowned in their flight, from high winds, &c. He recommends an open country, a free air, an eastern aspect, security from winds and moisture, &c. as being essential to the position of an Apiary.



CHAP. VII.

On the enemies of the Bees.

Man, the worst enemy of the Bee; where he uses the stinging method of robbing the hives; yes, man, that boasted child of reason, for whose enjoyment the Bee toils through her life, to draw from na-

ture, nature's choicest nectar; man, ungrateful man, in wanton spite of all his boasted reason, robs the Bee, and makes her life the forfeiture. But I forbear, man is now becoming more civilized; the researches of the Apiarian have not only taught him how to share with the Bee the rich rewards of her toils, without destroying her life, or even abridging her enjoyments, but how to promote the enjoyments of the Bee, and become her protector.

The mouse, of all kinds, the rat, the toad, and the ant, are amongst the common enemies of the Bee. The attention of man, in fixing his Apiary, may guard the Bee, generally, against these common enemies; but birds, which also are generally the enemies of the Bee, who catch him, and devour him in his flight, are out of the reach of man, and generally go unpunished; except the king-bird and wood-pecker, who hover about the Apiary, to feed on the Bees, they may be carefully watched and destroyed. The spider, also, is an enemy to the Bee, the same as the bird, not to feed on the honey like the mouse, and the ant, but to entrap the Bee in his web, and feed on *him*. The spiders enter the hive when the weather is cold, and the Bees have lost their energies, spin their web, and thus obtain their prey. The wasp is, also, an enemy of the Bee; he surveys the hive in summer, and wherever he finds a crevice, enters and robs the hive, and feeds on the honey. The wasps collectively, sometimes attack weak hives, the same as robbing Bees, and rob the swarm. Mr. Huish adds, I do not know a more efficacious method of destroying wasps' nests than sulphur. The wasp, the humble Bee, and honey Bee, all feed upon the same food; for this reason, the two first should be driven as much as possible from the neighbourhood of the Apiary, particularly in September and October, when the herbage of the fields fails, they then are driven by hunger to rob the hives.

Watch your Bees close at this season, or they may

be ruined before you are aware, and thus your hopes of the season be blasted in autumn.

The toad is the natural enemy of Bees, as of the wasp, and common fly, and will catch them indiscriminately, particularly in warm weather. He should be driven from the vicinity of the Apiary. A little garlic rubbed about your hives, will guard them against the ravages of the ant.

The moth is an enemy of the Bee. It is the caterpillar, which, in a certain state, gnaws our trees, books, paper, &c. Strong hives can protect themselves against the moth; but weak hives are sometimes injured and ruined. The moth, in the butterfly state, infests the hives in April and October, and by her dexterity deposits her eggs amongst the comb, and dies. From every egg a smooth caterpillar bursts forth of a pale white, its head brown and scaly. It encloses itself in a little web of white silk; which it attaches to the combs, and in which it finds its food by projecting its head beyond its case. When the food around it begins to fail, it prolongs its silken web, which, though a mere thread at the beginning, becomes almost insensibly as large as a quill. This insect, having attained its growth, submits to the metamorphosis common to all caterpillars; it quits its residence, retires to one corner of the hive, or departs from it; spins a white covering, emerges as a butterfly, copulates and re-enters the hive to deposit its eggs as before. I have been the more particular in describing this insect, because, next to man, he is the most destructive enemy of Bees. Mr. Huish states with confidence, that in sixteen years, the moth has destroyed more than a fifth part of his hives annually. Mr. Huish continues the subject of the moth much more extensively, both as to its manner of laying its eggs, in and out of the hive, and the manner by which they are introduced carelessly by the Bees into the hive, where they are hatched with the other eggs; the substance upon which the moth

feeds in the hive when grown, &c. ; but as all this cannot be of great importance, I pass it over, and notice the practice of some persons who surround their Apiary with torches in the evening, in order to destroy the moth, by singeing his wings, together with the objection to this, as being alike destructive to the Bee, who will be drawn out upon the wing by the same light that destroys the moth. Mr. Huish thus concludes, "A remedy against this insect is very difficult, and the only advice I can give on this subject, is, that whenever you suspect your hives are devouring by the moth, join your Bees to another hive, and thus save the little which remains. If your Bees become inactive when other swarms are at work, and continue so 10 or 15 days; no time is to be lost in examining your hive, where the ravages of the moth will appear. Save your Bees if possible by removal to another hive; all their labours are lost in that hive."

The death-head spinx, or hawk-moth, is a great butterfly, and belongs also to the family of phœtence. It is one of the most formidable enemies of the Bee; it alarms them very much, and sometimes in one night, will rob a hive of a great portion of its store. This butterfly emits a sharp and plaintive sound, which, with the spot on its breast, rudely representing a death's head, give rise to its name. It feeds on the leaf of the potatoe, and appears in the month of September. It is confounded with the bat, because of its size, and of its flight at the same time. As soon as the Bees perceive its approach, they are all in commotion, and retreat into their hive. Mr. Huish notices some remarks of M. Lomebard upon the curious defensive position of the Bees, by way of security against this enemy, which I shall pass over, together with Mr. Huber's remarks upon the same visionary scheme. Mr. Huish notices no particular remedy against this insect.

The Bear, the Fox, and the Badger, are all

the enemies of Bees. One trait of sagacity in the Bear, mentioned by the Abbe Della Rocca, deserves some notice. "The Bear seldom attacks a hive openly, from fear of its stings; but he will in the most gentle manner take a hive in his paws and carry it out to the first river, or pond, and plunge it, until the Bees are drowned, and then feed on the spoil. The proprietors, therefore, in those countries infested with Bears, attach their hives to walls, and other places, for their security against the Bear."

The sparrow and the lizard are also enemies of the Bees, and must be carefully watched.

I cannot too strongly impress it upon the minds of every Apiarian, who wishes to reap any profit from his hives, to be constantly upon the alert, to effect the destruction of those enemies by which his property is so materially injured. Let him remember, they carry on their depredations in secret, and that in this instance, as well as in every relation in life, a false security, is the most dangerous situation in which a person can repose.



CHAP. VIII.

On the Maladies of Bees.

On this subject, Mr. Huish acknowledges great difficulty, both in discovering the maladies of the Bee, and the remedies; but adds, if you have many hives and any one becomes sickly, remove it as soon as possible, that it may not infect the remainder. If you have few hives, you may attempt, first to investigate the disease, and next its cure. Mr. Huish states, that the dysentery is one of the most common as well as fatal diseases of the Bee; and that the mark of this disease is the excrement voided by the Bee at the

entrance of the hives, in spots, like linseed, nearly black, and of an insupportable smell, and that this malady is contagious. The Bees when afflicted with this disease, destroy each other by contaminating their wings with this excrement, and thus stop the organs of perspiration. The cause of this disease is by some ascribed to new honey, when eat in winter; by some to the deficiency of propolis, or bea-bread; and by others, to the flowers of the elm and lime, from which they extract their honey. These, and several other causes, have been named by various writers; but they do not appear to be agreed in any one general cause of the dysentery. Many remedies have been prescribed by various authors, for the dysentery; but, adds Mr. Huish, I consider it incurable; although its prevention may be effected. As soon, therefore, as I perceive any of my hives affected with it, I give them a little of the following composition, which has invariably checked the malady, when given in the early stages. *Rule.* To a quart of white wine, add a pint of honey and two pounds of loaf sugar; put the whole into a tin sauce-pan, and let it boil gently over a slow fire, skimming it at different times, until it is reduced to the consistency of syrup. It may then be bottled, and put into the cellar, and kept cool for use. Whenever it is used, it must be gently heated, until it partakes of the consistency of honey. Mr. Ranconi, an Italian author, recommends fresh urine, placed on plates near the hives, for the use of the Bees. He also recommends white wine boiled with an equal quantity of loaf sugar, with an addition of cloves and nutmegs, as doing well. Also the bark of pomegranates, pounded and mixed with honey and sweet wine, as being conducive to the health of the Bee.

Mr. Duchet recommends good old port wine, mixed with honey.

Mr. Wildman recommends fine salt, as a remedy, to be placed on the bee-stand where they may eat it at pleasure.

M. Le Abbe Bienaime recommends oat-meal in the dysentery.

Mr. Huish approves of all these remedies, and adds, great care should be taken to keep the hives as clean as possible during the prevalence of the dysentery amongst your Bees.

Mr. Huish observes that the antenna of the Bee are sometimes diseased and turn yellow, attended with some swelling; but considers the disease as slight. He also notices that Bees sometimes have the vertigo, for which no remedy had been discovered; but this was never general in hives, and not very serious in its consequences in the swarms.

The abortive brood, although not an epidemical disorder, is still very injurious in its effects upon the Bees. Two causes produce this effect; 1. When the Bees have given the larva improper food; 2. When the worm is placed in the cell with the tail towards its mouth. In this case, the young Bees, incapable of extrication, die and putrify. The Bees generally remedy the evils of this putrefaction, by removing the abortive brood; but should this accident take place in winter, the infected combs may be cut out when the hives are examined in the spring. The tops of the cells, when sound, are convex and yellowish; when abortive, concave and blackish.



CHAP. IX.

On the Brood.

Having described the origin of the Bees, the natural constitution of the queen, and of the drones, I now proceed to treat of their brood. By the brood, we understand the three different states of the eggs, worm and nymph, and it is on these states, that the prosperity, the conservation, and multiplication of the

Bees depend, for the establishment of the new colonies. In the chapter entitled, *Enemies of the Bees*, may be seen what a field of destruction constantly awaits this most valuable insect, from their common enemies; but the accidents, or casualties of life, together with the common diseases of the Bees, open another extensive field of mortality for their destruction, so that, whether at home or abroad, asleep or awake, the Bee may truly be said to be in the midst of death: all this is highly to be regretted by the friends of the Bee. To counteract these evils of extermination which surround the Bee, nature has rendered them vastly prolific, and fixed in their breasts an indissoluble bond of union. Their broods are very numerous, and they, like the Chinese, never emigrate, by deserting their swarms; when a swarm is once formed, they never dissolve by desertion.

I have noticed that the Brood all spring from the eggs which the queen Bee deposits in the cells, and that their number always corresponds to the exact number of cells. These eggs are broad at one end, and pointed at the other; at the end of three days they are hatched, and a worm appears at the bottom of the cell. In this state, it is termed larva, and retains one position in the form of a ring, without motion, yet replete with life. At the end of five or six days, it envelops itself in a whitish silken film, and changes into a chrysalis. In this state, it is called a nymph. These wonderful changes are common to all classes of the fly, as well as the Bee, and take their rank amongst the mysteries of nature. "The Bee in its state of nymph is enveloped in a pellicle, so delicate and fine, that its six legs may be distinctly seen arranged under its belly, and its proboscis bent, in its whole length. The Bee in this state is white; in the sequel, all the parts of the body gradually become covered, and insensibly develop themselves, and become perfect on the 21st to the 23d day. The drone takes its flight generally on the

27th; the queen about the 16th. These developments are slowest in small swarms, or in temperate seasons, and are suspended during the cold weather. The young Bee makes use of its teeth to liberate itself from its prison, and to break the envelope; this is an operation very difficult to the young Bees, and cannot be effected by all. The Bees, like all other animals, express great affection for their young, until they are come to maturity to support themselves, they then become indifferent. As soon as the young Bee obtains the use of his wings, he flits away into the fields, and commences the labours of the swarm: the old Bees proceed immediately to cleanse out the cells they have left, by removing the film, &c. and thus prepare them for eggs again, or honey."

The Bees are irascible, directly in proportion to the quantity of brood in the hive, and at this time, they should not be disturbed; when the brood diminishes, their agitation subsides, and when it comes to maturity, they become tranquil again.

Mr. Huish enters into an elaborate discussion of the question, whether any food is administered to the brood when in the state of larva, as is questioned by some; and if any, whether it be pure honey, or honey and farina, as is the opinion of others; but as he concludes with this remark, "the truth cannot be positively ascertained," and then assumes a decision, by way of analogy from the butterfly and other insects, I shall wave that part of his discussion, and enter upon the next chapter.



CHAP. X.

On the Combs of the Bee.

Immediately when a swarm of Bees take possession of a hive, they begin to clear and cleanse it

from all obstructions; even the ends of straws that project in the interior of a new straw hive, are all removed, and often with great trouble. To remedy this, every new hive should be smoked, and cleansed, and rubbed with a stiff brush, until it is quite smooth, before it is presented for the use of the swarm.

It is universally admitted by all Apiarians, that the Bees employ no other substance for the foundation of their combs than propolis, although the ancients, even Pliny, has furnished them with two others of an unctuous, pithy nature, more adhesive than propolis. On leaving the parent hive, the young swarm are provided with all the requisites for their new labours, with food for several days; and when they take possession of their new habitation, their activity and order are truly striking. Some cleanse the hive, others close up every crevice where the light can penetrate, others construct the combs, whilst others repair to the fields, and collect the necessary materials; thus all is action and order, amidst the busy hum.

The Bee always begins her labours at the top of the hive, and generally in the middle; thus they lay their foundation for the deposit of the eggs of the queen, around which they construct the cells for the reception of honey, and the whole fabric hangs suspended in air. They attach their combs with such a viscous glue, that they are always firm, and were never known to fail; and to diminish as much as possible the weight of their edifice, they give the least possible thickness to their cells; but, at the same time, they strengthen the entrance of their cells by a border of wax; this part being most exposed to suffer from use. This border, also, serves to assist in retaining the honey, and thus discloses the fact, that the Bee possesses a perfect knowledge of the laws of fluids; by the assistance of this border, the cell can be filled with honey even to a convex form, and thus being covered by a pellicle of wax,

may be secured for winter against the effects of the moisture.

The Bees construct several cells at a time, parallel with each other, all attached to the roof of the hive, and perpendicular to its base. The spaces between the combs are always sufficiently wide for two Bees to pass freely, these are the streets of their city; perpendicular, not horizontal. Every comb is composed of a double row of cells, which are placed back to back, having one common base, and their figure is an exact hexagon. Pappus, the famous geometrician of antiquity, demonstrated that this figure possesses the double advantage of filling a space, without leaving any vacuum, and of enclosing the largest space in the same circumference; and it is most wonderful, that the Bees have chosen, amongst an almost infinity of figures, the only one which could exactly fulfil the essential conditions to which their nature restricted them. The figure of the base is a pyramid of three lozenges, formed perfectly equal. The four angles of these lozenges are again so happily combined, and their opening is in such proportion, that the wax is used with the greatest possible economy, and in such a manner, that any other lozenge composed of any other size, would not yield the same results. Samuel Koenig, who made use of the analysis of infinite units, to resolve this problem, which was given him by M. Beaumur, arrived, after all his calculations, at the mere result furnished him by the Bees. The choice of the figure is, however, not surpassed by the astonishing manner in which they construct all the sides of the hexagons, all the lozenges of their bases, and all the angles of the lozenges. The thickness of each of the combs is rather indefinite; it may, however, be stated in the aggregate at one inch, the upper is, however, generally larger. The depth, then, of each cell, is about half an inch, and the breadth is constantly two lines, two fifths, invariably, the world over, wherever Bees are

known. Independently of the kind of cells which are the most numerous, others are constructed of a size rather larger, which are appropriated to the reception of the eggs from which the drones are to spring. The Bees, in the construction of the cells, regard particularly these two combinations, that of the size, and the number of Bees to be produced, or generated. The cells of the drones differ in their depth and breadth, but they have in general a regular diameter, which is three lines and a half; from which it appears that twenty of the drone cells would cover a space of five inches, ten lines, whilst twenty cells of the working Bees cover a space of exactly four inches. All this labour is performed with so much skill and firmness, that three or four of these sides placed on each other do not exceed the thickness of common paper. A different species of cell is also constructed, destined to be the cradle of the queens. The architects now abandon their ordinary form of building, and construct the cells of a circular and oblong figure, which possess much solidity. One of these cells will weigh as much as 100 or 150 of the common cells. There is less economy used in their construction; the wax is used with more profusion; the exterior is waved; in fine, they are really royal cells. They are trifling in number compared with the other cells.

A piece of honey-comb is one of the wonders of art, produced by the powers of instinct, and may be considered as a masterpiece of nature. Even man himself, with all his boasted reason, must bow with profound deference to the superior industry, economy, sagacity, political harmony, and order of the Bee.

CHAP. XI.

On the particular substances which are found in a hive.

In the front rank of these substances, stands propolis; for with this, they stop all the crevices of the

hive, to exclude both air and light, and with this, they attach their cells to the surface of the hive.

Propolis is a resinous substance, soluble in spirits of wine, and oil of turpentine; in this state, it is an excellent substitute for the varnish which is used in giving the colour of gold to silver, or to tin, made into tinfoil. It is very useful to expedite the maturity of abscesses; its vapour, when in a consuming state, gives great relief to coughs, if inhaled into the lungs. Crude wax, or bee-bread, is the next substance worthy of notice; this is the farina of plants, collected by the Bees, for the various purposes of the hive, and constitutes one of the elements of wax. Farina, also, forms the chief element of propolis, by a process which it passes through in the stomach of the Bees; yet propolis is not wax, although very similar, because propolis is much more glutinous and fragrant than wax. Propolis has been analyzed by M. Vauquelin in the *Anals De Chimie*, 1802, and 1818, and in the *Bulletin de Pharmacie*, by M. Cadet. By distillation, a very sweet essential oil is obtained; if it be placed on burning coals, it emits an odour similar to that of aloes; it mollifies, and in this state, it cannot be broken until it is stretched to the fineness of a thread. M. Lombard says, "That a perfect ignorance prevails, regarding the matter of which propolis is made, or whence the Bees extract it."



CHAP. XII.

On Pollen, or Farina.

Botanists designate by the term pollen, or farina, that fecundating dust which hangs on the stamina of all flowers, and which the Bees collect and transport to their hives, in little balls, or pellets, attached to

the cavities of their hinder legs. The Bee roams from flower to flower in quest of this substance, and never quits the species of flower on which she first alights, until she has collected her load, and returned with it to her hive, where she is unburthened of her load, by the attending labourers. This is performed with their teeth, and the treasure deposited in a cell, and pressed close with their hinder feet. This pollen, or farina, is placed at the bottoms of the cells, until they are about half full, and then covered with honey until the cell is filled; this secures the pollen from both air and moisture; and thus, by their wonderful sagacity, they screen their food from the two elements, which, if they found access to it, would sour and destroy it. This perishable property in farina, shows, also, that it is not wax, although it is the substance from which wax is made, for wax is imperishable, either from air, or water; wax is soluble with heat, pollen is not; wax will float on water, but pollen sinks in water; all these particulars show, that pollen is not wax, yet all Apiarians are agreed, that wax is the result of certain operations which pollen undergoes by the management of the Bees, yet, they are not agreed how this is performed; the Bee has never disclosed the secret, and probably never will. All are agreed, that farina is converted into wax, by the mouth of the Bee, and many, that the digestive powers of the stomach are brought into action to aid the process; but, even here, all becomes conjecture again, and the question is left as undetermined, as how the leaf of the mulberry is converted into silk, by the mouth and stomach of the silk-worm; so much behind the curtain, and so concealed from the research of man, are these two useful, common and valuable operations of nature. The use of pollen as food for the Bees, and more particularly for the broods, may be illustrated more fully by the following fact. "Mr. Huber had a stock of Bees in a glass hive, with twelve partitions; the queen of

which was barren. The cells were destitute of pollen, and possessed some honey. On the 16th of July, he removed the queen, as well as all the partitions, excepting the 1st and 12th combs, the cells of which were occupied with eggs and larva, of all ages; the cells in which pollen were perceived, were cut out, and the hive was closed again with a grate. On the 17th, the Bees appeared to tend their young; on the 18th, after sunset, a great noise was heard in the hive; the shutters were opened, and it was remarked, that the whole community was in a tumult; the brood combs were abandoned; the Bees gnawed the gratings of their enclosure, and were set at liberty. Night soon compelled them to return to their combs, order was restored, and the hive was closed as formerly. On the 19th, the sketch of two equal cells, was seen distinctly. At evening, as before, the Bees recommenced their tumult, and were let loose, and again returned to the hive as before, and it was closed. On the 20th, being the 5th day of their captivity, the brood was examined, in order to discover the cause of this periodical agitation of the Bees; the hive was carried into a chamber, the windows of which were closed, the Bees were set at liberty, and it was discovered that the royal cells had not been continued; not a single egg, nor larva, were to be found; all had disappeared; the larva had perished from hunger. Can this be supposed to arise from any other cause than the absence of pollen? To ascertain this fact, it was only necessary to carry them some pollen, and observe the result. For this purpose the Bees were restored to their prison, after having substituted new combs, containing eggs and young larva, in the place of those which had perished. On the 22d, the observation was made, that the Bees had fastened their combs, and fixed themselves on the new brood; some fragments of comb were then given them, in which some other Bees had stored some pollen, and they were placed openly on the stand of

the hive. In the course of a few minutes, the Bees partook of the pollen, devoured it greedily, attached themselves to the cells of the young larva, into which they entered head foremost, and remained in them for a greater or less time. The hive was gently raised, and the Bees which devoured the pollen were powdered, and it was observed that the Bees which were powdered returned to the pollen, and then again repaired to the brood, and entered into the cells of the larva. On the 23d, the royal cells were begun. On the 24th, it was observed that all the larva had some mucous matter upon them, that some of the cells had been lately closed, and that the royal cells had been elongated. On the 26th, two royal cells had been closed during the night. On the 27th, full liberty was given to the Bees; the mucous matter was still found in the cells, which contained larva, and a greater number had been closed with a covering of wax, and on opening several of them, the larva were found spinning their cocoon. After this experiment, no further doubt can be entertained, that the pollen was the food of the young Bees, and it was the deficiency of this substance that caused their death, and the evident agitation of the Bees, during their former captivity."



CHAP. XIII.

On Wax.

We have before observed, that propolis is not wax, neither is pollen, wax; but that both form the basis of wax, through the operations of the Bees, which are inexplicable to us. The great variety of sentiment upon this subject, began as early as the days of Aristotle, and continues down to our times, and will most probably continue. Messrs. Huber

and Blondelu, have both attempted to show from experiments which appeared satisfactory to them, that the Bees produced wax from honey only. M. Bonnet and M. Duchet have attempted to show, that the wax of the Bee is only an exudation of honey from the stomach of the Bee, and the scales of the body; and they cite as proof, the small particles of wax found on these parts of the body of the Bee. M. Bernard de Jussieu, a man of science, has undertaken to show that wax forms a constituent part of farina, or pollen, by swelling the seeds of pollen in water until they burst, and disclosed an unctuous matter, which constitutes the wax of the Bee; also, that aromatic trees and shrubs, exude from their pores, foliage and flowers, an unctuous matter, which is the genuine wax of the Bee. Instances of the wax-tree in Louisiana, and Carolina, are cited; but as these are wholly irrelevant, I shall pass them over, and conclude as before, that the *modus operandi* of the Bee in forming her wax, has never been discovered. The reality of bees-wax, its utility in common life, its advantages in commerce, &c. are familiar to all, and within the limits of almost every member of the agricultural community to partake of its benefits, both for public and private use; and it is with a special reference to these benefits, that I have been induced to make these extracts public.



CHAP. XIV.

On Honey.

This interesting chapter not only embraces the subject of honey as the essential and component part of all plants, as well as the food of Bees, and the luxury of man; but also the subject of the honey-dew which has so much excited the speculations, and in-

quiry of the curious, as well as of all classes of society. I shall quote this chapter at large, and give full scope to the reasonings of the writers, for the purposes of general instruction. "Honey is a gummy, saccharrine, fermentative substance, and the immediate principle of all vegetation, *without distinction*. This elementary substance appears destined to the nourishment of *all plants*, and particularly in their infancy, in the same manner as milk is destined to the nourishment of the young viviparous animals. It is found in all flowers, but principally in the single ones; its presence is afterwards perceived in all fruits; it shows itself in the humble flowers of our meadows, in the ears of corn in our fields, and in the leaves of the trees. It exists in the roots, as well as in the body and bark of all vegetables; it exudes from the trunks of trees; finally, it appears to be the soul and vital principle of all plants. On losing this principle, the plants generally decay, and it is the period of their existence. Even the aliments of the human body are impregnated with this fluid, and the Bees know how to obtain it from almost every substance. It is still, however, but a gummy, saccharrine substance, which must pass into the stomach of the Bees before it is converted into honey. As the productions of nature are infinitely varied, so the honey, its consistency, taste and colour, vary according to the productions of each country. The same species of flowers yield a different kind of honey according to the districts, and the greater or less humidity of the season. Even honey of different qualities is extracted from the same hive: that in the cells, in which there has been no brood, is less acrid; the honey of the swarm is superior to that which has been exposed for one year to the vapours of the hive; and the honey of the spring is superior to that of autumn. The honey extracted from flowers is the nectar which they enclose, and which was so much boasted of by the ancients, who formed from it the celestial beverage of their gods,

to which they gave the name of ambrosia. Honey is particularly to be ascribed to the circulation of the sap at the return of spring. Like the other productions of the Bee, Naturalists have differed as to the origin of honey. Some moderns, led away by vulgar opinion, have thought that honey is a moisture in the air, or a dew which falls upon the flowers and leaves of trees, and no where else. It is not a difficult matter to convince those persons of their error, who ought, in the first place, to consider, that dew and rain are very injurious to honey, as they dilute it, and prevent the Bees from finding it. It is on a close and sultry day that the Bees find the richest harvest of honey. If dew were the principle of it, the Bees would find it indiscriminately upon all flowers and vegetables; this is not the case, as confirmed by experience; and besides, how many flowers are there, which being in themselves fertile in honey, and having an horizontal or perpendicular inclination to the earth, consequently do not allow the dew to be received into their orifices. It is, therefore, most consistent with reason and experience to suppose, that the honey-dew is an exudation of the vegetables themselves, or a sensible transpiration of that sweet and mellifluous juice, which, having circulated in the different parts of certain vegetables, separates itself, and bursts quite unprepared, either at the bottoms of flowers, or at the upper parts of the leaves, and in some plants appears in great abundance. The primary destination of this mellifluous liquid, or honey-dew, appears to be the nourishment of the fruit in its infancy. But an objection here presents itself; why are the male flowers, which never produce fruit, also provided with this honey? Linneus himself was aware of this objection, and could not solve it to his satisfaction. The utility of honey to the flowers, and the reason of its being accorded to them by the Author of nature, are but imperfectly known to us. No Botanist has as yet given a direct and convincing

elucidation of it, nor has demonstrated either its destination or utility, in the vegetable economy of flowers. On this account, the solution of this question appears to be wholly abandoned to the researches of our successors. From the supposition that honey transpires from the plants and trees, by the action and admixture of heat and humidity, our surprise need not be great to find it at the bottom of the nectarium of the flower, which is the proximate part to the bark or peel, and it may, therefore, be easily conceived, why, in certain days, it is abundant, in others, scarce; because it follows the motion, more or less strong, of the sap. Also, why certain vegetables supply a greater quantity than others; because they are more favoured with a soft humidity, and are more abundant in sap. Why the honey possesses qualities so various in different climates; from the diversity of the vegetables. Why the cold rains, north winds, frost and snow, are unfavourable to honey; because they impede the circulation of the sap. Why this mellifluous liquid can abound without dew, provided the sap circulates freely; why, with an ardent sun, the harvest of honey can be great, when the vegetables are full of humid juices, and why, during excessive heat, honey is scarce; because, from the avidity of the soil, all the vegetable juices are checked in their circulation. It is evident there are two kinds of honey, the one contained in the nectarium of flowers, and the other an exudation on the leaves of trees. The oak and the laurel, are particularly abundant in the latter, and on the first view, it appears paradoxical, that the juice of a plant which is so very deleterious should produce an exudation of a saccharine and wholesome nature. This circumstance has been one great ground on which certain persons found their argument, that the saccharine matter observed on the laurel, cannot possibly be an exudation from the plant, but must have fallen upon it in some other shape. The homogeneousness of this liquid, is an-

other argument against its being an exudation, unless it can be proved that the sap of all plants is homogeneous, and this I believe the most hardy disputant will not attempt to do. It is certain that the most credible writers on this subject, men of science and knowledge, have maintained that they have actually witnessed the fall of this honey-dew; and Mr. Ducarne, one of the most intelligent of those writers, thus expresses himself upon the subject."

"You know what that honey is which the Bees collect with so much ardour in the flowers, but you do not know, perhaps, that there are two kinds; one, which is the real honey, is a juice of the earth, which, proceeding from the plants by transpiration, is collected at the bottom of the nectarium of the flowers, and is thickened afterwards; it is, in other words, a digested and refined sap in the tribes of plants; the other, which is called the honey-dew, is an effect of the air, or a species of gluey dew, which falls earlier or later, but generally during the dog-days. This dew, lights upon the flowers and leaves of plants and trees; but the heat operating upon it, coagulates and thickens it, whilst, on the other hand, the honey which falls on the flowers, is preserved a much longer time. It is said that an abundance of this dew renders the Bees idle, and makes them careless of collecting the common honey from the nectarium of the flowers. I however, never saw them collect it, but upon the flowers. One great disadvantage, therefore, of this honey-dew is, that if the season be foggy and moist, and especially if attended with small rain, this rain, or the too great humidity of the air, corrupts it, and forms a composition very inferior to the honey of the first species, or to that which has not undergone this adulteration. Those persons who have not viewed the honey-dew fall, as I have done, assert, that it is nothing more than the juice, or sap of the plants, which, in hot weather, experiences perhaps a greater fermentation, by which it is forced

through the leaves. In contradiction to this, I assert, that it is perceived much better in the morning, before the sun has been able to dry and harden it. These persons are, however, deceived. I have not only seen this honey-dew fall a hundred times in small rain on the leaves of the ash, but I have also shown it to others, and the globules were most distinctly to be perceived." Mr. Huish objects to this bold assertion, that honey-dew never appears in moist weather, and is the result only of sultry heats: and adds, I have long adhered to the opinion, that the honey-dew dispersed upon the leaves of trees, was only an exudation, although the globules scarcely bore any resemblance in form to each other, but were rather in imitation a species of rain. On examining more particularly different trees, on which the honey-dew was apparent, chance led me to the discovery of an holm-oak on which the honey-dew had recently appeared, and in its primitive form, which is that of a transpired humour. The leaves were covered with several thousands of globules, or small round and compact drops, without, however, touching or intermixing, similar to those which are seen on plants after a thick fog. The position of the globule seemed to indicate, not only the point from which it exuded, but also, the number of pores or glands of the leaf in which this mellifluous juice had been prepared. I assured myself, that the honey-dew possessed the real colour of honey, which of itself, was sufficient to decide on its origin without removing the doubts, which a contrary prejudice establishes. The honey-dew of a neighbouring bramble had not the same distinct appearance; the little globules had no doubt commixed, or being united to each other, either by the humidity of the air, or by the heat which had dilated and extended them, they formed large drops, or broad layers, the dried matter of which, had become more viscous. It is under these latter forms that the honey-dew is commonly per-

ceived, and our surprise need not be great, that exudation is not suspected to be the cause. In the season when I remarked the honey-dew upon the ever-green oak, in globules, this tree bore two sorts of leaves; the old ones, of a close tissue, like those of the holly, or those trees which, on the approach of winter, do not shed their leaves; and the new ones, which were yet tender, and which had shot forth only a short time. The honey-dew appeared constantly only on the leaves of the year old; the leaves were, however, still covered with the tufts of the new shoots, and consequently sheltered from all species of rime, or drizzling rain, which might have fallen upon them; this is a convincing proof, that the honey-dew is not foreign to the leaves on which it is found, and that it never appears in any other place, as the new shoots of our ever-green oaks, which ought to have been touched the first, as being the most exposed, did not exhibit the smallest drop. The same singularity struck me in regard to the honey-dew of the bramble, although, by the conformation of this shrub, all its leaves are exposed nearly alike to the air, or to the dew, which should fall in a vertical direction. The honey-dew appeared only upon the old leaves, the new ones had not a greater quantity than the new shoot of the oak, which has just been mentioned. It is probably only the long exposure to the air, perhaps to its intemperature, and especially to the sun, which ought to be regarded as the true agent of this secretion. To elucidate this subject still further, the plants or shrubs of different species in the vicinity of which the honey-dews appear, and of a nature less suitable to the formation of the juice of which I am now speaking, do not carry the least vestige of it. This honey never appears on the rocks, or stones, under the trees on which it is found, which is a fresh proof, that this species of liquid manna does not fall from the air like rain, as it would then diffuse itself on all bodies indifferently, and would not appear sole-

ly on certain vegetables, and even on some of their parts to the exclusion of others. The only objection to this theory, (and I must acknowledge, that the experience of the most able Naturalists is against me,) is, that the dew is attracted by some bodies, whilst it is not by others; but it is known that this phenomenon which often rises from the earth, always floats in the air, where it always obeys the least breath, and the weakest attraction, and often attaches itself to the upper as well as the lower parts of the leaves of trees. If it fell like rime, it would moisten indifferently every object. The acceleration of its fall, would enable it to surmount the obstacle of the weak repulsions, which it would find in its course. The circumstance, however, that favours in the greatest degree the illusion of the pretended fall of the honey-dew is, that it is only the upper part of the leaves which is moistened with it. It has been seen, also, that the moisture appears only on certain leaves, that is, on the new ones and those that are the least exposed, and this attraction or attachment is not the effect of chance; it is further known, that it is on the side of the leaf where the pores are not open and distinguishable that the greatest exudation takes place. It is there that the excretory vessels unite, by which the humour of the plants escapes in the same manner as the absorbents, which serve for their nutrition, in attracting the water of the rain and vapours which are diffused in the air. If the different proofs be now collected, which have been advanced, it may be considered as undeniably proved, that the honey-dew exudes from the leaves of certain trees, and does not fall from the atmosphere.



CHAP. XV.

On Swarms in general.

In the spring, when a hive is over stocked with young Bees, a particular period arrives when they

seek for a new habitation. A swarm, therefore, is nothing more than a colony of Bees which are forsaking their native home in quest of another place of residence. This change of abode now becomes necessary from their obedience to nature's law, *increase and multiply*, and is absolutely necessary to the preservation and support of the whole, as well as the general principle of increase. One of the fundamental principles amongst Bees is, that the small hives (all other things being equal) generally swarm, one, two, or three days sooner than the large ones; 1st, from the want of room; 2d, from their increased heat in bringing forward their eggs. The time in which Bees swarm differs in all countries. Mr. Mentille says, they swarm in the Isle of Cuba throughout the year, and Don Ulloa says, they cast their swarms every month, and sometimes double. In Europe, generally, as in America, they cast their swarms in the spring and summer, according to the state of the season; the warmer the climate or weather, the earlier they swarm.

As soon as a young queen has emerged from her nymphal state, she becomes capable of laying eggs, this is never done in the mother hive, but always in a new habitation. The Bees rally around their queen, and conduct, or follow her to some secure retreat, where she may deposit her eggs to lay the foundation of a new swarm. This retreat being secured, she deposits her eggs as before stated, and thus lays the foundation for a new swarm the next spring. Several important things are now necessary to be understood, and carefully attended to, as the sure signs of their being about to swarm. 1st, An extraordinary number of Bees which hang in clusters about the hives. 2d, An apparent idleness amongst the Bees. 3d, A particular noise of *chip, chip*, made by the young queen, two or three nights before they swarm. 4th, An unusual bustle amongst the drones. 5th, A sudden silence succeeding a vio-

lent uproar. 6th, The continual motion of the wings of the Bees which stand at the entrance. 7th, Violent commotions at the entrance of the hives, and the Bees crowding out in great numbers. Although these are certain indications of swarming, yet they sometimes take place at other times, when they do not swarm. The time of swarming is critical, and must be carefully attended to ; the least neglect may occasion the loss of a swarm. The profits of a swarm are worthy of the highest attention ; but the pleasure to an Apiarian is highly gratifying. The buz of confusion that accompanies a swarm when they quit the mother hive, and rise into the air in quest of their new abode, fills the Apiarian with anxiety ; but the calm of order, which follows when they light, fills him with joy, and their safe deposit into their new habitation, affords him the highest gratification. The question, whether the Bees send out a scout to discover a proper place for their new habitation before they swarm, may be answered by the following extract of a letter from Mr. Knight, addressed to Sir Joseph Banks, which is inserted in the philosophical transactions of 1807. Thus says Jan de Crevecœur in his letters *Du Cultivateur Americaine* ; “ One of the problems most difficult to solve, is to know when the Bees will swarm, and whether the swarm will remain in the hive provided for them, or escape, to establish themselves in the cavity of some hollow tree ; *for when, by means of their emissaries, they have chosen themselves a retreat, it is not possible to retain them in any hive you may select for them.* I have many times forced swarms into hives, which I had prepared for them, but I always lost them towards night ; at the very moment when I least expected it, they flew away to the woods.”

It is only by a particular management that a swarm of Bees can be reconciled to a hive, when a distant domicile has been chosen. If they desert their hive soon after swarming, they must be pursued, and their

new abode discovered if possible, and the Bees must be hived again, and confined in the hive two or three days, with some feeding, until the queen begins to lay her eggs, then the swarm may be considered as secured. Dubost in his works on Bees asserts, that he has seen a collection of Bees enter an empty hive in the morning, and before night of the same day, a strange swarm from some foreign Apiary, enter the same hive and take possession, and that the same facts have been noticed by other Apiarians. One of the greatest errors of the cotager in the management of his Bees, is in giving his swarm old and decayed hives; these hives are generally infested with those insects which are the enemies of the Bees, and ruin their swarms. It seldom happens that the first flight of a swarm is to any great distance, but it generally alights upon some neighbouring tree, or bush. Every exertion should then be made to hive it, for it will not tarry more than two or three hours, especially under a hot sun; and when it is hived, it should be covered with a sheet, or table-cloth, to shield it from the heat of the sun. The best mode of hiving your Bees is, either to cut off the bough on which they hang, and place it under the hive, either in your Apiary, or upon a table near to it, or place the hive under the bough when taken off, and shake off the Bees into the hive. Many persons perform this operation, without any safe-guard to their persons, but I would recommend some covering, that will guard the head, and particularly the face and eyes, the hands and legs; that for the head, may be of canvass placed over the hat, which will extend it from the face beyond the reach of the stings of the Bees, and it must extend down so low, as to tie around the body, and be closed upon the back, so as to exclude the entrance of the Bees. This covering will give confidence, which is one of the requisites in handling Bees. Bees should never be breathed upon at the entrance of the hive, this irritates them. If they are

blown upon with a bellows, it exasperates them. A great light dazzles them; hence the reason why they can be better managed in clear bright weather, than in cloudy weather. In swarming your Bees, let your dress be of some light colour, and guard the hair and the eyes particularly, for these are the objects they aim at in their wrath. If the swarm are restless after they are hived, you may suspect the queen is lost, and the Bees will soon return to the mother hive. If you examine the parent hive, and obtain a supernumerary queen, and introduce her into your new hive, she will be well received, and all will be tranquil, and the swarm will hum with joy. Whenever a swarm divides itself into several clusters, it is the effect of several queens in the hive, they should be immediately joined, and the Bees will destroy all the supernumerary queens, and the one joint stock will greatly exceed in value any number of small ones. If such a divided swarm should be one of your first swarms, and you should wish to multiply your Bees by keeping them separate, spread a sheet upon the ground, invert your hive in which your Bees have been hived, and by a smart knock upon it, the Bees will all fall upon the sheet, they will not fly away, but will separate themselves into as many groups as there are queens, and each group will cluster round their queen; you may then hive them separately, and place them at a distance from each other; the confusion which this process may occasion, will subside in one night, and all become tranquil again. If your swarm is hived in the morning, which is the usual time, the hive must not be moved until evening, to give opportunity to the stragglers to come in. The place of swarming, will be the resort of the Bees for several days. If you neglect to remove your swarm at evening, let it remain five or six weeks, that the combs, which are very tender at first, may acquire strength, so as to bear moving without injury. Whenever your swarms fly at a distance from your

Apiary to swarm, you may collect them into a bag, somewhat like a jelly-bag, the same as you would collect them into your hive, by cutting off the bough, thrust it into the bag, and tie it close; when you arrive at your Apiary, then hive them in the usual way. Some rub their hives with aromatic herbs, and in Italy and France, they rub the hives with the leaves of onions, and garlics; and the noted Apiarian Contardi says, "The Bees accustom themselves to this odour for the want of a better;" but Le Abbe della Noua says, "We should refrain from approaching our Bees when we have touched onions, or eaten cheese, for both will excite their acrimony." The best test of the value of a hive of Bees is its weight, and this can only be correctly ascertained, but by weighing the hive without the Bees, or one of the same size and structure, and then, by weighing them both together. The best swarms are from 5 to 6lbs. they sometimes weigh 8lbs., but this is rare, and are not desirable, as they impoverish the parent hive too much. 5000 Bees, generally weigh a pound, a good swarm of 4lbs. consists, therefore, of 20,000; the quantity of honey such a swarm carries with it to begin a new colony, is generally about 4lbs.

The signs attending the flight of the second swarms at the time of swarming, vary from those of the first. Wildman says, the second swarms appear generally about ten days after the first, this is not absolutely correct; I have known them often swarm on the intermediate days, from the 4th to the 10th, and some hives do not throw a second swarm, and this may be ascertained upon examination of the hives, when it appears that the combs are bare and destitute of Bees, when the supernumerary queens are dead before the hive, and when the Bees tear from the cells the nymphs of the drones, no second swarm is then expected; but if the Bees leave 3 or 4 queens alive in the hive, there is some chance of a second swarm. These particular examinations are not common to all

proprietors of Bees ; I would advise generally, that the hives be watched from the 4th to the 12th day after they have cast their swarms, and if none appears by that time, it may be concluded there will none appear. A second swarm is seldom worth preserving over the winter ; the stock of honey which it collects, not being, generally, adequate to its support ; but if two swarms, after the first, are thrown off, a junction should be effected between them without delay. This may be done by searching the hive of one of the swarms, and removing the queen, and then immersing the two swarms, so to be united, in pure water, or water saturated with ale, sugar and honey, and placed in a tub for the purpose : when they are well mixed together by stirring, I then strain out the Bees, by passing the liquor through a sieve, and return both swarms, so mixed, into one hive, and place it near the fire ; they will soon begin to hum, and in one hour, will be restored to life again ; no quarrel will ensue upon this method. All other methods of joining swarms, generally expose them to quarrels. Even in this method, it is absolutely necessary that one of the queens should be destroyed, or all will be quarrel. Whenever the weather is rainy the next day after hiving your Bees, it will become necessary to feed them at evening, particularly if it should continue rainy two or three days ; continue feeding at evening, until the weather becomes fair, they will then visit the fields, and supply themselves. Whenever you have occasion to move the hive of the young swarm, either for feeding, or otherwise, let it be done very gently, or the young and tender combs will be injured. It is always best to let them stand quiet for two months, they are then solid and firm, and may be inspected with safety. The purest honey, called *virgin honey*, is always found in the hives of the second swarms. I have noticed the clustering of the Bees without the hive, as one of the signs of swarming ; this sometimes arises from a want of room in the

hive, and may be remedied either by an eking on the bottom of the hive, of 3, 4, 5, or 6 inches, as occasion may require; or by drawing honey from the top of the hive, as has been described by my own invented hive; which may be considered the best way. The author, here, runs into a lengthy detail of forming artificial swarms, which may answer the purpose of curious Apiarians to amuse themselves with, and write about. I shall pass over the whole, as foreign to the design of this work, which is to illustrate the correct principles of nature, and apply them to the plain practical principles of common sense.



CHAP. XVI.

On preparing Honey and Wax for market.

If a large quantity of honey is gathered annually, a specific place should be appropriated for its manipulation, and its aspect should always be to the south, and it should be perfectly secured against all access to the Bees. When only a small quantity of honey is collected, it will be sufficient to have two or three small sieves of horse-hair cloth, with as many small vessels of earthen, together with some vessels to receive the honey, for its preservation. A small press is indispensably necessary, and some strong linen cloths which are to contain the honey when expressed, and finally, some great buckets, and glazed earthen vessels, with two handles, having a hole about half an inch from the bottom, through which the honey is to be poured, as it flows from the combs, and which must be kept constantly closed with a cork. To obtain the prime honey, heat, celerity and cleanliness are requisite. The honey should be extracted from the combs as soon as possi-

ble after it is drawn from the hives ; it will then flow more readily. The operations should be in a fair day, and under the influence of the sun, falling directly upon the honey, when extracting. Particular care must be taken to remove all dead Bees, and all such cells as contain brood, or pollen ; these will all injure the honey. If the season is far advanced, the heat of the sun must be supplied by the heat of the stove, to render the extraction more free. The sieves are now placed over the vessels, and the combs are now cut in pieces ; but it must be observed, that they must be cut transversely, and twice, viz. at top and bottom, in order to lay open each cell. The combs must not be crushed ; this injures the purity of the honey, both from brood, and bee-bread. Water should be in readiness to wash the hands of the operator, and his utensils, and this water should be preserved. When a certain quantity of honey has flowed into the pans, it is then poured into the buckets with the hole at the bottom, and carefully covered. On the following day, it may be poured into the vessels, either for use, or to convey it to market. This is prime honey.

Second honey is thus obtained ; let the combs from which prime honey has thus been obtained, be kneaded a little ; then wrung in a clean cloth, or pressed through a strong canvass cloth ; when the first is pressed, you may add a second, then a third, and so on, leaving them to drain ; after draining, the cakes of wax are removed from the cloths to be melted. If the weather is so cold as to render it necessary, the combs may be placed, for a time, in an oven, moderately warm, and drawn for pressing, as occasion may require. This second honey will be distinguished by a scum which will soon arise upon its surface. All the utensils used in this process should be taken to the Apiary, and exposed to the Bees ; they will soon cleanse them ; but care should be taken not to expose to them pure honey, this will

injure the Bees. Honey to be preserved, should be put into close vessels, corked close, and put into a dry place, to preserve it from souring; it should never be mixed with honey that has acquired consistency; this will cause a fermentation, and render both sour. The Abbe della Rocca says, that sixty pounds of honey-comb, will yield six or seven pounds of wax; but I could never obtain more than three or four pounds of wax to a hundred pounds of comb. There is scarcely any article in commerce more adulterated than honey; it is generally sold by weight, and mixed with other farinaceous substances, by which means it is very seldom obtained pure, in market. Water is a test by which adulterated honey may be discovered. Honey, impregnated with flour, gives to the water a milky colour; and, when boiled in water, gives a scum, which, when taken off and cooled, becomes a fine farinaceous substance. Honey is, however, not equal in its quality, but the choice is easy and important. The best honey, is new, transparent, of a ropy consistency, of a fragrant and agreeable smell, rather aromatic, and of a sweet pungent taste. The white is preferable to the yellow; the new to the old; the honey of the spring, to that of the summer, or autumn; and that, when boiled, gives the least froth; and that which gives a mild odour is preferable to that which gives a strong odour. These are the general characteristic features of honey.



CHAP. XVII.

On the cause of the mortality of Bees.

The first of these are the diseases to which they are incident, and the casualties of life, together with the cruelty of man in robbing and destroying his swarms

at the same time; all these have been considered under the chapters, *Diseases of Bees*, and *Enemies of Bees*. Many Apiarians, as well as common people, believe, that cold is an occasion of the mortality of Bees; but this is true only in a limited sense; and it is found from the nicest observations, that more Bees die, in proportion, in warm, than in cold climates. The Bee flourishes well in Siberia, and throughout Russia; and where the summers are short, and the winters long, the almost torpid state of the Bee during winter, renders him incapable of devouring much food, and yet they seldom if ever perish with frost, in their hives. The woods of Russia are known to abound with Bees, and the peasants have honey from the forests in great plenty, and always at their command.

Travels in Lapland, by a Swedish officer who accompanied the French Academicians, who went out to measure the length of a degree at the Pole, states, that "in these countries contiguous to the Pole, there are three months continual night in winter, and the cold is so intense that spirits of wine will freeze in the thermometer; when the door of a room is opened, the exterior air converts the vapour immediately into snow. In summer, there are three months continual day, and we are so annoyed with Bees and flies of all kinds, that we are obliged to burn green wood to occasion a smoke to drive them away." A summer of three months perpetual day gives the Bees an advantage for laying in stores, which may always be sufficient for food for their long winters, under their torpid state, and the natural heat of the swarms, sufficient to preserve them from freezing to death. Mr. Huish states, that he measured the atmosphere in the hard winter of 1814 with the thermometer, when the cold was 20 degrees below freezing point, and then placed the thermometer within his bee-hives, and found the temperature 20 degrees above it, making a difference of 40 degrees. This proved to his satis-

faction that the swarm, in their compact state, might set all cold at defiance, if they were full fed. This also led him to conclude, that whenever Bees died with the cold of winter, their food must be short, and their hives old, and bad, so as to admit both frost and wet. He also remarks, that heat often destroys the swarms, when the hives are exposed to the intense rays of the sun, and that this evil ought carefully to be guarded against. Mr. Huish also remarks, that the light of the snow, in a clear day, often invites the Bees abroad, and a chill causes them to light upon the snow, where they all perish; he directs that the hives be closed at such times. Twelve or fourteen pounds of honey may be considered sufficient food for a common swarm, through the winter; you may always determine the state of your hives with regard to food, by weighing them in January or February, (always allowing more for the weight of an old hive than a new one, on account of an accumulation of bee-bread, which, by its augmentation in old hives, increases their weight.) If your quantum of food falls short, feed your Bees.

Butler, in his *feminine Monarchy*, remarks, "That no hope can be entertained of saving a hive through the winter, that weighs only 10 or 12 pounds; but one of 15 pounds may be preserved by feeding, and one of 20 pounds will winter safe, and free from all fear of famine."

CHAP. XVIII.

On the life of the Bee and period of duration of a hive.

There are two seasons which exhaust the hives of their inhabitants; the spring and autumn. It may be calculated with some certainty, that more than one-third of a hive dies in autumn, and nearly the same number in the spring. The life of the Bee has

been generally estimated at one year, or two at furthest. Mr. Reaumur was of this opinion, although the experiments which he made were not decisive. Mr. Reaumur marked 500 Bees in the month of April, and in November following, not one was to be seen. The Germans estimated the life of the Bee at one year. Mr. Huish is of opinion that the Bee may live 3, 4, or even more years, because, he once marked one of his queen Bees, by clipping her wings, and found that she lived 4 years; when the hive was forsaken by the whole swarm, and he had no knowledge of her afterwards; and he thus concludes, "If the queens, who lay a great number of eggs, live 3 or 4 years, the Bees, by a natural conclusion, ought to live as long." The barbarous method of destroying the Bees by suffocation, to rob them of their honey, renders it difficult to ascertain with precision the natural life of the Bee; added to this, the enemies of Bees, together with the perishable structure of their straw hives, make general changes once in 3, 4 or 5 years. In the Archipelago, where hives are made of baked earth, they have sometimes lasted from 20 to 50 years; peopled, like a city, with a succession of population. Old combs become destructive to the Bees, and generally destroy the swarms if they are not removed; but upon the plan of my new hive, the combs may all be changed every year or two, and thus the hive be preserved free from this evil of old combs; and thus the depredations of one of the worst enemies of the Bees (the moth) may be prevented. The duration of the straw hive may be prolonged by a good coat of paint, to shield it from the weather.



CHAP. XIX,

On the deprivation of the hives, &c.

One of the most important questions which can be agitated relative to the management of Bees is,

whether it be more advisable to suffocate annually a certain number of hives, or to save their lives by depriving them of a part of their treasure? The latter sentiment begins generally to prevail; but the common hive is a great preventative; because few have the skill and courage necessary to perform the operation. I have shown how this may be done, by placing one hive upon another, upon the storying plan, by placing one hive by the side of another, by partitions in the same hive, and by my own new hive. I will now show how the Bees may be changed from one hive to another, and thus the honey removed with safety to the operator, and the Bees. Having ascertained the weight of the hive, and consequently the quantity of honey-comb to be extracted, begin the operation at evening, by inverting the hive of Bees and placing over it an empty hive of exactly the same circumference; then beat the lower hive gently, and the Bees will ascend into the upper hive with a loud humming noise. When they are still, invert the upper hive with the Bees on to the shelf, from whence they were taken, and remove the honey hive. When you cut out the comb which you design for use, cut upon one side of the hive, and extend your cutting quite to the top, otherwise the combs left behind, which had been cut, will drip on to the Bees on their return, and drown or injure them, or run on to the shelf, and thus invite other Bees to become robbers, to the ruin of your swarm. The honey thus being extracted, return the hive in the morning to its usual place, in the same way that you took it, by reversing the hives again, and the Bees will be restored to their own hive, and to their food. This may be done either immediately after the swarming season, when the Bees may have opportunity to fill up the chasm, or in October, but the former is much to be preferred. Mr. Huish now proceeds to notice the arguments in favour of the suffocating plan, by M. La Grenée at full length, and to refute them, and thus

concludes ; If I manage my hive well, and preserve it for ten years, it will yield me the same quantity every year, viz. 15lbs. ; and M. Grenée, by destroying his hive, has got 40lbs. his hive has only yielded him one swarm, and mine, at the end of ten years, has produced to me at least ten, without regarding the multiplied produce of the swarms, both in Bees and honey. At the end of ten years, my 15lbs. a year, will give 150lbs. with their swarms, &c. to his 40lbs of honey only ; Who has the advantage ?



CHAP. XX.

On the manner of feeding Bees.

There are two seasons in which the feeding of Bees becomes necessary, and these are in winter and spring ; at these seasons, the hives should be carefully watched, and when found light, an immediate supply be given them. It is the opinion of our author, that it is best not to feed profusely, by giving a great quantity at a time, but gently, say about 2 pounds a month, and that the feeding should be in the morning early, before the Bees leave the hive, and always in pleasant weather, and that the entrance of the hive should be closed immediately after feeding, to prevent robbery from other hives. Or, it may be considered most prudent and safe to administer food at evening, after sunset, when the entrance of the hive need not be closed ; but the vessel containing the honey must be removed before the next morning, to prevent robbery as before. Care should be taken not to delay feeding your Bees until their old store is all exhausted, for they will then become feeble, and if you preserve your Bees, you will lose much of their labours the next season. Sugar is sometimes administered as food for Bees, as well as clear honey ; Mr. Huish considers the first as impro-

per food, and the latter as dangerous, and often exposing the Bees to the dysentery ; and adds, “ Wherever honey is given, it should be mixed with some good old white wine, in the proportion of six pounds of honey to one of wine ; it should then be placed on a slow fire, and stirred until the honey is all dissolved, then poured out into a jar or other vessel for use.

Dissolve one pound of sugar in a quart of good old ale ; boil and skim it until it is clear, when cooled, it will have the consistence of honey, and may be given your Bees. A little salt added to their food is both safe and useful, especially when they are threatened with the dysentery. Molasses and water boiled, with a little salt, may be a good substitute, together with a little treacle.

M. Ducouedic recommends the addition of a little flour to their food ; but Mr. Huish objects, and adds, “ the admixture of any farinaceous substance acts as a laxative upon the Bees, and instead of invigorating, weakens and debilitates them.”



CHAP. XXI.

On the establishment of a hive, the Bees of which have perished by accident or want.

When Mr. Reaumur gave his explanation of a swarm, he was not far removed from the discovery of the re-establishment of a hive, the Bees of which have perished by hunger, or accident. A very simple remark on the existence of the eggs of the queen in the hive, and on the promptitude with which those eggs are hatched upon the return of the warm season, would have infallibly led to this discovery. Mr. Huish thus closes this chapter ; “ Whenever the Bees of a hive have perished in autumn or spring, the hive should be immediately taken from the Apiary, and deposited in a dry place, carefully protected from insects, spiders, mice, &c. When the warm weather has set in, it may be brought from its repo-

sitory, and exposed to the effects of the sun, with some caution however, lest the sun be too intense, and melt the combs: care should be taken to secure this hive, also, from the pillaging Bees, by removing it at some distance from the Apiary, in some retired spot. The eggs left in the cells will come forward, and thus re-people the hive, and if no queen appears amongst them, the earliest opportunity must be taken of extracting a queen, with some drones, from another hive, (as has before been noticed,) and thus effecting the formation of this new colony. Mr. Huish thus adds, "I never, however, knew that a hive thus regenerated, swarmed the same year, although Mr. Ducouedic affirms it, especially if the Apiary be in the vicinity of heath, or buck-wheat. Neither is it to be desired from so weak a stock; it is fit only for to be preserved over for the next season."



CHAP. XXII.

On the custom of transporting hives of Bees from place to place, for a change of pasturage, &c.

In many countries, this is considered as a very important point in the practical management of Bees. Savery, in his letters on Egypt, enters into a long detail of the manner in which the Egyptians transport their hives along the banks of the Nile, for the purposes of fresh pasturage, and concludes thus; "This species of industry, procures to the Egyptians, an abundance of wax and honey, and enables them to export a considerable quantity to foreign countries." This practice is alike common to the Chinese, Italians, French, Germans, &c. Mr. Boman, in his dictionary, observes, "Great are the advantages of being in the vicinity of some navigable river; by these means the spring of a dry country, can be united with the autumn of a fertile, unbrageous one, and thereby ample amends be made for the poverty of the country in which the Apiarian may be established."

Mr. Boman further adds, " we are informed by a Memoir of Duhamet, that the profit which is extracted from the Bees, under this management, is very considerable. From the month of July, when the Bees have swarmed, and have made an excellent harvest from the sainfoin, the whole of the wax and honey is taken from them, and the Bees put into an empty hive. The hives are then transported into the vicinity of fresh pasturage, where flowers and mellifluous herbs abound, and where they are often filled by the latter end of July. They are then again changed (care being taken to preserve the brood-combs) and transported into the neighbourhood of the buck-wheat fields, where they are again filled so as to yield an extraction of one third of this last stock;" and thus concludes, " By the aid of human industry, the most surprising quantity of honey is often obtained; but it must be confessed, that all years are not alike, and that some will not admit of more than one change."



CHAP. XXIII.

On the robberies of Bees, and the method of preventing them.

It has generally been understood throughout the preceding remarks, that robbery amongst Bees, arises from a scarcity of food. I shall, therefore, pass over the general remarks of Mr. Huish, and select only the following; " As the majority of the hives which are tormented with robbers are weak, and in want of provisions, it would be well to give them some food in the evening, after sunset, securing, at the same time, the entrance of the hive, against the admission of strangers, otherwise you will invite further pillage. Remove the hive, at the same time, into some close room, with a window to the south, and continue to feed them three or four days,

when you may open the window, and let your Bees pass out and in at pleasure, when the weather is fine. If the robbers appear again, close the window, and when the robbers are gone, admit the stragglers of your swarm; continue to feed, and you may save your hive. It is a good precaution to place an empty hive in the place of the one you thus remove, it will deceive the robbers."



CHAP. XXIV.

On the advantages which accrue to the State and individuals from the culture of the Bee.

It is a notorious fact, that England pays annually to the north of Germany 40 or £50,000 sterling for the produce of the Bee, which could be saved by a small expense by her own peasantry. Even in America, we are so regardless of the profits of the Bee, as to import honey in hogsheads from the island of Cuba and elsewhere. No country possesses greater advantages for the culture of the Bee, and perhaps no country has so grossly neglected it. Mr. Huish, after having gone over a complete system for the management of the Bee, observes, "I consider that 200 hives may be managed by one person, with some slight assistance, during the swarming season. Some French authors eulogize the skill of M. Prouteac, who had constantly under his care from 5 to 600 hives; this is rare, and perhaps the only one. I will state the profits of five years, on a fair and equitable scale, making, at the same time, fair and ample allowance for the losses, which, even the most skilful Apiarian cannot prevent. I will suppose a person to buy a swarm in 1812, for which he pays one guinea. In the month of May or June, his hive swarms, and in about 10 days, it swarms again, this is called a cast. His Apiary now consists of three hives, from one of which, (the cast,) it will be most

prudent for him to take the honey, and the Bees be joined to the strongest stock hives. Suppose the casts weigh 15lbs., say twenty-two shillings; thus, in the first year, he has received back the price of his original hive, and doubled his stock. The second year, his two hives produce him four swarms and two casts; let him sell the honey of his casts, at 15 shillings each, which will give him 30 shillings, and add the swarms to his stocks. He has now four good stocks; at the end of each year, let him weigh his hives, and take out all the comb over 30lbs.; say 11lbs. a year from each hive; this gives him 40lbs. of honey-comb, at 1s6 gives him three pounds; this added to the profit on the two casts as before, gives four pounds ten shillings. The third year, his four hives produce four swarms, and four casts; he goes on as before, and on the fourth year, his Apiary consists of eight stocks. At the beginning of the fifth year, his Apiary has increased to 16 stocks. I will now calculate the actual profit.

| Dr. | | Cr. |
|-----------------------------|----------|-------------------------------|
| 1812, To 1 swarm, - | £ 1 1 0 | 1813, By one swarm, £ 1 1 0 |
| 1813, To 2 new bee-hives, 0 | 4 0 | By one cast, - - 0 15 0 |
| To 2 new stools, - | 0 4 0 | By 10lbs. honey fr. |
| 1814, To 4 new bee-hives, 0 | 8 0 | the first swarm, 0 15 0 |
| To 4 new stools, - | 0 8 0 | 1814, By two swarms, 2 2 0 |
| 1815, To 8 new hives, - | 0 16 0 | By two casts, - 1 10 0 |
| To 8 new stools, - | 0 16 0 | By 20lbs. honey fr. |
| 1816, To 16 new hives, 1 | 12 0 | the two swarms, 1 10 0 |
| To 16 new stools, 1 | 12 0 | 1815, By 4 swarms, - 4 4 0 |
| 1817, To 32 new hives, 3 | 4 0 | By 4 casts, - - 3 0 0 |
| To 32 new stools, 3 | 4 0 | By 40lbs. honey, 3 0 0 |
| To 10lbs. sugar for | | 1816, By 8 swarms, - 8 8 0 |
| feeding Bees, - | 0 6 8 | By 8 casts, - - 6 0 0 |
| To 20 qts. ale, at 6d. | 0 10 0 | By 80lbs. honey, 6 0 0 |
| To incidental expen- | | 1817, By 16 swarms, - 16 16 0 |
| ses, - - - - - | 1 1 0 | By 16 casts, - - 12 0 0 |
| | | 160lbs. honey, - 12 0 0 |
| | £ 15 6 8 | |
| | | £ 79 1 0 |
| | | Deduct - - 15 6 8 |
| | | Actual profit, - - £ 63 14 4 |

The profit which is obtained from the Bee, stands in no proportion to the little trouble and time required in their culture, and this is sufficient to induce those who estimate things properly, to give a preference to the culture of the Bee, above all other agricultural pursuits, especially as no sacrifice of time or property are required, and no extensive capital necessary. As a proof of the importance attached to the culture of the Bee, Wildman quotes a modern author, who affirms, that when the Romans took possession of the Island of Corsica, they imposed a tribute of wax on the inhabitants, to the amount of 200,000 pounds annually; supposing the Island retained the same quantity, that would give 400,000 pounds per annum made in one Island by this wonderful insect. The known proportion of wax to honey in a hive, is as 1 to 15 or 20; then multiply 400,000 pounds by 15 or 20, we have 6 or 8 millions of pounds of honey, independent of the wax as above; what a source of wealth for Corsica, and all countries which will profit by the improvement.

I have before me a French news-paper of the 20th of September, 1787, which states, under an article dated Hanover, August 30th, "The culture of the Bee is a particular object with the Hanoverians; the produce of wax this year is estimated at 300,000lbs.; this, multiplied by 15, gives 4,500,000lbs. of honey; a most incredible quantity to be collected in globules by a particular species of insect." The Turks derive great profits from the culture of the Bee. The immense quantities of wax the Europeans annually draw from Smyrna, Salonichi, and the Morea, are well known. Paysonnec, on the commerce of the Turks on the Black Sea, says, Wax is the most important article in the commerce of Moldavia and Wallachia. Speaking of Bulgaria, he says, An immense quantity of wax is exported from Bulgaria; it is yellow, and of an excellent quality. The Bee flourishes well in all parts of the world, in China, Siberia, Lapland,

and in the West-Indies, and thus offers its labours to all classes of men without exception. The immortal Linneus, in speaking of the Bee, says, "It is not yet determined if the Bees, and other insects, which feed on honey, occasion any injury to the little embryos, or cause any obstruction to their generation, by imbibing the nectar of the flowers." Since it is so well known that the Bees afford such immense profit to the cultivators, with so little expense and trouble, and without the least injury to the most delicate parts of the vegetable kingdom, it must be owing to a want of knowledge, or a want of attention, that America derives so little share from the profits of this wonderful insect.



CHAP. XXV.

Directions for the purchase of Hives.

There is no commodity in which a purchaser can be so easily deceived as in a hive of Bees, and it is only the experienced Apiarian who can detect the particular defects. The value of a hive can only be known by a minute and close examination of its interior. If the exterior be sound, the interior may be bad; the combs may be black and ill-flavoured, which is always the case in old hives. When the age of the hive is determined, (which may be known by the number of queen cells,) and the hive is found free from moths and other enemies, the month of February and March will be the best time to purchase, and the activity of the Bees, together with the weight of the hive will give the best criterion. Hives purchased from a distance, generally do best, not being so often obstructed in their labours, by losing their way, and returning to their old habitations. Swarms, when moved, do best when carried by water, and in the evening.

CHAP. XXVI.

On the countries most beneficially situated for the culture of the Bee, and the number of hives each can support.

The former has already been fully considered, and the latter cannot well be determined; as much depends upon the nature and quantity of the herbage of all countries, and the advantages which may be derived from the transportation, or pasturage of Bees, in different districts of the same country, and as no damage has yet been recorded of any country, from having been overstocked with Bees. The celebrated La Grenée concludes, that, without contradiction, there are some countries more favourable to the cultivation of the Bee than others, yet that they may be kept to advantage in all, and that no one ought to neglect to provide himself with Bees, whatever be the country and the soil, and the productions of the place.



CHAP. XXVII.

On the distance which Bees fly for food.

It is generally understood by Apiarians, that the Bee can fly 3 or 4 miles, and that they sometimes collect honey at this distance; but Mr. Huish has rendered this certain by the following fact. "I once accompanied a party of friends to the Isle of Man, situated at the entrance of the Frith of Forth, and which is at a much greater distance than 4 miles from any land. Not a single hive of Bees is kept upon this Island; how great then was my astonishment to find a considerable number of Bees busily employed upon the Island amongst the heath, and who must have winged their way across the ocean in quest of

honey." From some observations afterwards made by Mr. Huish upon the labours of his own Bees, he ascertained that they often went to a distant field, two miles, in quest of honey, and that the velocity of their flight was about a mile in two minutes.

I shall here omit Mr. Huish's Monthly Manual, as it contains nothing but what has been noticed in the course of these remarks, and would be only an useless repetition. His catalogue of plants which furnish food for Bees, cannot be of sufficient importance to render it necessary to swell the expense of this work. His remarks upon the utility of Apiarian Societies, must be apparent to every person who reads this work, without the necessity of a particular chapter to illustrate it. The profits which have been fairly demonstrated by Mr. Huish upon the culture of the Bee, must be sufficiently striking to impress every candid mind with the value and utility of both the science and practice, and to induce every careful farmer to add the profits of the Bee to the profits of his farm, as well as to furnish his family and friends with one of the richest luxuries of nature. I shall close these extracts with Mr. Huish's chapter on Mead.



CHAP. XXVIII.

Manufacture of Mead.

Mead is a beverage prepared of water and honey: There are three distinct kinds of Mead, the simple, the compound, and the vinous. Simple Mead is made of water and honey which does not undergo fermentation. Compound Mead is mixed with fruits and essences, in order to give it a flavour. Vinous Mead is made of honey and water, which is subject to fermentation. Simple Mead is made by boiling three

parts of water to one of honey ; the honey may be increased, or diminished to the taste. The process is over a slow fire until one third has evaporated, then skimmed, and put into a cask, until the cask is full ; after 3 or 4 days it will be fit for use. The cloths which have been used in filtrating the honey from the combs, may now be used and cleared from their honey in the boiling Mead.

Compound Mead.

During the boiling process of simple Mead, add half a pound of raisins, stoned, or seeded, to six pounds of honey, and 4 pints of water ; boil these well together until the raisins become soft, and the 4 pints are wasted to two ; strain this liquor through linen, gently, and mix it with your Mead, and let them continue to boil ; add to the boiling Mead a toasted crust of bread steeped in beer. Skim the Mead again ; remove the Mead from the fire, and when cool, barrel it, as in simple Mead, with an ounce of salt of tartar dissolved in a glass of brandy. Let the barrel be full, that the froth may work over, and continue to fill as the barrel diminishes by working ; when this subsides, bung close, and stow it away in your cellar ; after a few months it will be fit for use. To give a variety of flavour to this Mead, a few drops of the essence of cinnamon may be mixed with the salt of tartar and brandy ; some lemon-peel, syrup of goosberries, cherries, strawberries, or aromatic flowers, according to the taste of the fabricator, or those who use it.

Vinous Mead.

This is the beverage of all the northern people ; they call it Miod. The Russians, for example, compose their Mead with honey, cherries, strawberries, goosberries and mulberries ; they soak these fruits several days in clear water, to which they add some virgin honey, and a piece of bread soaked in beer.

The barrels are placed in a room of 18 to 25 degrees of heat, day and night. The fermentation commences in 6 or 8 days, and lasts about six weeks spontaneously; it is then fit for use, but increases its value by age. The Grecians put into their wines the flour of sesame, kneaded with the honey of Mount Hymettus. By this method they made their wines delicious. The Turks make a very delicious pastry and confectionary with honey, and the flour of sesame, and even the sesame itself. The French imitate with Mead the choicest wines, such as Malaga, Rota, Muscat, Constantia, &c.; and it is fortunate that the beverage is not unhealthy.

Vinegar.

Put half a pound of honey into a pint of water, when dissolved, expose it to a warm sun, under a linnen cover, to exclude flies, &c.; in about six weeks it will change, and become good vinegar.

FINIS.



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ERRATA.

Page 16, line 3, from top, for *a poor day*, read *a poor clay*; p. 18, l. 6, from bottom, for *stythtic*, read *styptic*; p. 39, l. 15, from bottom, for *turn back*, read *turn over*; p. 31, l. 17, from top, for *preserve*, read *observe*; p. 112, l. 10, from top, for *Diskley*, read *Dishley*; p. 115, l. 8, from top, for *Diskley*, read *Dishley*; p. 115, l. 6, from bottom, for *practices*, read *practice*; p. 117, l. 7, from top, for *one peck*, read *one pint*.



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