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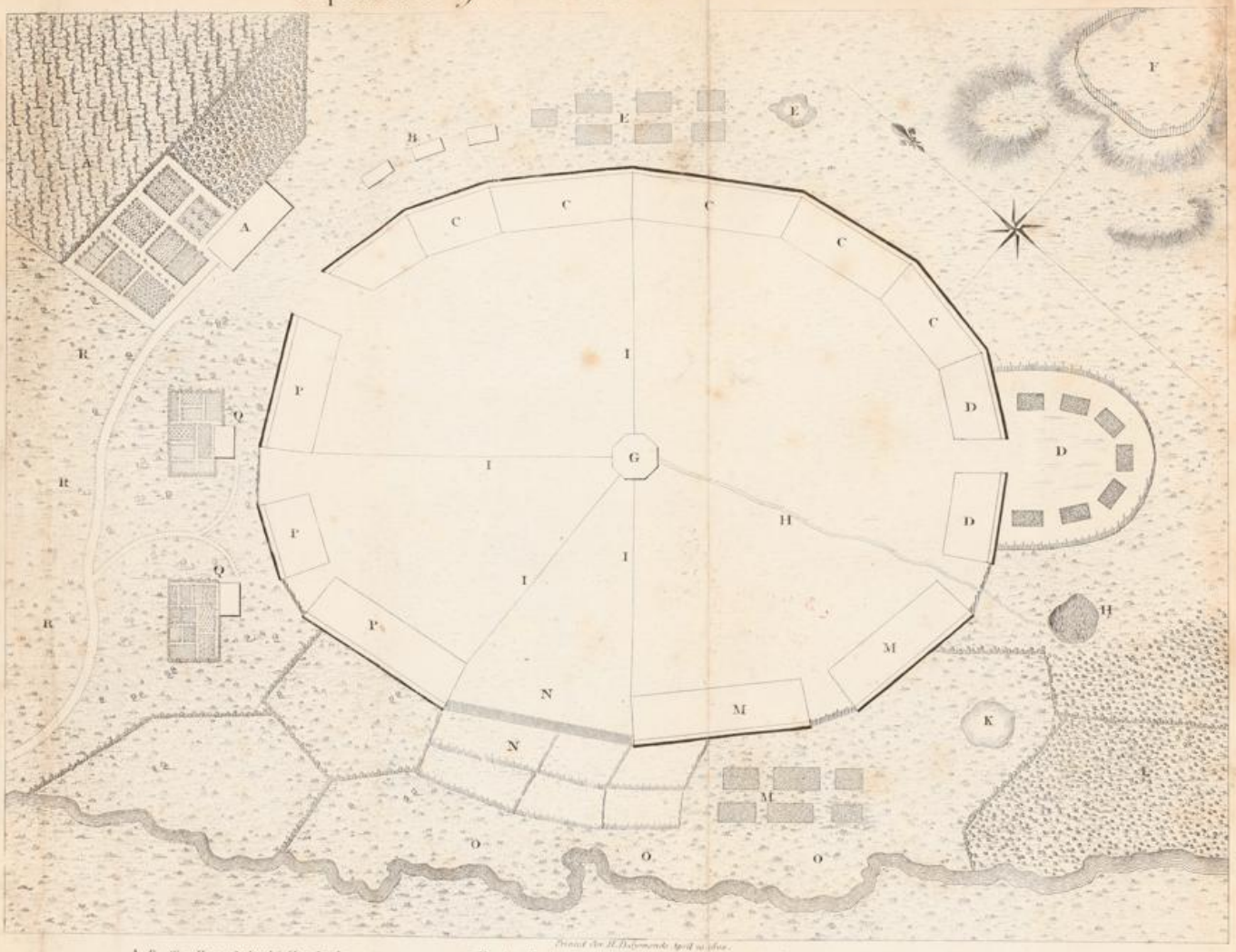
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Explanations *of the* Ground Plan FARM YARD.



A. *Dwelling House Orchard & Hop Garden.*
B. *Poultry Houses.*
C. *Cow House, Ox Houses, Straw Barling House, Pig Styes &c.*
D. *Threshing Mill Barn Granary Chaff Houses, Corn Stacks &c.*
E. *Hay Stacks Pond.*
F. *Out Yard.*
G. *Horse Gate.*
H. *Yard Drain and Pit.*
I. *Partitions of the Fold Yard.*
K. *Pond.*
L. *Gibbs pace 3 Acres.*
M. *Cart Stables Sheds Hay Stacks.*
N. *Sheep fold High Race.*
O. *Meadows.*
P. *Saddle Horse Stables Tool House Sheds &c.*
Q. *Labourers Cottages.*
R. *Lucern 5 Acres.*

See Page 215

1427

THE NEW FARMER'S CALENDAR;

OR,

MONTHLY REMEMBRANCER,

FOR ALL KINDS OF

COUNTRY BUSINESS:

COMPREHENDING

ALL THE MATERIAL IMPROVEMENTS

IN THE

NEW HUSBANDRY,

WITH THE

MANAGEMENT OF LIVE STOCK.

INSCRIBED TO THE

FARMERS OF GREAT BRITAIN.

BY A FARMER AND BREEDER.

Third Edition.

BRITONS! HONOUR THE PLOUGH.

BIBLIOTHEK D. KÖNIGLICHEN ACADEMIE DES LANDBAUES ZU MOEGLIN

London:
PRINTED BY C. WHITTINGHAM,
Dean Street, Fetter Lane;
FOR H. D. SYMONDS, PATERNOSTER-ROW; AND
VERNOR AND HOOD, POULTRY.

1801.

TO

THAT HIGHLY USEFUL AND RESPECTABLE

CLASS OF MEN,

THE

FARMERS OF GREAT BRITAIN,

THE ENSUING WORK IS,

WITH MUCH DEFERENCE, INSCRIBED,

BY THEIR MOST FAITHFUL AND

MOST HUMBLE SERVANT,

THE AUTHOR.

PREFACE.

THE following Work is a new attempt, whatever may be its success, to engage the attention of the great body of our Farmers, and to divert it to the most improved methods of Cultivation; an object in economics which has ever been held of the first consequence.

To the credit of the present times, it must be allowed, that ancient and ill-grounded prejudices and customs are gradually wearing away, and that there is, at present, scarcely any part of the country, in which may not be found, men in the farming line, thoroughly versed in their profession, and extremely capable of every rational enquiry; but at the same time, it cannot be denied, that there are still too many labouring under an unfortunate prejudice against Book-farming, as they phrase it, that is, against taking any hint, right or wrong, from books; a notion pregnant with too much self-sufficiency, and exposing those who entertain it, to the most manifest disadvantages; for it must be clear to every one, who will allow himself a moment's time to reflect, that written documents must necessarily surpass, in all respects, those of the most retentive memory; and that the experience of one man, however extensive, cannot possibly compass all which is, or ought to be known. Notwithstanding the plain and acknowledged advantages of practice, no one will, for a moment, question his superiority, who, with his practice, conjoins a just theory. As for the vulgar outcry against theory and speculation, it is, of all follies, the most absurd, since all practice ought to be founded on certain rational principles, and, to banish enquiry, is to prevent all possibility of improvement; and since we may divest experiment of all its danger, by cautious and moderate beginnings.

The first, or Calendar Part of the Book, is dedicated to the service of those, who may be either totally unexperienced in farming, or those who may need a new line of practice, and a Monthly Remembrancer. This convenient method of conveying agricultural instruction was, I believe, first introduced by Mortimer, and afterwards pursued in a most valuable tract, attributed to Mr. Young. To the practice exhibited in this Calendar of Mr. Young, I have gene-

rally adhered, in mine, as far as my plan would admit, since such is still the best prevailing system of the country. I have afterwards stated my sentiments at large on the Drill-culture, with a few words on folding sheep, a practice which appears to me rather to appertain to the old system, and to be by no means attended with those benefits usually taken for granted, rather than proved. But a circumstance here presents itself, which it concerns me, by no means, to pass over in silence: in revising the arguments I have made use of, although long and maturely digested in my mind, they have been delivered with too much warmth; a weakness for which I entreat, and trust I shall experience, the pardon of the candid reader: however incautiously I may have expressed myself, I mean not the smallest disrespect to any man. I hold no opinion which I am unwilling to submit to the most rigid test; and trust I preserve my mind, always open to conviction.

It is hoped, that no material branch of the science or practice of Agriculture, nor the account of any new mechanical improvement of consequence, is omitted. Such information as I needed, I have drawn from those which I esteemed the purest and most authentic sources. But the branch, on which the greatest stress will appear to have been laid, is the raising and economical expenditure of provision for Live Stock; a business which, at various periods, has had a considerable share of my attention.

As to style, the chief care has been to render it as plain and as perspicuous as possible; and after begging the reader's attention to a too numerous list of errata, *the book is respectfully committed to his patronage; the Author flattering himself with the hope, that it may become,* a faithful Guide to those who need instruction, a convenient Remembrancer to the already experienced, and an offering not unacceptable to the Public at large.

APRIL 28, 1800.

ADVERTISEMENT

TO

THE THIRD EDITION.

THE distinguished reception with which Two Editions of this Work have been honoured by the Public, and by the most respected Friends of the Author, demands the warmest sentiments of his gratitude, and the utmost exertions of his diligence. Two large Editions have been disposed of in the course of a few months, and the demand for the work still increasing, a third impression is now respectfully tendered to the lovers of agriculture.

AUG. 10, 1801.

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Plan of the Farm-Yard to face the Title, with a Guard.

THE

NEW FARMER's CALENDAR.

JANUARY.

The general Course of Business upon a Farm, during the present Month, is as follows: Thrashing —Superintendance of Cattle—Cartage of Manure or Earth—Road Work—Making or repairing Fences—Draining—Repairs of any kind befitting the Season—Sawing and preparing Timber for Use—Destruction of Vermin—or, in short, any useful Application of the Servants and Team, in order to profit by the Opportunity of all Tillage being at a stand.

THRASHING.

IN every county, this labour is performed after a twofold method, according either to standing custom, or the particular inclination of the farmer; that is to say, the labourer works by the day, or by measure. Whichever method may be adopted, the eye of the master, or some individual of his own family, or of a faithful bailiff, is required, to be a constant watch on the conduct of the thrashers; to ascertain, that if they work by measure, they make clean work; or if by the day; that they not only clear the straw perfectly, but that they do not lose their time. It scarcely

need be repeated, of what great consequence this attention is, whether in a private or public view; and that it is too generally neglected, any person may be satisfied by an examination of the straw sold in the London markets. A dishonest thrasher, either from motives of interest, or indolence, will employ himself chiefly with the largest heads of the corn, which yield most freely, slighting and hurrying over that part which requires more labour, and is less productive: such an one may also commit considerable depredations in a length of time, by concealing and carrying away the corn in small quantities; therefore, in order to prove good, as well as bad characters, and to prevent the dangers of temptation, the conduct of all labourers, without exception, in the barn, the granary, the stable, and in all situations of trust, should be sedulously watched, both early and late. Care should be taken to keep the poultry from the barn, in the casual absence of the thrashers, either by closing the doors, or watching.

CATTLE—At this precarious season, such cattle as are trusted to shift abroad, should have at least daily inspection, to prevent, or relieve accidents; and the utmost care should be taken, that such as lie at home, be well and plentifully supplied with fodder, both for food and comfortable dry lodging; for without this last, the cattle will never look thrifty and well, even with good food. Watchful notice should be taken of the time when the ewes may be expected to lamb, or the cows to calve, and some weeks previous to this critical

period,

period, they ought to have the best food the farm will afford them, with dry and comfortable shelter.

FENCES—One of the most useful applications of the leisure afforded by the winter season, is making good the fences upon a farm, and when the importance of this business is considered, the constant losses which must surely accrue from its neglect, together with its disreputable appearance, it is not a little wonderful, that in a country with such high pretensions to cultivation, this neglect should be so often seen. There is another species of negligence no less prevalent in many parts, that of suffering improper stock to run at large without a keeper; these will break through the best fences, and are doing constant mischief both to their owner and his neighbours. The example of a spirited farmer, who will suffer no trespasses of this kind, without requiring ample amends, and who has a strict regard both to the state of his own fences, and to the keeping his cattle within bounds, is of real utility in a parish.

DRAINING—When the vast and immediate benefit of draining land is considered, it seems strange to behold any in a wet and unproductive state, in the occupation of a man of property. Meadow land, in particular, is neglected, and suffered to remain in a state of swamp or bog, over-run with flag, rushes, and all kinds of sour and useless rubbish, to the immense loss of the infatuated owners, and of the public at large, which properly drained, seeded, and kept clean, would produce abundant crops of the most valuable herbage; and the far

greater part of that arable land, which is a mere puddle of water during all the wet season, or being partially relieved by surface draining, remains in a cold, unwholesome, perishing state all winter, to produce a crop of corn at harvest, which barely pays expences, would return in one year the expence of draining, and continue during a long lease in a sound and healthy state. On wet and difficult clays, or boggy grounds, which the tenant has not property or leisure to drain, it would be highly to the advantage of both landlord and tenant, were the former to advance the necessary sums on proper security.

At the commencement of a new year, we will suppose the careful farmer has before him a correct statement, lately taken, of his stock, its condition and value, with a general prospect of the present and probable future situation of his concern: from such certain documents, he will be able to proceed on his business in a regular and methodical way; and consequently with a greater assurance of success than if every thing (a too frequent case) were left to custom, mere chance, and the exertion of the moment. He will have a clear view of his funds, and how far they may be equal to any eligible improvements; he will combine his own convenience with the actual and probable state of the markets, in order to an advantageous disposal of his corn and cattle, and will determine from experience and reflection upon the propriety of continuing, or varying his course of crops, or of making any changes in the quantity or quality of his live stock.

FEBRUARY.

Ploughing for the earliest Crops, such Lands as are sufficiently dry—Irrigation, or floating Lands for their Improvement—Manuring Grass Lands —Top dressing Wheats—Sowing Beans, Black Oats, Hog Pease, Cabbage Seed, and Tares—Planting—Felling Coppice Wood—Clearing and dressing out Borders—Sale of fat Beasts—Fat or Store Pigs—Clearing old and cutting new Water-furrows—compose the leading Objects of Employment for the Month of February.

PLOUGHING.

THE lands which were fallowed up in autumn, with a view to the first spring crops, should be stirred as early this month as the state of the soil will admit, both on account of the general advantage of early sowing, and for the sake of obtaining future leisure by the present dispatch of business; but it may be safely laid down as a maxim, rather to defer the sowing, or even lose the season, than to go upon the land whilst in a state of puddle or mortar; for it is only sowing to reap loss and disappointment, as those farmers may be convinced, who will be at the pains to compare such a crop with the expences.

BEANS are put into the earth in various ways, according to local custom; with the drill, broadcast, or dibbled in by hand: sometimes they are cast over the land, and ploughed in; at others, harrowed

harrowed in after a ploughing, whether on ridge or level tilth: but the most prevalent method, in those counties famous for the Bean culture, is either dibbling, or rilling them in channels drawn for that purpose, with a plough, the distance between the rows being regulated by the wheels of the plough. The first mode is most suitable for heavy, wet lands, which must be laid up in ridges. The distance between the rows should be sufficient to admit the plough or horse-hoe, namely, full three feet, that between the plants, two or three inches; and in dibbling, great care must be used, that the setters do not drop more than one or two beans in a hole. Bean-setters, which are generally a mixed company of men, women, and children, need a very close attendance, both to keep them diligent, and also to oblige them to do their work in a fair and proper way. When paid by the bushel, the rate of which is from twenty pence to two shillings, they have sometimes no other care than to expend as many beans as possible, which they will attempt by filling up the holes, and even throwing away quantities of seed into the hedge-rows. I hope such profligacy is not common among our labourers, but I am sorry to say I have witnessed it. In some parts, they have a method of planting in clusters, four or five beans in a hole, the holes eight or nine inches apart, for the convenience of hoeing; but I should doubt of their podding well, under such management. Quantity of seed must vary according to distance, and is from a bushel and a half to three, and even four bushels. The sorts are, the fine, and very small

Horse-

Horse-bean, which usually bears the best price; the larger Horse-bean: the Tick, or as they are called to the westward of London, the Kidwell bean; and these vary in size, the smallest being the best; and the Mazagan, or Purple Bean: of Horse beans and Ticks, it is not very material which are sown, the superior product of the latter, bringing them about upon a level with the former, in point of profit; sometimes the demand for exportation raises Ticks nearly to the price of Horse-beans. Produce from two and a half, to five quarters per acre. Beans will thrive on any soil sufficiently stiff, and are advantageous to the farmer, as one of those hoeing crops, which pay the expence of fallowing and cleaning his land. When a wheat crop is intended to succeed beans, it is plainly of importance to sow these as early as is practicable, and even an autumnal sowing would be preferable, both in point of produce and early harvest, could a mild winter be insured; but in case of severe frost, all the beans not well and deeply covered with snow, would perish.

Oats—Of this grain we have the black, white, red, naked, and the Tartarian Oats. The white are well known as the most valuable. The black are perhaps equally good in quality for cattle, as are also the red, cultivated chiefly in the north-western parts of England. The Naked Oat, so called because it threshes clean out of the husk, is, I believe, nearly unknown in the southern parts. Oats will thrive upon almost any soil, and are very productive upon land newly broken up. The White require the dryest and best land, but

Black

Black Oats are more hardy, and may be sown as early in February as the land will admit. Seed, from three to six bushels per acre; but I am inclined to believe, the Oats thrown upon the surface by the harrows and lost, form the chief reason for such an increased quantity of seed. They are commonly harrowed in, upon land ploughed in autumn, and would pay well for a seed ploughing, which would bring the land to a finer tilth.

It is only on fresh soils that Oats are expected to be very productive; in the general course of husbandry, they do not seem to share so much of the farmer's attention as his other crops, never receiving the benefit of manure. There is no doubt, however, but that Oats would pay well for manure, could it be spared, and that by such attention, even seven or eight quarters per acre might be obtained, which is nearly double the common product. In cheap times for wheat, such practice might be particularly eligible. Oats have been both dibbled and drilled in some few places, but the success has not been well ascertained; the row culture of this grain, yet deserves further trial, for several obvious reasons: the Tartarian or Reed Oat, which produces such large quantities of long, husky corn, has been lately improved on the farm of a curious cultivator, by picking the seed, and sowing only the shortest and plumpest kernels. It may appear strange practice, but I have heard of Black Oats sown upon light land under furrow, and kept clean with the hoe, as a preparation for a wheat crop.

PEASE—These are generally looked upon as a risk

risk crop, which no doubt arises, in a great measure, from the groundless prejudice, that they neither demand, nor merit the attention of good culture; on the contrary, no article of produce demands it more, and it is the only mean in our power to obviate the natural uncertainty of this crop. Pease are too well known in their chief divisions of the Grey or Hog Pea, and the White Garden Pea, to need any particular description. They are sown upon almost all soils, according to the convenience of the farmer, and are supposed a proper crop for fresh land. The Hog Pea admits of early sowing, and will succeed upon strong land, the white sown afterwards, rather affect a healthy, light, dry soil, or that which has been chalked. It is unnecessary to repeat the common method of getting in a Pea crop, but of some consequence to remark, how ill it answers the general purposes of agriculture. Pease naturally belong to the hoeing and ameliorating course, and besides, the hoeing method is most likely to secure an abundant crop. A portion of manure ought to be allowed them, the land brought to as fine a tilth as is practicable, and the seed either dibbled, drilled, or rilled by hand, at such intervals as will at least admit the hand, if not horse-hoe: such measures, should the pea crop fail from accident, will at least assure a fine preparation for wheat, or any other crop which circumstances may render desirable. Quantity of seed, from one bushel to three; and of product at harvest, from a quarter and half, to five quarters per acre.

Upon warm and fertile turnip soils, a crop of Pease

Pease may be obtained, and harvested from the land, in time for a crop of turnips the same year. The Pease (the Charlton, or forty day species) sowed early in March, will be off in July; but they ought, particularly in this case, to be set in rows, and sedulously hand-hoed, as a preparation for the turnips; not a moment being lost, but the land slightly ploughed, as fast as the pease are carried, and the turnip seed harrowed in upon the fresh earth. Grey Pease, on the above noted soils, will bear to be sown in autumn, but I should doubt its success on clays. Winter pease sometimes produce great bulk of haulm for fodder, and also considerable quantity of grain; but I have not observed them to come very early at harvest, nor have I known the experiment of a very early autumnal sowing, recommended by some persons. October and November are the usual seasons.

The first opportunity should be embraced of stirring those lands which are intended for Barley, Carrots, Cabbages, or any of the spring crops; towards the end of this month, a seed bed may be made for cabbages, and even the seed got in, should the season be favourable. The bed should be rich, and may be harrowed fine, or prepared by hand, according to its extent. Three or four rods of ground will produce plants enough for a single acre; and about a quarter of a pound of seed, or somewhat more, will suffice. The bed of course must be kept perfectly clean from weeds.

TARES are divided into the Winter and Spring Tare, and will thrive on most soils, being frequently found a spontaneous growth. It having been

been hitherto an undetermined point, whether there exist any specific difference in the seed, several ingenious cultivators have made experiments, which seem to countenance the affirmative side of the question. According to a late experiment of the Reverend Mr. Laurent of Bury St. Edmunds, recorded in the General View of the Agriculture of Suffolk, the Spring Tare sown in autumn, was destroyed by the winter frosts, whilst the Winter Tare sustained no damage; and the Winter Tare sown in March, became in the end mildewed, nor did a single pod of it ripen. Although they may answer equally and indiscriminately for the spring sowing, with the view of fodder, the necessity of keeping them separate for the autumnal is evident. The smallness and blackness of the seed, are said to be the distinctions of the Winter Tare.

As a seed crop, Tares are generally supposed precarious, and the produce not expected large, perhaps from one to three quarters per acre; but this arises in great measure from defective culture. When a good crop of seed is the object, Tares ought ever to share the advantages of the Pea culture; they should be drilled upon a well-tilled and manured soil, and may then in truth be esteemed one of our best ameliorating crops. Seed, a bushel upon an acre. In the common method two or three bushels of seed are required, which may be harrowed in upon the autumnal fallow, or what is preferable, upon a fresh ploughing. Rooks and pigeons are well known to be dreadful

dreadful enemies to this crop, a circumstance which forms a strong objection to the broad-cast culture, in which the seed is insufficiently covered.

But the great objects of the Tare culture, are, spring food for cattle, summer herbage, hay, substitution for clover, where that vegetable has tired the land, and as manure, to be buried by the plough. In these various lights, the tare is absolutely invaluable, and since its merits have been known such a number of years, common sense is sadly at fault, to account for its frequent neglect. The winter crop is obviously the most important, and perhaps with the view of obtaining spring feed very early, the first week in August is not too soon to sow Tares: should they be drilled, or rowed in any method, (an uncommon practice when they are intended for seed) the rows ought to be hoe-ploughed early in October, and the plants earthed-up as high as possible, which always has an excellent effect in keeping them warm, and encouraging their thick and early growth. They may be also sowed equally mixed with rye, (the Flanders method) which nourishes, protects, and draws up the Tares; and it is not easy to contrive a crop which will pay so well, leaving the land at the same time in so favourable a condition.

It matters not how early Spring Tares are sowed, provided no hard frosts ensue, and their seed time lasts to the end of April. This gives a good opportunity for successions of them, to the great convenience of summer feeding. They may be advantageously mixed with oats or barley, either for green herbage or hay, of both of which they make

make a very heavy bulk, in a favourable season. When intended to be ploughed in for manure, some broad-cast four bushels upon an acre, that there may be as great a bulk as possible.

The farmers, near London, make a considerable profit of their Tares, by selling them green, as soiling for horses; and I have seen in Kent, drilled crops of them of immense weight, luxuriantly covering the whole surface of the soil, as though they had been broad-cast. Some of these crops mowed for hay, I have reason to believe, produced more than three ton per acre; and upon others, kept for seed, the land being in good heart, the product was considerable in proportion.

PLANTING.—The planting either of fruit-trees, or of quick-growing wood, fit for various purposes, will contribute largely to the convenience of a tenant, who has a long lease, and pay him very good interest for his money. The aquatics in general, are proper in this intent; namely, the willow, osier, sallow, alder; and for dry situations the upland, or red willow, which although not so quick a grower as the other, produces a very durable wood. Willow wood resists water, and remains sound many years after that period at which almost any other would be totally decayed and useless. These quick growers, planted in large stakes, form an excellent repair for decayed fences, and properly managed, with other aids which may be at hand, in a very few seasons produce a full and flourishing hedge-row. In short, it is a disgrace to a man of common activity, to live upon a farm naked of wood, when a stock may

may be so quickly and profitably raised, and upon those spots too, which must else be useless.

FELLING COPSES—In this month, the business of felling and clearing of underwood, is usually, or rather ought to be, finished.

CLEARING BORDERS—The borders of arable fields, are too much suffered to remain in a state of neglect; uneven and irregular, over-run with weeds, brambles, underwood, and all kinds of useless rubbish, when they might at little or no expence, and a trifling yearly attention, be rendered both very seemly and ornamental, and very productive of good herbage. The latter consideration ought not to be slighted upon a farm consisting chiefly of arable land; nor need the farmer, in such case, be afraid of extending his borders. Where wood is scarce, the clearing of old borders pays well. Cut up all the wood for faggoting, and grub up the roots for the stack. Shave the brambles close, which prevent walking near the hedge or ditch; and make the foot-path on that side. Cast your ditch deep and well, throwing up the earth upon that which is obtained in levelling the border, all which will be a valuable acquisition to your compost dunghill, and may remain in the field, the dung being carted to it. The borders ought to be sowed with good grasses, and if their spontaneous growth should be rank and sour, culture and the scythe will soon produce finer and sweeter herbage.

BULLOCKS AND HOGS.—There is frequently a great overflow of fat cattle upon the markets, in the autumn, and about Christmas; and those stall-

ed,

ed, or home-fed oxen, which can be kept, may find an advantageous market in the course of this month. January and February are also good seasons for the sale of pig-stock of all descriptions, fat or lean.

WATER-FURROWS—Constant attention must be paid throughout the winter season, to the state of the water-furrows, in the wheat-grounds, that they be always kept free and open with the spade, the earth being liable to fall in from various accidents. Let all new-ploughed lands be regularly water-furrowed, as soon as the plough has finished, which is necessary as well at this season as in autumn, more especially on stiff or retentive soils.

MARCH.

Shutting up Meadow and Pasture for the Grass Crop —Seed Tillage for Oats, Furze, Pease, Spring-Wheat, Cabbages, Potatoes, Carrots, Parsnips, Chicory, Canary, and Radish-seed—Sowing Grasses—Turnip Fallow—Breeding and fatting Stock—Barley.

MEADOW AND PASTURE.

IN the beginning of this month, inspect the meadows and pastures, make all the fences and gates secure, beat and spread the dung left by cattle, also the ant and mole-hills; roll, where the soil will admit, leaving the land in a clean, even, and husband-like state, free of wood, stones, or rubbish, which may obstruct the scythe.

The

The business of this, and the ensuing month, is various and pressing, and requires, particularly on a large farm, the best arrangement, and the full exertion of all the farmer's force of men and cattle, as seeding land is so critical a business, and so much depends on a man's being prepared to profit by every favourable opportunity. The sowing left unfinished last month, will in course be first attended to, and completed in the present.

Oats.—While I am writing, information has reached me of white oats, of very fine sample, bearing the enormous price of fifty-five shillings per quarter in the London market, in consequence of a demand from various parts of the country. This will stand in the place of a thousand arguments for their culture, after the most advantageous method. In truth, the jet of the business is this: upon an average of the common culture, and of markets, oats are a losing crop to the farmer, injuring both his purse and his land, and he had much better purchase than grow them. This will easily appear, from a calculation upon a crop, of from two to four quarters of oats per acre, either following, or to be succeeded by another crop of white corn, after the fashion of the old husbandry. But as has already been remarked, oats should stand in their proper place in the course, never without seeds, except they be drilled, and then lucerne very properly accompanies them; nor ever be put into land which is not in perfect good heart. So managed, oats I have always found an advantageous crop; in most situations, greatly before barley, in many conjunctures, superior even to wheat.

The

The land surely ought to receive a seed ploughing for oats, and even two, if the time could be spared, as much depends on the fineness of the tilth. The method of casting them also into seed-channels, or seams, purposely drawn with the plough, is advantageous, and a saving of seed. Four bushels is the common allowance to an acre, but I have seen very large crops from three. It will pay well to have the seed very clean and curious. Oats are generally sown before barley, except in Hertfordshire, and one or two other places; but it is probably an indifferent matter, and the mere child of custom.

FURZE.—Where wood is scarce, this may be cultivated to great advantage, on poor or exhausted soils of any kind which want rest. It may be sowed with oats, or other spring crops, about a gallon of seed per acre, which may be had of the seedsmen in London, or in Sussex, if it be not found in the neighbourhood. I believe it is usual in Sussex to let the furze remain three years on the land.

PEASE.—On light soils, it is most advantageous always to sow white pease, since they will answer the end of Cattle-feed equally well with grey, and if the sample be fine and good boilers, fetch a much higher price at market. It is not common to horse-hoe these, being apt to receive damage by the treading of the cattle, and the rows need not be farther apart than to admit conveniently the hand-hoe, by which they require to be well earthed-up. They are sowed throughout March and April, as the land can be prepared,

and a season obtained. Podding, or picking green pease for the London market, is a very valuable branch of the business of some farms, within a few miles of the metropolis.

Spring Wheat.—The culture of this article should never be attempted, but upon light lands of great natural fertility, and its profits, even on such, compared with other grain, are very questionable. It ought ever, either be drilled, or sowed with seeds, that some benefit may be secured. It has been disputed, whether any specific difference exist between spring and winter wheat. I believe that which is usually sold as spring wheat, came originally from Siberian seed; but, according to my observation, any wheat sowed in March, in a good soil, will produce a small crop at harvest, which being resowed in the spring, will succeed better as spring wheat; and perhaps as well as that properly so called. The white, light and thin-skinned wheat, is the most proper for this experiment.

Cabbages.—The seed should be got into the bed, as early as possible in March, if February afforded no opportunity. The proper sort for cattle is the Scotch, or any large, hardy, flat sort; and as soon as the plants are of tolerable size, it is best to transplant them immediately into the field, as at this season, if left too long in the bed, they are apt to run. The season of setting them out extends from mid-April to the middle of May; beyond which, I think it cannot be extended, with the prospect of a full crop. From three to five plowings are necessary for this crop; the last

of

of which turns in the dung, and of that the quantity ought to be the greatest possible to be spared. The land is usually kept upon the ridge.

POTATOES.—These, on a large scale, are an object to a farmer only on two accounts; namely, in case of a large pig-stock, or for sale, an advantageous market being at hand.

Giving them to cattle raw, I take to be one of those gross absurdities sanctioned only by custom or whim, both which are mighty powers in husbandry. It must however be allowed, that where there are conveniencies, for either steaming or baking potatoes, they are excellent bread for animals of every species, and with good hay, will make capital beef, either with or without corn. That they are an exhausting crop, is proved by the immense quantity of manure they require, even on soils of tolerable fertility. Where no large quantities of this root are in request, it is best cultivated on borders, or vacant spots, of which every farm, great or small, affords some. These are generally in sufficient heart without manure.

Potatoes are cultivated in various ways, and planted from February to May; but the early planting belongs either to the mere garden culture, or to that which is nearly similar, the raising of early stock for the London market. In the field culture, the earliest seed season is the middle of March, for warm fertile soils, and the following month, or early in the succeeding, for cold and infertile. They are very successfully dibbled upon grass land, with or without dung. Dig up the turf, and turning in the dung, dibble

in the sets; or, in the lazy bed method, well known and little worth description.

As to the proper field culture, it is immaterial whether the sets be dibbled or laid into furrows, drawn for that purpose with the plough, or by hand with the hoe; I always use the latter method, and have them planted pretty deep, and well covered. The tilth should be fine, and upon the ridge, a quantity of the best dung, between twenty and forty cart loads to an acre, being well stirred in with the last ploughing. From ten to fifteen bushels will plant an acre, and the eyes only need be used, two or three of them being laid together. Distance between the plants, from six to ten inches; between the rows, equally, from two and a half to three feet. This distance will admit the horse-hoe, and even independent of that consideration, is perhaps more favourable to the luxuriant growth of the plants, than one more confined, as in the case of most of them growing, the land will be fully covered. Any soil of tolerable depth, except mere clay, will grow potatoes, and the crop varies between one, and six or seven hundred bushels per acre. A wet season, which makes plenty of grass, is also favourable to potatoes; a dry, blighting spring, with cold easterly winds, is unfavourable on several accounts, and generally half destroys the crop. Such a season being very productive of the grub-worm, the rooks in search of that prey, will tear up the plants as soon as they shoot, and even devour many of them. A few years back I had a crop nearly destroyed in this manner, not being aware of any danger to potatoes from birds. Po-

tatoes

tatoes may be propagated, by planting either the shoots, stalks, or rind; for satisfactory experiments of such practice, see Index.

CARROTS.—This root ranking next to corn, in point of nourishment, as food for cattle, being perfectly wholsesome in its raw or natural state, yielding an abundant product, and leaving the land clean and improved, is of unspeakable importance to the farmer. It is only to be lamented, the situations are numerous, which cannot, from a defect of soil, partake of its benefits; and that even on proper soils, the cultivators in general are too inattentive to its merits. Depth of soil, and a sufficient quantity of sand in its composition, are the prime requisites for the production of carrots; they will grow in pure sands, but a rich and deep sandy loam, or the black rotten soil, are their favourite earths. In general, they may be successfully cultivated any where, but on stiff clays and shallow soils. Perhaps deep wholesome clays, well under-drained, manured with sand, would produce large crops of carrots. They will grow upon the same land almost any successive number of years, to great advantage, the soil always continuing in a state of garden culture, which is a good hint to those who may have only a particular spot adapted to this root. It was once suggested to me by a gardener, that it would be advantageous to have two crops a year, by sowing in July for young carrots to come in the beginning of April, but I doubt the profit of such a measure. As a preparation for corn, this fallow crop ought to receive a very liberal proportion of

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the best manure upon the farm, even to the tune of forty loads of rotten dung upon an acre, not a bushel of which will be misapplied, as both crops will testify. I have heard of carrots poisoned and stunted by dung, but never witnessed any such mishap, either in the garden or field. As a consolation to those who have land proper for carrots, but are unable to spare quantities of dung, I must yet remark, that I have seen very fair crops obtained without manure. The drill culture has been recommended for these roots, but as I have never practised, or even seen it, I can say nothing of its merits. As the plants, like turnips, may be set out with the hoe, to any distance proper for cleaning the soil, and allowing space for growth, broadcasting the seed seems a very sufficient method.

Carrot-seed may be put into the earth as early in the spring as the land can be prepared for it, without danger; but circumstances seem to have confined the season to the month of March, and the first week in April, beyond which it ought not to be delayed. Let the land be ploughed as deep as possible, and worked to a fine garden tilth. Put in your manure with the last stirring, and harrow in the seed, mixed with ashes, quantity four, five, or six pounds per acre, less in proportion to the sandiness or fineness of the mould. Some hand-rake instead of using the harrows on the binding soils, that the earth may be trodden as little as possible. In my opinion, carrots should always be sowed upon the fresh earth, to give them at least an even chance with the weeds. When land is laid up in autumn for Carrots, it is

usual

usual to trench-plough to the greatest depth possible, and with very small furrows, in order sufficiently to break the staple: to effect this properly, in a strong soil, will give six good horses labour enough at half an acre a day. For drilling Carrots, &c. see Index.

PARSNIPS require a similar culture with the above, in all respects, and are applicable to the same purposes. I have never cultivated them myself, but have known them grown upon a stiff clayey loam, about a foot deep, and of indifferent fertility, beside carrots. Much rotten dung, particularly of fatting hogs, was used. The carrots were a good crop, but the parsnips much longer and larger. It is probable, the latter are of a finer consistence, and more nutritious quality, and they are said to produce rich milk in cows, and good butter; also to suit strong, or clayey soils, better than carrots; but I know of no accurate experiments on those heads. They are much in use for cattle in Jersey and Guernsey.

CHICORY, or WILD ENDIVE.—Although the seed, first introduced by Mr. Young, was obtained in France, it is a native of this country, and grows wild in all parts. Its usual mode of culture, is to sow it with spring corn, either with or without clover, or other grasses. Quantity by itself, ten pounds of seed per acre. It is supposed to succeed better with sheep and pigs, than with the larger cattle. This plant will thrive on any soil, if it comes up, but I have sometimes found it fail in this respect, most probably from a defect in the seed.

CANARY

CANARY-SEED.—This well-known bird-seed is chiefly cultivated in the Isle of Thanet, Kent, for the London seed-market. It is, I believe, rather an uncertain crop, both in point of product and market-price. It requires a rich soil, and is suitable for land newly broken up. The common tilths for it in Kent, are summer fallow, bean-stubble, and clover-lay; the last best. The land being in middling condition, a coat of good rotten dung is required. Winter tillage supposed, as early in the spring as the soil is sufficiently dry, the seed is broad-cast into seed-furrows, twelve inches apart, five gallons to an acre, and well harrowed in. As soon as the blade appears, and the intervals are sufficiently distinct, they are cleaned with a Dutch hoe, and the operation repeated again in May and June, with the common hoe; every weed being carefully cut up, and the plants thinned where too thick. It is late cut with a hook, called a twibel and a hink; by which it is laid in wads of about half a sheaf each. The wads must be turned from time to time, in order to have the full benefit of the sun and rains, and they sometimes continue on the field until December, the seed not vegetating, or receiving any kind of injury. Without this exposure, it would be scarce possible to thrash out Canary-seed, it clings so remarkably to the husk. Produce, three to five quarters from an acre, and the crop sometimes repeated successive years on the same land.

RADISH-SEED is cultivated in the same place, under the same circumstances, much manure allowed,

lowed, and deep ploughing: the sorts, the EARLY SHORT TOP, the SALMON, and the TURNIP-ROOTED. Seed, two or three gallons per acre. As soon as the plants appear, every other row is cut up by the horse-hoe, leaving the rows twenty inches apart. The plants having got two or three rough leaves, they are set out eighteen inches asunder, and kept clean by repeated horse and hand-hoeing. This crop is also late, and sometimes out until Christmas, rain being necessary to rot the pods: produce, eight to twenty-four bushels per acre.

GRASSES.—March and April are the chief seasons for sowing Grasses, whether by themselves or with corn. It ought to be a standing rule in the broadcast husbandry, to sow no spring-corn without Grass-seeds of some description, for a temporary ley, to continue one, two, or more years, agreeable to the farmer's convenience, and the nature of his soil. This practice is a prime instrument in the regular courses of crops, it affords the land a necessary respite from corn-bearing, at the same time liberally affording more advantageous products; lastly, it leaves a clean refreshed soil with the best possible seed-bed for wheat. Should circumstances render it desirable to sow Grasses among the wheat, it may be done early this month.

CLOVER, the red or broad-leaved species, is the most valuable of the artificial grasses, as food, green or dry, for cattle of every species, and as seed for the market. From ten to fifteen pounds per acre is the common quantity sowed; but the best authority, grounded on long experience, proves the advantage of sowing twenty and upwards,

wards, on all soils. It may be harrowed in with the corn, but it is more safe to roll it in, after the corn is up, giving the latter the advantage of a start in growth. Should the wetness of the spring, and the aptitude of the soil force such a luxuriant growth of clover as to smother the corn, it will be most advantageous to cut the whole crop together, either as green fodder or hay.

RAY-GRASS is usually mixed with clover, in some counties, by custom; such custom, however, is disadvantageous where the soil is rich; on poor soils, the practice is proper. This grass produces a bite early, and should be used before it becomes too hard and stalky. Quantity of seed, four or five bushels per acre, if sowed alone; with clover, two bushels, to twelve or fourteen pounds of clover-seed.

TURNIP FALLOW.—The land, winter-fallowed for Turnips, should be stirred this month and the following, if required, and reduced to a garden-tilth, for a crop of weeds to be turned in before their seeding. The weeds will not only be destroyed, but contribute in a certain degree, by their return, to fertilize and force the soil.

BREEDING AND FATTING STOCK.—Should turnips be left upon the land, until this late period (a common, but very unprofitable practice) they ought at least to be cleared off by the middle of the month, or the succeeding crop will evidently suffer. The farm-yard ought now to supply good last year's provision for the breeding and fatting Stock, until the spring products are ready; but this most important point in husbandry can only be

attained

attained by a circumspect and judicious autumnal plan. It is generally most advantageous to complete, by the end of February, the sale of every thing in the pig way, fat or lean, intended for spring sale, large stores perhaps excepted. The spring quarter throughout, affords the best price for fat beef and mutton.

BARLEY.—The seed-season for this grain, extends from the latter end of March to the first week in June, dependent on various circumstances; but would those permit the attention to be directed to the simple object of obtaining a large crop, there is no doubt, but on all soils, a March sowing would be most conducive to that end, provided early pains had been taken so ensure a sufficiently fine tilth. On a winter fallow, the necessary tillage is easily attainable, and is best secured by attention during the autumnal quarter. In this case, Barley may be immediately ploughed in, upon a light or sandy soil, or harrowed in, with one ploughing, upon the more stiff. Barley more usually succeeding a crop cleared off the land late in the spring, and requiring a fine seed bed, its seed-time is necessarily protracted. It is common to give the land three ploughings, leaving a level surface for the seed; and in very favourable soils, which will bear late sowing, the practice is good, but questionable upon the more tenacious, where, after all the labour, a necessary degree of fineness may not be obtained, and if really obtained, may not balance the disadvantage of late sowing. Quantity of seed, on light sands, two bushels to three;

three; in general from three to four bushels. Four quarters per acre, is a fair crop of barley; eight a very extraordinary one.

APRIL.

Continue sowing Spring-Corn, Lucern, Saint-foin, Burnet, Mustard, Brank, Hemp and Flax—Plant Liquorice, Rhubarb, Tobacco, Madder, Weld, Woad, Mangel-Wurzel, Hops, &c.—Roll, Harrow, Hoe, Homestall, Live-stock.

LUCERN.

THIS foreign grass, the native of a warmer clime, succeeds extremely well in this country, upon deep soils which are both light and of natural fertility; on such, no other grass is so abundant, nor any other crop so profitable: but, as well as the best land, it requires the most perfect garden-culture, and a full share of the best manure upon the farm. As Lucern will be injured by any mixture of other grass, as much as by weeds, it ever ought to be drilled; sometimes it is transplanted. It is perennial, and may be cut several times in the season. The bulk of hay made from this grass is very great, and said to be a restorative for worn-down horses. Lucern is well relished by cattle of all kinds, and by hogs as much as clover. As green herbage for horses in the stable, it is not only esteemed the most wholesome, but the most heartening and substantial.

stantial. It has been grown with profit upon soils much inferior to those just recommended, such as chalky warm lands, of no great depth, and upon strong loams; but it may be questioned whether upon these, saintfoin, or clover, ought not to have the preference. When broad-cast, it accompanies spring-corn, particularly buck-wheat, as other grasses. Lucern has been longest, and is best known in Kent and Surry; in the former of which counties, to my knowledge, about twenty years since, a crop of it saved for seed, and fortunately sold at market, retrieved the affairs of a small farmer, which were verging towards ruin. Seed fresh from France is held by some to be most productive.

The proper quantity of seed, broad-cast, is about twenty pounds per acre, and something more than one quarter of that quantity drilled. In the former method, it is sown upon a flat tilth, and harrowed in at three times. If drilled, it is best done upon five-foot ridges, the work arched up, in three rows, one foot apart. The ridges should be highly manured with rich and rotten compost, that will mix well with the soil. It is needless to repeat, that the very best previous culture is supposed, a garden tilth being required.

SAINTFOIN.—This is the grass proper for poor soils which will grow no other, nor does it matter of what kind, or how shallow, provided they are dry. It will grow out of the solid rock. Limestone, and chalky earths, are its favourites, hence it is successful upon chalked lands. Long as this valuable grass has been known in England, it is a stupidity

stupidity almost miraculous, that there should exist such a number of cultivators of poor, shallow, stony soils, who totally neglect it, notwithstanding it would produce upon the worst of their land, more than a ton of hay per acre, with a considerable after-growth into the bargain. On fair calculation, they will find very little of their husbandry equal to that in profit.

Saintfoin will grow good crops, from ten to fifteen years, and will then afford a sheep pasture for several years afterwards; but it must be wrong to suffer it to occupy the soil any longer than it is productive. It is usually shut up in the spring, and mowed for hay, and then shut up, for late afterfeed; but sheep should not be suffered to remain upon it after the frost has set in, lest by biting too close they damage the root. This grass should be mowed early, before it is full blown, not only that being constantly mown, it may not be too much exhausted, but that the hay may not be too stalky and sapless. Saintfoin-hay is asserted by many, to be the most nutritious of all others, for horses, which, it is pretended, will work well upon it with very little, or even without, corn; but this I can by no means warrant upon my own experience. On the most proper soils, saintfoin will sometimes produce a full crop the first year, but generally, that does not happen until the third, or fourth, the first and second being only a load per acre, or half a crop: on this account, in some parts of Kent, they sow clover mixed with it, with the judicious view of obtaining a weightier growth of clover at first, than they could expect of saintfoin, which

last

last gets the upper hand in its turn, as the former fails. Both red and white clover, equal quantities, might be advantageously sown. The average produce for ten years, upon good land, may be stated at a load and half of hay per acre. For drilling this grass, see Index. It is usually broadcast upon any corn-crop, or, by itself in the spring, or even in the autumn. Quantity of seed, from four to eight bushels the acre, with, or without, six or eight pounds of clover. When kept for seed, quantity, a quarter and half, to two quarters and half per acre, the present worth of which is about two guineas to fifty shillings per quarter; and the straw is good cattle-fodder. It ought to be remembered that saintfoin-hay soon dries, and requires only one turning of the swathes. The right preparation for this valuable grass, is a perfectly clean and fine garden tilth.

BURNET succeeds on almost any, but strong clayey soils, and may be sowed, like other seeds, with corn, and covered with three turns of the harrows. Quantity, a bushel to an acre. I think it advantageous to mix Burnet with ray-grass and white clover, or with the latter alone, not only with the view of securing a good bottom, but to render the herbage more palatable to cattle in general, which I have been convinced by ocular proof (much more satisfactory than the argumentative) have no great relish for Burnet: they, however, become accustomed to its cucumber flavour in time, and contented with it; no small inducement undoubtedly is, that they are commonly fed with it when no other grass is to be obtained.

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Of its salubrity there is no question, and even its medical virtues are confidently spoken of, particularly for sheep suspected of unsoundness. It is excellent winter-food for deer and rabbits.

Several reasons are to be assigned for the ill success which has attended various attempts to cultivate this grass, as will appear in the following directions. Its chief use is as an early grass, and whilst young; and it must never be given to cattle when old and stalky, nor kept to that state when intended for hay. In fact, Burnet should always be reckoned out of season, when other grasses can be had. It never ought to be fed, but from January to the end of April; and upon lands proper for it, with judicious management, it will afford pasture even in January. It receives less injury from frost than any other herbage, and will even grow in the winter months, provided the weather be not too severe. If shut up in April, it will mow at midsummer, after which it must be reserved for seed, until January, or February; when, if the weather be favourable, it may be cut and carried to the stock, as in summer, and afterwards fed (but not too close with sheep) until the time of shutting up. It will produce upwards of a ton of hay per acre, and may be mowed again for seed; but if driven so hard, of course will not produce so large a quantity of spring-feed as when mowed but once. The value of the seed, upon an acre, will be from five to ten pounds. Granting the truth of this account of Burnet, it would be altogether superfluous to enlarge upon its value to a live-stock farmer: but such advantages

tages will ever be looked for in vain, upon a cold barren clay, or without the seed being fresh and good, or without culture and manure, even on a proper soil. One of the first objects is, to be sure the seed be good, which is seldom the case, Burnet being a grass very little cultivated; and I have more than once been foiled in my endeavours to raise a crop, from that circumstance. Burnet may be advantageously cultivated in drills, and treated precisely like lucern, a method which I have lately adopted. It may be sowed indifferently, either in spring, summer, or autumn. It frequently happens, that the crop is thin, until the third year; but afterwards, very luxuriant, fully covering the soil. Burnet is a native of this country, growing spontaneously in many parts, particularly, as I have heard, upon Salisbury Plain, whence an indication may be drawn of its proper soil: like lucern, it defies drought in summer, which makes it valuable in another point of view. The seed has been warranted as good for horses as corn; a consideration for those who may have the convenience of bruising it.

Mustard.—This seed is largely cultivated in the north, and upon a smaller scale, in the county of Essex. It is among the risk crops; sometimes producing a very large profit, but attended with the disadvantage of remaining everlastingly in the soil; that consideration, however, need not weigh, if a man would resolve in future to apply the land to grass, and hoeing crops only. Mustard requires a soil of some strength, but dry and healthy, which must be reduced to the fineness of garden-mould,

and upon which, in either March or April, may be broad-cast, one bushel of seed, harrowed in, and lightly rolled. Pursue the carrot-culture, in weeding and hoeing, setting out the plants ten inches apart. The crop is harvested in August, after the usual method of seeds, and the land left in fine tilth for any future crop that convenience may require. It makes an excellent bed for any spring-feed crop. Why Mustard never follows Mustard, I know not; the third year, it seems, is fixed upon as the proper period of renewal. That I believe to be mere speculation. Product, two to seven quarters, upon an acre. I have heard of high-sounding profits being made from Mustard in the north, for the truth of which I cannot vouch; but five and twenty guineas per acre, I believe, have really been made in Essex, and in one instance, a load of wheat per acre obtained after the mustard.

Brank, Buck, or French Wheat.—This grain, on its first introduction into England, was lifted up by report far beyond its real value. I can speak of it from actual experience throughout a number of years, during which, I used it in large quantities, with cattle of every description, (sheep excepted) rabbits and poultry. The invariable result, its inferiority to every other grain, but superiority over other vegetable food, namely carrots, potatoes, and the like. In the state of herbage, cattle, I know, will eat it, but it is from Hopson's choice, as a hundred trials have convinced me. Its fitness for ploughing into the land, is undoubted, on account both of its bulk and succulence.

succulence. The juice of it, however, is watery, and far enough from nutritious. Hogs fatten neither so fast with it, (and I have tried many hundred quarters for that purpose) nor is the flesh so firm as that fatted upon corn. I have expended it in large quantities, ground, with hard working-horses, both draught and saddle, but the difference of price by no means compensated for its inferiority to oats and beans, and besides, it did not always agree; we sometimes fancied it had a kind of stupifying effect. I tried it with a stock of several hundred head of poultry, and it was in the same degree inferior, both with the fatting and laying stock. I do not hear that it is very highly prized in the distillery. In fine, Brank is surely valuable upon land that will grow nothing else, and is produced with small expence, but when ready, its best application is to the market.

My last crop of Brank was in 1791, upon four acres of clayey loam, of moderate fertility, but lately old meadow. A bushel per acre was sown the first week in June; the green crop most luxuriant, but being late, it was got up wet, and the stack at the same time left without thatch, of course the sample was spoiled, and what was worse, the product did not amount to two quarters per acre, not worth, as feed, fourteen shillings per quarter. It has been said, that this grain being black, cannot be discoloured by wet, which is by no means a practical remark, since its discolour consists in the loss of its fine black; beside which, the grain feels cold and damp, to the great injury of the sample: wet, or dry, the only

use of its haulm is under foot. To those who expect to get money by Buck Wheat, I recommend early sowing, and even to allow it the manure necessary for a following wheat-crop; I should think by such management, five, perhaps ten, quarters might be obtained from an acre of good land, which would remain in excellent order for wheat. This necessarily supposes land in no want of late spring tillage. In this case, should a suspicion be entertained of the crop running too much to haulm, it might be advantageously rowed and hoed. I have rather enlarged upon the article, having read so much in its recommendation.

HEMP.—Suffolk and Norfolk are the head quarters of this culture. The fittest soil is a moist, but loose sandy loam, or the rotten black mould in the low lands, near water, or old meadow broken up; in short, the richest land that can be found; but it must be amply manured for Hemp, after the first crop; with such liberality, and garden-culture, the crop may be successively, and successfully repeated for perhaps even a century. Otherwise, being manured, it leaves the land in a very fine state of preparation for wheat, or any other crop. Twenty load of dung, or thirty load of dung and virgin-mould, or any good compost, should be ploughed into the land, in autumn, after wheat-seed time; two, or three spring-earths, with good harrowing will be required, when the tilth must be left level, with as few furrows as possible.

Sow eleven, or twelve pecks upon an acre, (present price, eighteen pence per peck) at the

earliest season which can be catched, in April, or May: recollecting that the earliest sown Hemp is best in quality. It requires much watching from birds, but no hoeing, or weeding; Hemp destroying every other plant. In three or four months it may be pulled, according to the season, a dry time agreeing with it better than much rain. The leaves turning yellow, and the stalks white, are the signs of ripeness. An acre will produce from thirty to sixty stone of Hemp, and forty stone may be accounted a good crop. LINSEED or FLAX, requires a similar soil and culture, two, or three bushels per acre being sown; but when good seed is the object, it may be advantageously drilled, in roods twenty inches asunder.

LIQUORICE requires the same kind of soil, above quoted, or a rich and deep sand. The land must be double ploughed, or rather dug to the depth of three, or four feet, which serves for two crops. The surface being fine and level, dibble in the sets, to nearly their full depth, one foot apart, in double, or treble rows, leaving two-foot spaces for horse-hoeing. The sticks to be had at the druggists, I am informed, will grow, but they ought to be inspected, to ascertain that they have at least one eye, or bud, without which it would be useless to plant them. The crop must be constantly kept clean, and towards winter the earth thrown up to the plants. It is also good practice, to cover them in winter with fern, haulm, or long dung; the roots require three summers' growth, but ought not to be left longer in the ground. They may be dug up as soon as the

sap

sap is at rest, and the leaves and stalks thoroughly withered, by going to the depth of the principal roots, pickers being at hand, to gather after the spade. This crop, wasting in weight upon hand, is best sold immediately, and has sometimes produced more than three thousand weight, or from sixty to an hundred pounds per acre; but I have given these few particulars, rather as matter of curiosity, than real use, since such an expensive, lengthened, and precarious culture, can never be an object with farmers.

RHUBARB stands in the same predicament with the last article, and farther, on consulting certain professional persons lately, I find, notwithstanding all which has been said in its favour, British Rhubarb is of a quality so inferior to the Turkish, as in that view to be no desirable object of culture. The seeds may be sown either in spring or autumn, in beds, well manured with rich and rotten dung, and the plants when fit, that is, about four inches high, set out at four feet distance, in pits, three feet deep, filled with manure, sifted coal ashes, slaked lime, and mud. Keep the plants free from weeds and vermin. When the stalks are withering, take up the roots, clean them, cut them into small pieces, string them on packthread, and dry them gradually.

TOBACCO—The culture of this herb, upon a farm, is by no means improper, since, where much live-stock is kept, Tobacco may be applied to various useful purposes, and its efficacy is considerably greater, while fresh and green. The law allows the culture of only fifteen square yards of

Tobacco,

Tobacco, for the purpose of "Physic and Chirurgy," and a patch of that size is fully sufficient for home-use. The seed may be had in London, and in some parts of Yorkshire. Sow in warm growing weather, either April, or May, on a piece of rich, deep, and well-manured ground, made into fine mould. As soon as the plants will bear moving, set them out upon a spot well sheltered, with a warm aspect, in rows two feet apart, the plants one foot asunder. Observe the hoe-culture strictly, and suffer no weeds. In autumn, as soon as the flowers begin to drop, cut and dry in the shade; when dry, pick off the leaves, and press them close in cask.

MADDER and WELD for the dyers' use, are both lottery-crops, some years paying a very large profit, in others, the price being low and the demand slack, no sale at all for the articles. For Madder, the soil should be a deep, rich, sandy loam, sufficiently dry and healthy, nor can it ever possibly answer upon inferior land, or at a less price than three, or four pounds per cwt. The land being ploughed deep in autumn, and laid dry, must be, by this time, by repeated ploughing and harrowing, brought to the finest tilth. In order to planting, plough twelve, or fourteen inches deep; women attending to place the plants about eight, or nine inches apart, in every other furrow, leaning off from the plough; thus every time the plough returns, the row of plants laid in by the women who follow the plough, are covered with the earth of the furrow, and the rows will be about two feet apart. Madder

der may be successfully planted from the middle of March to the end of May, a warm showery season being preferable; but the Kentish practice, that which I am detailing, inclines to the late planting. The sets for planting are ready for drawing by the end of May, or beginning of June; the proper time, when they are ten, or twelve inches high, and have produced roots, branching out from the bottom of the suckers, which may be ascertained by drawing up a few; an acre requires twenty thousand plants. Every plant must have some small fibres at the root, and be moistened when set, particularly if obtained at a distance; and about a third of the top may be cut off. The crop must be perfectly clean by hoeing and hand-weeding, during the summer months, and the rows earthed up with a plough each autumn, until the third after planting, when the roots are dug up by trenching two feet deep. Two children attend each digger, to pick out the roots, the workmen breaking to pieces every spit of earth. The roots being cleaned, are dried upon a kiln until they are brittle enough to snap asunder freely. They are then fit to be packed in bags for sale. Product from eight hundred to one ton per acre. Should Madder be repeated on the same land, the allowance of manure ought to be very large. It may be cultivated upon ridge-work, with any number of rows which may appear most convenient, but the horse-hoe is apt to damage the tender plants. Some cultivators have advised covering the beds in frosty weather, which, however good, is not so practicable on a large

scale

scale. Within these few years, a native plant of this country has been discovered, which is both a substitute for Madder and Weld, but an account of it has not been yet made public.

WELD.—This article recommends itself, by two favourable circumstances; it will grow on a poor, light, shallow soil, stiff chalk, or gravel, and the expence of culture is under a pound an acre. It may be sowed the first week in July, upon any spring-crop; in Kent, they put it among their beans, before the last hoeing. Quantity of seed, a gallon, or ten, or twelve pounds per acre. Mix the seed with sand, or fine mould, often stirring. It is of slow growth the first summer. Hand-weed and clean with a narrow hoe. Early in the following July, the bloom of the plants will be up to the top of the stem, when they may be pulled up by the roots, and tied by a single stalk in small handfuls, setting them up in a conical form to ripen. When thoroughly dry, the seed is shaken out on a cloth, or into a tub; the plants are then bound with rope-yarn, into bundles, each weighing thirty pounds; sixty bundles make a load of Weld, which sells for from four to ten pounds. Produce, from half a load, to a load and a half per acre; and the best time of sale is usually in the spring. The seed is marketable with the seedsmen. I have known Weld grown in Kent, as a single crop, when it has produced much more than above noted. Another convenience may be stated in its favour, the leisure-season in which it is gathered.

WOAD for the dyer's use, is cultivated in Somersetshire chiefly, in a far more expensive way than the

the last article, and to much higher profit; they grow it upon their deepest and best sandy loams, on narrow ridges, commonly on land fresh broken up. The plants, in a moist and favourable season, appear in a fortnight, and in three weeks after may be hoed and set out to the distance of six to ten inches. As the goodness of the plant consists in its size and the juiciness of its leaf, much depends on constant hoeing and weeding, that the land may be kept in a garden-state. From this care, three or four crops or gatherings will be produced in succession; but the two first are the best. The leaves are gathered at the full growth, and on the first appearance of change. They are cut into hand-baskets by women and children, who deliver them into a deep cart at the edge of the field. After two cuttings, the crop is suffered to go to seed for the next year, if seed be wanted, but if only one crop be taken, the seed will be finer. The pods turning dark in colour, the seed is ripe; the stalks are then reaped like wheat, and spread abroad, and in favourable weather the seed may be thrashed in a few days.

The green crops being carted home, are thrown into a mill, constructed with a heavy iron-ribbed roller, something like that used for bruising bark, which cuts and bruises the Woad to a pulp: it is then laid in small heaps, pressed close and smooth, and as the crust formed on the outside, cracks, it is closed again to preserve the strength of the substance. After lying a fortnight in this state, the heaps are broken up, the outside worked into a mass, and the whole formed by the hand, or sometimes by wooden moulds, into oval balls,

which

which are dried on hurdles, under a shed exposed to the sun. In this state they are sold to the dyer, and are valuable in proportion to their weight, and a purple cast in the inside. An acre will produce a ton and a half, of course if the price be moderately high, the profit is considerable. But this plant is supposed to exhaust the land, and therefore more than two crops are seldom taken. In the culture of dying articles, if the land be manured, it must be in the autumn, before sowing, as fresh dung might affect the colour of the plants. Wheat and beans succeed Woad.

MANGEL WURZEL, or THE ROOT OF SCARCITY, a species of the beet, supposed an article of great promise, as food for cattle, on its first introduction into this country, since which, however, it has fallen into neglect. As it cannot be conceived, that the high character given of this root, by persons of the first respectability, was without grounds, it would be improper to omit its culture, which may yet be revived. Both the leaves and roots are good food for man and beast; nor are they liable to be destroyed by insects, which will not touch them; they are also proof against the summer's drought and the change of season. The weight of the roots, from five to ten pounds, according to the quality of the soil; the leaves, which grow to the length of thirty or forty inches, by twenty broad, are produced four or five times a year, in a middling, but nine or ten, in a rich, soil; they grow two inches by one and a half, in twenty-four hours; and may be gathered every twelve or fourteen days, without injuring the root in the least. The root is relished by all cattle and pigs,

and

and when cut small, by poultry. The leaves are said to be excellent for milch cows, if mixed with other green meat, otherwise (a very extraordinary assertion) they would be too nutritious, and abate the quantity of milk. To prevent this root from degenerating, it requires an annual change of soil from light to heavy, or the reverse.

Sow the seed very thin, covering it an inch only —from the beginning of March to the middle of April, in a well-prep red bed, and as soon as the plants reach the size of a goose-quill, transplant, dibbling them upon a fine level tilth, well manured, eighteen inches apart, in eighteen inch rows. The root is not to be shortened, but the leaves cut at the top, and the upper part left about half an inch out of the ground The plants strike root in twenty-four hours, and after one hoeing, will take care of themselves, by smothering all other vegetation. They may be sowed until the beginning of July, for a succession.

In the beginning of July, when the leaves are about a foot long, they may be gathered for the first time, by putting the thumb into the inside, and stripping them off close to their insertion into the stem. Those which bend towards the earth, are to be gathered; those forming the heart of the plants, to remain. The earth around the plants should now be well stirred, care being taken to leave the crowns of the roots uncovered, an inch or two, forming round them a hollow, like a bason nine or ten inches diameter. Store the roots dry, like potatoes, before any frost, care being taken that they are not bruised in the carriage, which occasions their speedy decay. Those

roots

roots intended for seed, should be planted at the distance of three feet, and supported by stakes, as they grow to the height of six feet. The seed is ripe towards the end of October, and should be immediately gathered for fear of frost, the stalks being cut, and hung up under shelter, in an airy place, until well dried. A root will produce near a pound of seed.

Hops—The soils best adapted to their culture, in a large way, are rich, loose, and deep sandy loams, or bottom of loose black moor, if spungy and boggy, upon a bed of gravel, the better: in a small way, and for mere home consumption, there is no farm but what will afford a patch proper for the Hop-garden, and in a scarce year, a family may as well have a chance to grow their own Hops, for two or three pence per pound, as pay a market-price of half a crown.

The time for planting, is commonly that of dressing or pruning the old vines, when cuttings may be had, which is in March or April; but when root-sets are used, as on the occasion of grubbing up an old plantation, October to the beginning of November. The land having been deep ploughed and worked to a fine level tilth, a plantation may be set out as follows. Strike furrows with the plough equally distant, eight feet asunder; when finished, repeat the same across, in the opposite direction, which will divide the piece into eight-foot-squares. The hills are to be made where the furrows cross each other, and the horse-hoe may be admitted between the rows both ways. A Hop-plantation requires annual manuring, in proportion to the condition of the soil,

soil, and to be kept perfectly clean from weeds: it will last under such treatment any number of years, and when broken up, produce vast crops of corn.

According to the Suffolk husbandry, the plantations are formed into beds sixteen feet wide, by digging trenches about three feet wide, and two or three feet deep; the earth that comes out being spread upon the beds, and the whole dug and levelled. Upon this, they, in March, form the holes six feet asunder every way, twelve inches diameter, and a spit deep, by which three rows are formed on each bed. Into each hole they put about half a peck of very rotten dung, or rich compost, scatter earth upon it, and plant seven sets in each, drawing earth enough to them afterwards, to form something of a hillock. In two or three weeks, according to the season, they will be fit to pole, with old short poles, to which they tie all the shoots or vines, and then keep the land clean by hoeing and raking: at Midsummer they hill them. Some sow beans, or plant cabbages in the intervals, but it is not good practice. The produce of the first year may be three, four, or five hundred weight of Hops per acre. The expence in labour of forming the beds for a new plantation, amounts in the whole, to four pounds an acre; the annual work, picking excepted, may be put out to the labourers at four pounds an acre per annum, which includes to dig, strip, sack, clean drains, hoe, rake, hole, tie, &c.

Three holes are put to each hill, and consequently there are thirty hundred (at 120) to the acre,

acre, at twenty-four shillings per hundred, delivered. They are commonly of ash, twenty-four feet long. In addition to this, when a Hop rises much above a pole, they set another to receive the shoot, preventing its falling to entangle with other poles, and obstruct the course of the air. The expence of forming a new plantation, formerly £.75. amounts now to £.100. The flooding a Hop-ground, provided the water flow so moderately as not to wash away the earth, is beneficial; but a stagnant surface-water is as injurious to Hops as to any other growth; and in situations where the water lodges, the common methods of ridge-draining, must be used to keep the plantation sound and dry.

The cuttings for planting, are taken from the lower parts of the stems of grown plants, close to the crown of the root, and should be about four inches long, each having three or four eyes or buds. Root-plants are very conveniently kept in beds, for occasional use, either of planting, or filling up vacancies: these last arrive at maturity, sooner by a year, than fresh cuttings. Hop-plants are dibbled. The hillock being worked hollow with the hands to the depth of five or six inches, the sets, from three to six in number, are let into as many holes, their whole length; one in the centre, perpendicularly, the others obliquely, leaning to the one at top, and diverging from it at bottom. They are covered by hand with mould, an inch or two thick; reeds or sticks being stuck into the sides of the bason, and leaning, over the plants, as marks to prevent their being disturbed.

Hops

Hops are sexually distinguished, as male and female, the latter of which only produce fruit; the former is carefully destroyed with other weeds. Their great natural enemies are, honey-dew, blight, and fly, by which the crop is often rendered very precarious. A thousand hills to an acre, seem the eligible number upon good land; but the number of hills, of vines, and of poles, with the length of these, ought to be regulated by the strength and richness of the land. Short poling has been much recommended by some cultivators, to prevent the too great exhaustion of the root; and the cultivation of hops in espalier, has been often proposed, but I know not that any satisfactory experiment has been made.

Roll, Harrow, Hoe.—Grass lands being cleared, as before directed, it is the usual practice to roll them down level, for the scythe, the last thing: and it is no doubt right, in order to crush the inequalities of the surface, destroy worms, insects, and their eggs, and to bind the roots of the grasses in a soil not sufficiently tenacious; but upon a different soil, already too stiff and clung, or matted together with moss and weeds, it is of equal necessity, first of all, to run the scarificator over the land, or for want of such an excellent implement, to scarify it well, in different directions, with the drag or harrows; and it may be in a day or two afterwards levelled with a common light roller. The operation of scarifying by no means injures the roots of the grasses, particularly the artificial, for lucern is frequently treated in that way, until it has the appearance of a mere fallow, without the smallest

smallest injury; on the contrary, by loosening the earth about the roots, and giving free access to the influence of the air, the power of vegetation is renewed in a considerable degree; the same reasoning holds good with respect to manure, which, without this opening of the soil, in order to its admission, may lie a long time useless upon the surface of grass-land, exposed to the constant action of the sun and wind. I have my doubts of the utility of large and heavy rollers, in this case.

POTATOES and CARROTS, which are got in early, may be ready for the hoe by the latter end of this month. Respecting the former, the rule is, to commence the operation on the first appearance of the weeds, loosening the whole surface thoroughly with the hoe, and plucking up by hand where necessary. With the latter, the first cleaning commences as soon as the plants can be fairly distinguished from weeds, and short, narrow, garden-hoes are recommended, the labourers kneeling to their work; but whilst the plants are very young, the use of any tool is so precarious, that I always prefer hand-weeding by women, who chuse the strongest plants, leave them at their proper distance asunder, and remove all the weeds; and to render this operation more convenient, I have commonly had my Carrots upon lands, or beds, of such width, that one weeder walking up the middle, and one in the furrow on each side the bed, can just reach across. This will even be done full as quick as hoeing, it being so exceedingly difficult for the most careful person to extricate a plant entwined and surrounded by weeds. The expence of this early

cleaning is by no means to be regretted, since it will produce a considerable saving in the end, by taking the enemy in time. I never venture with harrows among Carrot-plants.

HOMESTALL, LIVE-STOCK. — Upon a well planned and well conducted farm, there ought to be not only comfortable lodgings, or shelter in dry, warm, well littered yards, for the stock of animals, even including sheep, but a sufficient provision of winter-keep, that no trespass may be made upon the lands, when in an improper state, or upon the immature and early spring-crops. The treading of cattle at this season, upon grounds which poach, do great mischief; and if the land will bear, the animals wander about to little purpose, but to scatter and waste their dung, and damage the growth of wood in all quarters, by browsing and nipping off the young buds. If they are turned too early into spring-feed, the bite is not only insufficient, even if the cattle have to labour over a great breadth of land, but both the grass and hay-crop is thereby anticipated, and greatly reduced. These important considerations will induce the prudent farmer to proportion his winter resources to his stock, by a previous exact calculation, that he may be at no loss throughout the season; that his cattle, well filled with good nourishing keep, instead of losing in condition, during winter, according to a custom too common, may be carried forward; at the same time, that his lands and growing-crops may remain in a state of thrift and security. It ought to be remarked, nothing can be more groundless, and indeed ridiculous, than the hesitation to stock a farm

farm with an adequate number of cattle, from a dread of inability to raise sufficient winter keep for their support; since the improved system of husbandry, and the example of the ablest cultivators, so clearly point out the most abundant and never failing resources.

MAY.

Finish sowing the Spring-Crops—Homestall—Pastures — Sheep-fold — Fallows — Hoeing and Weeding — Horse-hoeing — Cabbages — Rutabaga—Hops—Burn-baking—Weeding Wheats —Cut Turf to stack for firing—Shut up Clovers, &c. for Seed.

HOMESTALL — PASTURES — CATTLE.— The first or second week in this month may be looked upon as the concluding period of the straw-yard or winter-keeping: for by this time the winter's provision will have been consumed, and the spring pastures will be ready for the reception of the stock. An immediate arrangement is necessary, in order to clear the yards, when the manure which has been collecting through the winter, must be moved and disposed according to art. The state of the fences in the feeding-grounds having been well examined and made good; the cattle are to be distributed into the kind

of feed, proper for each species; particularly reserving the natural grasses for milch cows. The best pastures will be assigned to the forward and fatting stock. The labouring cattle, horses or oxen, are now turned out by night; which measure ought to be adopted for the health of the animals, even if green fodder be cut for them, and if no better place can be provided, the straw-yard, at this season, will be a more wholesome bed for them than the stable. All the pig-stock of sufficient size, namely, of the growth of four or five months, may be turned into the clovers for the whole summer season, during which they will want nothing farther than water, and a good look-out that they do not break into the corn; to which indeed, some particular sorts are more prone than others; the least quiet, I think, are the small and prick-eared. They should all be well ringed at the nose, for it is not true that they will not root up clover. Should there be no pond in the grounds, watering troughs must be conveniently placed. The flock may be folded upon the clean fallows, where the manure will be immediately stirred under the surface, and the sheep should be kept long enough in a place to leave an ample covering, although much the less be folded; for it is a very deceptious practice, to dress land in a thin and scattering way.

Fallows—The Lands intended for turnips, cabbages, or other immediate crop, will receive a ploughing this month: the wheat-fallows also should be stirred, to root up the crop of weeds, last ploughed for, and in fact should be repeatedly worked

worked throughout the summer, and if of a stubborn clayey soil, that will bake with drouth, every exertion should be used to pulverise, and reduce it to as fine a tilth as possible. If such land be left rough, as is the prevailing practice, particularly in my neighbourhood, the clods gather to an enormous size, and there is no such thing afterwards as obtaining a tilth, of any tolerable fineness, for the wheat-seed. The spiky roller, in this case, is the only effectual implement. Turning up and exposure to the sun will destroy the seed-weeds, on which account it is obvious their growth cannot be too much encouraged by tillage; as to grasses and root-weeds, it is a very common deception to expect that exposure will destroy them; which is to be done effectually, by no other means, than collecting them by hand, and burning them on the spot.

HOEING, WEEDING, and HORSE-HOEING.—All those Hoeing-crops already mentioned, will require a strict attention this month, very prolific of weeds, but which should never be suffered to gain the ascendant. Row-crops will now be ready for the Hoe-plough. A small common swing-plough fully answers this purpose, and may be drawn by two horses, or oxen at length, within four inches of the rows, the soil being turned from the plants, which will in course leave a ridge in the middle of the alley: this ridge being split by a succeeding operation, that is, at the next time of Horse-hoeing, throws the earth back to the roots of the plants. Should any of the corn be buried by the furrows, it must be uncovered with a rake,

a rake, and all remaining weeds carefully plucked from among the corn by hand. Perhaps after all, with a pea-crop, the Horse-hoe is as well omitted, since the damage done to the tender and straggling branches, may be equal to the benefit received; and which may be as effectually given by the hand-hoe. Previous to Horse-hoeing, should that be preferred, the pea-haulm should be carefully thrown back, and the earth drawn up with a hand-hoe to support it.

CABBAGES.—The season for setting out Cabbage-plants, in fact extends from March to June; but upon middling soils at least, according to my constant observation, no dependance can be placed on the growth of the Cabbage beyond the last week in September; and as four months at least, are requisite to bring the Cabbage to maturity and its full weight, a middling crop at best can be expected from late planting; add to this the risk of drouth, on account of which the plants may not stir for several weeks. I have tried experimentally the various periods of sowing and planting. To sow in February, May, and August, ensures a succession, and completes the Cabbage-culture. The earliest sowing is the regular and usual one, and if the plants be out in good time, will produce a perfect crop, as heavy, and frequently as forward, as that sown in autumn. The object of an autumnal sowing, is to obtain the plants forwarder, and the Cabbages of a larger size, which end is sometimes answered. I have tried two methods at this season, setting out the plants at Wheat-seed-time, to stand all winter in the

the field, and leaving them until March in a warm seed-bed: the latter is preferable, in severe winters, but in the open and mild, the plants will be forwarder set out in the field. The May, or June sowing, is with the double view of a very forward crop of large cabbages, the succeeding year, or of a crop of coleworts for the following spring; with this latter view, they may be planted thicker than common. They will not all loaf or cabbage, and the plants which run to seed may be drawn for use: or, the ripe cabbages having been consumed before Christmas, the coleworts of the May sowing, or those plants which have not loaved, will properly succeed; those which have increasing in bulk in the spring, will be in a state of soundness and perfection in April and May, a period when old and full-grown cabbages are either run away to seed, or rotten and useless. By this method the grand objection to the cabbage-culture is done away, which is the certain loss of weight in the crop between November and March, and its frequent total ruin by the severity of the frost. With me, the cabbage has endured the frost better than the kail, or borecole, the latter beside being stalky, producing much less food.

The other great objection to cabbages, the risk of dry weather at the time of planting, is a powerful reason for setting them out as early as possible, and giving them the full advantage of the spring showers, in the field; on this account, the sooner after the frosts the autumnal plants are fixed in their permanent place, the better; and the quicker the spring-plants follow them, the better also: these

these last should be all set out by the middle of April at farthest, but as people generally advise much better than they practise, from one hindrance or other, mine have been seldom out so soon, my last crop particularly not until late in May. One ought not to be sparing of seed in this culture, as no underling plant should be used, and a reserve is necessary to fill up accidental vacancies. Fill up vacancies as early as possible. Cabbages have several very dangerous enemies; first, the slug, in their early state, and afterwards when they have loaved, blights, which render them unsound and stint their growth, and the grub-worm which destroys their roots. These latter enemies, which equally affect potatoes and carrots, will sometimes reduce a crop one-half in quantity and, very considerably in quality. The best and only remedy, is moving the soil, by assiduous tillage.

Cabbages are planted indifferently, on flat or ridge-work, the latter most prevalent; the plants being set on the crown, or top of the ridges. My last were upon the flat in three feet spaces or squares. They may be horse hoed two or three times, each way; the first and second without the mould-board, the rest with it. They require to be hand-hoed thrice, but the first operation should be that of the horse-hoe, about three weeks or a month, after planting. In planting, the sets should be dropped at due distances, by children, and these followed by the diblers, who, provided with a stick, to mark the exact distance, in this manner, make quick dispatch. A common hand, man, or woman, will plant a quarter of an acre in a day, a good gardener,

dener, nearly double. In the early culture of this crop it was the custom to have four feet intervals and a space of two feet between the plants; but it has become the fashion since, to abate much of this distance; nor do I hear of such large Cabbages grown in any county at present, as were frequently seen thirty years ago: probably it is judged, that number is more than equivalent to large bulk; but on this head, the judgment of the cultivator must be determined by the nature and quality of his land. From five, to ten thousand plants, are grown upon an acre of land.

I have had patches of the white Borecole, or Kail, the species which curls like endive, very lofty and flourishing, and it has lasted several years, the repeated cutting, at all seasons, preventing its running to seed. This I apprehend to be the *Coleworts* recommended in the Mid-Lothian report. The reader will recollect what I have just said of Borecole in general; but on dry sound land, where it is suffered to remain, it may afford frequent and plentiful cuttings of excellent sheep-food. The French coleworts require the same kind of land, and there is one circumstance not generally known, in favour of coleworts of all kinds, cattle, universally prefer the leaves of the cabbage species to the heart.

RUTA-BAGA, or SWEDISH-TURNIP.—This root (which I have this day sown, by way of experiment, upon a strong loamy clay) has been many years known in England, but of late has risen to a very high degree of estimation, particularly in Nottinghamshire, as appears by the agricultural report

report from that county. I have also received private accounts of the great value of the plant, upon cold clays, where it has been held far superior to the Scotch cabbage, both for duration, in the most perfect state, in defiance of the severest frosts, even to the middle of May, and for its more substantial nutriment. It had been formerly rejected by various cultivators, for the following reasons: inferiority of quantity, compared with cabbages or Turnips; difficulty of getting up the roots, and of disengaging them from the earth, and their excessive hardness and stalkiness. These disadvantages, however, seem now to be forgotten, as will be seen by the following particulars, which I have transcribed (being without experience of the culture of this root) from the Nottinghamshire report. The Ruta-Baga should be sown about a month sooner than other Turnips, upon good rich sand, well manured, and a fine tilth, about two pounds of seed broad cast upon an acre. Set out nine inches asunder, and hoed three times in all, expence, seven shillings and sixpence per acre. In November their use began, when they were given to horses, bullocks, sheep, and hogs, which preferred them to common turnips. They lost their leaves entirely by the frost, without the roots being at all affected: nor were they injured even by being broken, or bitten by cattle. The method of giving them to horses is, to cut off the tap-root, to wash and cut them roughly, with a perpendicular hoe, giving them directly without keeping them to dry. At first, they were given to the horses with corn, but afterwards with hay only,

corn

corn being entirely discontinued; and on this food and hay, fifteen horses were kept at hard work two months, continuing all along in good and thriving condition, eating the roots with avidity, and even preferring them to corn. It is their singular quality to bind, instead of relaxing horses as other roots do; and this effect appeared with one mare in particular, although fed on straw with the roots, and worked every day. One acre maintained fifteen working-horses two months; and the owner (Mr. Daikin) judged them worth thirty pounds per acre, for this use; at which sum he would willingly purchase them, had he not the opportunity of growing them. It seems some of the roots cut white, others yellow, and the yellow are the best; this, according to my observation, is also the case with potatoes. We have here a most flattering account of a new species of winter-food for cattle, which, if true, in the full extent, must work an immediate revolution in the stable and farm-yard, by superseding the use of all other kinds of keep; but I must own, the following remark struck me very forcibly, as it will many others, and I shall in its proper place, speak further on the subject. "They (the roots) have a very strong effect in making the coats fine, and one or two (horses) affected by the grease, were cured by them, as they act as a strong diuretic." The prime roots reached the weight of sixteen pounds each, average eight, making the tonnage per acre, much to exceed common turnips.

A Middlesex correspondent (of this year 1799) upon a wet loamy clay, acknowledges the superiority

ority of common turnips over the Ruta-Baga, if drawn together in autumn, chiefly as to the larger quantity of the former, but he still allows the latter to be more substantial, and the yellow kind to bear some affinity, in taste and quality, to the carrot. He used them only with sheep and swine. It will be of use to the cultivator to reflect, that as this root is frost-proof, no good objection can lie against early sowing. For TURNIP-ROOTED CABBAGE, see Index.

HOPS are to be digged and hilled up this month, the stones turned up being carried off the plantation. The weeds must be pulled, or cut up clean. Towards the end of the month, or the beginning of June, the vine will be ready for tying to the poles; the strongest vines must be chosen, and constant attention paid to retie such as become loose by accident. The old plantations are also poled this month.

BURN-BAKING, or PARING and BURNING the surface of the soil.—This ancient practice is the best possible improvement of Bog, Moor, Heath, and Fen-land, or in general, of any old tough sward, overrun with moss, rushes, and other rubbish, the nettings and roots of which cannot be destroyed nor the earth pulverised by the common methods of husbandry, under great length of time, and at vast expence; after which, beside, the land will not be in so good or productive a state, as when burned. Every agriculturist knows, this is an old subject of dispute in husbandry; but what I have seen, and the evidence I have read of the practice, incline me to be its decided advocate, without,

without, however, entirely condemning the conduct of those landlords who interdict it to their tenants; because being a great provocative to fertility, farmers of a certain description make use of it to run the land entirely out of heart. Paring and burning are by the enemies of the practice supposed to diminish the staple of the soil; an idea purely chimerical. Mr. Young's arguments on this head, with the facts he has adduced, appear to be entirely conclusive. It is admitted, that some land in this country, as well as in Ireland, has been totally exhausted and ruined by the practice, whilst large tracts of a staple equally thin, have been immemorially burned, not only without perceptible diminution of their staple, but to their obvious great improvement. The exhaustion and ruin of the lands after burning, have, in all probability, resulted from the unfair treatment of plying them with successive corn-crops, without rest or manure; a method, in truth, fully adequate to the destruction of the richest lands, without the aid of paring and burning: but in order to prove fairly the evil consequence of the practice, it behoves the enemies of it, to produce examples of lands injured thereby, which have at the same time been cultivated in a fair and husband-like manner; namely, by having only a single corn-crop taken at first, to be followed by hoeing crops and seeds, a due proportion of manure being allowed to the succeeding corn-crops. Turnips or rape harrowed in on one shallow earth, are usually the first crops after the operation; and if the latter, they are used as spring-feed, oats and seeds following:

ing: or instead of the oats, regard being had to the nature of the land, a hoeing crop of pease may be taken, to be followed by wheat, with which seeds may be sown: or in lieu of pease, potatoes, to be succeeded by other hoeing-crops, which are essentially necessary, on some soils, in order thoroughly to eradicate the seeds of ling, furze, and broom, previously to laying down to grass.

Paring may be commenced, any time between March and May, but the burning ought to be deferred, until dry and settled weather may be expected. If desired in a county where the practice is not common, or understood, it will be necessary to procure one or two qualified hands, with proper tools, from the nearest quarter in which the art is practised. The expence is about or under a pound per acre, one of the cheapest surely, as well as most important of all agricultural improvements. Paring is sometimes performed with the plough, but more frequently and more effectually with the paring spade, the sods being laid to dry reversed, or with the roots upwards. Care should be taken that the digging be given sufficiently deep, or the operation will be imperfect, the roots of the grass and rubbish being left for future vegetation. The paring finished, and the sod heaps sufficiently dry, all the strength which can be mustered, men, women and children, must be set on, to take the advantage of a dry time for burning, and spreading the ashes equally over the field; but as rain, or even exposure to the air, detract from the strength and goodness of these, it is better to turn them in with the plough, as fast as they are made, excepting

cepting the surface be very rough and cloddy, when it will be necessary, previously to run the heavy drag-harrows several times over it.

Thus is finished this most beneficial operation, which at a stroke, as it were, effects more than could be atchieved in many laborious and expensive seasons. The soil is purified, and its natural fertility revived, by that grand destroyer and restorer of all things, fire. The tough, untractable hide-bound surface, with its mossy and sedgy herbage, the mole and ant-hills, the innumerable roots of rubbish, the hosts of insects and vermin, with their eggs, within the soil, before such unconquerable obstacles to fertility, are now suddenly changed into its most certain medium, that of a rich manure; and the earth left clean, friable and level, fit for every purpose of agriculture, to which its nature may incline. After all which has been said about the waste of staple, by burning, it is highly probable, or rather certain from experience, that the loss of substance is not perceived, before it is recovered from the air, from the accumulating process of vegetation, and from the addition of manure. If the hoeing system be early and well pursued, burned land will remain clean, and free from all weeds for many years, or indeed for ever; and the benefit of the original operation will be felt during half a long lease, but if in a few years, a renewal of paring and burning should appear necessary, it evinces either very defective and shameful husbandry, or that the former operation was superficially and improperly conducted. Old hide-bound meadow, on cold infertile clay, is recovered

covered and improved by no other means so effectually and speedily as by burn-baking. The rowen may be left until April, and then be close shorn with the scythe. If an immediate renewal of the meadow be desired, the land, after being burned, may be laid down with grass-seeds alone, in the autumn, with the certainty (granting the seeds be perfect) of a crop the next year. I have been fully convinced by repeated experience, that the difficulty, or rather pretended impossibility, of obtaining a good fresh sward, is, in general a mere apology for indolence.

Weeding Wheats.—Provided the corn be not too high, so as to receive damage, nor the weeds got into seed, no matter how late weeding be deferred, as one operation clears them. The common method is, to use the hook and pecker, with occasional hand-picking as required. I have tried the method of drawing all up with the fingers, allowing the weeders gloves; they complained, but the job was very effectual, the weeds being taken pretty early. It is an excellent practice to mow the weeds in the hedge-rows and lanes, for being suffered to seed there, they supply the adjoining fields with everlasting crops.

JUNE.

Cabbages—Turnips—Rape and Coleseed—Hoeing the different Crops—Finish sowing Buck-Wheat—Cut Grasses—Stir Fallows—Fold, Sheep-shearing and Manage.—Cart-Manures.

CABBAGES.—I have already remarked the advantages of their early planting, but should it be deferred, either by necessity, or choice, to the present month, it will be agreed on all hands, that no time is now to be lost. A reserve of good plants, in the seed-bed, for filling up vacancies, or for succeeding turnips destroyed by the fly, will be found convenient. The growing plants will in course now demand another horse and hand-hoeing, an interval of about ten days being left between the two; the hand-hoe will leave the rows in a clean and handsome garden-style, the earth being well drawn up around the plants.

TURNIPS.—By long established custom, June is the general seed-season for this vegetable, but as all customs ought to derive their sanction from thorough and impartial investigation alone, let us attempt it on this occasion. It is not pretended, that there lies any solid objection to early sowing of Turnips, simply considered; on the contrary, such seems to be generally acknowledged the most proper mean of obtaining a full crop; but the advantages of early sowing, whatever they be, are given up, and the season postponed, from

 three,

three, to near five months, by way of retarding the growth of the crop, that it may last to a later period in the spring, and receive less damage from the frosts, than that to which it would be liable in its early maturity. The disadvantages of this plan are, a crop, far inferior in weight to what might be obtained from the land; the very common risk of destruction from drouth and the fly; the other, although not so common, yet far worse casualties of a total loss by the severity of the winter, and the exhaustion of the land by the roots remaining too late in the spring. Indubitably, if there be no crop preferable to turnips as spring-feed, and no other method of obtaining them, we cannot do better than adhere to the beaten track. The matter, like many others, rests on a single point; the decision of one simple question, would at once resolve us; but unfortunately and unaccountably, we have hitherto no sufficient *data* from experiment, on which to ground a judgment. Can Turnips drawn from the land, be by any means preserved good throughout the winter-season? Let the affirmative of this be once proved, and not only the far greater part of the difficulties of the Turnip-crop is at an end, but the weight and worth of it may be nearly doubled. The weight and perfection of the Turnips being thus the object, instead of the mere endurance of an imperfect crop, to a certain period, the land may be got ready for them, as for any other early spring crop, and the seed sown with the first warm showers. This will afford ample scope for resowing, should the first seed

seed fail, of which, however, granting it to be good, and the land sufficiently fine, I believe there is scarcely any risk; and the crop may be harvested in the highest state of perfection, during any two or three days, between the end of September, and the middle of the following month; wheat being instantly harrowed in upon the ley. Clover, or seeds of any kind, may be sown upon the wheat, either directly, or as is more usual, in early spring, with full as good a prospect of a crop of grass, as with Lent corn. Should the cultivator be dubious of a crop of wheat, after drawing from the land a heavy bulk of Turnips, let him throw it into a good form of winter-fallow, and it will be ready in the spring for any purpose which his interest may require; nor ought it to be forgotten, that an extraordinary crop of Turnips will fairly entitle it to an additional coat of manure. As to any advantages of a crop previous to the Turnips, nothing surely can stand in competition with a full crop of roots, succeeded by wheat, and the seed course preserved. In Norfolk, the soil has for some years past been supposed tired of Turnips, I submit, whether a change of culture might not, in some degree, prove a remedy.

It is not a little extraordinary, that the result of stacking Turnips against winter, practised in so many parts, particularly in Norfolk and Suffolk, has not been yet clearly ascertained, and somewhat curious, that I have myself formerly practised it without any attention, and am at this instant ignorant of its success. Supposing the root well and carefully stored, remain sound until April,

will it not become more nourishing and hearty food, in its dry and preserved state, after the evaporation of its crude and watery juices? We know that both Turnips and Potatoes are rendered more nutritious and fattening, by the draining off their watery juices, through the means of cookery, particularly steaming and baking; and that old dry corn is preferable to new. The storing and preservation of Turnips surely merit farther attention.

The true Turnip-soil is a deep sand, or sandy loam, and doubtless they may be produced with considerable success on loams, or even clays rendered sufficiently loose and friable; upon these last, so difficult of approach, and impracticable in winter, the advantage of early harvesting Turnips, must be striking to every one. If early sowing be intended, as much as possible ought to be done to the land before Christmas, and afterwards; if it be not in a very clean condition, much and early exertion with the hoe will be required. Every gardener knows the proper time to begin hoeing Turnips, and should there be, at this mature agricultural period, any parish upon the island, in so shameful a state of backwardness and barbarism, that Turnip-hoeing is not yet understood, a gardener will be the most proper instructor, or a Kentish WOMAN. In general, when the plants spread a circle of about four inches, they are ready for the first hoeing. Some farmers harrow them previously, with a light harrow, once, repeating it the contrary way, after the first hoeing, should they be getting too forward.

forward. They are commonly left about a foot asunder. The second hoeing, three weeks after the first, and at half the expence, that is at two shillings per acre, should perfectly clean the crop.

The large round Turnip produces the greatest bulk, but it is probable the yellow has the most substantial nutriment. They who desire to go extensively, and successfully into the Turnip-culture, should grow their own seed, from the finest transplanted roots. It is wonderful what a small quantity of seed suffices an acre of ground, and indeed equally so, how it can be delivered and spread over such a breadth. A pint might be more than enough, but it is usual to broadcast a quart, over an acre. I have heard much in favour of transplanting Turnips, making use only of the finest plants from a rich seed-bed; but I should conceive no method so likely to produce the heaviest possible crop of roots that the land could bear, as that recommended by Mr. Middleton, in his very able report of the agriculture of the county of Middlesex. It is, to drill them on one bout ridges, the manure having been thrown by the plough, and concentred within the ridges. The intervals may be hoed, and the plants earthed-up, with a light swing-plough, and the weeding, thinning, and hoeing, will thus require so little skill, that it may be performed by women and children. Another great advantage of this method, assisted also by manure, or lime, is, the plants will be stronger in their early season, and better able to resist the fly, against which, perhaps, those numerous and infallible remedies

which

which have been taught at different times, are purely fanciful. The only effectual remedy is hand-work (ever the most effectual and accurate) flies, caterpillars, slugs, and the like, must be picked, wherever they abound, by women, and children, or suffered to remain. The only question is, is the six-pence a-day earned? Of this I am so satisfied myself, that I shall never grudge it. I have repeatedly tried ducks, several scores in a gang, but although they destroy a great deal of the vermin at first, as soon as the novelty of the thing is over, they become weary of it, as a task, and of that kind of food, so that, in fact, it is mere deception to expect any effectual assistance from them.

I shall make free to borrow part of a note from Mr. Middleton, as a conclusion to this article of Turnips; remarking, at the same time, that where the implement recommended, is not to be had, common tools, and rilling the seed by the hand, as with the gardeners, will answer perfectly well. "Mr. Mure's drilling-plough, with two mould-boards at once going, forms the ridge with the dung in the centre of it, makes a drill, sows the seeds, and covers it. The plants being reduced to proper distances, with the short-hoe, a man and an old horse with the same plough may hoe four acres a day, pare the sides and bottoms of the furrows, mix the soil, lay it up to the plants, and leave not a weed to be seen. Turnips so grown, exceed in weight per acre the broad-cast method fifty per cent. See a plate and description in the Annals of Agriculture, vol. ix. p. 432

to

to 443." This method, Mr. Middleton says, is equally applicable to beans, cabbages, potatoes, and, perhaps, carrots, parsnips, peas, and tares.

RAPE and COLESEED, cultivated both as spring-food for cattle, and for the seed, from which oil is drawn. This plant, is not perhaps worth attention on any but rich and deep soils, for instance, those luxuriant slips that are found by the sea-side, fens, or newly broken grounds, where vast crops of it may be raised; hence it is, we have heard such different accounts of its produce and use. In another respect, opinions differ widely; some cultivators asserting that rape exhausts the soil exceedingly, whilst others have tried it a number of successive years without any such effect. It may be remarked that the agricultural terms, exhausting and ameliorating, have been hitherto rather vague, of which more in another place. Although I have seen much of the plants, I have not noted the specific difference between Rape and Coleseed; and in Essex, where I have most observed the crop, I believe they are generally grown mixed. Cole, I find, grows to a greater height than Rape, and the stalk is more soft and tender, indeed sufficiently so, when in leaf, to be eaten almost entirely. The stalks of Rape are more tough, bushy, and branching, endure the frost better, and produce more seed. It might answer a good purpose to separate the seeds, I mean whilst in the straw. This article is a striking example of the fallibility of our general rules in husbandry. Cole is but cultivated charlock, and who has not seen abundant crops of that weed, upon middling, and even very poor soils?

soils? Rape is cultivated upon such in Kent, Yorkshire, and elsewhere, but they ought to be dry, for on cold infertile clays, it rots in the winter-seasons, and becomes a mere dunghill upon the land.

The turnip-culture is in use for this crop, and if for food, it is sown in the turnip-season; if for seed, the beginning of August. Quantity sowed from a quarter to half a peck per acre, which will produce from sixteen to forty bushels of seed; and upon rich fresh land much more. It is threshed upon cloths in the field, and in Yorkshire this Rape-threshing is a sort of festival, at which all the neighbours attend, and for the music and good cheer afforded by their brother-farmer, they return him their united assistance to the speedy housing of his crop: an example worthy of general imitation.

Cole is very fattening provender for sheep, highly relished by them, and much productive of milk, but must be given to cattle, in general, with due caution, as it is apt to heave and burst them. When it succeeds, the produce of feed in the spring is great; it may afterwards be shut up for seed, but in that case the quantity must not be expected so large, as if reserved entirely for the purpose. As feed, it is worth from forty shillings to three pounds per acre, for ten or twelve weeks in the spring; which time an acre will carry from seven to ten large sheep. The haulm is commonly burned, and in some parts the ashes, equal to the best pot-ash, are sold: that being the practice, the money ought surely to be expended in manure of some kind, or the means of obtaining it, otherwise

wise the soil is injured. As to treading such hard substances in the farm yard, I must acknowledge, having often essayed, I have no very high opinion of their profit.

Rape is of the description of plant, I conceive, which would reward the labour of transplanting from a seed-bed. A rood of ground would produce plants enough for ten acres. They might be set on ridges, as lately recommended for turnips, and the land kept as clean as a garden; this beneficial culture duly observed, and manure allowed, the common objection to seeding Rape and Cole, would lose all its force. I am sorry to remark, I have seen the crop in several counties, in the most slovenly state, over-run with rubbish of all kinds; well might it prove exhausting. In Lincolnshire, they sometimes lay their lands down with Rape, under which the seeds are said to thrive to admiration: that does not shew any thing like exhaustion. Rape, as has been observed, is an appropriate crop to fresh broken up, or burned land; or as a successor to early pease, or green crops mowed for soiling.

HOEING THE DIFFERENT CROPS.—One horse-hoeing will be required this month, by which the ridge will be divided as before directed. The last hand-hoeing must now be given to the potatoes, as there will be a risk afterwards of cutting the roots; they ought nevertheless to be hand-weeded, if necessary, and kept perfectly clean to the root, both for the profit and the credit of the farmer. This observation extends of course to all the hoeing-crops, which ought to be industriously attended through the piece, as long as a weed shall remain.

DIG

DIG AND CART MANURES.—This advantageous method of employing the team, should be diligently pursued, at every interval of leisure, throughout the present and succeeding month, with still more particular attention upon those soils, which cannot be worked in the wet season. The objects in this view are, MARLE, CHALK, LIME, CLAY, SAND, ORDURE, SEA AND RIVER-WEEDS, EMPTYINGS OF OLD DRAINS, AND PONDS, DITCH-EARTH, and purchased manures of every species.

FOLD, SHEEP-SHEARING, and MANAGEMENT.—Upon down or sheep-walk farms, or such as have the appendage of common-right, in course, all the store-flocks are supported in those walks, at no other expence, than loss of manure and shepherds' wages; the fatting stock have the produce of the farm, either to graze at liberty, hurdled off, or cut and carried to them. A period of the most settled weather, in this month, generally towards the latter end, should be fixed upon for washing and shearing the flock. Folding now demands the utmost attention from the farmer, as a principal branch of the profit to be expected from his sheep. As before observed, all those lands under preparation for sowing and planting, or those already sown, but on which the plants have not appeared, will receive much benefit from the fold, provided the soil be light, and will bear treading. Pastures mown, or eaten bare, may also be advantageously folded, particularly those slips of the artificial grasses, which are mowing for the cattle at home. If the

grass

grass be in rows, hand or hose-hoe, immediately after the fold, and turn the dung in; on a broad-cast crop, harrow it in. At this favourable season, there lies no good objection against folding fat sheep, if they are well attended, and not driven far, or harassed about.

FALLOWS.—The crop of weeds being sufficiently mature from the last fine tilth, must now be turned in, and the land left until the dog-days, the great season for destroying root-weeds and grasses.

CUT GRASSES AND HAY.—The operation of cutting and carrying Grasses, whether natural or artificial, to the cattle, has been already taken for granted, as commenced last month, to be continued throughout the season. Should the soil be loose, upon which lucern, or any leaf-grass apt to hold the dust, stands in drills, it may be reaped, if large, and thrown immediately into the cart, or laid in a heap: it should be also well shook, if dusty, previous to feeding.

The artificial grasses will be ready to hay first; in a warm and forward season, before the middle of the month. Lucern should be cut just before it flowers: tares whilst the stalks are green to the bottom; indeed all these crops should be taken in the most succulant state, whether for green-feed, or hay, both on account of their stalk, and for the sake of the future crop.

A different process of hay-making from the common is in use with the artificial grasses; these are withered gradually in the swathe, for if tedded, or spread, as is the custom with meadow

dow-hay, the leaves and blossom would all be left in the field, and the stalks dried to a stick. The swathes lie a day or two, according to the weather; they are then turned, and left a day or two longer, after which they are pitched into cocks, to remain two days, when the hay will be ready to carry. Nearly the same method is proper for tare, oat, or barley-hay, which may be dried in swathes, wads, or heaps; nor is there that danger of totally spoiling tare-hay, with a few days rain, commonly supposed, provided it be diligently attended, and every opportunity of turning, and dry exposure embraced.

Meadow-grass should attain its full perfection of growth before it be cut, unless two crops of hay are expected, or perhaps with the exception of its being very rank and coarse. Good natural grass seeded, makes very hearty hay, and the seed shed in the mowing replenishes the sward. Mowing is best performed in the dew of the morning and even, when the grass being wet, the scythe will the more easily shave it close to the earth; an important object, both on account of the bulk of the crop, and the future thrift of the herbage. Every farmer ought to discourage slovenly mowing. As soon as the swathes are top-dry, they are tedded, or shaken out upon the land, which has also become dry enough to receive them. Before the close of the day, they are raked into wind-rows, and being tedded afresh to the next morning's sun, they are in the afternoon, made into the first, or grass-cocks; these should be turned the next, or third

morning;

morning; and great, or hay-cocks, made the same day, which finishes the process.

I have hitherto supposed fine weather; rain will, of consequence, lengthen the process described, and being continual, will retard it in proportion. The large cock, made in the best form to shoot off rain, and raked down smooth, is the only secure state for hay, in rainy weather: but such cocks can be large but in proportion to the forward state of the hay. Every fair interval, and every gleam of the sun, must be carefully watched, to turn and dry the cocks; and however long and tedious the business, hay must always be perfectly cured, before it be ventured in the stack; not only from the dread of accident by fire, but for its preservation from mould and corruption, it being in such state very unwholesome for cattle, although they will eat it. Salt strewed in layers upon a stack of damaged hay, a peck to a load, is much recommended by some, and by others (who pretend to have tried it) as much slighted. Every farmer will apprehend the benefit of having plenty of hands at hay and harvest-time, in order to be enabled to catch at each favourable opportunity presented by the weather in a variable climate like ours; and it ought to be more generally known, that by virtue of an old law still in force upon our statute-books, the farmer is permitted to make use of the seventh-day, in a service so truly interesting to the community.

An improved system of hay-making, has long been a desideratum in husbandry. The common, quick,

mon, quick, and secure method, no doubt, exhausts too much of the vegetable juices, but by adopting the gradual, or attempting to dry in the shade, we run a very evident risk from the uncertainty of the weather. Any effectual improvement appears hopeless, since nothing short of covering the grass could be really effectual, and that is attended with the insurmountable objection of too great expence. Some person, I understand, has lately proposed to dry the grass, by setting it up in conical bundles, or shocks; but I believe we must still balance according to our convenience, between the two established methods of tedding, or drying in the swathes; the latter, past all question, being far the most advantageous both in regard to weight and nutritious quality of the hay, granting it received no rain.

According to Mr. Parkinson, it is the custom in Lincolnshire to suffer the swathes to lie several days, until withered, by which means the grass retains its juices. When sufficiently dead, they turn the swathes the next day, shake, spread, and cock it; carrying, after it has stood a few days in cock. He observed, in case of wet, it was much safer in the swathe than spread: no doubt but this method is the least expensive. Cattle should be turned into the fresh-mown field, a few days, to glean the refuse, and bite down any inequalities which may have been left.

JULY.

Finish Hay-Harvest, and the sowing of Turnips, Rape, and Cole—Attend to the Hoeing-Crops—The Fold—Fallows and Couching—Farm-Yard—Manures—Early Harvest.

IN most counties, hay-making will be finished before the middle of this month. Should the weather be uncertain and catching, the hay-makers engaged, may be advantageously employed in stone-picking, weeding, and couching, hoeing, digging ditch-earth, emptying ponds and drains, grubbing up wood, or any kind of business which ought to occupy the leisure of the summer-season. Thus the farmer will have no hands standing idle, or at a useless expence, and at the same time will be ready, with full force, to lay hold on every opportunity offered for the preservation of his crop.

HOEING-CROPS.—These crops, as before directed, must be attended with regular monthly diligence, that no weeds be suffered to remain upon the land, and that the earth be left, by the operation of the horse or hand-hoe, in a loose and pulverized state. Let the roots of the young cabbage-plants be moulded up with fresh earth. The present operation of the horse-hoe will, of course, be in a contrary direction to the last.

THE FOLD.—Fold those lands where the dung may be immediately turned in, and particularly the mowing-grounds, the instant, if possible, a sufficient space is cleared by the scythe, the dung being harrowed

harrowed in, and the roller used afterwards, if the land be light, and not liable to bake in the sun.

FALLOWS AND COUCHING.—This month and the succeeding, afford the dog-day-fallow, of such great consequence for the eradication of couch and twitch grass, and every rubbish of that species, upon stubborn and binding clays; such it hath been, of late years, my lot to cultivate, and those by no means of first-rate fertility. As to light and sandy soils, they surely ought not to be stirred under the hot and parching sun, and a general system of summer-fallowing such, appears to me an absurd and barren practice. Light summer fallows should be moved and cleaned in a moist state.

With cold and binding clays, whilst wet, no good can be effected by tillage, and were it possible for the ploughs and other implements to work, clays would be most successfully tilled in a perfectly parching state; for if you move them wet, and more rain ensue, you have only made batter; if drouth, hard cakes, impenetrable even to the severest frosts. I have seen land of this description, loaded, above and beneath the surface, with seed and root-weeds, so abundantly, that a spectator would naturally have concluded such a crop must have been the farmer's grand object. After bearing many repeated corn-crops, it had been left to fallow itself, until the beginning of August, when it has been torn up by great force, into huge clods, in order to have part of the couch drawn out by the harrows, to receive a thin and paltry coat of dung, and to be got ready again for wheat.

Strong

Strong land, in such bad condition from root-weeds, as to require a whole year's fallow, should, if possible, and the season be sufficiently dry, receive repeated plowings, harrowing, and rollings in the autumn, and be then laid up as high and dry as possible, for the winter. The spring-tillage should be given with the utmost diligence and care, every six weeks, and in the following dog-days, the land will break up in a tolerably mellow and loose state, proper for totally eradicating the remainder of the grass-roots. As to dock and coltsfoot, I know of no immediate remedy, but the spade and hand-labour; they who do not chuse the labour and expence, may even keep their dock and coltsfoot, as far as I know. For the finishing stroke, a dry and leisure-time being fixed upon, between haysell and harvest, plow as deep as may be judged prudent, and follow the plow, with the spiky roller, or for want of such implement (a lamentable want on a strong soil) with the roller and drag, without any apprehension of too fine a tilth, a thing impossible upon such land. Cross harrowing or plowing are strongly objected to, upon land full of knot-grass, on account of its breaking and dispersing the grass, and rendering it still more difficult to gather. The drag will tear much of it up by the roots, the remainder must be drawn up by hand, and the whole collected in heaps, and forthwith burnt upon the land. I am aware that some of our ablest cultivators advise the carting couch to the compost dunghill, or the farm-yard, and I have myself taken so many waggon-loads from a field of a few acres, that I dare not mention the number, for fear of being

suspected of exaggeration; but Mr. Parkinson, a good practical writer, assures us from experiment, purposely made, that this accursed weed will vegetate after having been trodden in the yard, and mixed with the dung; and considering the expence and labour of its eradication, it is a thing not to be trifled with. Care having been taken in autumn and spring, the labour at this season will be less, the fallow now complete, and the land, however foul in its pristine state, rendered as clean, and the moulds as fine as a garden. If seeds and rest be desired, a good season may be secured for spring-feed; for example, tares and rye mixed, or if the land will carry it, coleseed, under either of which grasses will prosper very highly; or any hoeing-crop will be advantageous, without excepting wheat itself, provided the rows receive an ample bed of manure. When manure is scarce, impoverished land of this kind will receive considerable immediate benefit from surface-burning, quantities of dry fern, stubble, furze, or any rubbish being collected and added to the grasses and weeds, which have been rooted up.

FARM-YARD.—It is taken for granted, that every opportunity, since the clearing the yards in May, at the breaking up of the winter-fold, has been embraced, to replenish them with a foundation of earth and manures, for the succeeding winter; and that such necessary business will be occasionally continued, until the period of again opening the straw-yard. In the mean time, if the land be farmed according to the maxims of the new husbandry, there will be also a summer straw-yard; in fact, the home-

stall

stall will at no time of the year be without feeding and lodging a stock of cattle, by which method the profits of farming are increased in a twofold view; ample time, labour, and expence ought to be allowed for these very important branches of the farming business, and without regret, since they are its main pillars and support.

MANURES.—The hot and dry season is proper for emptying ponds, collecting mud and weeds from rivers, ditches, drains, commons, &c. Make this collection into a mass, with a proper quantity of virgin-earth, and with it stir as much unslacked lime or chalk, as you choose to afford. It will ferment, and become an excellent compost for your pasture-land, by the beginning of November, having been once previously turned in October.

EARLY HARVEST.—It is a great convenience, when the different crops at Harvest proceed in succession. Tares, pease, rape, barley will come first; oats and wheat follow; beans, hops, and the latter seeds, conclude the bountiful scene. The first, in a forward season, should all be carried by the end of this month. Tares and pease had need be well watched, or the pigeons will harvest a vast quantity of them; in wet weather also, the wads ought to be sufficiently turned and attended, both for the sake of the haulm, which makes good fodder, and the pease, which must be housed perfectly dry, in order to secure that colour and plumpness, in which, at market, the value of the sample consists. Early sown barley will in general be sufficiently forward. Whether the species make any difference, in this particular, I am unable to ascertain,

but I suspect not. As to the famous Teddington, or Fulham sort, sowed and reaped in less than two months, and of such remarkable fineness and weight, I apprehend the whole lies in the warm, genial quality of the soil, and its peculiar aptitude for barley. Let a farmer upon the cold clays of the north of Middlesex, try Fulham barley, and he will perhaps not find it earlier to harvest than any other sort, but assuredly much degenerated. Again, a poor species of barley sowed in the neighbourhood of Fulham, I doubt not, would be much improved in all respects.

AUGUST.

General Harvest for Corn and Seeds—Field and Home Management—Hoeing Crops—Lattermath and Pasture—Fallows—Seed-Season, Wheat, Cabbage, &c.—Folding as before.

GENERAL HARVEST.—The period of Harvest, is obviously to the farmer the most important of any throughout the year, as then it is he expects to reap the reward of his anxious and watchful daily labours: but the assurance of this, will now materially depend upon a system of management, both spirited and correct, the consequence of a plan previously adjusted, in which the hands are fairly apportioned to the quantity of labour, and those well and reasonably satisfied, that the extraordinary exertions, which circumstances fre-

frequently render necessary, may go off with cheerfulness and even enthusiasm. Of all penny-wise savings, those at Harvest-time are the most foolish and unprofitable in pounds; and it is much more safe to be over, than under done, in point of strength, whether of men, or cattle; for not only the mere Harvest ought to be minutely attended, but at the same time, no other necessary branch of labour should be neglected or postponed, under the old pretence of the superior consequence of Harvest-work. It should be remembered, that hoeing, fallowing, folding, sowing, stock-feeding, &c. are all great instruments, and means of a successful harvest, and therefore should at no rate be slighted: those besides will be very much forwarded by a judicious use of leisure intervals.

With respect to the method of engaging labourers for the Harvest, it is nearly similar in general, throughout England: part, or all of the constant workmen upon the farm, receive Harvest-pay for a certain number of weeks, and the extra hands agree for their work by the acre, according to the condition of the crop, heavy or light, lodged or upright. It is the farmer, or his bailiff's look-out, that these acre-men do not make too much speed, by cutting or binding, in unseasonable weather, and that they make the sheaves of proper size, with regard to the quantity of weeds to be withered, and the state of the corn. It is a good method, to agree with mowers and reapers, both at Hay-time and Harvest, to finish by cutting down all the weeds in the hedge-rows.

WHEAT.

WHEAT.—Farmers are not agreed upon the point, whether it be better to cut Wheat before it be thoroughly ripe, or to leave it until nearly ready to cut and carry. To adopt a medium, with particular regard to taking advantage of a fair time, is no doubt, the safest course. If the corn be cut in too green a state, no time in the shock will ever make it a fine sample, as I have often observed; too many of the corns will be shrivelled, pale and sickly. The greatest disadvantage of letting it stand to be full ripe, is its shedding at almost any motion, on which account it should be cut with the morning-dew upon it, and if it has not sometime to stand in the field in sheaf, the weeds will not be dried. I could wish to see Wheat-crops so clean, that no objection of this kind might lie.

Reaping Wheat is well known to be the general practice, but I see no solid objection to mowing that grain, which, on large farms particularly, is attended with the great and valuable conveniences of expedition and saving of labour, so much in demand for various purposes. Several objections to the practice are urged. Mowing, it is said, shatters, or causes the Wheat to shed more than reaping, which, however, I do not find to be the case; I am rather inclined to a contrary opinion, particularly with many strong and boisterous reapers, who will throw and dash the sheaves against the ground, without the smallest consideration. The greatest, perhaps the only, disadvantage, is the cutting more weeds, on which head I have just made a remark, deserving, I think, of attention. The other disadvantages,

vantages, of having a weightier cartage from the Harvest-field, the necessity perhaps of another stack, and a little more labour in threshing, I conceive are amply balanced by the superior quantity and quality of the straw, for thatching, hat-manufacturing, and every other purpose. They who have the convenience of a threshing-mill, will think nothing of the extra labour of that kind.

In carrying corn, three waggons and five horses to a field, make all needful dispatch, as they will keep the proper number of hands busy, both in the barn and the field. As to stacking abroad, or housing, it is a thing nearly indifferent upon the balance, of course referable entirely to local convenience. The only inconveniences of stacking, are, danger of storms, and difficulty of removal to the floor in wet weather: these are easily obviated. The most valuable ricks may be sheltered by straw or wood-stacks, or those of less value; some ought also to be placed close to the barn-side, where may be made a window, through which to pitch the corn, accompanied with a sail-cloth-awning at top, in case of rain. There are also many ingenious contrivances for covering ricks with oil-cloths, or tarpaulins, articles which may sometimes be purchased cheap; but if at a considerable price, with care, they will last a life: their use is various and great upon a farm.

Barley.—As has been already remarked of hay, all corn must remain in the field, until perfectly dry and cured; this is absolutely necessary to its preservation. Barley usually lies abroad from three

three days to a week, nor will a heavy shower or two injure it; on the contrary, it will imbibe the moisture, and swell much to the farmer's profit, and the colour may yet be preserved; but in case of constant soaking rains, the value both of the sample and the fodder will be much diminished. Many farmers cut and carry barley, with great success. It is customary to rake after all crops, wheat excepted, the scattered gleanings of which are left to the poor. Raking is performed much more expeditiously, either by the horse-rake, or the dew-rake, drawn by a man; but in my opinion the objection to both are insurmountable. In a driving soil, they rake as much dirt as corn, and in a stiff one, the rake jumps over the clods, and misses half the corn. Wherever accuracy is required, nothing is comparable to hand-labour, and if care be taken to rake clean after the load; the remainder is very easily performed. It is true, I have seen good active women-rakers earn three and sixpence a-day.

Oats are extremely apt to shed in cutting and moving, of course require great care in that particular, and also in the other of preserving their delicate white colour, in making. These are often the first new corn wanted upon a farm, on which account they should be placed in a convenient situation to be come at. In a want of old oats, the new had better be dried in an oven, or kiln, for the use of the horses.

Pease are hacked, or cut with the reaping hook; when carried, they are safest in the barn, out of the danger of rain, unless indeed, they can be

be thatched in the rick immediately, and very securely.

SEEDS.—TURNIP, RAPE, GRASSES, &c. In harvesting Seeds, much depends on the fortune of good weather, and if a farmer be weather-wise, this is the season for an exertion of that faculty. The next object is, *getting Seed while the sun shines*; to which end a great number of hands is necessary, and such liberality will, in the end, be found the greatest œconomy. Seed is commonly threshed abroad. The most careful reapers should be selected, for your giddy, or aukward fellows, will dash out half the seed upon the land, either in reaping, or afterwards moving the haulm. As this work can only go forward in fine weather, the thrashers must be constantly attended with supplies, and at the same time the Seed moved homewards, until all be finished. There are various contrivances for moving the crop to and from the threshing floor; some use little covered one-horse-waggons, constructed with poles and cloths, fixed upon truck-wheels, the number of men, women, and children, must at first be properly apportioned to these various services. Grass-seeds being harvested, of course, after thrashing, the grass is made into hay; which although of an inferior kind, will make good fodder for store-cattle.

FIELD and HOME-MANAGEMENT.—Gleaning by the Poor, was formerly held to be a right depending upon ancient custom, but within these few years, such right has been legally abrogated, as will appear by a reference to the trials in the court of King's Bench; and it was indubitably an act of patriotism

patriotism in the farmer who tried the cause, since not only the frauds of the practice were continual and enormous, but the principle itself was vicious. The gleaning-field was a school for juvenile thieves, as I have observed in too many instances. On the other hand, considering the situation of our labouring poor, it would be cruel and illiberal in the extreme, to deprive them of any accustomed, or fair gratuity. Let them glean as usual, after the *last* sheaf shall have been carted, and let not the farmer turn in his cattle, until the poor shall have fully gleaned the field. This I take to be a fair and reasonable settlement of the matter, and such *custom* has been some years since adopted and established by Mr. Arthur Young, and various other eminent cultivators of the country.

With respect to agreements with Harvest-labourers, it is ever understood, but perhaps is always deserving of a particular mention, that in Harvest, there are no set hours, set days, or holidays: night, or day, they must be at the master's call; in fact, they are engaged in the service of the nation; they are securing its bread. Nor are they hired for this or that particular service, every thing which may become necessary to be done about the farm, whether of Harvest, or other work, during the intervals of bad weather, is their proper business. The reward of this extra labour, is included in the extraordinary pay of Harvest, and in the good cheer made by the farmer.

A considerable number of Harvest-men are boarded in the house, upon many farms, and our farmers are not apt to be niggardly at this joyous season,

season, when however, excess, although it may temporarily gratify, is a real prejudice to the poor labourer. Those who have been liberally accustomed to over-do in this matter, I would advise to retrench, within the bounds of a plentiful moderation, and if their hearts overflow, to reserve the surplus, with which they may administer comforts to the poor families, in the severe and chilling season. The health of the labourer under the burning sun, should be particularly considered, as well for the farmer's interest, as that of humanity; and I am sorry to say I have sometimes seen men much injured by drinking quantities of wretched thin and sour small beer: I have known it so bad, that the fellows have emptied their cags upon the earth, to replenish them from the ditch, at the same time, loading the name of their master with execration, and demonstrating by their language and actions, how little they regarded his interest. When small beer is allowed in the Harvest-field, it should be of sufficient substance, pretty well hopped and brewed from soft-liquor; it is then a great refreshment and support to labour, much more so than strong liquor. In order to contract the Harvest-expences, within the narrowest possible compass, every supply of provision which can, ought to be derived from the farm; thus a bullock or two, or a few sheep, should be fatted for the Harvest-occasion.

The teams which have been soiling through the summer, will require, during the exertions of Havest, the best dry meat, and stable-attendance.

HOEING CROPS.—Hoeing, and the drill-culture, must not be neglected, on any pretence of more pressing

pressing business; for it would be to throw away great part, both of the past expence, and future advantage. Turnips will demand another hoeing this month, and the harvest-field must supply the necessary hands, either male or female. Hand-weed potatoes, also carrots, which may perhaps require a slight farewell hoeing, that at digging the crops, the land may turn up in style, or perfectly clean. The cabbages and lucern will require hoeing, weeding, and earthing; in general, all rows or drills, should receive a stirring with the plow or cultivator, to loosen and pulverize the soil, and to feed the roots of the plants with fresh and renovated earth, two most important advantages of the roe-culture.

LATTERMATH AND PASTURE. Where Lattermath or Rowen can be got ready so early as this month, it is a vast advantage, on account of the greater warmth and certainty of the weather, to what may be expected later in the season, and such advantage may always be secured by high manuring, without which, indeed, no second crops of grass can be expected on most soils: on that condition, a second cutting of saintfoin may always be had, without the smallest injury to the grass, or future crops. Upon most farms, green food is plentiful in autumn, after clearing the corn-fields, but on all, hay in the winter-season is particularly valuable. It is now proper to determine upon the quantity of *fog*, or old grass, which will be wanted for the use of the stock in the spring, and to shut it up accordingly.

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THE FALLOWS ought, by this period, to be in a state of clean and fine tilth, but some few remaining weeds, or a baked surface, may require another stirring, which on no pretence ought to be neglected; previously to this, they should receive the benefit of the fold.

SEED SEASON for wheat, cabbages, &c.—I am a strong advocate for general early sowing, and when a part of the wheat can be got in upon the fallows at this time, it is an advantageous point gained. Rye and tares for spring-feed, may now also be put in. Sow for early cabbages. Make your seed-bed as fine as a pinch of snuff, manure to the utmost, with rich and rotten dung, and sow thin, that the plants may have room to come up strong. This is a general rule for seed-beds.

SEPTEMBER.

Latter Harvest—Wheat, Beans, Hops, Fruit, Fern, &c.—Shack—Cattle—Pastures—Stubbles, Wheat-Seed, and Fallows—Fold.

LATTER HARVEST.—Wheat-harvest in all parts of our island, in a good season, is finished in the course of this month.

BEANS are seldom got in until this month, as they require some time in the field, from their bulk and succulence. They are cut with the reaping hook and bound in small sheaves, to the end they may be

be the sooner dry. It is preferable to bind the sheaves with tarred twine, which being hung up at threshing-time, will last three or four crops.

I greatly prefer pulling the bean-stalks to reaping them, but then care must be taken to clean the roots before thrashing, for the sake of the sample. A true bean-fallow, that is to say, one in a state of garden-tilth, the soil also disencumbered of the roots, which, in fact, are a nuisance any where, but under the feet of the cattle, will furnish an excellent bed for the wheat-seed, with very little labour, perhaps only a slight operation of the plow and harrows. It must be acknowledged, however, that bean-pulling, upon a bound soil, and in dry weather, is a tough job; and if the crop be very ripe, the labourers will scatter great quantities upon the ground, which in order to conceal, I have known them cover with earth.

Hops are picked by men, women, and children, at, from a penny, to two-pence the bushel. The vine being cut close to the earth, the pole is drawn with an iron instrument called a dog, and carried to the bin in order for picking; being measured, the Hops are taken to be dried. As to picking, all the care necessary is, to have plenty of hands, and to see that they perform their business properly. The poles being stripped of the vine, should be secured, under cover, if possible, until the next spring, or season for poling. Some burn the vine, or haulm, upon the land, but it amounts to much more, trodden in the farm-yard.

Fruit.—The orchard-product, although gathered with so much care, in fruit-counties, is frequent-

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ly much neglected in others, upon large farms in the press of more important business, which, however, is improvident enough, since fruits which will keep, will always pay the charge of gathering, in one way or other. Every body knows that when the leaf begins to wither, and the pips to become brown, the apples, or pears, should be gathered with as little bruising as possible. I shall only add on this head, that I know a number of people who keep parcels of ground, under the name of orchards, in a state of mere waste; the trees old, decayed, and nearly useless, and the fruit besides, of inferior sorts; instead of which, they might have at a very little trouble and expence, new plantations teeming with the very best fruit. If they are too indolent for the trouble of an orchard, they had much better grub up their old, moss-grown trees, and convert the spot to some useful purpose.

FERN, OR BRAKES, should by no means be neglected, where is a scarcity of straw. This vegetable is of great substance, and full of salts, therefore useful as a manure, but requires much and long treading, to break its substance, and put it in a state proper for putrefaction: should it be backward in that respect, at the time of making the compost dunghill, a few layers of lime will forward the operation. All the fern upon the farm should be annually cut and stacked for use, and if an addition can be made from the wastes within a reasonable distance, it is an object not to be neglected, since farmers do not usually complain of having too large a bulk of manure to bestow upon their land. I cart

Fern

Fern three miles, and for cutting pay five shillings a waggon-load.

SHACK; a term applied to the waste corn, left in the fields at harvest: pigs are the stock usually employed in gathering this, and in some parts flocks of geese and turkies. Where pigs are clovered through the summer, they are finished with the Shacks and the acorns, but I have known some farmers so improvident, as neither to feed their clovers, in that advantageous way, nor even keep pigs enough to pick up their waste corn, which has absolutely lain to rot in the fields. Young pigs are very proper for this purpose, as they grow exceedingly at Shack, and they should be bred upon the farm.

CATTLE.—All the cattle, stall-fed, or otherwise, and fat pigs, which are marketable, should be, generally speaking, disposed of before the second week in September, when the price may be expected to begin to decline, from the quantities of summer-fed stock, for various reasons, coming upon the markets. If possible, nothing should be kept, that will not go on until February. The autumnal is the proper season for purchasing store-cattle of all kinds; oxen for grazing, or the yoke, cows in calf, sheep for breeding or fatting, horses and colts for all the various purposes.

PASTURES.—The inclosures of fog, or after-grass, reserved for spring-feed, are now supposed to be shut up, also the burnet, which is never to be fed in autumn. The grounds fed bare may, in this, and the following month, be scarified, and the allowance

lowance of compost given them, or they may receive the fold, as happens to be convenient. As soon as the cutting of lucern is finished, dress the land with twelve, or fifteen loads of the richest compost to be procured, after the operation of the scarificator or harrows. If the lucern be drilled, spread your compost over the field, and then draw a furrow with the plough, in the midst of each interval, by which the manures and a portion of mould are thrown upon the rows of plants, and they lie covered, warm and dry, all the winter: as early as possible in the spring, cross-harrow the ridges sufficiently to level the whole field. There is no winter-management of lucern, or indeed any grass, equal to this. The most careful water-furrowing is understood.

STUBBLES.—Cutting and carting Stubbles, is an object of some importance when the straw is left high, as in many places; for stubble not only contributes much to the bulk of manure, in a farm-yard properly stocked, but it is a real impediment to the plough if left on the land. Chopping and raking is worth from twenty-pence, to two shillings per acre. This operation is surely more profitable than burning the stubble upon the land, but I would rather chuse to keep a wheat-crop clean, to the end that I might cut the corn close to the ground, and save the trouble and expence of either cutting, or burning Stubbles.

WHEAT-SEED.—September is universally, in our climate, the chief seed-season for Wheat, and when the bulk of the business can be dispatched so early,

experience proves the favourable result. The summer-fallows will in course be first ready, and they ought to be in fine condition, or much time has been wasted to little purpose. Potatoe, carrot, and clean bean fallows, will probably be next ready. The clover-ley makes a most excellent bed for Wheat, but it is much the best practice to trench plow it, burying the sod with a cover of mould, which will harrow to a fine tilth. It is a gross error to sow Wheat, or indeed any thing else, on rough clods. As to the form and width of the land, for Wheat, and whether on flat, or ridge-tilth, the matter must be determined by the nature of the soil, which if cold and wet, must, of course, be laid in that position most proper to keep it dry. Water-furrows should be sufficiently numerous, in every part of the field, where required, to keep the surface perfectly free; and in bottoms or declivities, where is a double slope, the furrows ought to be cut double, a few feet one from the other, that the water may run from each descent.

With respect to different species of wheat, the grand divisions are into white, red, and bearded; the sub-divisions, or varieties, are numerous and very unimportant, in any point of view. The best in England, according to my experience, are the Essex and Kentish white and red, and the Taunton Wheat (Somerset) which appears a mixture of both. Bearded Wheat, Rivets, Clog-Wheat, or Cone-Wheat, is an inferior species, large, thick-skinned, hump-backed, its flour less tenacious and clammy, by consequence of less substance, and the grain of less

less weight per bushel than that of the other sorts. The price is sometimes very much below that of fine mealing wheats, nor is it saleable for starch, producing less of that article, by eight or nine pounds per bushel, than good black or smutty wheat, which generally weighs well, and is thence the best for starch. But the difference of price is somewhat dependant upon circumstances, and is not always so considerable, particularly in times of scarcity. The produce is sometimes, and on certain soils, considerably above that of white, or red Wheat. Suffolk is, I believe, the chief county for the growth of Rivets.

From two bushels, to two and a half, of Wheat, are sown broad-cast; as to drilling or dibbling, there is in those practices, a great saving of seeds.

The unspeakable nonsense of steeping Wheat-seed, with the intention of preventing the ears from being blighted by certain airs, or dews, which may chance to fall upon them, nine months afterwards, seems to have revived again of late. There can result no harm that I know of, from a farmer's amusing himself with these steeps or brines, which may possibly tend to fructification (although I doubt that) at least to drive away the worm and vermin from the seed. Washing repeatedly with fair water, has certainly the excellent use of detecting the light and barren grains, which should never be sowed. Every one knows the common practice of laying the seed on a heap, and drying it with lime.

FALLOWS.—The stubbles intended for winter Fallows, should now be begun, and receive one, or

more stirrings, between this time and Christmas, in conformity to circumstances. According to the old system, lands were left rough in their stubble, and perhaps deluged with wet for want of surface draining, all winter, even until April, for the alleged purpose of starving and rotting a few miserable draggled sheep. The loss from this practice was enormous every way. Exclusive of the want of that profit which would have accrued from a proper management of the sheep, and of the actual damage sustained by them, the land missed the greater part of the immense benefit of being pulverized and mellowed by frosts, and was injured in an equal degree by the seeds of weeds being locked up securely in its bosom, to vegetate in abundance after the first spring-stirring; instead of being exposed by the tilth, to destruction, either from the winter-frosts, or having vegetated, to be smothered by the spring-culture. Lands, winter-fallowed early, and harrowed fine, will produce a crop of weeds to be smothered by the plough before the frost sets in.

The fold, may still go on, through this, and the ensuing month, wherever its services are most in request.

OCTOBER,

OCTOBER.

Digging and ploughing up the Root Crops—Hiring Servants—Finish sowing Tares—Planting Mazagan Beans — Fallows — Commencement of the Straw-Yard—Fatting Beasts — Hog — Sheep—Cows—The Teams—Brood Mares—Sick Horses—Plant Fruit Trees and Quicks.

ROOT-CROPS.—Potatoes, Carrots, Madder, and Liquorice.—It is very common to leave Potatoes and Carrots in the ground, until very late, and the latter even until the spring, digging them as wanted: but this is upon favourable soils, which may be trodden at any time of the year; yet even on those, it is hazarding the crop. As to the culture of these roots, on stiff soils, nothing can be more imprudent than to leave them abroad late, when they will be most probably taken up, all mud and puddle, with scarcely a prospect of getting them sufficiently dry to store in safety; hence they ought always to come in with the bean-harvest, or the instant, if possible, that they have arrived at perfection, which is known by the decay of the haulm and tops.

It is by no means improper, and by much the most expeditious method, to plough up potatoes; the few that are hurt may be used first, and those left after the harrows, will be rooted up by the pigs. Nevertheless in my own practice, I always take them up with the spade and three-prong-fork, the same as carrots.

Carrots,

CARROTS, are often ploughed up, where they are not cultivated with that nicety the crop requires, the ground perhaps being left hard and almost as full of weeds as roots. I have often heard of such inattentive practice, under which, I should think this crop can scarcely be an object. Carrots should be taken up carefully with the spade, or fork, and spread in the field to dry, if needful; but if the land be in fine dry order, the roots had better be taken home, and spread in a barn or outhouse, where the tops being cut off, and thrown to the pigs, the Carrots will soon become in proper order to store.

MADDER AND LIQUORICE, are generally taken up towards the end of this month, as already noted in the account of their culture.

HIRING SERVANTS—Old Michaelmas is the usual time for hiring Servants, throughout the country; but I must acknowledge myself entirely of Mr. Marshal's opinion, that it is one of those customs, which ought by all means to be changed for a better. Michaelmas brings with it a great pressure of business, of every description, and to be looking after servants at that time, or even to admit new ones entirely unacquainted with your peculiar methods and management, is extremely inconvenient. Old Christmas, as of more leisures would surely be a more proper period for this affair.

As to farming servants, the best counsel I am able to give is, for an employer to receive no known thief or idler, to give the greatest possible encouragement, to overlook trifles, and to trust implicitly to no man's honesty or industry, but to put

put both to the severest test; so shall he have a choice of the best labourers in the country, and enjoy the profitable reputation of the best master. In a small concern, a farmer may himself superintend his whole business; but a gentleman-farmer, or the cultivator of an extensive tract, particularly if managed in the more varied style of the new husbandry, will require a bailiff, and overlookers, in proportion to the extent of the business. The bailiff of a gentleman, who cultivates a hundred acres of land, for his convenience or amusement, will have leisure to work himself, which is impossible, or rather totally out of question, with one who has extensive business to superintend, since that alone, if he be industrious, will take up his whole time, early and late. In very large business, a bailiff will need occasional lookers under him.

A bailiff ought to have had some years experience of, at least, the common methods of husbandry and gardening, of the management of all kinds of live stock, and of buying and selling; he should be able to keep common accounts; in short, he must be something either from nature or habit, above the common labourer. But then he must have *a bailiff over him*; and such must be the proprietor of the business, unless he rather choose to risk the consequence.

As to entrusting these upper servants with buying and selling corn and cattle, I would advise no persons to do it, except indeed those whose situation is so elevated, that such engagements might be thought inconvenient and improper: still, it is no derogation from the honour of a Prince, to be well informed

informed of market-prices, and to be able, by inspection, to form a judgment of the worth of cattle. I dwell a moment on this head, because I have seen too much, both of the gross ignorance, and iniquitous collusion of bailiffs and managers, in bargaining. It is a common saying, "Oh! your master is a gentleman, he don't want to get money, but *we* must live." Indeed it is no wonder that gentlemen so often farm their own estates to loss, considering the sottish, ignorant, and knavish instruments which they employ, under the name of bailiffs. I have a farm now in my view, of about one hundred and seventy acres of rough land, which the owner has kept in hand some years, to the loss, as I am convinced, of a hundred pounds per annum at least, exclusive of the rent which might be obtained. The bailiff, of all things in the world, fats poultry for market, with the view of profit, and when he attends to sell them, often gets so drunk, as to be unable to return until the following day; in the mean time the fences upon the farm are so bad, that the few cattle and pigs upon it, are a perfect nuisance to the neighbours.

It has been recommended to vest a bailiff with full power of discharging the servants and labourers; the propriety of which I am rather inclined to dispute. Invested with such a power, there is no check upon his conduct; whereas, were this particular made matter of reference to the principal, all necessary information on both sides would come out.

One of the first qualifications of a bailiff is, to have a mind perfectly indifferent to all prejudice in

in favour of the old system of husbandry; and where things are upon an extensive or improving scale, it ought to be an invariable maxim to receive no servant or labourer, who will not positively agree to follow directions, in default of which, he ought instantly to be taken before a justice of the peace. I have known several instances of a combination among the ploughmen, not to work without their accustomed number of horses.

SOWING TARES.—Winter-Tares are sown as late as the end of this month, but I should think with but an indifferent prospect of success, on any soil; if mixed with rye, or some kind of corn for their support, it is probable they cannot be sowed too early.

MAZAGAN-BEANS.—I am not aware of much benefit from the culture of these. They are not of advantageous home-use, and I have known them extremely unsaleable, when other beans have been much in request. The land had probably better lie until January or February, for a crop of common beans. I wish to speak, however, under correction. As to the husbandry of Mazagan, it is the same as of other beans precisely. Get the land fine, throw it upon ridges, and drill, or dibble on the crown of the ridge, your own distance.

FALLOWING should go on briskly, during this month, according to the directions often repeated.

COMMENCEMENT OF THE STRAW-YARD.—Earlier, or later, in this month, according to the weather, all the cattle upon the farm must be taken into winter-quarters; for in that season, they not only damage themselves, but the land, fences, and woods.

woods. Under the chilling rigours of winter, cattle require both shelter and dry fodder. We will proceed upon the supposition, that every leisure opportunity, since clearing of last year's straw-yard, has been embraced, to cart and spread to the depth of two or three feet, virgin-earth, chalk, rubbish of any kind, turf, marle, clay, or sand, &c. as a needful foundation for the present. Upon this base, the waste-fodder must be spread, and constantly renewed, that the cattle may always lie dry; and should there be a suspicion arising from a good fore-reckoning, that the litter will not last through the season, no part of farming will pay better than to purchase; which ought to be done at first, and whilst it may be had.

There is a piece of advice, which Mr. Young gave many years ago, and which at first struck me of the highest importance to a farmer upon the new system. A cheap and commodious method, I mean, of enlarging the bounds of the farm-yard; for without convenience in that respect, to the most needful extent, all a man's resolves at improvement are mere air. No possible application of the ground, near home, can be so advantageous as this: and if the landlord will not, it will answer the tenant's purpose, to make the addition himself, and he may do it at a very trifling expence. Let the ground be marked out on the most convenient side of the homestall, and inclosed with a stack-wall of long straw, stubble, rape-haulm, fern, furze, &c. about a yard thick, and eight feet high. For security, it had better be defended by posts and rails, and every small breach ought instantly to be repaired.

repaired. Slight sheds might be run up, if needful, against the back of the buildings, or even in any part of the inclosure. Thus, warm and convenient yard-room may always be obtained, in proportion to the quantity of the stock, and the stock kept in that necessary state of separation, preventive of confusion, and of those many accidents which daily occur.

FATTING BEASTS, upon carrots, cabbages, turnips, or hay, may be fed in stalls, or what I prefer, in cribs in the yard, with a shed for them to retire at liberty. Being kept at large, they will afterwards travel better, a great consideration where the market is distant. Sufficient litter must be allowed to keep them always clean. The store-cattle, incalvers, &c. will follow the fat, picking up their refuse.

HOGS, littered in their styes, or not, according to the demand for straw, and the condition of the animals, should be put up in time to be ripe in February. Corn-fed, any size will be fat in four months. The stores and breeding-sows, having gleaned their mast and acorn-harvest, will now attend the barn-doors, and gather all the refuse of the fold.

SHEEP may be yet folded. Breeding ewes, and fatting wethers, (such are at this season to be found at market) must be kept upon the farmer's best products, already mentioned. This species of stock is almost always winter-fed abroad, in our country, a system in my opinion extremely disadvantageous, of which more bye-and-bye.

Cows, are now brought home, full of good succulent summer-keep, to suffer the unprofitable reverse

verse of having their strength and juices exhausted, by being fed, or rather starved all winter, upon dry and sapless straw. This, I conceive, is, to imitate the natural order of the seasons, rather too closely; they who grudge a milch-beast nourishing keep, deserve no milk.

THE TEAMS, having been well soiled all the summer-season, must be fed throughout winter, upon good hay and corn, receiving the best stable attention, in order to enable them not only to endure constant labour, at the present time, but to continue it a fair number of years. I am speaking of horses. It is the custom in some parts, and indeed highly recommended, to feed these entirely with carrots; but for my own part, I have always found, that the most profitable expenditure of roots, is to bestow them upon animals which are not required to labour; and few cattle-farms produce more of that species of provision, than those will consume, and in fact demand. We have some people œconomically mad enough, to force their labouring horses to eat raw potatoes, and even, if I am not mis-informed, with straw-sauce only!

BROOD MARES.—When good stock is desired, these ought not to be kept too low. They should lie dry at straw, receiving a daily portion of hay and carrots. A little corn is still better. If they are worked, it ought to be in moderation, and not too near their time; indeed as to cart mares, they are much better for moderate labour, provided they are rewarded for it, with the full keep of the stable.

SICK HORSES.—Such as are sick, or debilitated from excessive labour, are recovered at no time and place,

place, with more advantage and certainty, than in the straw-yard, if well-fed and properly attended. Carrots and lucern hay, are grand specifics in this case.

FRUIT TREES, QUICKS, PLANTATIONS, demand their portion of the autumnal labours of the cultivator.

NOVEMBER.

Pease—Fallows—Fold—Thrashing—The Teams—Levelling Pastures—Irrigation, or Flooding Meadows—Draining—Fencing—Wood.

HOG-PEASE, as before stated, in the account of the spring-culture of that article, will endure the frosts uninjured, and produce an early crop in some soils, in others, not perhaps so early as the forward spring-pease. They are recommended to be broad-cast, four or five bushels upon an acre, but I prefer drilling or dibbling, for as the haulm of this sort is generally great, it will soon touch in the rows, and completely shade the land. This late season of sowing them is suitable only to light dry soils.

FALLOWS.—On good sound dry land, or sand, the plough may be kept going this month, and even until Christmas; but on clays, and wet clayey loams, it can seldom venture, with propriety, later than October:

October: on these, therefore, we will now suppose the winter-fallows completed, and the lands laid up, round and dry, in order to receive the benefit of the winter's frost. Such land as is intended for root-crops, will of course have been trench-ploughed to the required depth, and left on the proper ridge, with a sufficient number of well-placed water-furrows. Those last require constant inspection, and immediate repair, when necessary, that no surface-water be ever suffered to lodge upon the land.

Fold.—On a dry, sandy or chalky soil, the Fold may go on throughout the winter, bating severe frosts. On a poachy soil, this is impracticable, nor did I ever see the advantage of keeping this stock to shift abroad on such land; comparatively I mean with better methods. Folding is surely of the greatest benefit to such pastures as will carry the sheep, not only enriching them in the most advantageous method, but farther improving them by treading and destroying the moss, with which old meadow is so liable to be over-run.

Thrashing.—Where a large stock of cattle is kept, thrashing can at no rate be delayed very long after harvest, as the stock of old straw will seldom over-run, and besides, new must be had in plenty as fresh provender. Very different farming this from the old system, under which I have seen such mountains of straw, that it perfectly obscured the view, and it was a little Alpine expedition to climb across the farmer's yard!

The Teams.—Because all the fallows may now be finished, is a very poor reason that the Teams should

should stand idle. It is of the very essence of the practical œconomy of a farm, to execute the irregular business at those leisure intervals, which occur in almost every season, and by attentively embracing those, nothing, even to that which may seem trifling and minute, need be neglected. There is a time for all things, to those who possess foresight, and the means! Digging, carting of earth, chalk, or manures of any kind, from the neighbouring towns, should have its due share of attention this month, that the stock of such necessary materials may be always kept complete. Dressing grass-lands with compost may still go on, carts with broad-wheels being employed, that will not damage the sward.

LEVELLING PASTURES.—The cattle being now secure in winter-quarters at the homestall, and the grass-lands free, this is a proper time to commence any requisite improvement: that of cutting ant-hills and levelling the surface as before described, is an improvement of great consequence to those who know the value of grass and hay. The parings being left to be pulverized by the frost, may be spread over the land with the fresh dressing.

FLOODING MEADOWS.—This most beneficial operation, superior in effect to the richest coat of manure, may now commence on grounds which lie convenient for the purpose. The reader is referred to the word IRRIGATION, in the Index.

DRAINING—FENCES—WOODS and TIMBER—See Index.

DECEMBER

DECEMBER.

Break-up Old Lays—Thrashing—The Team—Cattle—Hedging and Ditching—Manuring—Conclusion of the Year, with a General Survey and correct Account of the Stock, and Property of all Kinds, upon the Farm.

BREAKING-UP OLD LAYS.—As old sward cuts easiest and best, when the staple is soaked through with moisture, the latter part of the autumnal quarter is a fit season for breaking it up. The breaking up of old worn-out meadow, is one of the most profitable operations within the circle of agricultural practice, and should never be withheld by a landlord from an intelligent and able tenant. It is a mistake to suppose this practice attended with immediate benefit to the tenant solely, since under proper regulation a lasting improvement is also insured to the land. Old seeding grounds, which have been neglected for a long series of years, until they become covered with mole-casts, ant-hills, and moss, and of which the far greater part out of a poor produce, is bad herbage, weeds, and trumpery; or mowing-grounds starved, hide-bound, matted at the root, and tired out with the scythe, can no otherwise be effectually reclaimed, than by the loosening operation of the plough, and the consequent exposure of the heart of the soil, to the purifying influence of the air.

Trench-

Trench-ploughing is most effectual in this case, and the sod being buried, a bed of mould is left for any crop which may be chosen, but this should ever be a hoeing-crop, even if oats; or one great object in the change, that of a clean tilth, will be lost. It must be remembered, however, there is a very strong objection to the sowing a fresh crop over the buried net-work of the roots of weeds and grasses, which, instead of rotting and turning to manure, according to expectation, may lie years in the soil, throwing up a constant and gradual produce of grass and rubbish; on this material account the operation of breaking up turf, seems incomplete, without burning the roots. It may be done, however, at any convenient time, even after taking a crop; pease, for instance, which being cleared off, the land may be dragged and couched, and the rubbish burned, in good time for sowing it with wheat.

THRASHING.—In the dispensing of straw, it is most prudent to begin at first of all, with the best, for instance, the oat and barley stover, which is most tender, and *ought* at least, to be well mixed with clover, because the cattle have just come from succulent food; this regimen being continued awhile, proceed by degrees to the wheat and bean straw, having care, so to manage, as to be provided with plenty of the best provender for the last and most pinching part of the season. On a farm provided with proper and convenient stowage, the corn may be housed, or stacked, in such sort, that any part, or species of it, in request, may be immediately commanded.

THE TEAM.—Various useful jobs may be found, on which to employ the Teams, in the early part of the month; the latter end seems appropriated, by universal consent, to rest, during which, the most necessary business of thorough inspection, may be conveniently pursued.

CATTLE.—The ewes with lamb will now require good attention, and good nourishing keep, that they may be in heart to suckle their lambs; nor is there a more unprofitable practice, than keeping breeding animals in a poor and low state, since, granting the young to be brought forth of the full size, and in good health, of which there is yet great risk, the dams will fail of strength to support their growth, and very often even to bring them forth. Whatever course may be taken with the store-stock, neither the ewes, nor the fatting sheep, should ever be exposed to the storms, deep snows, and extreme cold of winter. They should have the benefit of at least some kind of shelter; for it must be remembered, that good keep loses half its efficacy, unless aided by the genial comfort of warmth.

FATTING OXEN AND HOGS.—This is the middle of the season for fatting those animals; should any of the former be now ready, if the heads of them, they may find a good market, since large beasts are always in request against Christmas. The fatting-stock, in general, must be served with a constant, unvarying attention, or the feeder, in the end, will come sadly short of his expected profit.

HEDGING

HEDGING AND DITCHING.—This is an employment proper for the season. It affords support to those labourers, without whose constant and regular assistance the business of husbandry cannot be carried on, and being mindfully attended, at every leisure opportunity, the fences on the farm will be, in process of time, in the most perfect state. Mr. Young advises to get the fences of a farm into good order, in the three first winters of the lease; and afterwards to divide them into twelve parts, and to do one every year, which will bring the whole to regular cuttings. Truly valuable advice, which deserves the attention of every farmer.

MANURING.—I think the manuring of grass-land should be finished before the frost, that there may be a chance for the manure to get beneath the surface. As to those fallows which have not been dressed, frosty weather affords a good opportunity for carting dung upon the land, where it may be left in heaps until the spring tillage; for dung ought never to be left, for any length of time, spread upon the surface, either in winter or summer, since much of its virtue is, in that state, dissipated and lost to the land; nor is there any other use, than saving time, in this winter-cartage of dung, to be left on the surface of fallows.

CONCLUSION OF THE YEAR, WITH GENERAL ACCOUNT OF STOCK.—Every farmer, who desires to know correctly to what sort of purpose he does his business, should provide himself with a book, which he may call his GENERAL STOCK-BOOK; and in this book, he should now register the result of a general survey of the condition and worth of

his whole stock and property, of his debts, and his credits. Having such a book to refer to, at all times, and on all occasions, will afford an unspeakable satisfaction to his mind, nor ought he to enjoy the festivities of the season, until he shall have completed his survey. Let him, in the first place, order in all his tradesmen's bills; in the mean time, he may take an examination and account (slight as he pleases) of his household goods; then a very particular one of his horses, cattle, and poultry, corn in straw, or thrashed; hay and fodder, wood, manure, growing crops, and fallows, waggons, carts, ploughs, sacks, and implements of every kind; finishing with the state of his fences, gates, drains, &c. and an estimate of the necessary repairs on all sides. Memorandums being made upon waste paper, the particulars may be afterwards copied into the Stock-Book, with whatever degree of minuteness shall be judged necessary. After this general register, a D^{r} and C^{r} account may be drawn out, the balance of which will exactly shew the present worth of the farmer's estate. The form of the account is as under:

Stock, D^{r}. *Contra, C^{r}.*

On the D^{r} side must be entered all the farmer owes, beginning with rent, tythe, and taxes; on the Contra, or contrary side, all he possesses, and all which is owing to him. He must rate every thing at what he judges the fair present worth, was it then to be sold; manure and tillage performed, must be valued at the common rate of the country; corn unthrashed, &c. he must take by estimation.

With respect to a general system of accounts, upon a farm, speaking to well-informed people, I, without scruple, recommend the Italian method, a beautiful system of arithmetical philosophy, which fills the mind with the satisfaction of certainty, and may be extended to every concern of life: but this method is out of question with common farmers, to whom common accounts are more suitable, and may be rendered perfectly sufficient. A farmer should keep a day-book and ledger; the first, because memorandums are so necessary in his business; and he need not be over studious of forms, entering down in his day-book whatever he may think needful to remember, with the day of the month. Every practical man knows the accidents that so frequently happen, from want of timely care of animals about to bring forth; by consequence, the date of their being put to the male should be correctly taken down: it is also of the greatest use, to keep an account of the dates of every sowing, and indeed of all the various transactions of tillage. Common accountants are apt to be frightened at the very idea of the trouble of Italian book-keeping; but there is a useful kind of half-method, unattended either with intricacy, or trouble. It is merely to erect what are called Stock-accounts, in a Ledger, without any of the usual connections by reference. Thus, if a farmer desires to be very correct in his calculations of the profit, or loss, upon a lot of stalled oxen, for instance, on the crop of any particular field, his readiest method is, to make an account, for either the one or the other, in his Ledger,

Dr and Cr. On the Dr side let him place the cost, including every minute particular; on the Cr, the returns; in course, on sale of the articles, the account is closed, and the balance demonstrates the profit, or loss. This will be found a much more certain future guide, than the best memory.

I am well aware, what an alarm this recommendation of accounts will give to the indolence of many, perhaps of most farmers. I have done—but with this observation, that the regular taking stock every year, and the keeping fair accounts, is, on calculation, attended even with less trouble than the everlasting puzzle, confusion, blindfoldedness, and loss, of heedless negligence. Regular accounts and annual valuation, will not only afford a man an exact knowledge of his real situation, but wonderfully improve and sharpen his judgment, on the real worth of all those articles in which he deals; and in the necessary contemplation of the final accident, he will have the satisfaction to reflect, that all stands fair for the benefit of his family, and as little liable as possible to loss or dispute.

INSURANCE against accidents by fire, should never be neglected, or postponed an hour, in a situation like a farm, surrounded as the Homestead is with combustible matter.

END OF THE MONTHLY CALENDAR.

ON THE

MOST IMPORTANT BRANCHES

OF

THE SCIENCE AND PRACTICE

OF

AGRICULTURE,

AND OF THE

MANAGEMENT OF DOMESTIC ANIMALS.

GENERAL IDEAS

ON

HIRING AND STOCKING FARMS.

ON this Head the most striking Considerations are those which follow: *That the Captital be fully equal to the extent of the undertaking—The Term of the Lease of sufficient Length to ensure the Safety of the Property to be expended in Improvements —The Rent Customary, or the Prospect of Reimbursement for Advance, reasonable—The Nature of the Covenants—The State of the Poor-Rates, and the Usage respecting Tythes—The Condition of the Land, and Quantity of under-draining, necessary—Of the Fences—Of the Wood, Water, the Homestall, and Dwelling—Fields joining or intermixed with other Property—Common Paths—State of the adjacent Roads—Quantity of Acres, whether accurately measured, or computed—Danger from Floods—Whether the Farm, or neighbouring Wastes, afford any Article of Manure—The Extent and probable Use of Commonage—The Number and Distance of Market Towns —The Business proper or usual to the Farm, or Country, whether such as the Farmer has been bred to, or whether it will profitably admit of being changed—Lastly, the Healthiness of the Situation, and whether its general Aspect be that, under which a man could comfortably spend his Life.*

It

It can obviously very seldom happen, that a tenant in want of a farm, can have the opportunity of chusing precisely that kind of soil and situation which may be deemed the most advantageous; in general, he must content himself with such as chance to be unoccupied, and these chances in fruitful parts of the country, have never been, of late years, and since the vast enhancement in price of all the fruits of the earth, very numerous. But the superior advantages of natural fertility, and facility of cultivation, are too plain to admit of question and argument; and nothing is more clear, than the preference which ought to be given to good land, at the advanced price, since the culture of barren land is infinitely most expensive, and the risk of crop nearly double: and what is of great force, from the influence of custom and local circumstances, the price of land in the most fruitful counties, is frequently as low as of that in districts of far inferior fertility.

An attentive observer, although not very conversant in the principles or practice of husbandry, can scarcely be deceived as to the general nature and degree of goodness of soil, upon a farm; a comparison with the neighbouring farms, and their average products, will be a sufficient guide. Wherever is found considerable depth of mixed soil, even if natural fertility be deficient, art and culture will remedy the defect, and fully reward the labours of the husbandman: on the other hand, the most shallow and stony lands, from a natural richness in their light moulds, may be wonderfully productive. The luxuriance and deep verdure of the grass, the

spontaneous

spontaneous growth of white clover, the tallness and fruitfulness of the hedge-wood, particularly hazel, the large size of the timber, and the height and substance of the straw, are all common indications of a strong and fertile soil: plenty of weeds, particularly thistles, although a popular, I fear, is but an equivocal sign, since the most barren land will also produce spontaneously abundant crops of these.

It is much more prudent for a farmer to wait, and look forward, than to engage himself upon a miserable barren tract, where the certainty or promise can be of nothing, but everlasting labour and expence: such must be the case upon soils which are naturally poor, at the same time of insufficient depth, and abounding with flint, or shingle; upon sandy wastes, parched gravels, cold acid iron clays, boggy, or poachy lands, to, or from which there is scarcely access, or passage, during the winter-months. Some such tracts we have in England, and of these, held in hand, an opulent and well-skilled proprietor can make a far greater annual profit, than can be drawn from the labour of a needy and miserable tenant. The most profitable purposes, to which these estates can be devoted, are the growth of wood and of live-stock.

A farmer, who aims at obtaining his profits with the least possible trouble and risk, and without the burden of much live-stock, must procure a rich light-land farm, a sandy loam; on such a situation, with a moderate capital, and the example of his neighbours before his eyes, he may set himself down in contented indolence, and yet grow rich.

The

The case is widely different with him who engages with a strong clay, or in the improvement of an exhausted, or infertile soil; this will find an ample field for the most strenuous exertions, directed by a fair portion of agricultural skill, and ought to entertain no hope of very considerable success, without the aid of a full stock of cattle.

These observations are by no means intended to damp the ardour of aspiring husbandmen, who aim at raising a fortune and a name, by the improvements of low-priced land; for although from the irregularity of rate per acre above-hinted, the rent of land is seldom the prime cause of good or ill success, yet cheapness is a material consideration, when money is to be expended in gradual improvement. A farm at four or five shillings per acre, possessing within itself, or its vicinity, the permanent means of amelioration, will turn out a mine of wealth in the hands of an able cultivator, who, in the course of half his lease, will bring it to a level of fertility with the high-prized lands.

It is doubtless a sound general maxim, for a man to hire no more land than his capital is amply sufficient to stock; the disadvantages and dangers of a want of money, in all concerns, are too common and well-known, to be for a moment insisted on; the farmer had indeed better be somewhat short, than burdened with too large a tract of land: for in that case, if he be judicious, and master of his profession, he may well employ his surplus capital in a superior and garden-style of cultivation, and as a dealer in live-stock. But it is yet a grating

grating thing to an industrious man, to refuse a promising bargain, particularly of the low-rented kind, on account of its extent, the very consideration which must animate his hopes; and when such a one has made the leap, instead of the common method of aiming at the culture of the whole in a slovenly, insufficient, and unprofitable manner, it would probably be much the safest plan, to crop only such a portion of the farm, as his means would compass with good effect; seeking but to pay the rent and live, and by dint of frugal and persevering industry, to make an annual addition, until, in process of time, the whole farm should be in a flourishing state of cultivation.

I cannot forbear in this place, copying an important remark from Mr. Young; which, in truth, I have repeatedly seen verified. Farmers frequently adopt no other rule respecting the rent they will give, than mere custom, nor attend to any other criterion of estimating the worth and qualities of land, than that of the good or ill success of the last occupant; than which, there can scarcely be a more fallacious method of forming a judgment. I have known many farms, on which fortunes might have been obviously, and afterwards were really made, lie untenanted, and taken afterwards, with the utmost apprehension, purely because an ignorant, wretched, and needy tenant had failed therein. Many fine farms may now be pointed out, on which, at seven shillings an acre, the old tenants starved, and brought their families to the workhouse: whilst their successors (times still the same, or worse) made their fortunes, by being

being rented at eighteen. It is a cruel disgrace, or rather a very laughable piece of burlesque, for a man pretending to common discernment, to regulate his judgment, and his conduct, from motives like those. If fair land be offered at a fair rent, it is well; if an additional rent be demanded, and a man, after the nicest scrutiny, both actual and probable, can discover money's-worth in the terms, he must be unwise to forego the occasion. Some landlords, from a magnanimous and princely spirit, have supposed it beneath their dignity to raise their rents; and certain tenants mistaking the nature of this bounty, and the question in general, are extremely averse to the very idea of any advance, not considering that it is a question of property, and that landlords as well as tenants have all possible right and reason, to make a fair advantage of the growing prosperity of the times.

Those men who are adverse to a distant removal, by which they might obtain a far superior situation, from the single consideration of present loss in the disposal of their stock, do not well understand their own interest. A present trifling loss, which the farmer's circumstances can well bear, ought not to weigh against a permanent and growing profit; this motive, however, confines many a farmer to a poor and barren spot: men are absolutely afraid of fair calculation, as they often are of their best friends.

In the examination of a bargain, the objections may be of a twofold nature; such as may be held insuperable, or such as may admit of compensation, either in proportional abatement of price, or in the goodness

goodness of the prospect. As to the first, on perceiving them, a man instantly turns his back on the business. In my own ideas, tythes taken in kind; a number of common carriage-ways, or paths, and the lands intersected by other property; far distant markets, and roads impassable in winter, are objections of that class; and granting pecuniary compensations can be made, there can be none found adequate to the anxiety of mind, which must be inevitably suffered in such a situation. Of those defects, with which a person is content to put up, he ought to have a very correct estimate, that he may really know when an offer is made deserving of his acceptance; an important point, where many contracting parties fail. Every practical man knows, that in bargaining as in angling, there is a critical moment, a time to strike, which may never return.

The heads already enumerated, will furnish matter for an estimate in writing, taken on the actual survey. Thence will appear the sums necessary to be expended, and the deduction of rent, or other recompence, such expenditure will fairly warrant. It may be proper here to enter a little into particulars, calculated chiefly for those who possess a capital adequate to the undertaking in which they are about to engage. I pass over the dwelling as a mere matter of comfort; on that head, referring the farmer to the counsel of his wife, if he has one; if not, advising him to take one with all convenient speed.

The Homestead should contain all the needful buildings, and the full space necessary for the reception

ception of a stock of various cattle, in proportion to the quantity of land. Nothing is more material to be attended to than this, nor is there a more common defect all over England, nor a more obvious reason, why so many farms are understocked with cattle, to the great detriment of individuals and the public. *Barns, Granary, Stables, Cow-houses, Calf-pens, Ox-house, Pig-styes, Cisterns for Wash, Cart-sheds, Poultry-house, Sheds various,* for the reception of harness and implements, are indispensable conveniences, and which ought to be found on an ample scale, wherever much business is intended to be carried on. The buildings ought invariably to be tiled, or slated; if not already so, one of the first improvements should be a demolition of the old dangerous and disreputable thatch. The granary, secured upon piles from vermin, should be sufficiently capacious to hold the whole, or nearly the whole, annual growth of the farm; that the farmer may, at no time, suffer the want of fodder, nor be exposed to disadvantageous markets. The cow and ox-houses ought to have convenient standings or stalls, in which those animals may be confined; and the styes must have room, as well for breeding, as fatting pigs. The advantage of shelter for carriages, ploughs, harrows, and other implements, would be found very considerable, on fair calculation of the damages which they annually sustain from exposure to the weather.

The want of convenient, or of good water, either at the Homestead, or in any part of the grounds, is a most serious defect; the remedy should be well-weighed, and the expence calcu-

lated

lated. The annual loss also from common paths across the land, where they abound, will be found much heavier on a strict examination, than any one could suppose. Where such have been established, rather from inattention, or accidental circumstances, than usage founded in good right or reason, it is highly for the interest of landlord, tenant, and the community, that they be abolished.

With respect to the fences, exact account should be taken of the number of perches to which the necessary improvements or repairs, will amount; and of the nature of those repairs, whether new planting, plashing, digging ditches, raising banks, repairing old, or rearing new walls. The calculation will, in course, be made, according to the usual rate, or charge of the county. Hedges without a ditch, or ditches only, are an insufficient fence. Dead hedges are a shabby apology for security, and in a living hedge, where the breaks, or gaps are numerous, and only stopped with bushes, the trouble and expence is everlasting; and the damage accruing in one half-hour, may amount to more than the cost of a perfect repair. A tenant of property who reflects, and is capable of calculation, will never be satisfied unless the whole of his land be amply secured, by living hedges and ditches of sufficient depth; but one less fortunate must put up with the condition of the fences, whatever it may be, at least, until he shall acquire leisure and property equal to its amendment. Nothing can be clearer, than that it would pay a landlord good interest for his trouble and advance of money, to let his farm in a perfect state, as to

fencing and draining: no tenant, whether rich or poor, but would catch eagerly at such a bargain.

The game, in some counties, forms an article of material consideration, since the quantity of corn they devour and spoil, is past all calculation, great. Where nurseries border upon a farm, the tenant is justly entitled to a large abatement of rent.

It needs no proof, that leases under equitable covenants, are beneficial, in an exact proportion, to both landlord and tenant; and it seems to be agreed, that the usual term of twenty-one years, is the fairest for both parties. Landlords who determine to grant no leases, (and the disposal of their own is an unquestionable right) ought, in justice to themselves, as well as tenants, to do all the permanent improvements with their own property; a thing which can never be expected from a renter at will, who, was he to chalk his land, for instance, might be obliged to quit, before he had even tasted the benefit of that costly amendment.

It is matter of regret, that there should be so much necessity for certain restraining clauses in the lease of a farm; but these are rendered absolutely necessary by an indolent and slovenly husbandry, and in truth, there are too many narrow-minded and ill-judging people, who delight to catch at every petty advantage, and who will not incur the expence or trouble of improvements, although a fair proportion of the benefit must inevitably fall to themselves. Were all out-going tenants to act liberally, it must result to the common benefit of all.

On the other hand, there are certain burdensome and unprofitable restrictions, of which a good tenant

nant has just reason to complain. These seem to be derived from a period anterior to the modern improvements in husbandry, and to be continued by unenlightened agents to estates, to the absolute extinction of the very spirit of agriculture. I hint chiefly, at binding the tenant's hands by the interdiction of particular crops, and that most impolitic obligation upon a good farmer, to keep a part of his land fallow and useless. The fallowing system is evidently incompatible with wintering large stocks of cattle.

The following obligations upon a tenant, in a lease of twenty-one years, the rent payable half-yearly, appear to me perfectly reasonable.

No old meadow, or pasture, to be broken up without licence.

No straw, dung, or manure to be sold, being the property of the soil. Tenant to carry all materials for repairs, at his expence, and to pay for labour of all kinds, the landlord supplying timber in the rough. All timber and young trees, or saplings, to remain untouched, the property of the landlord; the loppings of the pollards, and underwood only, belonging to the tenant.

Landlord to be permitted to plant trees in any fit situation. Tenant to house or stack, in the last year of his term, all his crop of corn or hay, upon the premises, and to leave the old dung properly turned up in heaps.

All hedges, ditches, banks, or fences, to be kept in perfect repair, one twelfth part of the

whole, being new made, or sufficiently repaired every year.

Hay and turnips, or other winter-feed, to be left on the premises, for the landlord, or succeeding tenant, to be taken at a fair valuation.

Succeeding tenant to be permitted to sow seeds on the lent-corn, of the last year of the term; to be harrowed for him gratis.

The in-coming tenant to have liberty to enter upon the yards, part of the stables, and upon such part of the arable land as may chance to lie fallow at midsummer, previous to his taking the farm, for any necessary purpose of cultivation.

The in-comer to be entitled to all the straw and chaff upon the premises, on condition of his thrashing out the corn, and carrying it to the usual markets at his expence.

The out-going tenant shall be permitted to retain the use of the barns and stack-yard, until the following May.

To conditions like those, no man of sense would object; but as to those clauses, frequently introduced, which prescribe the precise method in which the land is to be cropped and managed, however necessary they may be to the ignorant, they cannot be otherwise than disgustful to the intelligent and able cultivator. It is to commit a man's property, to take it entirely out of his own government, and to preclude both the ambition and the opportunity of improvement. It is to be lamented, both on public and private grounds, that estates are ever superintended and leased out by other than able judges of cultivation.

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The half-yearly period of payments is, I believe, in general, matter of form, the liberal custom of landlords allowing the tenant twelve months credit with the rent; nor is the custom more liberal than politic, as an industrious tenant is thereby enabled to do more ample justice to his land.

Some improvements might yet be made on the usual condition of a lease. The disadvantages of old, hidebound, and unproductive pastures, are obvious. It would be equally to the interest of both parties, for the landlord to consent to the breaking up of any quantity of old meadow, on the condition of the tenant's laying down a like quantity of land of equal worth, seeded and managed to the landlord's satisfaction. The landlord, indeed, ought to take upon himself the task of providing the grass-seeds, on being re-imbursed the cost. In those parts, where from the inferiority of the husbandry, it is held absolutely necessary to stipulate for fallows, would it not be an improvement, to substitute the obligation of hoeing a certain number of acres yearly?

In the conduct of the farming business, it has always been the fashion to lay much stress on the difference between the gentleman and the labouring farmer, and to allow a decided superiority to the latter, nay, even to deny all possibility of the former deriving profit from the practice of husbandry.

The matter has been improperly stated. Nothing can be more true, than that the man, whether gentleman or farmer, who determines to remain ignorant of his business, and who indolently suffers himself

himself to be cheated through the nose, will have a fair chance to be everlastingly unsuccessful. But grant the gentleman a moderate portion of the science of agriculture, and a decent competency of activity and resolution, and I conceive the balance will preponderate even heavily on his side, whatever may be the quantity of land, from a cabbage-garden, to a farm of a thousand acres. The personal labour, and superintendance, of the mere common farmer, in the old beaten track, can never stand in competition with the advantages of the new husbandry, of the most productive kinds of live stock, of an ample portion of manure, and of the garden cleanness of the hoe-culture.

Agriculture, viewed in a trading light, perhaps makes as ample a return for the use of money, as any domestic concern whatever; and although such be not the general custom, it is easy enough of proof, that very great capitals, to the amount of twenty, thirty, or forty thousand pounds, and upwards, might be safely and prosperously employed upon an extensive farm. The cultivator of two thousand acres, who should fully stock according to the principles of the new husbandry, breed and fat his own cattle, consuming all his spring-corn at home; bacon his hogs, and meal his own wheat, would find occasion for sums of very high account. His articles being all those of the first necessity, and being without the obligation of allowing credit, the profits would be more certain, and the risks less, than in any mercantile concern.

In what consists the new husbandry, so often quoted by agricultural writers, without a definition?

tion?—In allotting certain portions of an arable farm to the purpose of summer and winter-feeding a stock of cattle, sufficient, with their dung to manure and fertilize the whole of the land. In the eradicating, as far as possible, all useless vegetation with the hoe. In the use of the various improved, or newly invented implements, for the purpose of expediting, or abridging labour, and in the judicious selection of domestic animals.

The usage of the old husbandry, (too generally prevalent indeed at this hour) is to place very little dependance on the profit of live stock, to feed very few, excepting those animals absolutely necessary for labour; to reject the hoe-culture, perhaps altogether, to foul the land by repeated corn-crops, and to clean it partially and insufficiently, by summer-fallows, or seed it in its foul state, for a temporary ley.

The rate of stocking farms, may vary from three to fifteen pounds per acre. Many farms are taken by needy persons at the former rate, and if the soil be of natural fertility, the husbandry good, and the renter frugal and industrious, he may stand a fair chance, besides spending a life of cheerfulness, independance, and comfort, to enter the ranks of property, before the expiration of his lease. Such are the peculiar and glorious privileges annexed to the cultivation of the soil! Sums of such magnitude, as from ten to fifteen pounds per acre, are of absolute necessity, either for stocking according to the new principles, or improving to any considerable extent. Were it demanded of me, generally, what is the most advantageous application of land,

I should

I should be inclined to answer, that of dairying, or feeding a large number of cows, for the produce of butter: but with the reserve, that the business be conducted with great variation from the common modes. The dairy-man must himself be a perfect judge of the live stock which he entertains, and they of the improved species; no bad milkers must be kept, nor indeed any kept too long; the profit of grazing must come into the account, and of pig-feeding to a much larger than the usual extent. The winter provisions for the cows, both green and dry, must be so ample, as to equalize the produce of butter, in money, at least, with that of the summer, and it will be clearly adviseable to have a considerable breadth of land under the plough. If this, however, be the most profitable, it is, no doubt, the most troublesome scheme of husbandry.

The next in point of profit, is two-thirds arable, one-third grass; the most advantageous winter-feed provided, and cattle enough, of the best kinds kept, to furnish annually from twelve to fifteen loads per acre of rich compost.

This may prove more profitable than if all the land were grazed, since it is to divide the risk of markets between corn and cattle, and large crops of the former may of right be expected, where the quantity of manure shall have been so liberal.

A family which cultivates a parcel of land, with the prudent view of increasing its income and domestic comforts, should keep a small dairy, with two or three breeding sows, a small flock of sheep, some tame rabbits, and a few hives of bees. It

should

should not be forgotten, to stock a fish-pond or two, if there be such a convenience. The plan will also admit of the fatting a few bullocks annually.

Hay-farms and grazing-farms are obviously attended with the least trouble. Hay-farming is by no means the most profitable branch of husbandry, as it lies under the constant disadvantage of incapacity to feed live stock to any good purpose, hence much after-grass is annually wasted. Granting a hay-farmer has fatted a lot of beasts, they must be late in the season, when beef is usually cheap, and he cannot keep them until after Christmas, for fear of injuring his future crop of hay, which is his grand dependance. As to grazing, however profitable, or void of trouble it may be, I would advise every person to be cautious how he enters into it, to any great extent, unless he shall have previously acquired a considerable knowledge of live stock. Most bailiffs know much worse than nothing at all of the matter.

In the common advice given on the head of breeding animals, aptitude of situation and room have always been very properly insisted on, but the consideration the most important, perhaps, of all others, hath hitherto been neglected, which is, aptitude in the breeder himself for the undertaking, without which, I will venture to affirm, no adequate success ought to be expected. A man ought to be possessed of much sensibility for the brute creation, with a considerable spice of the *mania* of improvement, who sets up for a breeder. In his daily or weekly bible-excursions, he must be sure never to forget the book of Job. He must

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enter fully into the spirit of a thousand little niceties, both of judgment and practice, which it would take a good volume to describe. He must find a pleasure in never ending care and solicitude, and keep a perpetual watch. On such conditions, a breeder will acquire wealth and fame. The generality of cultivators, whatever may be their situation, had, perhaps, better purchase their live stock ready made. With respect to fatting animals for market, the greatest difficulty occurs with pigs, as is sufficiently manifest from the accounts of our numerous experimenters. The English of that matter is, the business requires a correct judgment both of that species of stock, and of the markets.

I have room to spare, but for one or two concluding remarks. There is a false pride amongst farmers of inferior property, which demands examination, if not correction. A man will make any shift, even to the neglect of the important advantage of purchasing cattle in the autumn, rather than sell his oats during harvest, or his wheat at Michaelmas. His importance is much diminished, unless he can make a capital display of stacks. But fair and impartial calculation alone, must be his guide in this case, who pursues his real interest. The profits of cattle, manure included, the waste in measure from the drying of the corn, and the consumption by vermin, must be strictly calculated, and set opposite to the probable rise of markets in the spring. In general, I pronounce without hesitation, it is nothing short of madness, for a grower of corn to hold it at a high price; and the most arrant and sottish stupidity for him to fix upon a flattering

tering and imaginary rate, under which he will not sell. I could fill a number of pages with ludicrous anecdotes of this kind. There is also another error amongst farmers who have acquired property, which has an extreme ill effect both upon their own, and the public, interest. As their money abounds, they have no idea but of purchasing into the funds, or of some other investment foreign to their proper concern. Instead of which their surplus cash ought to be invariably applied to the improvement of their farm, until their husbandy be complete, a mode of employment, by which their money, instead of five, would earn them more than three times that rate, per cent.

Those who desire to enter fully into the subject of hiring, stocking, and improving, I refer to Mr. Young's admirable work, for the moderation and truth of the calculations in which, on live stock particularly, I can vouch, having repeatedly seen them not verified only, but exceeded in practice.

ON SOILS AND MANURES.

BY the soil, is generally understood, the upper stratum, or covering of the earth, which is the object of cultivation; the next layer, or bed of earth, is termed the subsoil.

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The component parts of soil or mould, of whatever colour, proper for vegetation, are Argill, Sand, Water and Air, for unto these original principles may all earths be reduced, however blended, or joined with apparently foreign substances. Argill is the soft and unctuous part of clay. The primitive earths, Argill and Sand, contain each, in perhaps nearly equal degrees, the *pabulum*, or food of plants; but in their union, the purposes of vegetation are most completely answered. The precise quantities of each, necessary in this union, or whether they ought to be equal, is neither easy nor very material to ascertain, in a general or theoretical way; since that point is best determined in practice, when the soil proves to be neither too stiff and adhesive, from the superabundance of clay, nor of too loose and weak a texture, from the over-large quantity of sand in its composition. The happy medium in general it is, which constitutes the richest soils, but an excess towards adhesion or stiffness, is obviously most safe. These moulds will retain the rain sufficiently to absorb all its fructifying virtues, but not so long that it becomes stagnant, chilling, and unwholesome: they are known to experienced people by the sight and touch, and although they adhere to the feet in passing, they may be rubbed off without any great difficulty. The subsoil, whether it be retentive or porous; springy, or dry and warm; and the situation of the land, whether of level or irregular surface, together with the exposure, form very material points in the estimate of its fertility.

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The mixed or secondary Earths are, Clay, which is compounded of Argill and Sand—Loam, or a mixture of Sand and Clay—Gravel, or Sand and Stone—Till, or iron earth—Silicious and calcarious, sandy, stoney, or flinty Earth, Chalk, and Lime—Marl, which is composed of Stone, Argill, and Sand, and is usually denominated after that ingredient which may chance to predominate; thus the soapy, or unctuous kind, is called argillacious; the stoney, calcarious; and the sandy, silicious marl.

The various Soils, compounded of the above earths, will rank under some of the following common denominations:

Clays, Sands, Loams, Gravels, Chalks, clayey Loams, gravelly Loams, sandy Loams, chalky Loams, Peat and Bog, Moor and Heath. The soil of Bog generally inclines to Clay, that of Heath, to Sand. These terms are subject to an accommodating variation, and we frequently hear of a loamy Gravel, as well as a gravelly Loam; in the first, the gravel is supposed to be the base, and to predominate: so of other variations.

Manuring, or amending the soil, is performed by mixing with it certain substances, known by experience to contain a portion of that matter which is the food of plants, or to possess the property of loosening and decomposing the earths, and exciting into action their dormant virtues: and simply increasing the depth of its staple, with the addition of mould: by altering and correcting its quality, with that species of earth in which it may be deficient, as in giving friability to clay, by the assistance

ance of sand, and tenacity or stiffness to sand, by the admixture of clay: by Draining off stagnant water, above or below; by Irrigation, or Flooding with simple water; or by Warping, which is, to flood the land with thick river-water, for the sake of a considerable settlement of mud: by Paring and Burning the surface: by Fallowing.

Vegetable, as well as animal bodies, are furnished by nature with absorbent vessels, through which they attract, or suck up, from the surrounding earth and air, that matter destined for their nourishment: the fibres of their roots do the most material part of this office of nutrition. The *pabulum*, or food of plants, consists, I think, obviously, of elastic, and non-elastic fluids; of steam or vapour, and of water, which are drawn in various forms, from both earth and air. It is not possible that any gross, or terrene substance, could pervade the minute and almost imperceptible organs of plants. Their food is the essence merely, or so to speak, the *essential substance* of the bed of earth in which they are posited, in the form of *gas*, or steam; hence probably, a given quantity of mould, after having thrown out a large vegetable weight, shall have lost scarcely any of its own, as hath often been experienced. By way of illustration, this essence may be compared with the spirituous part of alcohol, which bears no comparison in weight with the mere liquid mass. The hypothesis naturally extends to those manures, we select to replenish the earth, when exhausted of its vegetable nourishment. It is the essence of those substances which

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goes to supply the defect of the soil; and experience, as old as the supposed date of the world, has proved that such as abound most in oils, mucilages and alkaline salts, are the most powerful fertilizers of land. Perhaps any substance susceptible of putrefaction or dissolution, and which contains nothing noxious to the vegetable creation, is convertible to the food of plants.

The above desultory ideas ought, by no means, to be construed into any intended disrespect to the authority of the celebrated Hassenfraz: the labours of such eminent professional men ought to be accepted by the world with gratitude, and their opinions received with all but implicit deference. I am aware that the theory of the carbonic substance, or the coaly residuum of substances, as the food of vegetables, is now generally received by our chemical agriculturalists. But I beg leave to ask, are we sure there is any novelty in this discovery, or does the novelty consist, as in certain other discoveries, purely in the nomenclature? Virgil, Cato, and Columella, I believe, were equally well aware with us moderns, that vegetation would be promoted by the charcoal of almost any substance, that the putrefactive heat, as well as actual combustion, might be likely to produce a coaly substance, and that such substance must necessarily be soluble before it could become the food of plants. If it be pretended, that *carbon* is exclusively the food of plants, I conceive such a notion is contradicted by every day's experience, which demonstrates to our senses, that vegetables are nourished by the essence or vapour of fresh dung,

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as well as by that which is arrived at its carbonacious state.

It is in course to give a catalogue of the various animal and other substances, which are proper for manure, and it has at least one particular use, that of reminding the cultivator of some articles within his reach, which might else have escaped his notice; but respecting the particular application of these, dependent as it is, upon such numerous contingencies, which may entirely alter the state of the case; every one must be left to his own experience and discretion. None other than general rules, founded on evident and permanent principles, can, with propriety, be given, as the numerous agricultural instructions, perfectly ludicrous from their direct opposition, sufficiently evince.

The principal Manures will be found in the following list: The Excrements of all animals, including Bones, Hair, Blood and Offals; Feathers; the auxiliary Earths, Chalk, Lime, Rubbish, &c. before-mentioned—Putrefied Vegetables, Bark, Wood, and Leaves—Soot—Ashes—Malt and Rape-dust—Saw-dust—Salt—Woollen Rags—Scrapings of oiled Leather—Sea-Water and Weeds—Fish Blubber—Oil—River and Pond-Mud and Weeds—Sullage or Sweepings of streets and roads—growing Vegetables turned in by the plough, or green manures.

The principle seems to have obtained general assent, and with good reason, that animal-manures are the most powerful, and that the excrements of fat, particularly corn-fed animals, are far superior to those which are lean and store-fed. Human ordure,

ordure, putrefied fish, and powdered bones, are, perhaps, superior to all other substances, for fertilizing land in general, and for their quick as well as lasting effect. Next to those, indubitably, I conceive, stands stable or horse-dung, and in succession, the dung of the fold-yard, and sheep-fold. Cow-dung is generally held to be cold and watery, but however that be, I have seen it work wonders on cold clays, doubtless, because any dressing is better than none. The opinions concerning hog-dung are laughably contradictory. Authors teach us, that it is the fattest and most beneficial of all sorts of dung, and that one load will go as far as two of any other sort, and yet many farmers assert with the gravest conviction, that it is good for nothing, but to poison lands with weeds and rubbish. Of this I do not speak without book, since, in the year 1780, I humbly entreated the farmers around me to accept, gratis, a large lot of many hundred loads of the best swine's dung, which they unanimously refused. Doctors differ so much upon the point, that some vouch it to be hot, whilst others are equally positive that it is cold. They may, perhaps, be both in the right, as it sometimes happens with your strenuous argumentators: the excrement of corn, milk, or offal-fed swine, is, no doubt, hot and stimulating; that of such as are poorly kept, the case also of animals in general, but of moderate warmth and fruitfulness. I once sowed Poland oats upon a piece of land of a black, garden-soil, highly manured with hog-dung, and whilst green, experienced farmers laid the crop at twelve quarters per acre: it was, however, cut

green for fodder. Farmers on the cold wet clays of Sussex, have assured me of their preference of this dung before all others, and one in particular pointed out a heap, which he valued at twelve shillings a load: whilst on the still stronger clays of Middlesex, I have been assured, that hog-dung is cool, weak, flimsy, and good for nothing. My informants were all practical men, and I have enlarged upon this one of a multitude of similar instances, to shew how little worth is sometimes, that thing commonly nicknamed, experience. The manure in question, is probably among the strongest.

The dung of sheep, goats, deer, rabbits, and fowls, is known to be specifically hot, abounding in salts and oils, whence so small a quantity is found efficacious: but I have ever suspected, those farmers deceive themselves with this general idea, when they place so great a dependance on a fold of half-starved sheep. I would not exchange my compost dressing for their fold.

Bones have ever proved a most beneficial and lasting manure: it is reasonable to expect more speedy effect from them, when broken, or what is preferable, reduced to powder; and some eminent cultivators have the convenience of two cylinders, which lock into each other, for this purpose. From thirty to sixty bushels, ground, or unground, are laid upon an acre. The price of bones, sixpence per bushel. Feathers are highly spoken of; the quantity, ten bushels the acre. No doubt, that Feathers contain the principle of manure, but I have never had experience of them, and had I

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any to spare from a different purpose, I think I should prefer mixing and rotting them in the compost dunghill.

The propriety of throwing urine upon the soil has been sometimes questioned; and if I remember aright, Mr. Marshall, in his Minutes, does not prove, that the use of dung-water from the farmyard, answers the expence of carriage. I have myself carried urine upon grass-land without any perceptible effect. On the other hand, it has often been found to answer greatly, and the urine of the hogs at a distillery in Hertfordshire, is constantly sold, and has worked great effect in the neighbourhood. I, nevertheless, prefer mixing both urine and dung-water, with the compost, to pouring it in a liquid state upon the land.

Both the putrefaction, and the ashes of vegetables, contain an essential salt which enriches the land. Tanner's bark, partaking both of vegetable and animal salt, is a very forcing and strong manure for cold stiff lands, warming and opening them in a very eminent degree. A load generally suffices an acre; but I think the best method of using bark, when intended to loosen clay, is to mix it with sand, light mould, and a moderate quantity of lime, or powdered chalk. With respect to vegetables, if reduced to ashes, their virtues come quicker into action, but the effect of putrefaction is more substantial and permanent; for that reason, it is better to rot, if possible, all vegetable matter, leaves, fern, straw, &c. than to reduce them to ashes. Fern and all hard stalky substances will rot in length of time, being mixed with earth,

stable dung, or ordure, and lime. Leaves and weeds may be collected in fans, and the concomitant advantage of clearing away the latter, will render the business worth while. Where expeditious manuring is desired, either fern, or stubble and straw, may be burned upon the land, to the quantity of five or six tons per acre; but should straw run short, virgin earth or sand, and some lime, may be mixed with the ashes, and the whole buried immediately.

Ashes in general, and soot, are of a warm and stimulating nature, and always proper for cold and stiff soils. They are both turned into the land, and used as a top-dressing, in which latter case, care should be taken not to burn the crop. Soap and coal-ashes are the strongest; the latter I have observed to destroy worms and insects, but they have one ill effect, which is, to cut of the tender fibres of plants, and I have often seen the stalks of young seedling cabbages entirely cankered by the friction of contact with the rough ashes. Peat-ashes are burnt from black, moorish, or marshy ground. Ellis writes of fat and lean peats, by which, I suppose, we are to understand it, fat or lean, as the clay or sand predominates. The fat peat-ashes are judged very hot and sulphureous. From ten to twenty bushels per acre of these, are used, but, in general, a load and a half or two loads of ashes are allowed. They must ever be kept dry, or their goodness will be much diminished. Grasses, in general, are much benefited by them, at least, for a crop or two.

Malt-dust, or combs, as it is called, is a beneficial

ficial dressing for almost any land, to the quantity of fifty or sixty bushels to the acre. Saw-dust also, which will help to loosen stiff clays, is advantageously mixed with sand and lime for such end. Rape-dust, abounding with oil, must be beneficial on poor soils. Rags, particularly woollen, are used with advantage upon stiff soils, after the rate of twenty or thirty bushels per acre, chopped small; I have, however, observed, they make good nests for worms. To be convinced of the efficacy of rag-manure, one need but examine the corn-crops adjoining to the paper-mills in Kent, which are most abundant. I have heard of seven quarters of wheat growing upon an acre of land, highly dressed with the refuse and water from a paper-manufactory. The water in which hemp is retted, or soaked, is also said to be a good manure.

The circumstance of human ordure, the most powerful of all manures, being so totally neglected in this country, has often been remarked by foreign agriculturalists. It is a truth not to be denied, that in a few of the most material points of husbandry and tillage, we are at this day far behind our continental neighbours, and even the Asiatics, however antiquated and unvarying the practice of these last; one of these points is the use of manures. In Flanders, ordure is in such request, that it is carefully collected, and transported from place to place at great expence: they even mix it with the soil, fresh, and in a liquid state; sometimes pouring it into the holes, as they dibble the plants. Nay, the Chinese are so fearful

fearful of suffering any needless waste of a commodity so precious, that it is a common thing for their farmers to erect by the way-side, a commodious house, from the door of which an appropriate rhyme invites the traveller to deposit his welcome contribution. The reason for our neglect of this manure, appears to be threefold: the natural fertility of the soil of this island, and its peculiar fitness for the product of corn and grass, the great quantity of cattle-dung made from our extraordinary consumption of flesh meat, and a strong inveterate prejudice against the manure in question. Of this prejudice I have seen various instances; I was once consulting a carter about the use of bog-house-soil, upon a piece of cold, iron clay, on which nothing would grow, when the fellow turning up his nose most delicately, told me, he hoped I would then get people proper for the employ.

Mr. Middleton assures us that ninety-nine parts in a hundred, of the soil of privies, in London, is carried by the common sewers into the Thames: thus, although we loath the essence of this manure in our victuals, we do not scruple it in our drink; and as the Thames water, strongly as it must be impregnated with the infusion, is so renowned for its superior excellence, surely we ought to expect analogous effects in the productions of the earth, ameliorated by the same substance. A similar proportion of this valuable substance, is, I dare say, lost throughout the country; and as it is averred, that three or four cart-loads of it are sufficient for the first dressing of an acre, and that afterwards

wards, one load per acre, per annum, will keep the land perpetually in heart, the public loss, and public negligence, in this instance, must be great indeed.

I have seen ordure laid upon land by itself, in its fresh and gross state, when it had wonderful and sudden effects; but certainly the most proper and cleanly method is, to mix it in the compost dunghill, which it will enrich in an extraordinary degree. Every body knows that lime, charcoal powdered, or ashes, cast upon ordure, will absorb and neutralize its disagreeable effluvia, and render it tolerable to work. Mixed with lime and earth, it makes a compost fit for all kinds of soils.

Fish, and those gelatinous, or slimy substances which are washed on shore by the sea-coast, make a very strong manure, when rotted with earth. Whale blubber is also used with good effects, in those parts where it can be had at a reasonable expence; it is commonly mixed with other manures. Sea-water abounding in a fertile salt, is, (twelve gallons being allowed to the acre) sprinkled upon the land with good success; foul salt is also used in Suffolk, and other parts, at the rate of ten to sixteen bushels per acre: and sea-sand being impregnated with saline particles, is thence of a more enriching quality than any other. Sea, river, and pond-weeds, flags, and mud, sullage, or sweepings of streets and roads, particularly of the latter, when made of limestone, are all highly useful ingredients in a compost.

Of the earths proper for strengthening and amending the soil, virgin-earth, or such as has not been

been exhausted by vegetation, is too much neglected: this should ever form the bottom layer of composts, and if the farmer has nothing better to lay upon a piece of ground, which has been hard driven (a case too common) he would reap much benefit by a good covering of fresh ditch earth, or rotten mould, which must necessarily contain a certain quantity of the food of plants; and should his land be of a thin staple, or stoney, there would be the additional, and lasting benefit of an increase of substance. But fresh earth and lime will always make an advantageous dressing for land, and with those ingredients, which are sometimes, and in some situations, easily commanded, the cultivator should eke out his more scarce and valuable manures. It must be acknowledged there are poor tracts, where no valuable earth can be obtained, in any considerable quantity; it may also frequently happen, that either sand or clay, may be very desirable manure, and yet quite out of the farmer's reach, at any reasonable charge.

Sand and clay, as has already been hinted, reciprocally manure each other. Marl, Fuller's Earth, Chalk, and Lime, which is either lime-stone, or chalk, reduced to powder by combustion, or burning, are beyond all doubt, endowed with the virtue of promoting vegetation, by their unctuous and alkaline qualities, as well as of decomposing, or loosening the soil, either by their weight, mechanically insinuating themselves into the pores of the earth, or by the power of raising a fermentation therein. Chalk being reduced to the state of lime, its virtues are probably concentred, but a part of them

them lost or dissipated by the action of fire; hence, the effects of the latter are found more immediate and striking, but less permanent. The very essence, as it were, of the manure, is at once brought into play, and the substance reduced to minute particles, fitted for immediate insinuation into the clods of earth. The same effect has been before noted of ashes in general. But the powdering of chalk, either by grinding, or manual labour, seems to secure the double advantage of immediate and lasting effect, probably saving much useful substance which would be dissipated by the action of fire: not but that the stimulating properties of lime, or ashes, are exceedingly desirable upon cold, clung, and sluggish soils; and they are of singular use in the destruction of weeds, worms, and insects. It appears thus to be advantageous, to powder the soft and unctuous chalks, reserving the very calcareous, and the proper lime-stone, for burning. Sea-shells burned, produce the finest lime, and it is probable most of the stones found upon the shore would answer that purpose. The burning of clay, in large piles of wood, as a manure, has been recommended, but I am not aware that it has been often, or profitably essayed.

Chalk and Marl, are species of the same genus, composed of the same elementary substances. The indications of their goodness are, solubility, and a facility of being rubbed to a pure, unctuous powder, free of dross and grit. They do not always effervesce with acids, the defect of which is a proof of inferiority. Marl is found in various parts of the island, on calcareous and sandy soils; a soapy

species

species of different colours, is also met with on clays. The shell-marl, or marine-shells in a crumbling state, is sometimes found near the surface, and the stone-marl at a considerable depth. The former may be pulverized between the fingers, and is, of course, fit for use, without any operation in which, probably, and its fine and pulverized state, capacitating it for immediate action on the soil, its presumed superiority consists. The effects of marl on both arable and grass land have been most extraordinary, but it has frequently failed, or turned out pernicious, from an erroneous application; sometimes from overloading meadow with it, at one dressing, which has had the same effect as too large a quantity of quick-lime upon green wheat: the present sward has been nearly destroyed, yet as soon as the land has recovered, and the marl has become mixed with a larger quantity of soil, the grass has shot up in a most flourishing state, and continued in high thrift. The stone-marl is, from its nature, adapted to clayey soils; the shelly and argillaceous, to sands and light lands. The goodness of marl must vary with the soil, and the Norfolk marl is held superior; it is reasonable to suppose that preferable, which is found nearest to the sea, or large rivers.

But even the inferior kinds of these valuable earths possess a considerable power of amending the soil, and should not be neglected in districts where those of superior quality cannot be obtained. They are of so varying a nature, as to be fit for nearly every kind of soil, that excepted which is plainly composed of them; this, however, regards merely

merely the upper stratum, since sands, clays, of loams, which contain chalk, or marl, beneath them, have a mine of wealth in their bowels: yet such an immense advantage is neglected in some parts of the country, although in others, marling and chalking have doubled the value of the lands. As a farther instance of the power of custom, chalk-stone surfaces are, in some parts, chalked and limed, and lime laid upon burning sands, as a cooler! Lands are chalked, to the amount of from thirty to eighty loads per acre, which, with the occasional assistance of the farm-dung, will produce and continue the desired effect, for twelve or fourteen years. It may be better to use half the quantity at first, and the remainder in three or four years. A good artificial marl, for light lands, may be made of pure clay and lime, alternate layers, the heap being left exposed to a winter's frost: if intended for strong land, loam and sand must be substituted for the clay. Gypsum, or plaster of Paris, as an improver of land, is yet in its probationary state, both in America and Europe; I have paid due attention to the various experiments with this earth, without having any reason to suppose it superior to the richer marls and chalks, nor, in my opinion, need the want of it be at all regretted, where these can be had.

I shall conclude this subject, as I proposed, with a few general rules, originating, I conceive, in the rational principles of agriculture, not daring to make any nice scientific distinctions between hens, rabbits, pigeons' dung, or feathers; or to point out the peculiar adaption of each, to this, or that particular

particular soil, or crop: a practice which I ever compared, in my own ideas, with the sage advice of my grandmother, who taught me to catch sparrows by laying salt upon their tails, but that I must use bran for pigeons.

I must remark too, that no part of the present theme ought to be obtruded upon the attention of those jolly cultivators, whom the blind goddess has blessed with a soil of unconquerable fertility; who have no other care than to sow and to reap, and to do their utmost possible, to keep down rampant vegetation, unmolested by the plague of cattle, and the contamination of filthy excrement. It may be true, that even an Indian soil will be exhausted by everlasting giving without any return; but what of that? the evil day is afar off, and the farmer will be rich and indifferent, ere its arrival. It is lost labour, to reason on any subject with indolence and wealth.

The perfection of the culture of land, consists in returning to it, through the medium of manures, the whole of that essential substance extracted by the crops—in the total eradication of weeds, and in the dispersion of stagnant water.

Presupposing industry and capital, nothing can be more easy than to keep a farm, as well as a garden, in constant heart; for the bountiful earth allows us the advantage at starting, not requiring any returns until it has presented us with various crops. As to the pretended impossibility of entirely extirpating weeds, setting aside the example of other countries, China particularly, in the husbandry of which not a weed is to be seen, every

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one possessed of industry and resolution, may be convinced it is a mere pretence: *We have only to kill them by all the various and well known methods, as fast as they come, and there must necessarily be an end to their coming.* I freely acknowledge this to be an expensive process, in the beginning; but I fully defy any man to disprove that it is true œconomy in the end.

Manure amply sufficient to recruit the exhaustion of cropping, ought to be produced by the animals kept upon the farm, with the assistance of the straw; beside which, nothing even to the most minute trifle, should be neglected, which may, in any way, contribute to enrich the compost dunghill. Thus every farmer, if he shall so chuse, may be absolutely independent in this respect, in full and safe reliance on his own home resources. His cattle will make him a present of their dung, as well as pay him a good price for their keep. But in times unlike the present, when flesh provisions may chance to be low-priced, and not ready of sale, the case will be somewhat altered, and the wary farmer will rather resort to purchased manures, of which all the various kinds have been pointed out.

In the choice of dressing, a man will consult the nature of his land, his own ability, and debate within himself, on the scope of his intentions. If his land be in a worn-out state, exhausted by perpetual cropping, at the same time, perhaps, of too thin a staple, it is his business to recruit by those manures which will give permanent strength and substance; laying as much of it down for a time, and putting as much of the arable under the hoe,

as

as he has ability. The proper manures are marl and chalk, or in defect of these, clay upon sand, or sand upon clay, in quantities, according to the state of the case, and of the farmer's purse. Sea-sand is proved to be an excellent manure, and the Norfolk farmers on the coast, spread it in their stables, and fold yards, to the depth of several feet, littering over it.

Cold and wet lands naturally require warm and absorbent substances, such are chalk, lime, and ashes. These suck up the superfluous moisture, and render the soil dry, mellow, and friable. It is curious, that lime is recommended for precisely opposite effects, in both sand and clay: is it, that being more substantial than sand, and lighter than clay, it binds the one, and loosens the other? It would be wonderful, did we not know of the constant recurrence of such contrarities in agricultural practice, that lime has been often found, both of the utmost advantage, and perfectly noxious, by different cultivators, on soils of a perfectly similar nature. For my own part, used with discretion, I have known it succeed on most soils; chalk too, by some accounts, has done wonders on grass-land, according to others has had none, or a very ill effect. I have known it produce fine carpets of grass; a similar effect I have witnessed on clays, from a compost of bricklayer's rubbish, and cow-dung.

Two remarks on chalk and lime ought not to be omitted: it is averred by an American physician, that these possess an antiseptic quality; that is, they resist putrefaction, and by their absorbent powers,

attract

attract and suck up the unwholesome vapours of the atmosphere: hence, in boggy and marshy situations, it is extremely beneficial to chalk the lands, or roads. The other remark I have to offer is, that as lime-burning is expensive, from the scarcity and increasing value of fuel, would it not be more œconomical, and equally beneficial, to substitute the powder of chalk, or lime-stone? and if in any case, a stimulant might be held necessary, would not ashes of some kind, mixed with the powdered chalk, answer the desired effect? A man will break from thirty to forty bushels of chalk or lime-stone, to the size of a hazel-nut, in three days; but this operation would be much shortened, as well as performed in a more effectual manner, by machinery, in which the threshing-machine might probably be rendered instrumental. Dr. Mitchell says, they are deceived, who mix lime in a compost, by way of forwarding putrefaction, on account of the antiseptic quality of the lime; and of the same opinion was the late ingenious agriculturist, Mr. Baker, of Dublin.

Parched and thirsty soils, gravels, or sands, apt to scald, according to the common term, require manures which are cooling and phlegmatic, but which will, at the same time, impart solid substance whereon to feed and allay the superfluous heat. Such are composts made of cow-dung, mud, weeds, ditch-earth; with the addition of any cooling and fattening substances. These composts, thoroughly rotted and friable, make a most valuable top-dressing in the spring, for the corn upon the lands under description, preserving a necessary coolness

and

and moisture about the roots, defending them from the violence of the dog-day sun. By a parity of reasoning, the spring-crops of cold and wet lands, which, probably, on account of the autumnal rains could receive no manure, are highly benefited by a top-dressing of an opposite, that is to say, of a warming and stimulating nature, which may protect them from the inclement effects of cold easterly winds, during a backward spring. Soot, ashes, and the dung of fowls, and of the smaller animals, are in common use for this intention; but a compost made of those, with the aid of powdered chalk and sand, I believe to be still more effectual, because more substantial. The chalk and sand alone, other ingredients being unattainable, are a good dressing; as is clay and chalk, rendered friable by a winter's frost, for lands of the first description. I should suppose vegetable manures turned in by the plough, are fit for hot and thirsty soils; although that is a practice I never have, and probably never shall, use. The advantage of collecting at leisure-times, a large heap of earth to lie until it become mellow and crumbling, will be found great; if mixed with one third of chalk, still greater.

Respecting the season of laying manure upon the land, it must depend upon the convenience of the farmer, and the state of the soil. The leisure of summer, and the dry time, or frosts, of autumn and winter, are the common seasons. The objections to summer-manuring, are a presumed exhalation of the virtue of the dung, from the attraction of the sun; nor can any apprehension be more rationally founded: for although men reason, that the aqueous, or watery particles

particles alone, are exhaled: that granted, for argument's sake, such articles must possess virtue; and because dung dried by the sun still possesses virtue, the circumstance affords no proof, that the same unexposed and unexhausted, would not afford still more. This leads to the old argument concerning raw or fresh, and rotten dung: the rationale, or truth of this subject appears to me to be, that dung, even in its fresh state, contains the food of plants, and that every atom of *gas*, or vapour, exhaled, is a loss to the farmer; but it is one of those unavoidable losses to which we are necessitated to submit, for the sake of other and superior conveniencies. Long, heavy, and bulky manure is extremely inconvenient, upon a stiff soil, although perhaps desirable upon certain loose and sandy ones. Granting moreover, the quantity of *essence*, imparted to the land by green manure, to be superior, its effect will be more gradual, and, perhaps, from imperfect fermentation, its virtue less elaborate and subtil, than that of dung thoroughly putrefied in a mass. Hence the most advantageous method is, to use the dung immediately after the first fermentation shall be thoroughly finished, which may be expected in a well-managed heap in about six or eight weeks, according to circumstances: nevertheless, let not any one apprehend ill-consequence, or loss, from the use of dung, even fresh as it falls, should his convenience require it; he will perhaps find, as I have done, that it fattens the worms to a monstrous size, but many of those may be also converted to manure, by quick-lime and ashes. The plan of

the late Mr. Bakewell, to dry his dung to the fineness of a pinch of snuff, I have ever thought absurd and unprofitable in the extreme.

Dung, lime, and ashes, should ever be covered, in order to preserve, as much as possible, their effluvia from dissipation, whether in the heap, or in the field. If in the latter, in summer or winter, and the heaps cannot be immediately ploughed in, they ought to be left defended by a complete covering of mould; this is particularly necessary with lime and ashes: and those manures will often be found more profitable for stubborn clays, in a wet state, when dung would make them still more quaggy and intractable.

It is the practice of some to bury the dung, in the drills, wherein plants are to be set; which is, in truth, to make a sort of hot-bed for them. In the common method of spreading, all possible care should be taken to break, and immediately mix, the manure with the soil; in this respect, the Devonshire practice, in liming and chalking, ought to be an example to the country; they spare no expence in manual labour with the spade, and other convenient implements, to effect this desirable union, in the completest manner.

Cautions have sometimes been given not to bury the manure too deep, so as to place it without the reach of vegetation: there cannot be much in this, since it is the nature of exhalations to ascend, but it is probable, the use of manure may be so retarded. Ponderous substances, such as chalk, or marl, may perhaps sink deep, and be afterwards advantageously recovered, by deep ploughing. By

ploughing

ploughing deeper than common also, the soil may be advantageously mixed with fresh and unexhausted moulds, but the benefit of this will materially depend on the depth of the staple, and the nature of the subsoil; the latter may consist (as I have lately experienced) of a sour, infertile earth, which will bear nothing, until exposed, for a considerable time, to the ameliorating influence of the sun, dews, and frosts. In fallowing land, to lie for a considerable space, deeper ploughing than ordinary may be adviseable.

The bulk of the manure, upon a farm, should ever be bestowed upon those crops, whether turnips, cabbages, carrots, tares, pease, beans, grasses, or the like, which are intended for the support of cattle, by which measure, and the use of the hoe, those fallows, as they are styled, will be in the most rich, clean, and beautiful order, for the production of corn. But this measure is essentially necessary upon soils apt to run riot from superabundant fertility, when fresh dunged and sowed with corn broad-cast: the consequence too often is, one continued bed of weeds, and a forest of reedy straw, borne down to the earth by its own weight. I once saw a remarkable instance of this kind, in a three-acred piece of the most fertile land, by a river-side, on which a wheat-crop was absolutely spoiled, and a succeeding crop of beans nearly so; nor did the farmer get it into moderate tilth, under several seasons. The soil was so happily mixed (a deep hazel loam upon a healthy gravel) that it was naturally fitted to any crop, and would have done wonders, with either carrots, lucern, or cabbages;

either of which I recommended, but was answered only with a very significant shake of the head. Where they farm in the old style, fallow for wheat, and afford no manure for any but their wheat fallows, it is a common practice to lay on their dung immediately before sowing; and that from necessity, for they probably have none ready before that period; but if their land be stiff and clayey, the fresh dung may make it work badly; and it were, under this system, far better to get their land and their dung ready as early as possible in the summer, when the latter should be spread and turned in immediately.

The true management of dung in the farmyards, is to get it ready for use, that is, to expedite a due fermentation as early as possible; and to throw it into convenient situations, in heaps of advantageous size. Dunghills of moderate size, are most favourable to fermentation, and are besides ready at hand, for choice, on any emergency: and it is much better to continue at every opportunity, making hills in proper situations, either at home, or in the field, than to suffer the dung to lie all the season, trod down hard in the fold-yard, and exposed to a winter-flood of rain.

Every dung-heap should rest on a foundation of mould, so placed for the purpose of catching the draining of the manure, which would else soak into the earth, but which fully impregnating the bottom layer of mould, renders it nearly equal in goodness with the rest. The dung ought to lie loose, that there may be space for the act of fermentation, on which account, the cart ought by no means

means to be driven upon the heap. Should the heap be left a sufficient length, to produce weeds, let them be drawn previous to seeding, and either burnt with some rubbish, or buried with the dung, and a quantity of lime. It is doubtless advantageous to have a dunghill under cover, but such convenience is rather out of question, on account of the expence; nevertheless, a light covering of earth is no despicable substitute.

Various receipts, how to make a compost, are given by our scientific agricultors; some of them, laughable enough, on account of the expensiveness, scarcity, or hard names of the ingredients. The best receipt is, for the farmer to get all the various articles of manure he can possibly lay his hands on, the fatter the better, and so form his compost dunghill. The different ingredients should be equal as possible, no one lying too thick, nor should lime, or hot ashes (this, however, cannot be very material) lie in immediate contact with dung, but with earth or vegetables. Every practical man knows when, and how, to turn over the heap, and to divide and break lumps and adhesions; but this ought never to be done, so as to impede fermentation, namely, whilst that process is going forward: such task, however, ought to be well performed, at first, on making the heap.

In forming a compost of slop articles, the following is a good method: first raise a pye of earth, the bottom crust and sides being of sufficient thickness, and the latter of sufficient height, to contain the fruit. The carts being backed to the sides of the pye, into it are shot mud, scourings, ordure, weeds, flags,

flags, &c. a quantity of lime being added, and the whole inclosed by an upper crust of mould. These pies, in due time, will cut up very fat and rich, and being stirred over, may be again slightly covered with mould, and left for use.

Some persons are so curious, as to thatch their dunghills slightly with straw, during the summer-heats; a practice which I recollect to have seen in the yard of the late Mr. Rawlins, of Dartford, in Kent, of whom I heard the character of a very able, and very liberal, practical farmer.

Wood has been said to contain the virtues of manure, and I have known it left some years in the earth, with that view; to be taken up at last in a sound state, after having acted no otherwise, than as an inconvenience to tillage.

Sods laid up to rot, grass to grass, become a rich earth, which being mixed with ashes, the compost will form a good dressing for the gardens of those who dislike the contamination of dung in their culinary vegetables.

Farmers in the *environs* of the metropolis, who cart ashes and bones from thence, I think, should not forget oyster-shells, of which also a considerable quantity might be procured.

Let it not escape the memory of any one concerned in manuring land, that lime, ashes, burning, and all forcing articles, or methods, by warming, loosening, and intimately dividing the particles of the soil, stimulate to its utmost exertions; which, if continued, without the support of the most substantial animal manures and earths, must end in total exhaustion and barrenness.

IRRIGATION,

Or watering Meadow-land, is a very excellent, at the same time, an expensive, and not unfrequently, difficult mode of improvement: the intent is, to cause water to overflow the land, so long, until it shall have deposited its sediment, after which, the mere liquid itself would be prejudicial. It hath been matter of dispute with many, particularly Mr. Boswell and Mr. Wright, eminent writers, and judges of this matter, whether for the purpose of Irrigation, the preference be due to turbid or limpid water. Mr. Boswell inclining to the latter opinion. It is probably not too much to assume, that they may be both in the right. It seems reasonable, that when there is much warp, or sediment, the produce of grass may be more abundant, but of a rank and inferior quality; the crop from pure, limpid water, impregnated however with lime-stone and marly particles, may consist of a finer, sweeter, and more valuable herbage. The peculiar benefit of watering and warping is, that we thereby make use of a gratuitous manure, that otherwise is wasted, or becomes a nuisance; and it is much to be lamented, that the sediment of either spring, brook, or river in the country, which can at any reasonable expence be floated upon the land, should remain useless.

Having myself never attended much to the practice of Irrigation, I shall offer only a few general hints, which I have casually collected from others: in fact, although I were able to give directions

rections from experience, I believe the best I could possibly give to a beginner, would be, to send into Gloucestershire for a regular floater, on which head, I refer the reader to Mr. Wright's excellent pamphlet.

The water should be a full sheet, quickly flowing to the depth of more than an inch, at least, and the first consideration no doubt is, that the stock of water be sufficient, lest the expence be incurred in vain, or for an inadequate return. The beginning of November is the usual time of flooding, for a crop of grass, to be ready for stock in the beginning of March, which may remain nearly April out, but no longer, a crop of hay being desired. The water lying upon the land during frost, is supposed to preserve the roots of the grass warm, and free from injury. After securing the hay-crop, the ground may be again irrigated; the advantage of water to perform this, in a parched season, must be singularly great.

The ingenious Mr. Wright proposes the following necessary questions, previously to the attempt at floating a meadow. 'Will the stream of water, to be employed in floating, admit of a temporary wear or dam across it? Can you dam up and raise the water high enough, to flow over the surface of your land, without flooding and injuring your neighbour's adjoining land? Or, is your water already high enough, without a wear; or can you make it so, by taking it out of the stream higher up, and by the conductor keeping it up nearly to its level, till it enters the meadow? and can you draw the water off as quick as it is brought on?'—

There

There is full scope for ingenuity in a cultivator, who wishes to turn an adjoining stream or brook, or to convert the waters of a convenient pond, to the use of flooding his meadows—to adjust his levels, to regulate his acclivities and declivities, to lead his carrier trenches, and cut his outlets, or drains. The trenches should stand as a fence to the land. The method of constructing a wear or dam, recommended by Mr. Wright, being simple and unexpensive, is worth transcribing. "A strong and effectual frame of a wear, composed only of two rough pieces of timber, and a few stakes, in the following manner: one of the pieces of timber, or beams, was laid across the bottom of the stream, below the water, the other across the top, above the water, each beam having its ends firmly fixed in the banks, on each side of the stream; and the stakes were placed in a perpendicular direction to the front of these beams, the lower end of each stake resting in a deep groove, cut along the uppermost side of the lower piece of timber, and the upper end of each stake bearing against the upper piece of timber. For the position of the uppermost beam, and the upper ends of the stakes, see the wears across the stream, in plates, 2, 3. The lower piece of timber, in this case, is always placed a few inches higher up the streams, than the upper one, that the stakes may stand perfectly upright, at the same time that they bear against the uppermost piece of timber. Having thus obtained the outwork, or frame of a wear, it will be no difficult matter to fill up and complete it with a variety of materials, such as each situation shall most conveniently

niently furnish. When the stream, which is to be obstructed or diverted by a wear, is as much as three or four yards in width, it is generally found requisite to complete it, by placing portions of boards to the front of the stakes, nailed together in quantities agreeing with the dimensions of the stream: but when the stream is of less width than three yards, it will be thought superfluous to give any directions respecting the materials which ought to be used in a wear. Behind each wear and flood-hatch, a board or plank is always laid over the streamer or feeder, for the person to stand upon, who is to make or regulate them."

The expence of preparing a meadow for watering, will be upon an average of situations, from three to seven pounds per acre; the annual improvement will be best illustrated by the following account of the produce of an old watered meadow, in Gloucestershire, containing eight acres. On the 2d day of April, 107 sheep, 8 cows and 7 colts, were fed on this piece during five weeks; that is to say, until the time of shutting up for the hay-crop, for the keep of which the proprietor received £.35. 1*s*. 10*d*. after the rate of 10*d*. a head, per week for the sheep, 3*s*. 6*d*. the cows, and 4*s*. the colts. The crop of hay was afterwards about fifteen tons, which was six weeks in growing.

WARPING

Was first practised in Lincolnshire, about forty years since, and what may be truly thought absurd, considering its instant and immense advantages, was discontinued for twenty years; it will be an absurdity yet more admirable, should other counties, watered by maritime rivers, delay to follow the example of Lincolnshire. Granting it a risk of expence and trouble, what man even of a moderate share of spirit and activity, but would incur it on the prospect of so precious a return; even that of covering with the richest soil, to any desired depth, a bare rock, or the most barren heath, with the power of renewing it at will for ever? The sediment warped along by the tide, appears to consist of silt or sea-sand, and slime, such as is generally seen accumulated in the obstructed parts of navigable rivers; and it is inconceivable that the warp of the Lincoln rivers alone, should be fructifying to land.

Again, how an improvement like this, should have been discovered so late, with the ancient and illustrious examples of the Nile, and other rivers, before our eyes, that annually enrich with the slime left behind, those lands they overflow, is truly matter of wonder. But the discovery made, and its immense profit established by numerous, clear, experimental proofs, it will, no doubt, have the most extensive effects. River-mud, of all kinds, will now come in for its just share of repute, as a manure.

manure. There can be no doubt at least of the fructifying quality of the sediment of all waters, near the sea; as the fertility of marsh-land fully evinces. The goodness of the Thames warp, will also be readily answered for, by the farmers in the neighbourhood of Gravesend, where a spring-tide will leave an inch or two of the richest sandy slime, through which presently shoots a most luxuriant crop of herbage.

The few following particulars are extracted from the Board Survey of the county of Lincoln; and to that noble and truly national institution, and its indefatigable secretary, the country at large is highly indebted for information, which surely cannot fail of being attended with wonderful consequences.

The warp, or sediment, is left by the tides of the Trent, Ouze, Dun, and other rivers, which empty themselves into the Humber. These waters are muddy to excess, insomuch that a cylindrical glass of them, twelve or fifteen inches long, will (in summer, or the dryest time, which is most favourable to the purpose,) deposit presently, an inch and more of warp.

The process of warping is perfectly simple; only to let the tide in upon the land, either arable or grass, at high water, and to discharge it again as the tide falls. This is effected by a cut, or canal, from the river, having a sluice for the admission and discharge of the water, which is also confined to the grounds intended to be warped by surrounding banks raised to the required height, which may be from four to seven feet. The cut, or carrier,

may

may extend several miles, in proportion to the quantity of land to be warped, on each side, lateral cuts being made in proper directions. It will be easily conceived, that as in irrigation, the farther the course of the water, the smaller must be the quantity of the sediment deposited. A sluice for warping, five feet high, and seven wide, will do for fifty acres per annum; if the land lie near the river, for seventy. Cost from four to five hundred pounds. Warped land has been sold for one hundred pounds per acre.

Warping creates a soil of any depth you please. It leaves one eighth of an inch of sediment every tide, on an average, and the layers do not mix, but remain in leaves distinct. With but one sluice, every other tide only, can be used, as the water must run perfectly off, that the surface may encrust; and if the canal be not empty, the tide has not the effect. At Althorp, Mr. Bower has warped to the depth of eighteen inches in a summer. Every hollow upon the land is filled and levelled by the warp, and the stiffer and firmer it is, the better. A certain spot was warped to the depth of ten inches in eight hours. Mr. Webster at Bankside, has in about four years, warped his farm of two hundred and twelve acres, to various depths, from eighteen inches to three feet and a half. Some of it was moorland, worth only eighteen pence per acre, which now equals the best. He gave for the land, eleven pounds per acre, which is now, by warping, improved to the worth of from seventy to one hundred.

The expence has been twelve pounds per acre, from

from which, however, may be deducted, five pounds an acre, on three hundred acres, offered him by a neighbour, for the use of his sluice and main cut, in order to warp that quantity of adjoining land.

Warped land lets at from fifty shillings to five pounds per acre, producing vast crops of corn, grass, potatoes, and flax. Great crops are produced from three inches of warp. In some seasons, corn is sown the year after warping; if deep, a greater time required. Barley and turnips seem excluded from the crops in this improvement. A wheat-stubble warped, and sowed with oats the following April, produced twelve quarters per acre. Wheat afterwards thirty-six bushels per acre. Oats scuffled upon the fresh warp, the scuffle being drawn by eight, and held by one man, produced on three acres, particularly, fourteen quarters one sack per acre. Beans ninety bushels per acre: one acre measured to decide a wager, yielded ninety-nine bushels. An hundred and forty-four pods have been taken from one bean on four stalks. Tartarian oats seven feet high. White clover and hay-seeds, mown twice the first year; the first cutting three tons per acre, the second one ton, afterwards an immense eddish. Warp brings plenty of weeds; mustard, cresses, wild cellery, docks, and thistles, but kills rushes: its effect is very lasting upon land, which requires no farther manure for many years.

DRAINING.

DRAINING.

I HAVE been in the habit of turning over a great number of authors, both old and recent, on the important subject of DRAINING; I have also attended to the practice in various parts, but chiefly in the counties of Essex and Suffolk, where I had intelligence of the method adopted by James Young, Esq. a transcription of which I afterwards observed in Mr. Secretary Young's Survey of Suffolk. Mr. Young's plan being, in my opinion, preferable, in point both of œconomy and effect, to any other within my knowledge, I must beg leave strongly to recommend it to those particularly who are plagued with wet spewy clays, that in the winter-season will scarcely carry a rabbit. Much land I have ridden over in Sussex, the value of which might be more than doubled by being thus laid dry, and its nature changed from liquid mortar, or hard brick, to a dry, warm, and crumbling mould.

"The drains never to be drawn straight down a hill, but obliquely across, with a descent just sufficient to give the water a fall into a leading ditch. The leading ditch, carrier, or master-drain, never to be covered but from necessity. Every drain to be independent, and open ditches to be purposely cut whenever eligible.

"Mark the drains a rod asunder, and draw two furrows with a common foot-plough, leaving a balk between them about fifteen inches wide, then with

with a strong double-breasted plough, drawn by three or four horses, made on purpose, split that balk, and leave a clean furrow, fourteen or fifteen inches below the surface; but where the depth of soil requires it, touch the clay, by a second ploughing, to eighteen or twenty-inches: it is then ready for the land-ditching spade; with which dig a narrow drain fifteen inches deep. Examine (yourself) the drains before filling up, but let them not lie open long, lest they be injured by wet or frosts: fill up every day.

"The materials for filling, wheat-stubble, stacked for the purpose immediately after harvest. Fill well up to the shoulder, laying a small stick or two at the outlet, to prevent its being stopped by any external accident. Lastly, with a common plough, turn a furrow of the upper soil or mould upon the drain, taking care not to turn any of the dead soil raised by the spade, which always ought to be laid on the outside, and scattered over the land. Expence of digging, twenty pence, and filling up, fourteen pence per score rods. A man will dig twenty-three or four rods in a day.

"In case of a drain stopped by accident, which is discovered by the wetness of the place, make one or more fresh ones, in different directions to the old ones. In crossing an horse, or foot-path, much frequented, the use of wood or stone, for the drain may be advisable. The process of draining above described, is equally adapted to grass, as arable land; the turf may be raised at first, with a common foot plough, after which, the spade is used to the needful depth, and the drains being filled, the

the green sward may be relaid, as neatly and regularly as before."

I should suppose fern much more durable than stubble or straw, for the purpose of filling drains. The following method is practised in North Britain. "A ditch three feet deep, two and a half wide at top, and nearly of the same width at bottom, is filled up half way with small round stones from the adjoining lands; on these is placed a slight layer of old straw to prevent the mould, with which both are covered, from intermixing. The plough passes over without interfering, and the drain remains entire, and running for ages. Spouty lands are generally on a declivity, and the water when resisted by a stratum of clay, issues out in different places: the way that has been generally practised, is to cut a drain near the head of the spungy land; if you cut through a stratum of sand, from which, for a considerable space issues a large quantity of water, your object will be gained; but if your drain never gets below the clay, it will never get below the springs. Where these springs are frequent and issuing out of many places in the same field, the surest method is to lead a drain straight from the bottom of the field up the middle, until it is above where the spouts break out, and then lead cross-cuts at short distances from the main drain."

Such common methods of under-draining, will doubtless prove effectual, where the springs or collections of water, do not lie too deep: in that case, the only remedy is to tap, or bore through the bed, which covers the spring, with an augur, such as is

used in searching for marl; through the holes made by this instrument the springs will flow, and may be cut off from injuring the soil. Boring has also been successfully used, in getting rid of waste water downwards, when there happens to be a hollow pervious substratum; and likewise for the discovery of springs, which have been afterwards converted to the most useful purposes.

A knowledge of the necessity of sinking the drains to the depth of the water to be evacuated, was no doubt coeval with the art of draining itself; but to that able and justly celebrated rural œconomist Dr. Anderson, it probably first occurred, to use the augur in this business: Mr. Elkington has also employed it to the same purpose, with success, and this improved system of drainage promises to be attended with the most beneficial consequences to the public. Each of these gentlemen has published upon the subject, to which publications, in all cases of material consequence, I refer the reader.

In undertakings of this kind, of any considerable extent, it surely behoves the cultivator to be very circumspect, lest he put himself to great expence, and afterwards finds his drain injudiciously posited, and his land scarcely any the dryer; a piece of ill fortune with which I have been frequently made acquainted. As was observed in the case of Irrigation, it is much the more prudent method, at once to employ experienced men; such, in the draining branch are most readily met with in the county of Lincoln. For expediting this business, Mr. Watts has invented a mole-plough, the price of which is ten guineas.

It has been said, "that all arable land may be effectually drained by ploughing it into ridge and furrow, except in springy soils, or peat bogs." A position which I well know by experience to be erroneous; for in case of a retentive subsoil, a part only of the surface or flood-water will be drained by the furrows, whilst the soil, relieved merely at the surface, remains all winter, poachy, wet, and cold. Nor am I convinced of the utility of narrowing the ridges, in this case, being more inclined to give a preference to the broad, rounded beds of the Flanders' culture. I must own, I have witnessed striking good effects from surface-draining, when at the same time the lowermost ditch has been cast afresh, to a considerable depth, and plenty of earth carted upon the different sinks in the field, where the water had been accustomed to lodge. Much land there is at present, lying in a wet and unproductive state, which demands no other remedy. It will sometimes happen, that the swampy, or dependent parts of a field, are in its centre, and that always in a state of bog in the winter-season; the casting a pond, to a considerable depth, on the spot, will completely drain the piece, whilst it may serve other useful purposes.

The advantages of draining, however unaccountably neglected, are as plain as day light, and to be obliged to repeat them is a tiresome and discouraging task: amongst them must not be forgotten, the preservation of sheep from the rot, and the eradication of flags, rushes, and other aquatic weeds, which are to be ridded by no other means, than by cutting off the supply of their natural

element, and which generally delight in a good soil, well worth the expence of improvement. In many situations, the subterraneous and waste-water collected and reserved in proper receptacles, with convenient sluices, for the purpose of Irrigation, would render a most abundant profit.

ON THE

HOMESTEAD, FARM, OR FOLD-YARD.

I HAVE already adverted to the absolute necessity of ample housing and yard-room upon a farm, which the occupier purposes to keep in a state of fertility and improvement, with the aid of animal manures; also, to the too common defect of such a palpable convenience. The general outline, and the particulars which follow, will be found applicable to a considerable scale of farming business, and in degrees, to every farm of smaller extent.

It would be nugatory, to hold forth about aspect, straight lines, or right angles, in the formation of a farm-yard; such considerations will ever be postponed to those of local convenience: it will be sufficient to insist, that the space be ample and properly divided, the offices sufficiently numerous and commodious, and the whole sheltered in every quarter.

In the arrangement of the offices, namely, the dwelling, barns, stables, cattle-houses, and sheds, the material objects are, such a position as may contribute to convenience and the abridgment of labour, and at the same time afford the largest possible

possible proportion of shelter; this last, however, must obviously give way to the former consideration, and as a substitute, all the vacant places or exposures, may be well barricadoed with a lofty, warm, and substantial fence, such as has been already described. Mr. Marshall's idea, of an angle of the buildings presenting to the north, by which position, the two sides would afford shelter in the most material points, from the N. W. to the N. E. is, I think, happily conceived.

Respecting the number of yards, no precise rule will be expected, any farther than to state, that in the smallest concern a division is necessary, and in those of greater magnitude, two main yards, with appendages for stacks, and other purposes, conveniently situated, will properly describe the home-stall. A barn seems the natural division of two yards, since it will serve the common purposes of both.

The proper form of the surface of each yard, is concave, or that of the dripping-pan, which will drain all liquid manure from the stables and other offices, and from the cattle abroad, to the centre, in order to its preservation: and also the rain and waste-water, keeping the fold always dry and comfortable. But to avoid the inconvenience, in rainy weather, of more water than the bottom-crust, or layer of earth in the centre, will soak up, an outlet or sub-drain will be necessary, communicating with a pit of sufficient size and depth, and railed round, on the outer side of the yard-fence.

This pit may be so placed, as to serve two yards, and may be bottomed with rammed clay,

and

and its sides plastered with some composition which will make it retentive. Into it may be shot as much ditch-earth, as it will probably hold, without causing an overflow; and instead of pumping the liquor out, in the end, as has been recommended, I have generally shot in earth sufficient to absorb it, afterwards carting the whole away to the compost-hill, which I believe the easier method of the two. The materials for bottoming the farm-yard have been already particularized: nothing is equal to chalk for this purpose: Upon that bottom, the layer of manure-earth is to be spread, to the thickness of a foot, if possible, throughout the whole area, the quantity in the centre, or drain, being increased two or three-fold, as having the greater part of the moisture to imbibe. The whole must be kept sufficiently littered, that the cattle may not poach in the earth with their feet.

The above, or some method of similar effect, for the preservation of articles so precious to the farmer, as the dung and urine of his cattle, one would suppose so simple and obvious, that common sense could never miss it. How strange then is it, that we see such beneficial measures generally neglected, and that by men who have it in their power to compass them, and who pretend to be sensible of the value of manure? How many hundreds of farm-yards are there, either mere bog, or with a bottom which absorbs and devours the most valuable part of the manure, or with a descent towards a pond, a road, or a ditch, where it runs off, to be in part, or totally dissipated and lost? But what is

still

still more singularly absurd, a pond or drain, shall fortunately stop the grosser parts of this waste, and yet it shall be suffered to accumulate for years unobserved and untouched! I once assisted at working a mine of this kind, left by a generous predecessor, whence we drew an addition to the compost-hill, worth a considerable sum.

A pond is always recommended in a Farm-yard, but I must own, I would rather have it without the fence; for within, it is ever a receptacle of filth, and a drain for the urine and liquid part of the dung, the farmer never scrupling to drench his cattle with the delicious coffee-coloured beverage. An adjoining pond, however, situated out of the reach of the dung, is an indispensable convenience. I hold it of importance to the health of cattle that they have clean water to drink, with which, a yard may be well supplied by large troughs, or a bricked cistern made water-tight, and always kept full.

Should the ground not readily admit of being thrown into the hollow form recommended, should there be an objection to it, or should there already be a declivity forming a sufficient drain, all that remains is, to remind the farmer, that the richest part of his manure be not suffered to run away in waste. When the ground happens to be of irregular surface, and it is thought too great a trouble or expence, to level it, the next remedy, if there be any desire to preserve the manure, and a dry standing for the cattle, seems to be, to dig several pit-drains in the yard, which may be inclosed by posts and rails, with hurdles.

From

From every stable, or cattle-house, a drain will be necessary in order to conduct the urine to the proper receptacle: not a mere common gutter, in which the liquid sinks or stagnates, keeping a constant puddle at the heels of the animals; there ought to be a grating, or sink-plate, to every two stalls at least, which, with the drain itself, should always be kept free and pervious. The entrance to the chief cattle-house, is usually over a pavement of convenient width.

The dung from the different houses, must, both for convenience and preservation sake, be stowed near at hand, for should it be wheeled into the area, it would be trodden to waste, that is to say, either bound down too hard, or too much scattered: instead of which it may be at once placed in a state proper for fermentation and perfection. Either, pits may be made opposite to the stable doors, and bottomed with marl or earth, or the dung may be made up in clamps, or hills; in both which cases, the nice and scientific cultivator may, if he please, cover with straw or stubble, in order to prevent exhalation, and to promote the putrefactive process. The heaps growing to an inconvenient bulk, an auxiliary dung-hill must be pitched in the nearest situation; thus in a certain, perhaps sufficient, degree, with attention and a little ingenious contrivance, the dung may be preserved from exposure to the external air; in case of its too great aridity, or drowth, in the hot season, and with the view of reproducing fermentation, no method is better than to stir into the heap mud and weeds, slop of any kind, or foul water from ponds and ditches.

I have been hitherto speaking of the plan, or outline of a homestall, its constituent parts detached and irregular, as generally found, prescribing only certain additions and alterations; but in case of beginning entirely afresh, of projecting a new plan, and raising the building anew, as far as I can at present judge, I should incline to the following scheme, which seems to be the most compact and comprehensive, to unite all possible conveniences within the least possible room, and to be capable of extension or contraction, to serve equally the largest or the smallest concern—it is, to inclose the homestall, the dwelling perhaps excepted, in the figure of a CIRCLE or ROTUNDA. This figure was lately recommended to comprize a country gentleman's stabling and offices, and the idea has been sanctioned by the approbation of Mr. Young, who has prescribed the circular form for a Farmer's stack-yard and cattle-sheds, of which he has given a plate in the Annals of Agriculture, No. 189. But with all due respect and deference to the opinion, and unequalled experience of Mr. Young, I conceive that certain important advantages would be lost, by placing the stacks within, and the cattle withoutside the circle. The buildings would be placed out of the way of doing their best secondary office, that of affording shelter, and the benefit of a fold-yard, an important one indeed, to growing, and lean cattle, seems entirely excluded. I should greatly prefer placing the stacks without the pale, in an appendant circle, granting that figure to be necessary for the valuable purpose of their sliding along an iron groove,

or

or road, to the thrashing-mill. The stacks are to be built upon wooden frames, with wheels, the stumps of the frames being covered with brass latten, as a defence against vermin. The wheels being fixed in the circular groove, the stack is drawn along, either by horses, or an application of the machinery of the mill, to a shed adjoining the mill, under which it is unladen, without the smallest exposure to the weather, and may be afterwards returned to its place laden with the straw: this method of drawing heavy weights, upon wheels running in fixed iron grooves, (originally invented, I believe, by the celebrated Stevinus) has been some years in use, and one horse only, has drawn thirty tons, upon a very slight declivity. The invention is of very great utility, and is happily applied by Mr. Young, to corn stacks, and the thrashing-mill. Every considerable farmer has experienced the trouble and expence, of moving stacks to the barn, and the risk in wet weather.

The scheme which follows, I submit to the correction of better judgments. A circle of sufficient extent being marked out, and the area properly levelled and hollowed in the centre, the whole of the needful farm-buildings of every description, barns, granaries, mill-house, stables, ox and cow-houses, pig-styes, store-rooms, and sheds, are to be erected around, in the most convenient order, in point of useful contiguity, and with reference to shelter in the coldest exposures. The area being so spacious that the buildings will not completely surround it, every vacancy to be filled up with a good

good fence: with, or without, a lean-to and roof, as a shed. As many of these sheds as are required, may be run up against any of the buildings, that none of the cattle of the fold need be abroad, or feed in the rain or snow. Divisions and subdivisions may be made at will, with hurdles, faggots, or posts and rails, for the purpose of every requisite separation of stock. The number and position of the entrances to be regulated by local convenience, the gates being boarded to render the security complete.

The stack-yard must be formed without the circle, the corn-stacks being placed within the least distance possible of the barn, or thrashing-machine; those of hay and straw, in an equal degree of convenient proximity to the back-sides of the stables and cattle-houses. It is obvious that the back parts of the buildings will afford convenient walls for sheds, or erections of any kind, should a very large stock or peculiar circumstances render it necessary, to fold a part withoutside the circle: the communication, or rather the whole system, may be rendered complete, by furnishing all the principal buildings with entrances for cattle, backwards, as well as in front.

In the investigation of this scheme, the judicious reader will perceive that a mere pedantic literal adherence to the figure of a circle, to which every other consideration must yield, is not so much intended, as a generally round compact inclosure; nevertheless, it seems that the nearer the figure approaches to a true circle, the less will be the waste of ground and of expence in fencing.

Although

Although not absolutely necessary, it would be a point of great convenience for the backside of the dwelling-house, consisting of the dairy and other out-offices, to form a part of the Fold-yard circle. The wash of every kind from kitchen and dairy, should be saved with the utmost care, and led by proper sinks and pipes, into a capacious under-ground cistern, from whence it may be pumped into the hog-troughs, the styes being placed within a reasonable distance for the sake of that convenience. Adjoining the dairy should be found the cow-houses and fatting-houses for oxen; the pig-styes next: between the styes and the ox-stalls, is a handy situation for a boiling and a washing-house, in which an oven also, or kiln, is an excellent convenience. The lofts above the different offices might communicate, by doors through their several partitions, with the granary, thrashing-mill, and barn, affording the convenience of wheeling sacks of corn, or chaff, to every part. Room above or below must be afforded likewise for hay, potatoes, cabbages, and every other article of provision of that species. In feeding stalled oxen, to approach them at the head instead of the feet, is much the best method, for which end, a gang-way, sufficient to admit a large barrow, may be left between the wall and their head-boards, these being made to slide. Such is the practice of several distil-houses which feed oxen; and it has been recommended, where cattle feed at racks appending to the barn-side, to have sliding boards through which the thrashers may push the straw, without having to quit the barn, in order to replenish

replenish the racks. A chaff-house should be connected with the barn, and we will suppose the opposite range, whether stables, sheds, store, or cattle-houses, to have an appropriate share of those conveniences of connection already stated, that as little waste as possible may be made of time, labour, and materials.

It has been the subject of dispute, whether or not it be preferable, in point of interest, to keep cattle enough to consume all the straw, as meat, without any being allowed for bedding: the affirmative I think not improbable, but it is a length in cattle-feeding to which few will be disposed to proceed. But to go upon the supposition of foddering abroad, nothing can be more plain than the benefit derived from cattle, from warm littering and shelter; and it is equally obvious, that young and growing stock thrive much better in a range of a yard, than when confined in a stall, being also much more agreeable to their natural liking. This idea extends to store-pigs, which are almost indispensable in a yard, as gleaners of what would be waste to every other description. Some are for confining all cattle to the house, throughout the winter, and even recommend the expence of entirely covering in the yard, with a roof of deal-boards; a greater premium, in my opinion, for the perfection of dung, than such perfection, if attained, would ever repay. In case of a very large stock, it would be to incur no slight risk of contagion. It would be to run into the extreme of the continental practice, where they exceedingly injure the health of their cattle, by too close housing, stifling heat, and

hot

hot watery slops. Theirs, and our common system, form two extremes.

I have long been decidedly of opinion, that sheep are equally entitled to the benefit of the home-fold, with any other description of stock, and that they will repay it in an equal proportion; but I shall not say any thing farther on their subject in this place, than that they must, in course, be folded apart from other cattle, either within, or at the back of the circle; all the cover they require, being sheds in which they may be sheltered from wet and wind, but which should be left open, that they may walk into a small space at their pleasure. Pens, or divisions, are necessary, in order to seperate them in feeding, and for various other purposes.

There is no need to prove, that a large stock of cattle in fold, demands considerable and constant attendance, and that of steady, and capable hinds; yet some persons require to be reminded of a truth so palpable, notwithstanding the evidence of those many accidents, and that confusion they witness. A single accident, or a month's neglect, may very easily amount to a year's wages.

Next to proper food, the two great points in feeding animals to proof, are, regularity, and a particular care of the weaker individuals. On this last account there ought ever to be plenty of trough, or rack-room, that too many may not feed together, in which very common case, the weaker are not only trampled down by the stronger, but they are worried and become cowed and spiritless, than which, there cannot be a more unfavourable

state

state for thrift; beside, these are ever compelled to shift with the worst part of the meat. This domineering spirit is so remarkably prevalent amongst horned cattle, that I have a hundred times observed the master beasts, running from crib to crib, and absolutely neglecting their own provender for the sake of driving the inferior from theirs. This is, much oftener than suspected, the chief reason of that difference so visible in a lot of beasts, after a winter's keep. It is a very common and a very shameful sight, in a dairy of cows, to see several of them gored and wounded in a dozen places, merely from the inattention of the owner, and the neglect of tipping the horns of those that butt. The weaker animals should be drawn and fed apart, and in crib-feeding, in the yard, it is a good method to tie up the master beasts at their meals. As to cribs, I much prefer the substantial wooden ones, being better calculated to endure the treading and rubbing of the cattle, and therefore cheaper in the end. Hog-troughs should be bound at the edges, with iron hoops, to prevent their being knawed; with a number of partitions across the top, giving room for so many heads, and the victuals being given without-side the stye, it is convenient to have a flap to let down over the trough withinside, whilst feeding, that the animals may be kept entirely away, until it be stirred and ready. The absolute necessity of separation, and the propriety of keeping that stock together, the food of which is alike, are apparent; young cattle, in-calvers and colts, will herd well together, supposing none of the former to be vicious with their horns.

Every

Every barn ought to have a chaff-house, or two, in such situations as to communicate, if possible, on each side, with those houses in which chaff is expended; but the general use of the thrashing-machine, in no very great length of time, is so probable, that barns will serve to no other purpose than that of stowage.

It may be thought a simple and trifling thing to repeat, but if profit be the object, it is clear, no poultry ought ever to be admitted into a barn-yard: instead of barn-door fowls, they ought to be called rather, barn-fowls, for I am convinced, they generally get their good plight from thence; and to trust to the care of thrashers, in that particular, is a notable dependance. When corn-fields adjoin the home-stall, a thing to be avoided if possible, the fences should be well-secured against the above depredators. I often smiled to see two or three broods of young ducks, in the wheat of a man who had industriously bushed the top, and middle of his gate.

In every cart-stable, there should be a convenient space, or room adjoining, for the purposes of containing the chaff-bin and corn-chest; this last to be furnished with a good lock, and to be filled under the eye of the master or his deputy: here also the harness should be hung up, a greater attention to which than common, would be a material help in the payment of the collar-maker's bill. A tool-house under lock and key, where all the various little necessary implements may be secured, to be forthcoming the instant they are wanted, is a place of some consequence in a farm-

yard.

yard. To return to the stable, cart-horses should not stand without separation, for the reason already assigned, respecting the food. The most powerful, or courageous horses, will rob the weaker, biting and keeping them in a constant state of trepidation at feeding time. As to the watchfulness of the keeper, in this and all similar cases, the very idea is a joke. Swinging-bars are dangerous, and if stalls be thought too expensive, partition head-boards, of considerable width, from the rack to the manger, will be useful. No kicker ought ever to stand among other horses.

The granary and thrashing-machine, will in course join, and I have often thought, that granaries in general, were too distant from the barns; where those buildings are newly erected, cranes and spouts, and every thing instrumental in the abridgment of labour, ought to be previously remembered.

In an extensive farm, where it is ever so inconvenient and expensive to cart manure to the distant grounds, the great convenience of OUT-STALLS, appears to me very striking. I do not mean to insinuate, that there are never any out yards upon large farms, but I think they are not, in general, enough attended to, so as to render them of sufficient utility. A yard of this description, well fenced in, might contain a cottage for a labourer and his family, a stable for a plough-team, with sheds for straw, cattle, and sheep: but thrashing in distant barns, is imprudent, and of two evils, it would be the least, to cart the straw from home, stacking, or housing it at the out-stalls.

The unlucky possessors of aukward, straggling, incomplete Farm-yards, will do well to strike a fair and impartial balance, between the expence, and probable advantage of improvement; between immediate, but temporary, and everlasting trouble. In the case of new erections, the defect of proper arrangement is gross indeed: and with respect to necessary conveniences, and such as will make a return of both comfort and profit, they surely ought not to be neglected, although attainable only in the meanest style—A shed or stable, run up with a few posts and faggots, and roughly, but warmly covered, never fails to make a good return for its little cost and labour.

On the precise form of STACKS little can be said; those are undoubtedly best which are most securely thatched, and defended at bottom from vermin and wet. In respect of beauty and neatness, no doubt the globes of the Isle of Wight, and the South-West are superior. Where the homestall is distant, business pressing, the weather uncertain, and the thatcher at hand, the practice of field-stacking deserves attention: you still have but once to carry the corn home, and stacks properly hurdled round, may serve the purpose of shelter.

I have already given a memorandum of the great use of sailcloths upon a farm; the best method of rendering them completely serviceable, in covering a stack, whilst making, is to fasten two tall poles or balks, upright, one at each end, in the centre, another being attached lengthwise atop, of the proper height; over this ridge the cloth is thrown,

thrown, and in such position, shoots off the rain like an umbrella: but in contemplation of the great saving in barn-room, to be induced by the adoption of the thrashing machine, surely some additional expence might be bestowed upon the rick-yard; and it is submitted, whether cheap sheds, sufficient to cover all the corn and hay, at the same time admitting a free current of air, would not be both useful and profitable; they would besides serve other valuable purposes.

VERMIN.

SURELY the general obligation of taking all feasible methods to destroy those vermin which prey upon corn, was never so strongly incumbent as at the present alarming crisis: and it is to be hoped, that their own interest, enhanced as it is by the present enormous prices, will urge all those immediately concerned, to the most indefatigable exertions. What does it annually cost this fertile island in corn for the maintenance of that enormous stock of RATS and MICE, which the too indolent and full-fed sons of property suffer to range uncontrouled, and to propagate in myriads, as though they were animals of the chase, kept sacred for the necessary purposes of diversion? How many of this species of game, has the cultivator of a corn-farm, of three hundred acres, the honour to feed?—how many pints of wheat, per week, will a fine, full grown rat consume, including the waste?

wheat in England twopence a pint in November! Suppose a rat will consume half a peck of wheat in a week, which is sixteen pence, and a man has only two score of them quartered upon him, their board will stand him in upwards of FIFTY SHILLINGS a week—the rent of a good farm! I would advise my brother farmers when they have nothing of greater importance to take up their attention, to make a few calculations on this subject: and if any man be desirous of ascertaining the quantity of corn a rat will eat, let him take one alive, and make the experiment for his satisfaction; allowing, however, for confinement, since there is no doubt these animals consume much more at their liberty. Being at some degree of certainty as to the fact, may stimulate to radical measures. I do not pretend to say, but people employ rat-catchers, set traps, and lay pastils and poisons: and so did their grandsires—that is to say, when the vermin get to an intolerable head, we draw them, thin them, and cull them, leaving a sufficient breeding stock, about the increase of which we feel perfectly indifferent and at our ease, until they return in shoals, and wake us again. Are there then no measures which would go to the entire extirpation of these vermin? I have faith to believe there are: it has been said, faith will remove mountains, but I should think, persevering exertions full as well calculated to answer such, and every other end. I will next describe my method, at no rate a new one, and I heartily wish every other farmer may find a better: it must be understood, I confine myself to the farm-homestead or country-house, solely, leaving

leaving town-warehouses and mills, to men of the profession.

Every farm should be provided with a competent number of FERRETS, and of true vermin-bred CURS, such as are commonly kept by rat-catchers and labourers. An hour or two should be reserved, weekly, for a general hunt (in all accessible and likely places) when the beer-can ought to pass about pretty briskly, to make the business go down with cheerfulness, and to keep the hunters mindful of it as a pleasing task. The ferrets and dogs should be in the care of him, among the servants, either the best skilled or most attached to the sport. The holes and haunts of the vermin, in and around the premises, are diligently to be sought out, the master never failing to allow trifling premiums to those who make discoveries thereof. No respite to be allowed to the delinquents, but a war of extermination to be constantly carrying, and carried on, from January to December. If by these brisk measures, you do not entirely destroy your rats, you will not fail, in time, to drive the major part of them to the homestead of your next neighbour, by which you will have the additional satisfaction of doing him an unspeakable kindness, if he be an indolent man.

In aid of these measures, others also may be adopted, if necessary: traps for instance; but these ought to be of the cage-kind, and by no means such as to endanger the cats, a most useful species of domestics fully entitled to our care and kindness. The qualifications of a good cat are, that she will not touch young poultry, and will hunt

hunt from mere sport, rather than from the impulse of hunger. Eating their prey, injures them, and lessens their exertions. They should be kept well with flesh, and a little milk, for it is a curious fact, which I have often experienced, that milk, which will fatten a pig, will, if freely given, make a cat lean and unthrifty. It is a disagreeable drawback upon the services of these animals, that they soil with their devilish excrements, as if by choice, the finest and purest part of the corn, they are destined to guard; the only probable remedy for which is, to place some sand and ashes in a convenient corner, with some valerian and a little milk. Oil of carraway, it is said, affords the proper scent to entice rats and mice, and a paste is recommended, of flour and sugar scented with that oil.

Ferrets are best kept in huts like rabbits, their food is well known to be carrion, or offal of any kind, with occasionally, a little boiled skim-milk and bread. Before I quit this subject, I beg leave to speak a word or two, on the most proper dogs to guard a house and yard; which I am fully convinced, are those of the small yelping kind, the tongues of which there is no charm to tie, and which may be taught the highest degree of jealous vigilance. The security attributed to the keeping of fierce and savage yard-dogs, is purely imaginary, as I know to my cost, being perpetually robbed, whilst I kept a dog that was a terror to the neighbourhood; once in particular, of all my most valuable Rhone ducks, Chittegong-hens, Shackbags, Polanders, and I know not what, about which I was so curious and so solicitous! What a blank-leaf

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in my poultry-journal, and what an unlucky end to all my fine experiments! It is well known that thieves of any eminence in their profession, care not a fig for the largest and sharpest dog, and with respect to your own labourers, who, although not professional, may yet be very capable thieves, they are his cronies—where then is your safety? you have mighty little to plead, as a set-off against the breach of humanity in keeping these savage animals, in a land where are no wild beasts, the defence against which, is the only use of mastiffs and bull-dogs. I have known several accidents to the children of the poor, from yard-dogs, too horrid to relate; and abhor the idea of having all access barred to the benighted traveller, or the messenger of distress. Bull-dogs are useful to no other purposes in the world, than those of the most wanton and stupid barbarity, and it is much to be desired that the whole species were extirpated. The best guards are unremitting vigilance, good locks and bolts, and good fire-arms.

The same remedies apply equally to the field vermin, polecats and weazels, with their varieties, which, unless checked, commit such frequent considerable nightly depredations in the Farm-yard, taking even young pigs. Neither these, nor the fox, would be heard of near premises well guarded by vermin-dogs. Mr. Marshall, in his survey of Kent, has favoured us with a good method of trapping field vermin. "A wooden box, resembling a dog-kennel, divided in the middle by an open wire partition, running from end to end, and reaching from the ridge of the roof to the floor. One side of

of this partition is again divided into two parts, or cages, one of them for a rabbit, and the other for a live fowl, to allure the vermin; the other half formed into a falling box-trap to take them." This, whether new, or old, is an ingenious contrivance, but I wish the amendment of it, which humanity requires, had proceeded rather from Mr. Marshall, than myself. It is a most unnecessary piece of cruelty, to expose a poor wretched fowl, or rabbit, to the sight and the claws of their dreaded enemy. Kill the baits, and the scent of the fresh blood is the greatest possible enticement.

I know not that vipers, efts, toads, or any other poisonous class of reptiles, are a whit more necessary here than in Ireland, and I conclude, if country people would be unanimous and steady in their endeavours, the entire genus of these animals, might in time be extinguished. Would a single parish make the essay of rooting out all useless and dangerous vermin, they would soon find their account in it, and would undoubtedly be followed by their neighbour parishes. The only method is, by allowing handsome premiums to those who shall produce the vermin, or discover their harbour, or their eggs. Steps like these, it is well known, have been taken in various parts, but in so loose and indifferent a way, as to be entirely nugatory. was there a determined resolution to hunt out and destroy any species whatever, where is the possibility that it could long exist? These, and a thousand other evils, are purely the offspring of a general indolence.

Birds of prey, such as hawks and carrion crows, which

which endanger the poultry, and will even attack lambs; and bull-finches, pyes, and jays (the last, very devils in feathers, for perserving impudence) which are such destroyers of fruits, can only be combated by the gun. I usually allow boys, a penny each, for the eggs or birds; was the practice general, those birds would soon become high-prized rarities.

But it is necessary to look on the other side of this question, and to discriminate before we put in force measures of absolute destruction. Probably there are few classes of the feathered tribe, which we could well spare; and they are in general our defence against the tribe of insects, which would else, by their multitudinous increase, devour all the fruits of the earth. We cannot enjoy the benefit without its natural drawback, therefore must be content to allow those a share of our goods, which are so materially instrumental in their protection. It is a kind of wages, which these little feathered servants dearly earn, by working laboriously nine months out of the twelve, to maintain themselves upon insects, blights, worms, slugs, and seeds of weeds. The proposals for the general destruction of sparrows, I think, were ill-advised. Bradley relates, that he found a great number of caterpillers in the maw of a sparrow, and thence computed, that a pair of sparrows carry to their young, in the course of a month, 3,360 caterpillers. Rooks also, are our best defence against that devouring insect, the grub-worm, and on the dispersion of a rookery, those have been observed

observed to increase, in an alarming degree. I understand there are no rooks in America, and that several farmers, in that country, have desired a breeding stock of them from hence. Upon the whole, it appears, that all we have to do with regard to rooks and sparrows, is to watch them diligently at seed-time and harvest, looking upon that portion of corn, of which we cannot deprive them, in the light of a debt for past services.

Venomous insects, wasps, hornets, or of whatever species, having no merit towards us, of which I am apprised, had better be destroyed root and branch. Children would effect this for trifling premiums. In 1791, I determined to take account of the number of wasps, I caused to be destroyed, but by accident, my account was interrupted at 1,200. Had every family in the parish destroyed an equal number, I believe, it would have been several years before we should have been again much troubled with those pests. Not a moment's delay should be made in the destruction of a hornet's nest, when discovered. I recollect a sad instance of neglect in this case: a nest was suspected, but it seemed nobody's business to attend to it. Some time after a poor horse, attached to harrows, disturbed the nest, and these horrible insects instantly burst out, and covered him; the miserable animal, driven to raging madness, overturned his fellow, and mangled him dreadfully, but getting disengaged, he ran over hedge and ditch, into the village, where after doing considerable damage, and suffering most cruel tor-

ments,

ments, he was at length shot, there being no possibility of approaching to save him: half a crown ought to be allowed to the first discoverer of a hornet's or wasp's nest.

WATER.

THE neglect of procuring water, by artificial means, in situations where that first of necessaries is either unwholesome or scarce, shews a glaring instance of inattention to a very near interest. In soils which rest upon an iron clay, and in various other descriptions, where the water is hard, or filled with unwholesome earthy particles, the inhabitants are generally troubled with diseases of the urinary bladder, and the horses remarkably subject to the gripes. The beer in such countries is always hard, and unless very old, thick and turbid. To obtain good soft water, would be to add to the comfort of, and even prolong many valuable lives. The end is fully attained, by preserving, in under-ground cisterns, rain-water; the most pure, diluting, and wholesome of any.

In various parts of the continent, they depend entirely upon rain-water, thus preserved; and from thence the method was communicated to this country,

country, where it seems to have made very little progress, except in Yorkshire. They there excel, both in forming these water-cellars, and the artificial ponds, for the supply of cattle, in their upland pastures. These cisterns may be made under the dwelling-house, or near to it; but if the demand for water be great, they should be so placed, as to receive collections from the roofs of as many buildings as possible. The waste rain water in a garden, may be also very usefully conducted, by channels, to bricked, or clayed reservoirs, in some dependent part.

At present, there are few parts of England, where workmen are not to be found capable of constructing a good terras cistern, either above ground, or below, which will continue firm and water-tight, for a great number of years. The old method was, to bed with clay, upon which the floor bricks were laid, and if the cistern was made in a cellar, room was left to ram clay between the old walls and those of the cistern.

Upon Chiltern Downs, and in hilly districts, where water for cattle, and even for domestic use, is scarce, and obtained with much labour and expence in the dry season, instead of sinking wells, as in former days, the improved practice is, to conduct either the water from springs, through artificial rills, or brooks, or the rain-water from the surface, through cuts made by the plough, to ponds and reservoirs, ready prepared, and made retentive for the purpose. In counties, where such measures are necessary (Yorkshire for instance) artificers are always to be found capable of conducting the process,

process, upon the best principles hitherto discovered; and in case of any considerable undertaking of the kind, in other parts, recourse should be had to such, that a large expence may not be incurred at a hazard. But with respect to smaller matters in this way, every county, and one would suppose, every considerable farm, capable of producing engineers sufficiently qualified.

The borer, already spoken of in the article Draining, is a convenient implement for the discovery of springs, on the sides of hills, where rushes, aquatic herbage, or other signs, indicate the existence of water at no very great depth beneath the surface. The water brought to light, may be conducted by channels, and fence ditches, whithersoever the occasion may lie. Conducting furrows for rain-water may also be drawn by the plough, from the surface above, to a made pond or reservoir; namely, one main channel, with a sufficient number of lateral ones, the earth of the furrows being thrown on the lower side, as a bank to the water in its course.

Towards the end of summer, is the proper season for bottoming artificial ponds, which is often effectually done with chalk rammed hard, and covered with a coat of gravel. The common, and indeed best adapted, is the bason form, the sides shelving towards the centre, or deep. If the position of the pond could be in the line of a fence, thence serving two inclosures, it would afford another convenience: it has been recommended, to dig another to receive the waste water from the superior part of the principal one, in case of overflow, which,

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if kept replenished, would have the good effect of giving additional room to the cattle, when in hot weather, the master beasts are apt to engross the whole of a small space, keeping the weaker entirely from drink, unless constantly watched.

In loose and open soils, and when it is intended to go to the expence of perfect and lasting reservoirs, the bottom and sides are clayed and terrassed, the clay being rammed, and worked to perfect and impervious leaves or sheets, previously to being plastered over. The great object is to prevent the perforations of worms, and cracks from drowth, in the state of emptiness. To guard against injury from the worms, it is usual to lay a foundation of lime for the clay; and to secure the clay, in the second instance, from the tread of cattle and external accidents, it is covered with a coat of earth, which again is secured from poaching, by an upper stratum of stones. In my own case, I should chuse a bottom of clinkers, or coal-ashes, under the lime, as an impenetrable fence against the worm; and to loose stones, I should prefer coarse, strong gravel, as an upper stratum; nor have I that high opinion of pavement, entertained by some, which is by no means so durable under water, as above, when trodden by cattle; for should a single stone accidently give way, a yard or two of pavement is presently torn up. The clay must be pure, perfectly free from sticks, stones, or dirt, and the coat of it three or four inches thick; formerly, according to Mortimer, they laid on two coats of clay, each of the thickness of six inches; but as in some parts, the cartage

of

of so much clay, would be a heavy expence, and on the strength of a superior cement of mortar, full an inch thick, the quantity of clay is reduced: the earth and gravel above should perhaps be, together, a foot deep. Constant attention must be paid to keeping the channels clear from all obstruction, of leaves in autumn, and snow in winter. It is good to shoot chalk, or any absorbent earth, sand, or gravel, into reservoirs of hard water.

ON THE

IMPLEMENTS OF HUSBANDRY.

It is in the mechanic branch of agricultural science, that the superiority of the moderns is most apparent and decided. Within the last half century, since most fortunately for mankind, husbandry has become such a favourite and fashionable pursuit, the industry of scientific amateurs, and ingenious mechanics has been incessantly at work, and has not only highly improved all the ancient implements, but invented a vast variety of new, adapted to almost every conceivable use, or purpose in the tillage of the earth. Many of these, as is natural to suppose, have been fancifully complex, expensive; of trifling, perhaps, no utility; but others have done signal honour to their inventors, and cannot fail of being eminently beneficial to their country, and to mankind.

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The tardy progress of improvement amongst farmers has been often and justly lamented; but the mists of prejudice seem at length to be gradually breaking away with this secluded race, and our country can now boast its men of talents and business, in this, as well as in every other line of human cultivation. The midland counties may no doubt challenge a superiority, in most points, and the management of their superior cultivators well deserves the attention of their brethren of other districts. The grand reason of that backwardness, and bigotted attachment to old erroneous customs, and aukward unprofitable implements, which still disgraces but too many of our farmers of property, is, that they do not travel, and they will not read; accustomed to confound the ideas of their old habits, and their property, together, they look with a jealous and contemptuous apprehension upon all novelty, and will scarcely vouchsafe even a patient hearing to any proposal of improvement. Not to disguise a truth, indolence and pride have no small share in the generation of this folly. Were our farmers, who are beforehand with the world, to imitate the laudable and patriotic conduct of the Bakewells and the Culleys, in making occasional surveys of the different parts of our country, most worthy of attention, for improvements of every species, their character would soon acquire a favourable change; their indifference would be shaken off, their minds expanded, their eyes would furnish them with experimental proof. They would return home to amend their own practice,

to

to enlighten their poorer neighbours, and to benefit the country at large.

With respect to my own practice, I must acknowledge, and at the same time lament, that I have had hitherto few opportunities of experience, in any of the improved or newly discovered implements; Cooke's drill, a small barrow drill, and a small, convenient hoe-plough, with moveable mould-boards, being almost the only exceptions. It ought, however, by no means, to be forgotten, that all the operations of the new husbandry may be carried on, upon the most extensive scale, with the ancient tools properly and lightly constructed. Thus, a small plough will both strike out and hoe the drills, and the drag-harrows, with a little contrivance, will be easily changed into a scarificator or cultivator. This consideration yet weighs nothing in the balance against real improvements; and I believe the most useful method I can take, in the present section, will be to place before my practical readers, a concise detail of the most material newly discovered, or improved implements, at present in use, in various parts of the country, for an intimation of which, I stand indebted, chiefly, to the board-surveyors.

The THRASHING-MILL, that greatest of all modern agricultural improvements, was invented in North Britain; the principle on which it acts, to clear the corn from the straw, is not that of beating, but swingling it, as with flax, the operation being performed by a cylinder, which moves with an astonishing velocity. These machines are now very general, in Scotland, even among the inferior

classes of farmers, being made of various dimensions, and wrought by one, two, or four horses, or by water: their price from £. 25 to £. 60. or upwards, when made to clean the corn, which requires more machinery, and more room.

Mr. Moody at Riseholm, Lincolnshire, has a mill, constructed by Parsemore, of Sheffield; cost £. 36. 15s. Mr. Young remarks, that all the machines he had before seen, thrashed every kind of corn well, excepting barley. Here was however, a favourable exception: the thrashers declared in favour of the machine, against themselves. "The circumstance upon which the good thrashing of barley depends is, the iron covering under which the beating-wheel, having six beaters, moves; this, in Mr. Moody's, is fixed; but the beating-wheel admits rising and lowering at pleasure, but a new improvement is to make the iron roof moveable, and the wheel fixed. This iron is so near the beaters, that it rubs as well as strikes the grain out." Mr. Young advises a semicircular cast iron to close upon the beating-wheel.

In Nottinghamshire the first cost of a thrashing-machine is thirty-five guineas, or upwards: the expence of putting up, together with timber for the stage and shed, if built with brick and tile, about £. 60 more.

Colonel Mordaunt, of Halsall, in Lancashire, has a thrashing mill which moves by water, thrashes, winnows and grinds (or crushes the corn for provender) all at the same time. Hand-machines, price six pounds each, have been there tried, but without success.

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The following particulars are extracted from the survey of Kent, by that enlightened cultivator, Mr. Boys, of Betshanger; and a singular circumstance it is, that at the time of the survey, that gentleman's thrashing-mill was the only one in that flourishing country! After a number of improvements it answered extremely well. "It requires four horses, about eight men and four boys to remove the corn from a distant part of the barn, feed the mill, attend a winnowing fan, and stack the straw. When the corn yields well, it will thrash and half clean, THREE quarters of wheat, FOUR of barley, or FIVE of oats, per hour; by which I find there is a saving of nearly one half of the expence of thrashing, besides the advantage of getting the corn out cleaner from the straw. There is however no small inconvenience attending so large a quantity of straw, chaff, &c. being got out at one time, when perhaps it is not wanted; and by that means it is either wasted, or spoiled by neglect before it comes to use.

Expence and Produce of a Day's Thrashing.

	£.	s.	d.
Eight men, at 1*s.* 8*d.* each - -	0	13	4
Four boys, at 1*s.* - - - - - - -	0	4	0
Four horses, at 2*s.* 6*d.* each - -	0	10	0
Cleaning and measuring 24 qrs. of wheat at 3*d.* - - - - - -	0	6	0
	£.1	13	4

Which is about 1*s.* 4*d.* per quarter, or as before stated, about half price.

	£.	s.	d.
Cleaning and measuring 32 qrs. barley, at 3*d.* per qr. - - -	0	8	0
Other expences as above - - -	1	7	4
£.	1	15	4

Which is something more than half-price.

Cleaning and measuring, 40 qrs. oats, at 1*d.* - - - - - - -	0	3	4
Other expences - - - - - - -	1	7	4
£.	1	10	8

Which is little more than half price, they being usually thrashed at about 1*s.* 3*d.* per quarter.

" This mill will thrash every kind of corn cleaner than it is usually done by the common mode. To ascertain which, I sometime since got several neighbouring farmers to have thirty-six pounds of wheat-straw thrashed perfectly clean, in their respective barns, and then I had the same weight of straw thrashed after it came from the mill; and I found that the average produce of corn left in the straw, by the common mode of thrashing was half a pint in every thirty-six pounds of straw, more than is left by the mill.

" The horse-wheel is twelve feet diameter, in which there are 120 wooden cogs, which work into a cast iron nut, with 14 cogs on the end of a horizontal shaft; at the other end of which, withinside

withinside the barn, is a spur-wheel with 57 wooden cogs, which work into a nut fixed on an iron spindle, in which are 14 cogs. On this spindle the cylinder is placed, and it is five feet long, and three feet in diameter, and it has four beaters lined with thin iron plates fixed upon it, each projecting from the face of the cylinder, about two inches and a quarter.

" When the horses walk a tolerable pace, the cylinder revolves upwards of 200 times per minute, making nine or ten hundred strokes in that space of time. The beaters, by the revolution of the cylinder, meet two fluted wooden rollers, working in contrary directions, by a wheel fixed in the horizontal shaft; they are the same length of the cylinder, and five inches diameter, and revolve near 30 times per minute.

" The corn is drawn in, between the two rollers, from off a feeding-board, as broad as the cylinder is long.

" The beaters strike the corn upwards, by which the straw and corn together, are thrown over the cylinder, and drop down a grating; through which the corn and chaff fall into a hopper, and from thence pass away below a winnowing fan, by which the chaff is separated from the corn. The straw is pushed off the grating by a person who stands by it, and from thence is by others conveyed, either out into the farm-yard, or stacked in the barn for future use. The corn with the remaining chaff, &c. is then passed through a winnowing machine, and by that made perfectly clean."

Thus

Thus far, Mr. Boys, in his very satisfactory account of this admirable implement of husbandry, which surely must soon become general throughout our island: its advantages, of which we have had for many years, and in various counties, the most satisfactory, experimental proofs, are truly of a superior kind. The knavery, or the inattention of thrashers, is a trite, as well as a sad subject: I have too often convinced myself of their defects, by rubbing out the ears of a truss of straw, and measuring the produce; but the excellent implement in question, absolutely clears the ears. Mr. Winlaw, of London, the engineer, in his catalogue of tools, says, this machine will answer equally well for clearing of clover-seed, rape or canary, and for rubbing off the husk of rice: it may also be made to winnow at the same time, cut chaff, and grind, proper space and power being allowed. Its superiority over hand thrashing is most eminent, in all, and every respect. In a damp season it gets the corn out clean, which could at no rate be accomplished by the flail; and in case of smut-balls, they are not broken, as with flails, but remaining whole, much of them is blown away in winnowing; chaff or hulls also, are obtained in greater quantity, than from the flail: the advantages of dispatch, and of security from fraud, the process passing so expeditiously before the farmer's eye, will strike every one.

On the merits of this important engine, I shall farther present, or remind my reader, of the opinion of Mr. Middleton. "The saving by this means of thrashing, in the extra quantity of corn procured,

procured, and the security against having the corn stolen in the chaff, amounts to an advantage in favour of the mills, of about ten per cent on the corn crops; in some cases, to one shilling a bushel on wheat, and very generally to twenty shillings an acre, on the wheat crops. The expence of thrashing wheat in this county, (Middlesex) by the flail, is full four shillings per quarter, supposing the land to produce twenty-four bushels. The thrashing is twelve shillings per acre, to this add eight shillings, for thin wheat left in the straw. Two bushels per acre, worth four shillings each, makes labour and waste amount to twenty shillings per acre; which, on twenty-four bushels, is ten pence each, on the saleable grain: an allowance being made for pilfering, will make the ten pence a shilling."

The presumed disadvantages of the thrashing-machine, are, a decrease of labour to the poor, and an occasional redundance of straw. They are both, in my opinion, purely imaginary, at least easily obviated. In a country like this, enlightened, active, commercial, with a large and growing population, imperiously demanding the culture of immense wastes, hands are very little likely to superabound; nor is the new engine at all unpopular with the labourers, but the reverse, I believe, in every quarter. The straw coming together in too large a quantity for immediate consumption, I should not regard, being convinced from trial, that if carefully and closely stacked *at the instant*, straw receives no manner of damage from keeping, particularly if not much mangled, or broken. But they who apprehend the contrary, may secure themselves

themselves by cutting it into chaff forthwith, in which state, we have Mr. Young's authority, that it will keep, undergoing a gentle fermentation. This process may be forwarded, by now and then throwing a little water upon the heap, which however must be laid in a brick, or stone building, having proper ventilation in the roof. I have myself had in contemplation a method, for the amendment, as well as preservation of straw-fodder; but not having yet found the opportunity of proving by experiment, I decline speaking farther of it at present.

The REAPING-MACHINE, a most desirable implement, has been attempted, by various ingenious persons, but hitherto without success. MACHINE-FANS, for winnowing corn, have been used in Scotland more than fifty years; they run twelve sacks an hour, and in two or three operations, the corn is completely cleaned: they require four people for sifting, ridling, &c. but some machines perform these operations also, by which two persons less are required. Price from £. 2 to £. 5.; and they last twenty or thirty years. I believe we have no better implements of this kind than those made on the plan of Mr. Cornforth, of Stockton, Yorkshire, which may be had in London.

The PLOUGHS in Scotland, were formerly long and heavy, but well enough calculated for the powerful draught of four and six horses: of late years, Mr. Small, of Ford, has reduced and simplified them. The mould-board, now a plate of cast iron, he has modified into such a form of curvature, as to make less resistance to the earth turned up,

by

by which it requires less force to draw it, than any other plough known in the country, whilst the furrow itself is gradually laid over to its proper position. This plough has no wheels. The chain, connected with the muzzle, by which it is drawn, fixed as far back as the coulter, is not essential to its formation, serving merely to strengthen the beam, which may be made stronger of itself at less expence, whilst the tillage is as accurately performed with ploughs that have none. Price forty to fifty shillings. This is on the plan of the Rotheram plough; its distinctive merit lies in an improved curvature of the mould-plate, and I instance it as a light and convenient tool, deserving imitation in many parts among us of the south.

The Kentish Turn-wrest Plough.—The beam of oak, ten feet long, five inches deep, and four broad; behind, is a foot, four inches by three and a half, and three feet and a half, long; on the tops, the handles are placed; the foot is tenoned to the end of the beam, and mortised at the bottom to the end of the chep. Through the beam, at two feet five inches distance from the foot, is a sheath of oak, seven inches wide, and one and a half thick, which is mortised into the chep, in an oblique direction, so that the point of the share is twenty-two inches distant from the beam. The chep to which the share is fixed, is five feet long, four inches wide, and five deep. The share is of hammered iron, weight about thirty-two pounds, twenty inches long, and from four inches and a half, to seven, wide at the point. The upper end of the beam rests on a carriage, with two wheels, three feet

feet two inches high. On the axletree is a gallows, on which is a sliding bolster, to let up and down. Through the centre of the axle is a clasp iron, to which is fixed a strong chain, called a tow, that comes over the beam, so fixed, as by means of notches, or a pin, called a cheek, to let the whole plough out a greater length from the axle, thereby letting it down to a greater depth. Price, with every kind of tackle fixed for drawing, five guineas.

The Kentish plough is an implement of great strength, adapted to rocky and hilly countries, and to turn the soil to a great depth, and to lay the land quite flat, without any furrow, or opening, a great advantage no doubt, in a dry soil. But in my opinion, the use of this huge machine, is by far too common and indiscriminate, in Kent, and the rejection of the Suffolk two-horse, whip-rein plough, well calculated for their occasional, and even general use, in some parts, was a proof of a very considerable fund of prejudice in the minds of the farmers of that county. They have a foot-plough, with a turn-wrest for breaking up lays, price two pounds fifteen shillings; also a swing turn-wrest.

The OLD HERTFORDSHIRE two-wheel plough, with its picked share, and those in common use in Berkshire and Hampshire, are powerful implements, calculated to turn up strong and stony soils: it would be a desirable improvement to lighten them, could that be effected without detracting from their power.

The DOUBLE, or TWO FURROW-PLOUGH, was I believe,

believe, originally invented by Mr. Duckitt, and has been lately improved by Lord Somerville, the late Right worthy, as well as Right honourable president of the board of Agriculture. This tool is best adapted to light and level soils, which are also most suitable to the drill-culture. It has been very properly observed, that they who determine to adhere to the old custom of driving a great number of horses at plough, should surely adopt the double one, and this seems to be really the case in the midland counties. Five horses and one man, with a double plough, for it requires no holder, will do as much work in a tolerable level soil, as two ploughs, with their full complement of horses, men, and boys. Single ploughs are also guided by wheels, without requiring any person to hold them.

In Staffordshire, besides the two-furrow plough, they also use the single-wheel plough, finding it very convenient, as it requires no holder, but only a lad to drive the horses, and to turn the plough in and out, at the end of the furrow. For the purpose of turning up turf, they make the addition to this plough, of an iron plate, called a flay, firmly screwing it to the coulter; this flay slices off the turf, and turns it into the furrow, where the plough immediately covers it with earth: from this single operation, turf has at once the appearance of a fallow, and they say, harrows nearly as well. It requires an extra horse. For ploughing hedge-rows, and irregular pieces, they use the common swing-plough.

The LINCOLNSHIRE FEN-PLOUGH.—An account

of this, take in Mr. Young's words, who warrants it a most excellent tool. "The mould board of a good sweep; the throat, a segment of an ellipsis; and the form of the share of great merit, always well steeled and sharpened with files; the coulter, a sharpened steel wheel; it much resembles the Dutch paring plough of the Cambridgeshire fens, deserves attention, and ought to be in the collection of the Board. To this plough, Mr. Cartwright has affixed a bean-drill of great simplicity, for drilling upon the centre of the preceding furrow, while the next is turning; it answers well, and drills every year a great extent of land, nor does it require previous tillage upon a stubble."

The following remarks on the fen-plough, and its management, are from the MS. of the Board. "Its wheel coulter much better adapted for ploughing among stubble and twitch-grass, than the sword one—they turn all their land over with two horses, double or parallel to each other; and in this business many of them are very clever, and will make their furrows as straight as a line; and by laying your head so low on the bottom of it, that your sight is confined by the sides, you may see down it to the farther end, which is in some, not less than a quarter of a mile in length. This extraordinary regularity is done by training their horses in this manner: they fix a piece of wood pointed at both ends, between the horses, in an horizontal direction of about two feet in length, by which means they are kept at such a distance, that the ploughman can see between them, to the further end of the land he is about to plough, and is thereby

thereby enabled (by fixing his eye upon some object that is stationary) to make his furrow as above-mentioned."

A TRENCH PLOUGH, has been lately introduced in Lancashire, by Mr. Duckitt, jun. It has a skim coulter, by which the surface (if foul) may be turned under, and fresh soil brought up, from a depth of ten inches, three horses being employed. Another instrument has been lately introduced, called the Miner, this is a plough-share fixed in a strong beam, without mould-board, drawn by four or more horses; it follows in the furrow just made by the other plough, and without turning up the substratum, penetrates and loosens the soil, from eight to twelve inches deeper than the plough had before gone; which operation, besides draining the land, causes the water to carry along with it, any vitriolic, or other noxious matter. The sub-soil thus loosened, the roots of plants have room to penetrate a full depth, and the soil itself is amended by being drained and opened to the influence of the air.

In Nottinghamshire their common tool is the DUTCH SWING PLOUGH (of which the Yorkshire plough is an improvement) its bottom is from two, to two feet and a half, with a pair of handles.

A ONE-WHEELED PLOUGH is also used, with two horses, and a one-wheeled drill-plough for turnips, much approved.

The late Mr. Chaplin, of Tathwell, Lincolnshire, introduced hither a ONE HORSE PLOUGH, which has been tried with success. It appears sufficient on light lands, for all purposes, breaking-up sward excepted,

excepted, and makes great dispatch in turnip-sowing. It succeeds also on strong land which has been previously-well-worked. The drill part of the one-wheeled drill plough, might be easily adapted to this. These are made by Mr. Watkinson, at Wragby, Lincolnshire.

The following (extracted from the Annals of Agriculture) is said to be an improvement of the common Foot-plough, used in several parts of Essex, by Mr. Lucas, of Bloomfield parsonage. "Nothing more than a double swillyard and double foot-chain to the plough, afford it so much additional *steadiment*, that I have seen it turn a straight deep furrow, forty rods long, without being touched by the ploughman: and thus his labour is infinitely lessened, without holding the plough in the leg hand, the careless indolent manner of half tilling the land in this neighbourhood. Making the *crongs* of the whippletree moveable, the lever may be lengthened at either end, so as to balance the strength of unequal sized horses."

"With this plough, a very old man, and a child of ten years of age, do each their journey with ease. The first has just finished a field of eight acres, in eight days, with three horses, extremely deep (eleven inches) which, with the single swillyard, he tells me, it would have been utterly beyond his strength to have accomplished; and this he has done with great ease both to himself and horses. The plough, with jaded horses, went equally well and steady upon the ridge."

Admitting the above to be an improvement, I should suspect the construction of the plough to be generally

generally defective, as requiring three horses upon that soil, where I think any of the SCUFFLERS hereafter-mentioned would be extremely convenient and efficacious.

The KENTISH NIDGET, called in the West, a TORMENTOR, is a horse-hoe, with triangular shares, fixed horizontally at the extremities of tines, which are driven into a three cornered wooden frame, in cross bars. At the corner, by which the implement is drawn, a wheel is fixed, in order to give the coulters their proper depth.

SHIMS, or BROAD-SHARES, for cleaning the surface of stubbles, particularly beans and pease, to fit them for wheat or spring-crops. In the isle of Thanet, Kent, these are made straight and sharp, very strong, four feet in length, and are often hung behind a pair of cart-wheels. Elsewhere they are made in the form of a crescent; or of a large prong, with three or four broad flat tines, and drawn horizontally, with the points forward, which force their way among the flints and loose stones.

The SCUFFLER, or CULTIVATOR. "The teeth intersect, and as they are but twelve inches from each other, and by intersecting, the distance is reduced to six inches, and then the breadth of the shares, being full three inches, reduces the intermediate space to so small a dimension, that the whole of the ground is entirely broken up, and answers the purpose not only of ploughing, but harrowing likewise, without cutting the quick grass roots in two, which is an advantage that ploughing has not. It likewise, from the standing forward and bend of the teeth, brings all the roots up to the

the top of the land, which is another advantage that cannot be had from the plough. The reduction of labour is another advantage that belongs to this instrument, as four horses and one man will do from six, to seven acres per day, in sand land. ——By arranging the teeth in the common harrow, the teeth in each row answering to the interstices of the bars, on either side of it, if the clods pass through the interstices of one bar, yet they are certain of being broken by the teeth, in one of the other bars."

Hayward's EXTIRPATOR.—A Mr. Hayward, of Stoke Ash, in this neighbourhood, has invented a machine for destroying weeds, and clearing ploughed lands for seed, which, by the experience of four years, is found more effectual than any other instrument hitherto used for that purpose. The extirpator, or the SCALP plough, as it is generally termed, is drawn by two or three horses, according to the quality of the soil, and the depth you put it to. The land should be once ploughed over, before this instrument be used. If it has lain a summer fallow, the usual way is, to work it twice over with the extirpator, about two inches deep at the first, and about four inches deep, and crosswise, at the second time, which, with running a harrow once over, will not only effectually destroy all weeds, but also render it very fine and ready for the drill or sowing. Lands being ploughed in autumn, and intended for spring-crops, are by this instrument prepared for seed, better than by any other method ever tried in this country, it will work in all lands, and may be handled by any person that knows how

to

to manage a plough. It will easily plough one acre per hour, and not in the least distress the horses. A farmer assured me, that he would with three horses, work up sixty acres per week with it; and that a person having the extirpator, may, with only three horses farm as much land as would, without it, require six horses. It is not customary, in this part of the country, to work oxen, but I am confident it will answer the same purpose, where oxen are used. It is adviseable to work all lands that are overrun with weeds, twice over; some lands may possibly require three times dressing. Some time should elapse, for the weeds that are cut, to die, before it is ploughed a second time. It is now adopted by most farmers in this neighbourhood; and its great utility will be attested by every person that has used it. Many, whose prejudice against every novelty induced them at first to ridicule the idea, are now as warm in praising it, and acknowledge it to be the greatest improvement in agriculture they have ever witnessed.

The above account of this most promising tool is given in the words of the Reverend Mr. Lewis, of Thorndon, to whom the public is much indebted for the information. It ought to be remembered to the honour of the British clergy, that many amongst them have taken great pains to acquire both a scientific and practical knowledge of agriculture, a most laudable and appropriate employment of their leisure hours. A plate of this instrument is given in Mr. Young's Suffolk, whither the reader is referred, for full satisfaction, but an idea may be caught from the following particulars

represented in the plate. The tines and shares are fixed in an oblong wooden frame.

The shares eight inches broad and nine inches long, fixed to stalks rising ten inches. Distance between them eleven inches.

The hind-ledge, six feet long, four inches square.

The fore-ledge five and a half feet long, four inches square.

Distance of the ledges twelve inches. The beam seven feet long; its elevation three feet three inches. Two handles. The instrument fixed to the wheels, &c. of a common plough, and made to go shallow, or deep, in the same manner.

HARROWS.—In some parts of Essex they draw their harrows upon a frame with wheels; the harrows being moveable, higher or lower, as may be desired. They are the invention of Mr. Knight, farmer, of Great Barfield, Essex, who, in consequence, received from the Society of Arts, a premium of fifteen guineas.

The UNITED HARROW and ROLLER, is the late invention of Mr. Benjamin Young, farmer, of the Isle of Wight; the price of the implement about fifteen or twenty guineas. The report of its utility is very good in the island, where it has, with two horses, rolled and harrowed in, twelve acres of turnip-seed, in eight hours, going once over the land; performing the work excellently, and making the saving of a man and horse.

ROLLERS.—In Kent, the common rolls nine feet long, and from fourteen to twenty inches diameter, cost from three, to ten pounds; for their stiff lands they use stone rolls of twelve or fourteen pounds price.

price. In Staffordshire, large, heavy cast iron rollers, from one to two ton weight; also a common roller, constructed of two pieces instead of one, cut through, as it were, and hung with gudgeons, in the middle; the advantage of which is, that in turning, it is less liable to root up the corn, and may be formed of two short pieces, instead of one longer.

Four-rowed, Duck-footed Drag.—Mr. Graburn, of Barton, in Lincolnshire, has for four years past, tried it with success, dragging-in barley and oats. After ploughing the turnip-fed land once, instead of a second-earth, scuffled the seed in, with Cook's scufflers, upon ninety acres, and the crop as good as any. One man and three horses did eight acres a day, a mile from home; which strength would have done but one acre, in ploughing and harrowing: but he thinks the drags much better, and has dragged-in 150 acres, with his four-rowed, duck-footed drag, sown with seeds, and the land as clean under them, as his neighbours who put in with ploughing. This year he has tried it with turnips, on sixteen acres ploughed twice, and worked with drags, one in winter, and one in spring; three of the lands were managed with the plough, and had extra earths; the turnips dragged are better than where ploughed, and he has determined in future, to follow this method. On light woldland, the crop misses much in the common way, gets too dry. *Young's Lincoln.*

Drill Roller. This tool, invented in Norfolk, gains ground in Suffolk. Its object is to save the expence of dibbling, by making (with

cast iron rings, which surround the roller) little channels, four and a half inches asunder, across a clover-lay, after ploughing; the wheat-seed is then sown broadcast, and covered by a bush-harrow. For light soils, that require pressing, it is a very good implement, but inferior to dibbling. It is used to pulverize fallows, on stiff lands, in a dry season, in which it is incomparably effective, more so than any spiky roller I have seen. *Young's Suffolk.*

Next the above implement, may be properly introduced another of similar intent, the KENTISH STRIKING PLOUGH, which is generally employed in that county, for striking out seed furrows, or channels, ten inches and a half apart. Team, two horses, at length, and two men, turning alternately to right and left, as with the turn-wrest plough. To draw the seams equi-distant, and parallel, the inside wheel is kept in the outside furrow, or seam, the seams being made three or four inches deep. Day's work three acres.

DRILL-PLOUGHS are made and used in various parts of the kingdom: they shed and cover the seed, which is completed by rolling. The common drill-barrow, for sowing a single row at a time, is adapted to all grains or seeds. A machine of this kind on a simple construction, that would at once deliver with accuracy into a number of drills at the required distance, is perhaps still to be sought. The drill-machine of Mr. Wellward, of Deal, price £.14. 10*s.* for setting in seven rows at a time, each seven inches apart, and any required quantity per acre, wheat, barley, oats, pease, tares, &c.

&c. is recommended, as the best extant, by Mr. Boys of Kent, our chief drilling county. This plough is drawn by two horses abreast, in a double pair of shafts, is very simple in construction, and not liable to get out of order.

HORSE-HOE.—The account of an expanding one, for all breadths, is to be found in Mr. Amos's Treatise on the Drill Husbandry; this has proved in Lincolnshire to be a most useful and effective instrument.

CHAFF-CUTTER, Cook's; a man and boy cut with it 100 qrs. a week. This implement, fixed to a large wheel, turned by a galloway or ass, cuts 50 qrs. per day. Nailor's cuts 3 qrs. an hour, with two men. Price £.10. 10*s*.

SWARD-DRESSER, useful for meadows and pasture: it includes a scarificator, with a bush of thorns, and cuts to any depth; drawn by two horses, carrying the breadth of five feet, in use at Brotherltoft, Lincolnshire.

The GATHENING FORK, used in Scotland, for collecting into sheaves corn which has been mowed. Its prongs seem by the plate to be nearly in the form of the letter W.



The longest are pushed below the swathe, raising accurately the straw from the stubble, whilst the shortest prongs serve the double purpose of retaining cut corns from scattering backwards, and of forming the size of the sheaf, which is regularly determined

determined when the straw accumulates as high as the top of these prongs. This implement appears to save time and labour. *Mid. Lothian Report.*

A HAY-CUTTER, in the form of a spade, straight and sharp at the point, and upon both sides, which performs the work with much more ease and expedition than the common hay-knife, has been introduced into practice by Mr. Ecclestone, of Yorkshire.

WHEAT-STUBBLE RAKES, used in Kent, of Oak, ten feet long, and very heavy, with iron teeth, fourteen inches in length, and five apart, beam five inches by four, drawn by two horses. Price £.2. 2*s*.

IMPLEMENTS and APPENDAGES to a HOP-GROUND, from Boys's Kent: Every Hop-plantation, of four or five acres, requires an OAST about sixteen feet square, which, built substantially with the requisite stowage-room, costs from £.150 to £.200. This is furnished with a dozen PICKING-BASKETS, at 5*s*. 6*d*. each.—A good SCALE-BEAM with weights and scales, £.5.—A SHIM made with a frame like a wheel-barrow, costs about £.2. 2*s*. —proper also for clearing summer-fallows. A HARROW, drawn by one horse, with a small wheel in front, to go round at the ends of the plantation, with a pair of handles, to be holden by the man who follows, in order to keep it from bruising the binds; price £.1. 15*s*.—A large iron PEELER to make holes in the land for the poles, 6*s*. or 7*s* A HOP-DOG to wrench up the poles, 5*s*.

Many of the implements already mentioned, are the invention of that most renowned of all modern

English

English farmers William Ducket, of Esher, in Surry; the successful disciple of Tull, and perhaps the only invariable practitioner among us, upon a large scale, of the drill-husbandry. Those who are desirous of going into the new system, will probably chuse to make their first essay with the tools of a man of such long experience, and so eminently practical, as Mr. Ducket: with these they may be accommodated, I understand, at Esher, a small distance from London; nor are the implements by any means of exorbitant expence, since (according to accounts given, ten or a dozen years since) the cost of a set, comprising trenching plough, furrowing machine, drill and horse-hoe, was considerably under twenty pounds.

Newly invented HAND HOES of Mr. Mark Ducket, jun. for doing more work, and at less expence, than with common ones.—*Communications to Board of Agriculture, Vol. II. p. 424, with a plate.*

June, 1799, Lord Somerville had a satisfactory trial of these hoes. His Lordship's servant hoed a land of barley, containing the fifth part of an acre, drilled at nine inches, in thirty-six minutes; and could continue the work, at the rate of two acres a day, for any length of time. Going backwards saves half the time. Made good work with barley, oats, and wheat, upon every sort of soil, on Mr. Ducket's farm. Likewise made trenches for potatoe planting, with this implement, and trenched some land up in ridges, with the two long and one short hoe, fixed; and found the tool so effective and handy for the work, that he thinks he could do twice as much with it in trenching (light land) as a spade

a spade could do in the same time. Price of this tool complete £.1. 10*s*.

The noble Lord, anxious to serve the agricultural interests of his country, in every possible way, has in his late judicious and patriotic publication, given the figure of a very useful and effective Portuguese hoe, having a short light handle, and the iron-work being heavy, and of a conical form, cuts deep without much exertion; the exact reverse of our common hoe, which, except in the lightest sands, demands great exertion, to make any impression whatever, if the soil be dry. Lord Somerville has well supplied the omission of Tull, who found fault with the English hoe, without suggesting any improvement.

I have in the beginning of this section, hinted at those causes which seem, more or less, to operate in every county, as an impediment to improvement in the implements, and general practice of agriculture; an additional one is, the extreme aversion of the country labourers and mechanics, to any new tools, and in truth, an equal aukwardness in their management. These difficulties can alone be surmounted by the energies of a man of unwearied industry, and a thorough conviction of the utility of making every possible advance towards perfection.

With respect to minute description of tools, in books of agriculture, in whatever degree they may inform, or engage the minds of readers, there is one purpose in which they can never be generally useful; namely, that of sufficiently instructing the village mechanic. To get new implements (unless

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of his own invention) made at home, is what a farmer should seldom attempt, he will easily inform himself where those are to be had, which he has chosen as applicable to his soil, and whence he will be sure to obtain them in perfection.

Farther, it is a material point, when a man desires to make trial of the common implement of another district, not to omit providing himself with a labourer accustomed to its use, as well as with the implement itself; or he is likely to have as little success in his new attempt, as I formerly had in persuading a Hampshire ploughman, to drive a light swing-plough with a pair of horses, guided by reins: not a ploughman in the parish would ever hear of such a presumed absurdity with patience.

Large farms, in several counties, have smiths' shops upon their premises, which is surely a great convenience, and saves much time, that otherwise must be spent in sending perhaps a mile or two, backward and forward, often to the delay of very pressing business: if to smiths, were added another shop, for the joint use of the carpenter, wheeler, and cooper, it would be no small or useless addition. I am speaking only of conveniences for men who undertake the jobs with their own tools, without pretending to determine how far it might answer the purpose of a large cultivator, to undertake the various mechanical branches upon his own bottom: in that case, I should recommend to seek out and employ the most competent workmen in their way; a track which has not been happily followed by certain gentlemen within my knowledge,

ledge, who, in order to have their horses shod in the improved style, have set up forges at home, and their farriery, notwithstanding, has retained all the vile and clumsy bungling of the old practice.

It naturally happens, that light and sandy soils are tilled with implements, and by cattle, proportionally slight, and that the reverse of this must necessarily take place, on strong, heavy, and stubborn land. The stirring and pulverizing of the former is, in truth, a matter of so little difficulty, that scarcely any thing need be said of the instruments by which these operations are to be effected, but that they be sufficiently light, handy, and conducive to that speed, which, on such happy soils, may and ought to be made: hence no small portion of those panegyrics, which it has been long the fashion to bestow upon the Norfolk husbandry, ought in strict justice to be transferred to the soil. That heavy and tenacious soils, those particularly abounding with impediments, require the strongest implements, and that to work these with effect demands great animal force, none but mere theoretical opinionists will deny: the chief error to be attributed to the clay-land farmer is, that he is too apt to substitute clumsy and inconvenient bulk for symmetry and solid strength, and to be indiscriminate and general in the use of his heavy tools and strong teams; whereas, upon almost all tracts of land we find a variation of soil, some parts of which may be stirred over with much less strength than others; nor can any kind of land require the exertions of so great force in the succeeding, as in the first operations of the plough. Thus it will be much to the interest of

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the strong-land farmer, to have a variety of tools suitable to his various occasions; for although it may require four horses to fallow his land at first, yet the latter stirrings may often be as well, and as effectually performed by two, and with a lighter plough.

The number of cattle used in a plough, and the necessity or not of wheels to that machine, have been for a long time, popular subjects of argument, perhaps of declamation. Having sojourned for many years together, both upon the lightest sands and the strongest clays of England, with the operation of ploughing, and, in fact, every other of rural affairs in which the labour of men and cattle were concerned, constantly under my eye, I must be free to declare, the subject to me offers no kind of difficulty or question. Upon those sands, where they boast of turning off their two acres a-day with a light pair of horses, driven by the ploughman with coach-reins, a skilful lad, with two good jack-asses would perform the same feat; but upon some lands of the opposite description, the attempt to plough an acre per day would break the hearts of a pair of the best horses in England. I know, nevertheless, of no lands which, with a proper tool, require more than four active, selected plough-cattle, nor at all times so many, unless upon an extraordinary occasion of trenching. During the seasons of winter and spring, and whilst the ground is moist, perhaps the strongest soils might be well tilled with a common swing plough, the shares being always kept sharp, as in Lincolnshire (a thing not so well attended to elsewhere), but in the dry time, when

when the clay is hard baked by the sun, wheels are a convenient appendage to the plough; in soils full of stones and obstructions, they are of absolute necessity. Very ridiculous comparisons have been drawn, ridiculous, because upon presumed equal terms, between men ploughing on these opposite grounds. Upon a light and free soil, the plough once let into the work, will proceed even of herself, with scarcely a deviation, whilst the whistling ploughman has no other care or labour than to walk after her, and guide his horses straight; in fact, it is his eye only which labours, and this in great measure accounts for the superior accuracy of the ploughman of our light land counties. Hence also, there is no necessity for a driver, since the ploughman himself has nothing else to do. But on strong and difficult ground, it frequently requires all the force of a very powerful man to keep the plough-share in the earth, which, in truth, would be totally impracticable, without wheels to second his efforts. The share, sometimes driven with the immense force of four, or six powerful horses, against a huge stone fast bedded in baked clay, will occasion a sudden jerk, sufficient, if it took place, to beat the breath out of a man's body with the plough-handle. Let common sense judge of the difficulty, under such circumstances, of a ploughman's guiding his horses accurately with reins. But impartiality requires it to be stated, that these arguments are frequently used when they do not apply, and that on every soil, without exception, two-horse and coach-rein ploughs may, and ought to be, occasionally used.

On

On HARROWING and CARTING also, our too sanguine and too theoretical writers declaim without discrimination. It is stated (and where is the wonder?) that on the light lands of the West, and the sandy carpets of Norfolk, they trot both at harrows and at cart. But can any man in his right wits recommend this upon stiff clays? The slow and lounging pace too of the labourers of certain districts, is introduced as a foil to the alertness of those in others. But, on examination, this difference will be found naturally to result from the different conditions of the soil on which they tread. It is much easier for a regulator of rural œconomics in his study, with his half-emptied bottle at his elbow, to advise the *pas de charge*, or the quick step, over a heavy and deep soil, than for the peasant, with a daubing of seven pounds of clay each upon his clouted shoes, to practise it.

A vast variety of harrows has been recommended within the last twenty or thirty years, many of them improving considerably upon the ancient form. The nature of the land to be tilled, will in general direct, as to the size and weight of the harrows. The prime considerations are, that the tines stand not straight, but obliquely, pointing forward, or, as they call it in the North, racked; that they all incline one way, and that they intersect and cross each other. This will completely do away the objection which Tull made to the blunt and straight tines of the harrows and drags of his day, which did but collect the clods to form perpetual obstructions. By the account which I have heard of the Patent Scuffling Harrow of Mr. Lester, of Northampton,

thampton, it seems to be a tool deserving of attention; it may be seen at the Windmill, St. John's Street, London.

Rollers, intended to do great execution, are generally made to cover too great an extent of ground, by which, in fact, their pressure is diminished, from being received and supported from too many points; the weight, to be effective, should lie in a narrower compass. Perhaps the old-fashioned octagonal rollers were more effectual than the plain circular ones in crushing clods; but, upon tenacious soils, a fluted (as in Suffolk), or a spiky roll, should ever be at hand. The adoption of iron mould plates for ploughs instead of boards, is an improvement, but no novelty, such having been used in Essex more than fifty years ago.

On Wheel Carriages, it ought to be remembered, that from symmetry and due proportion, the materials being good, result greater strength and durability than from mere bulk and weight, which have an increased tendency towards their own destruction. The Western, or Berkshire waggon, wider than common, with the lock holes closed up, is beyond all comparison the handsomest, the most capacious, the lightest, and most durable in England, price £. 25. On a large farm, where single horse-carts are not in use, a broad-wheeled double waggon is very convenient, as are also light broad-wheeled dung-carts. The Kentish Hutches, or large close-bodied carts, calculated for carrying corn, coals, or sand, may be very suitable in many situations. A small cart, to be drawn either by hand, or by an ass, or galloway, is extremely convenient

venient for light jobs about the premises, or in the neighbourhood: in such an one, much dung may be collected at leisure times, which else would be wasted in the adjoining paths, roads, or chases.

Of the great saving to be made by ONE HORSE CARTS, there can be no doubt, since it has been experimentally proved, and was moreover easily to be discovered from just theory. More weight may be drawn by six horses in so many carts, than by eight in a large waggon, and one man may manage two carts in the country. There are some peculiar inconveniences attendant upon this plan, which are sufficiently obvious; and notwithstanding it has been, for years past, so warmly recommended by very powerful pens, it never has, nor probably ever will be, relished by the generality of farmers. Figures of the improved IRISH CAR, so much recommended by Mr. Bakewell; of Lord Somerville's DRAG CART; and of Waggons with the FRICTION DRAG, may be seen in *Vol. II. Communications to Board of Agriculture.*

Lord Somerville's DRAG-CART, and method of adjusting the centre of gravity of the load, same vol. plate 19. fig. 1. p. 416. "A perspective view of a cart, to be drawn by two strong oxen, by a pole, yoke and bows, and to carry 45 cwt. In the front of this fig. is represented the method of adjusting the position of the centre of gravity of the load, to prevent its pressing too much upon the cattle in going down-hill, the point of the cart being elevated by means of a toothed rack, screwed to the front of the cart, and worked by a pinion and the handle

a,

a, immediately connected with the pole *e*. By means of this pinion and rack, the front of the carriage is elevated, more or less, in proportion to the declivity of the hill, by which means, the weight of the load is made to bear more upon the axis, and less on the necks of the oxen," &c. &c. see above: where also will be found an ingenious essay by Alexander Cumming, Esq. intituled, " *Observations on the effects which carriage wheels, with rims of different shapes, have on the roads.*

ON

FENCES, &c.

THE size of Inclosures has always been a disputable point: where, from the nature of the soil, it is a desirable object to preserve all possible moisture, and to prevent its dispersion by the action of the winds, small fields are entitled to a preference; they are farther more convenient, as grazing grounds, both on account of the separation of stock, and of affording shelter in the winter season: but on the wet and tenacious soils, a free and unobstructed ventilation is of the utmost consequence, and inclosures of from fifteen to twenty acres and upwards are most suitable. The fences may yet be lofty and thick, with deep ditch-drains; and in case a division should be required by circumstances, it may be made with hurdles, or what is better

better and cheaper in the end, with temporary posts and rails. Respecting the form of an inclosure, every one would prefer the regular square, excepting when attention to symmetry and its advantages is precluded by more weighty considerations; the regular figure of a field is then no longer an object. In the inclosure and laying out of wet lands, every ditch ought to be cast in such a situation as to become a drain; and this business should be in the hands of those who have experience and skill in the discovery of springs. In this art, the well-known Mr. Elkington stands supereminent. Should, on this account, the irregular figure of a field be found inconvenient to the plough, there is a prompt and advantageous method to correct it already advised, by making grass borders along the hedge-rows to the requisite extent. The hedge being constantly kept within bounds, and not suffered to overhang, will by no means injure the grass, either in quantity or worth.

In the new inclosure of stony countries, where the stones may either be collected from the land, or dug from a neighbouring quarry, a wall presents itself as the most natural, cheapest, and readiest fence. To use the appropriate phrase of a Northern Nobleman, such a fence is "major the first year:" it is nevertheless minor to the end of time, in most essential respects. It by no means affords so good a shelter as a luxuriant fence of growing wood, nor like wood, repays its repairs with profit. A fence-wall being reared for immediate convenience, the next step for the convenience of futurity is, to plant beside it, a good hedge, which will, in

a few years, if duly cultivated, supersede the necessity of a wall, unless indeed this be retained upon those parts of a farm adjoining the public roads, for the greater security. Wall-fences seem to be confined to the northern and western parts of the island, but it is probable, there are some parts of the south, in which they might be profitably adopted on the first inclosure of land.

There is a very expeditious method of forming a hedge, when the materials can be readily obtained, and which has been often practised with success; it is, to transplant the full-grown wood into your intended fence. You have thus, at once, a full fence upon very easy terms.

Some have recommended fences of entire quick or thorn, without any mixture of other wood, which is neither necessary nor advantageous; because, however good quick may be as a fence, it is little productive of wood, particularly on cold infertile soils; and the mixed hedge, which is extremely productive, may also be rendered perfectly secure. An anonymous correspondent, a few years since, proposed to one of the Agricultural Societies to plant the hedge-rows with fruit; an idea which occurred to me many years ago, when I recommended the practice to several gentlemen, whose approbation it did not obtain. It is certainly a measure which will never be pursued by our common farmers, who would not endure the thought, either of such an innovation, or of such an additional trouble; but the consideration of its improbability to become a common practice, must enhance the profit to a few that would undertake it.

The

The objection which floats upon the surface is, the exposure of the corn and grass-crops to the trampling of thieves in quest of the fruit; to which it may be replied, that the fruit must be little worth, if it would not repay the vigilance required for its preservation.

The immense hedges, and double ditches of the western counties are not only a most effectual fence, but they must preserve an atmosphere of genial warmth, both for the soil, and the cattle which it feeds. Where the inclosures are sufficiently large that the rays of the sun are not too much excluded, there seems no countervailing inconvenience; it is matter of calculation how far the growth of wood pays for the occupation of such an extent of land. There are many cold exposed districts, on which it would be highly profitable to introduce the Devonshire fences; at least, in such there ought to be no want of coppice, or plantation screens, upon the bleakest exposures. These plantations ought to consist both of timber and underwood, and in the opinion of the judicious Mr. Hitt, their expence and product should be divided between the landlord and tenant.

As there is considerable attention required in rearing young quicks, it is by no means worth while to put up with stunted, unpromising plants, such as are frequently collected in the commons, and in the neighbouring hedges, as I have several times experienced; it is infinitely cheapest, at once to purchase good ones of sufficient growth from the nurseries; and where much fencing is intended, it is to the interest of an in-coming tenant imme-

diately to form nurseries, not only of white-thorn, but of willow, poplar, alder, larch, chesnut, or whatever wood he may suppose most profitable in his situation. He may rest assured, he will not find this the least beneficial, or comfortable part of his farming system. It is necessary, however, to remind certain indolent persons of the inutility of putting in quicksets, unless they determine to keep them perfectly clean. I have known several farmers attend to the cleaning their plants very diligently the first and second time; after which, they have been totally neglected, and suffered to die smothered with weeds.

In absorbent soils, where no drains are needed, the hedge-wood may be planted, and a good fence made, upon the level surface, without either ditch or bank; and so planted, it is said the quicks shoot up to a great height, and much more expeditiously than in the common method.

Of fancy-hedges, that of Flanders, in which the stakes of hornbeam, or other wood, are stuck into the earth across each other, and grow up in that position to a fence, and the poplar hedge of the ingenious Dr. Anderson, of which I shall give a sketch, may be interesting to the curious.

The WALL FENCE OF SOMERSETSHIRE. In most instances, the outside bounds are a wall fence, five feet six inches high, two feet and a half wide at bottom, and fifteen inches at the top, which is covered with a turf of six inches, put on in the form of an arch, making together an height of six feet. This wall is partly dry and partly cemented with mortar, or what is commonly called a LIST-WALL.

In

In some instances, where a flat bed of stone can be procured, it is made without cement; and if well-built, such a wall is very durable. When the ground is level, the foundation of the wall is laid on the turf, and this is to be preferred, as it will not be so apt to sink as when a trench is dug. The expence of a list-wall may be thus calculated, *per rope of twenty feet running length.*

	s.	*d.*
To quarring or digging 8 loads of stone, each 25 *Cwt.* at 3*d.* - - - - - -	2	0
Carriage, suppose half a mile, at 6*d.* -	4	0
Building, per rope, at 3*s.* 6. - - - -	3	6
7 Bushels of lime, at 3*d.* - - - - - -	1	9
Covering with turf - - - - - - -	0	3
per Rope	11	6

The dry wall will be two or three shillings the rope less; but it is evident, from advancing prices, and in various districts, the expences may amount to fifteen or twenty-five per cent. more than this calculation.

The stones being at hand, the cost will in course be reduced; but if the wall be wholly made with cement, it will be enhanced two shillings and six-pence per rope.

In making dry stone-walls, two masons should work opposite each other, so that the surface of their work may be always level. Stones also should be occasionally selected, of a sufficient length, to reach the whole breadth of the wall, this

this precaution will bind the work together, and render it durable.

QUICKSET HEDGES. First, mark out the course of the ditch. The dimensions of the bank, on which the quicks are planted, is generally six feet at the bottom, three and half at the top, and two feet high. On each side is a ditch three feet wide, and two feet deep; the sides being made sloping, and the bottom not wider than six inches, to prevent the cattle from walking in the ditch, and cropping the young shoots. In making the ditch, the men should be particularly careful not to throw any bad earth from the bottom into the centre of the bank, which may retard the growth of the quick. The making the bank will cost ninepence per rope. Sometimes only one ditch is made, the earth on the other side being worked off to a slope.

By this plan, the bank is kept more moist, and the thorn plants flourish better.

Let the sets be taken from a nursery, formed on a good soil, straight in their growth, having been once transplanted from the seed-bed, and four or five years old. The shoots should be smooth on the bark, and well rooted. They cost, in the West, about a shilling per hundred.

A trench being cut in the middle of the bank, the sets are to be cut off, and laid, with the head a little inclining, at the distance of three inches from plant to plant. Cover the roots with a little of the best mould, and fill up the whole trench with rotten dung or compost, strewing good mould on the top. Digging and planting twopence per rope.

It is absolutely necessary, instantly to secure the young quicks from injury. They must therefore be defended and sheltered by two dead hedges of bush-wood, two feet and half high, made about four inches distant from the outside edges of the bank. The expence of these will be about two shillings and tenpence per rope. Time for planting, October, February, or March. Some plant two rows of quicks instead of one, but this plan has not been found to succeed well. Others recommend planting at a greater distance than three inches, under an idea that thick planting retards the growth; but it has been invariably found, that the hedges planted thick thrive the best. (I have seen very fine flourishing plantations in double rows, but at greater distance than three inches.)

Timber, indeed any trees planted in the hedge, kill the thorns by dropping upon them, which makes a vacancy.

Weed and hoe the young quicks carefully twice a year, securing them from the cropping of sheep particularly, which are very fond of the buds: should these be gnawed by accident, the plants must be cut down within an inch and an half of the ground. In cold, exposed situations, it will require two sets of dead hedges, to bring the quick to maturity. Posts and rails of any wood are an expensive defence, and besides do not so well shelter the young quicks as hedges, by the warmth of which their growth is promoted. Expences as follow:

Making

	£.	s.	d.
Making the bank - -	0	0	9
Sets 80 in a rope - - -	0	0	9
Planting and dunging -	0	0	2
Two dead hedges - -	0	2	5
Making two dead fences	0	0	5
(N. B.) A waggon load of writh will cost 17*s.* 6*d.* and make about 15 rope of single hedge.)			
		4	6
Weeding three years - - -	0	3	
The two last dead hedges		2	10
per Rope		7	7

The old wood pays for sundry repairs. In counties where wood for fencing is scarce, they plant the quicks in the face of the bank.

Quickset hedges, at the end of fourteen years, will yield sufficient produce, when cut down and plashed, to pay all the expences incurred by the first making; and this cutting may be repeated every twelve or fourteen years without injury to the stocks: and the proper time to cut and plash is, when the ground is to be ploughed, or if it be pasture, when the crop is to stand for hay; for cattle are very fond of the young branches, and cropping them in the summer will greatly injure the shoots.

The expence of a dry wall and hedge joined, will be as follows. The wall four feet and half high, with six inches of turf upon the top, may be reared

reared (according to the Somersetshire calculation) for six or seven shillings per rope of twenty feet. Under the wall, a low bank may be raised, on which to plant the quick. The growth, encouraged by shelter and warmth, will be rapid, and in four or five years time the wall may be taken away, and the stones (if proper) converted into lime, or to mending the roads. This hedge, made upon land under tillage, will need but one dead fence for its security.

	s.	*d.*
Building four and half feet of wall, stones, &c. included - - - - - - - - - - - -	6	0
Turfing, 2*d.* Banking and planting, 4*d.* Sets, 8*d.* - - - - - - - - - - - - -	1	2
One dead fence, inside, 1*s.* 2*d.* Weeding 2*d.* - - - - - - - - - - - - - - - -	1	4
	8	6
Value of the stones, 3*d.* per cart load, deducted - - - - - - - - - - - - - -	1	6
	7	0

With the addition for advance in price as above-mentioned, this may be rated at 8*s.* per rope.

The expence of transplanting full-grown hedge-wood in the west, is as under.

Making the bank, 1*s.*; digging and planting, 1*s.* 6*d.*; carriage of plants, suppose 9*d.* or 3*s.* 3*d.* per rope.

The bank must be three feet in height, and the wood, in course, such as can be obtained in the neigh-

neighbourhood from coppices, borders, or commons; chiefly black thorn or sloe, with which will be found maple, hazle, willow, holly, and the large briar. Cut off the tops to the height of three feet, and plant very thick. One large waggon-load will be sufficient for twelve ropes, or two hundred and forty feet running length. There need be no apprehension of the plough being obstructed by the spreading of the roots beyond the banks and ditches; nor would that probably be an objection of any great weight, were the planting done upon the level surface. The loppings of the thorns may be laid along the summit of the bank, secured by small stakes, which will prevent sheep from forcing their way through the stocks. This fence, the cheapest of all others, will require no repairs, for the sloe will throw out so many shoots from the roots, and the briar so entwine its branches with the hedge, that it will be in a few years impervious to all cattle. It will form a close and thick fence, affording good shelter; and the wood being upon its proper soil, may be expected to grow luxuriantly, which is far enough from being always the case with white thorn purchased from the nursery, and transplanted into a poor soil. Hedges of furze, or in part furze, may suffice in poor lands, where wood is so slow of growth. It has been remarked, that hedge-wood is injured by the dripping of timber trees; but it remains to be considered, how far such objection is valid in a district bare of timber; and to be remembered, that such plantation of trees occasions no extra expence for their security, and that the

hedge

hedge is not so far injured by a tree as to cease to be a good and sufficient fence within its shade: a large and spreading tree, however, surely damages the corn, and even the grass beneath it.

In Nottinghamshire, they secure their young hedges with posts and rails, the former of oak, the latter of ash, but more generally of late of fir grown in the county. Gates of willow, having oak posts, are found to answer well, having the advantage of lightness, and not damaging themselves by clapping to. On their poor soils, they have found birch to answer very well for plashed fences against light stock; also for light gates and rails.

Mr. Harper of Lancashire, pursues the following method of plashing and laying the shoots of old hedges, become thin at bottom, which I think deserves imitation in many parts, where I observe very defective fences. Cut the wood very low, leaving the young and vigorous shoots; then, with a hand-saw, again cut away that part of the old stump as far as was shaken by the hatchet in the first separation, leaving the top level, that no wet may lodge. From this practice, the shoots will grow stronger, and more in number in one year, than they commonly do in three. The shoots being half a yard, or two feet long, bend the young ones down, and, room permitting, make a hole in the bank with a shovel, in which tie the shoots closely down with hooked sticks, and cover them up again with earth; these young branches, with a little nursing, will, by taking root afresh, form a new hedge. Some GATES are made in this county with painted deal.

In

In Romney Marsh, Kent, an immense quantity of oaken POSTS and RAILS are used, which are delivered, ready prepared for use, from the neighbouring woody part of the county, price 9*s.* per rod, for three rails, for four 13*s.*

WATER DITCHES, as fences in the marshes, are from eight to fourteen feet wide, and from three to five deep, with sides somewhat sloping; they are emptied once in ten ye rs, at the expence, for those of middling dimensions, of 18*d.* per rod; and for those of larger size, and very full of mud, 2*s.* or upwards. Digging of new ditches, 2*d.* per cubic yard. Considering the vast loss of young stock upon these marshes in a severe season, and the exposed and comfortless, of course disadvantageous situation, in which stock of all ages must lie, it has always appeared to me, that hedge plantations would be extremely beneficial in every point of view. This surely applies to all marshes and exposed situations, where the herbage being protected in a considerable degree from the keen and piercing blasts, would be signally improved; and wood, upon such rich soils, would grow most luxuriantly.

In planting quicks, one hundred plants are allowed to every three rods; they are set upon a bank made by the mould dug from a ditch, three feet aside, and two deep. Their dead hedges are made at the expence of 2*d.* or 3*d.* per rod, for labour; well stacked and bound, they last five or six years.

In Lincolnshire, white thorn fences superior. Expences of a treble rail on each side, bank and quick, 1*s.* 8*d.* per yard running measure. Ex-

pence

pence of a new inclosure, 11*s.* a rood of seven yards, and 2*d.* per rood per annum, cleaning and replanting failures for three years. Three halfpence a rood for three weedings. Leicester method pursued, with one fence of a very small trench, planting the quick upon the surface of the field for the sake of the moisture; the other side of the same field a double ditch, three feet deep: the difference of the growth is very great, the former as good at three years as the other at seven.

In Staffordshire the new inclosures are first fenced round with post and rail, after which a mound or bank of earth is raised up to nearly the height of the lower rail, with a ditch sufficient to drain the land, where draining is wanted: withinside the bank, and a little above the level of the natural surface of the earth, are then planted white-thorn quicksets. Stakes of the narrow-leaved willow will grow most luxuriantly in dry, as well as moist situations. An œconomical scheme lately talked of, and attempted in that county, to plant willows in proper situations, for making gates, rails, and hurdles, which being of luxuriant growth, will soon be ready for cutting down, and also quickly shoot forth again. Any moist corner, or pit, would produce them, or they may be planted regularly in the fences. This plan is intended as a saving of oak.

In Middlesex, the hedges are generally well replenished with live wood, hawthorn, elm, maple, black thorn, crab, briar, damason: they are new made, once in ten or a dozen years, when the whole is cut down within a few inches of the bank. The scourin of the ditch is thrown up, a very thin

thin stake and edder hedge is formed, and the rest of the wood made into bavins, and sold principally to bakers, at about a guinea per hundred delivered. In about two years, the live wood is grown so thick again, as hardly to be seen through.

The mould thrown out of the ditch may be considered as earthing up the plants, and it is always done loosely. The plants thus grow with vigour on the sides of the bank, as well as on the top, thereby preserving the bank from destruction by cattle. It is far superior to the methods practised in some other counties, of making a solid wall-like face to the bank in some cases of stone, which smothers all the shoots that would otherwise grow from the sides, and of course exposes the bank to be pulled down by the horns of neat cattle, at the same time that it greatly reduces the produce of the hedge.

In Mr. Middleton's opinion, it is an improvement to put in two rows of thorns about two feet apart, to be cut, when full grown, alternately, one every five or six years. Thus the cut wood would be ten or twelve years old, and the other, left for a fence, would be five or six, which would be sufficient, both for a fence, and to protect the young shoots from the bite of cattle on one side; to the other, a few loose thorns in the ditch would be a security.

Stagnant water is very injurious to hawthorn, which should therefore never be planted in its way; such situations are most proper for willow and other aquatics. The usual method of planting quick on the edge of the ditch next the bank, is almost

most the worst possible. Be the soil what it may, the operation of the elements will make it crumble away from the roots, and leave the sets without sufficient mould to support them.

In planting quicks, make your bank four feet wide a-top, with a ditch on each side, and set two rows, at two feet or more asunder, on the flat surface of the bank, taking care that the roots penetrate the best mould, and that the sides are so stopped as to leave no fear of their mouldering down; and laying loose thorns in the ditches to keep off cattle. This method precludes the necessity of either railing or dead hedges, as no cattle can stand nearer than six feet to the stems of the quicks. This fence, recommended by Mr. Middleton, is doubtless a very complete one, forming an excellent drain upon wet soils: but it is proper for me to remark, that I have often found *loose thorns in the ditch* a most insufficient security, both to the new banks and the quicks.

Plan of FRUIT HEDGES. Plant at the distance of ten, twenty, or any number of feet that may be thought adviseable, a Spanish chesnut; midway between the chesnuts, plant a crab; between the chesnuts and crabs, plant a common plumb; in the intermediate spaces, white-thorn. When they have been planted three or four years, and are in a thriving state, about February or March, cut them off with a sharp knife about an inch above the ground, they will then throw out many shoots; keep them clean from weeds, and let them continue growing until the chesnut shoots are large enough for stakes and binders, which may be in eight, nine, or ten

years. When the hedge is made, at proper distances leave a straight handsome chesnut shoot, to grow into a tree; if you prefer timber, let it remain for that purpose; if you prefer fruit, cut off the top; and if you can procure grafts from Spain or Italy, graft them therewith. In like manner, leave a handsome shoot from the crabstock, and graft it with an apple, and the plumb-shoots, with the different kinds of plumbs: the shoots of the white-thorn may be grafted with medlars. Thus you will have a very productive fruit-garden, without any waste of land, and a permanent fence that will continue to the end of time.

Crab may be successfully engrafted with every species of apple, white thorn with every species of pear, black-thorn with every species of plumb, and the wild or bird-cherry with every species of cherry. No stock receives and nourishes with more admirable facility its graft, than does the white-thorn, the scion, or bud of the pear; but in consequence of the engraftment being four, or more feet from the ground, the scion becomes larger in diameter than the stock; but this circumstance may be made subservient to their bearing, by leading their very vigorous shoots to stakes or standard trees, where affixed, they acquire the form and fruitfulness of an espalier, which being raised two or three feet above the quick, are out of the reach of the bite of cattle, and form a complete barrier against their leaping over or breaking through; with equal ease they may ascend into sturdy standards, by being engrafted within an inch or two of the bank.

APPLE TREES. The method of planting apple and cherry-trees in Kent is, to dig holes about two feet square, and two spits deep, taking out the rocks, and turning down the surface soil on which the young trees are placed, and the remainder of the earth is trodden down close about the roots. They are supported by stakes, until they get sufficient strength not to be hurt by gales of wind. A composition of lime and night-soil is painted with a brush on the stems, which is said to promote their growth exceedingly.

But large, and even very old trees, may be grafted, so as to bear very fine heads of other sorts of fruits, and to produce a crop quicker than by any other method. The trees being full sized, the tops must be cut off in the winter, otherwise when grafted, they will bleed so much, that the grafts will not succeed. The trees must not be cut down to the trunk, but as many branches must be left as look kindly, above where they branch out, of the thickness of one's arm, or double that size: the tops of these must be taken off, about two or three feet from the place whence they branch from the trunk. These stubs will bear each two or three, or four grafts, according to their size. New orchards are raised by planting in March well-grown crab-stocks, and grafting them, the following March or April.

THE POPLAR FENCE of Dr. Anderson for rich lands. Species, the BALSAM POPLAR, a healthy free-growing tree, distinguished for the firmness and luxuriance of its shoots, largeness of leaf, and fragrancy of bud in the spring, having more

firmness and stability than the willow, and more luxuriance of growth than the Lombardy poplar.

It is recommended to rear the plants at home, the nursery being made upon the richest, mellowest, and tenderest soil, inclining to moisture, but not absolutely wet. Cuttings, best of two years' growth, but any age will do: one foot in length to be planted in rows eighteen inches distant, and three inches between each plant. Autumnal planting best, but spring may succeed; tops to be left one inch above ground. In the spring, a careful person to rub off, with his thumb, every bud except one, which will then push up to a vigorous stem, without collateral suckers to weaken it.

Keep the ground clean between the plants, and dig it over between the rows at least once a year. The plants in general will reach about four feet in height the first season; in two years more, or at most three, they will be large enough for planting out, where the fence is meant to be.

Plough up a narrow ridge, where the hedges are meant to be planted, so early as to admit of its being four times ploughed, at least, before the time for sowing turnips. Manure richly, and sow turnips in drills sixteen inches apart, hoeing them properly; after these are drawn, the ground may be either ploughed, or dug and harrowed fine, to prepare it for planting.

Take up the plants from the nursery, which will now be ten or twelve feet high, and from an inch to an inch and an half diameter at the root; and sort them carefully, so as to have them all nearly

of

of the same sizes, which are to be planted together. Make a mark in the middle of the ridge, where the centre of the hedge is to be, and stretch a line parallel to that, nine inches from the centre; then let one man, with a spade, begin to open a hole on the outer side of the line sufficient to receive the roots of one plant, and let an assistant put the plant into that hole, slanting the top of the plants, to an angle of about forty-five degrees to the horizon. But instead of laying these parallel to the line, let them slant so much inwards, as that every plant, at the height of four feet above the surface of the ground, shall be right above the centre of the ridge; and proceeding in that manner, leaving an interval of about one foot, or fifteen inches between each plant round the whole of the inclosure. When this is finished, move the line to the same distance (nine inches) from the middle of the ridge, or on the opposite side; begin and proceed exactly after the same manner to plant another row of poplars in a direction the reverse from that of the former, so that if the tops of the one row lie to the eastward, inclining to the left, when you look east, the tops of the other shall lie westward, inclining to the right hand, if you still look eastward; that the two rows meet each other at the height of four feet from the ground, exactly above the middle of the ridge. The whole row being planted, let the tops of both rows be plaited through each other, so as to assume a horizontal position like the top of a rail; and the fence, when viewed sideways, will have somewhat of a lozenge-like appearance, but not crossed like the willow-

fence; and with this difference, that the stems are much thicker and stronger in every respect, not contiguous to each other, and cannot be wattled through each other unless at the top only.

This fence, at first a living railing of no inconsiderable strength, will rise in a few months to five or six feet in height, and in a few years will be nearly impenetrable to animals of every sort. To render it farther complete, let the earth at the roots of the plants be smoothed, and plant a young sweet-briar in the opening left between each two of the poplars, so that there shall be the same number of plants of eglantine as of poplar; but let the briars be put about three inches farther back than the line of poplars, so that they be about twelve inches distant the one row from the other. These plants should be one year old or two at most; for as it grows very quickly, it will soon reach the top of the hedge.

The first summer, nothing more is necessary than weeding; and in the autumn, to go over both sides, cutting away with shears all the shoots that come beyond the line of the ribs of the hedge, as the original stems may be called: then raking the rubbish back from the hedge, cut over, with the point of the shears, every plant of eglantine close by the ground, leaving the dead stems that are between the ribs of the hedge without disturbing them. Next season, the eglantine will send out strong shoots from the bottom, which, pushing through the dead branches of the former year's growth, will intermingle with them, and fix them firmly in their place, some of these stems also pushing through the

ribs

ribs outwards. In the autumn, once more cut the sides with the shears, as before, and then once more also cut over the eglantine at the bottom, as in the former year.

The matting of prickly briar in the heart of the hedge will now have become very close, so as nearly to fill up the whole of the internal cavity originally left between the ribs, and the next year's shoots intermingling with these, will render it still closer. The sides of the hedge should be clipped every year, and the eglantine cut over, as above described, until the whole of the bottom of the inside of the hedge shall become as close as you wish it to be, so as not to suffer a fowl, or any animal of that size, to be able to creep through it; after which time, it will be only necessary to cut the sides of the hedge annually, so as to give it an external coating of living eglantine, which will form a fence the most impenetrable, as well as the most beautiful, that can be conceived. To add to the beauty, a few plants of honeysuckle may be set along the hedge, and some of the freest shooting roses, particularly the white rose, interspersed through it, which will thrive abundantly.

The shoots on the top of the hedge may be suffered to run upwards until they have acquired the size you wish for, or have attained to as great a height as you would incline, when they may be cut over at four feet from the ground, and applied to any useful purpose. After being cut, they will send forth fresh shoots in general, which will reach to nearly five feet in one season, and about the thickness of a thumb at the under part: in three years,

years, they will be as thick as the wrist, and very tall.

The reader will recollect, that I present this *recipe* for a hedge, of the ingenious Doctor, to the curious only: it will form a very agreeable and sightly fence upon a *ferme ornée*, or around a garden or orchard. As to its utility in a common way, I do not pretend to judge; but Dr. Anderson has actually experienced it, and reckons the expence under two-pence per yard. For a similar hedge upon barren grounds, the larch, or pinaster, would be preferable.

The WITHY, or WILLOW FENCE, recommended by the late worthy and patriotic Joseph Wimpey, Esq. of the West.—Ditches and banks being prepared, plant a withy edge on the brink of the bank (as a defence to quicks) in manner following. Cut strong willow stakes, from three and half, to four feet long, and from one and half to three inches diameter; drive them fifteen or sixteen inches into the ground until firm, fifteen inches apart in a line. Prepare an equal number of shorter sets, sixteen inches long, and about an inch and half round; drive them into the ground ten inches deep, leaving out six, to be planted, one in the middle of each two of the former, then they will stand in alternate succession. Fasten the tall stakes together with twisted willow rods, planted in January or February. In two years time the shoots from the stakes and sets will be long enough to be woven stakewise; those from the short sets into the bottom and middle of the hedge, and those from the stakes into the upper part and top. At that age, they

they will be flexible enough to be wrought in without cutting, which is practised in older and larger shoots, to the great damage of the hedge.

WOODS, COPPICES, AND PLANTATIONS.

For the preservation of woods, it is absolutely necessary to put an end to the pernicious custom of turning in cattle, which can never be admitted without both the timber and underwood suffering great damage in various ways, at whatever age they may have arrived; notwithstanding the height of the bulk of the underwood, there are always young plants within reach, and liable to be cropped and stinted by cattle, beside the great quantity they tread down, an object of consequence in old and decaying woods.

In woodland farms, it is for the mutual advantage of landlord and tenant, that the woods be kept entirely shut up from stock, and in case of public right of commonage in woods, it would be for the interest of rich and poor to abrogate such right by a general act.

The boggy parts of woods should be drained of the stagnant water, an improvement which is always well repaid.

Underwood neglected, and suffered to grow too old before cutting, receives much damage, the strong

strong shoots smothering the weaker, and by dripping upon them, killing the parent stocks.

In the sale of the underwood, the buyer ought to be restricted in cutting the saplings, and prevented from cutting too close to the stocks. These particulars ought to be closely inspected during the cutting. The bargain should be made to clear the woods early in the summer, that the young shoots may not be injured by the horses and carriages.

But the most advantageous method of sale is, for the seller to cut his own underwood, and then sell it in lots, with the condition, that the whole be cleared away by the buyers, on, or before the 10th of June. Cart-horses, coming in after the new shoots have put forth, to be muzzled, or their heads secured.

The most profitable time to fell underwood is precisely when it is ready, and well fitted for the purposes intended. The customary periods are seven, eight, and fourteen years. For fuel it can hardly be cut too young. Supposing a demand, and a fair price, it can never pay to keep wood standing eighteen or twenty years, excepting, however, poles for the carpenter's use, of ash, alder, birch, willow, &c. which must stand nearly twenty years. Those are in demand for rafters, posts, and rails, turnery, and patten ware, and various other purposes. Hazle and ash are fit for hurdles and cattle cribs, at eight years old: ash, and other wood, for hop-poles, at fourteen.

As the stocks or stools from constant cutting, must in time decline in their produce and value, and

and finally decay, it is necessary to renew them by occasional planting. New planting in woods, and filling up vacancies, is an advantageous business, and of easy expence, since no new fences are wanted, and the young plants, (if not improperly smothered) shoot up rapidly under shelter of the old wood. The practice of laying down, or plashing from the stock, has been long pursued with success. It is the quickest method of producing poles. Select long healthy young branches from the stocks, near to vacancies. Dig holes two feet square, and fifteen inches deep, returning the surface-mould to the bottom of the hole, then bend each branch, and fasten it down with a peg about a foot below the surface, treading the mould over it.

Where spontaneous saplings are in plenty, great care should be taken of them, and their standing regulated. At the time of cutting the saplings, being perhaps fourteen or fifteen years old, such as are straight and handsome, should be preserved for timber: it is common to cut the rest, but these so cut will seldom or ever produce shoots sufficiently strong to keep pace with the other underwood, and had therefore much better be left until the next cutting, when being between twenty and thirty years old, the objection will be done away, and they may be safely cut with the rest. In a scarcity of saplings, young trees must be planted in autumn, the best of which may be left for timber, the remainder for underwood.

But the planting young trees under the shade of old branching wood, subject also to obstruction in their growth, from the land being already occupied by

by roots, turf, and weeds, it must be remembered, is attended with considerable risk and uncertainty. It frequently happens, that more than two-thirds of the young plants are thus lost. The remedy is constant inspection. Large holes should be dug for the plants, and they should be hoed round clean from weeds and grass. It is of equal consequence to trees, as to inferior plants, to preserve the soil loose and friable around them, as any one may be convinced by experiment; and the want of this necessary culture is probably the cause of failure in many plantations.

As to the most advantageous species for planting, the first consideration is a natural aptitude to the soil; the next, usefulness, and probable demand for the wood. Oak, elm, and chesnut, thrive best upon stiff, deep, and strong soils: the whole willow, osier, sallow, and alder tribe, affects rich marshy ground; poplars, particularly the Lombardy, will scarcely thrive upon any but clay soils. For light, shallow, and stony grounds, the class of pines: the pinaster, larch, silver, and spruce fir; of these, the two first are most valuable; the Scotch fir is generally the quickest grower, but of inferior wood. The black, white poplar, and arbele, are superior to the Lombardy poplar. For exposed situations, either upon hills, or towards the sea, the hardiest trees are the sycamore, beach, hornbeam, birch, ash, alder, platenus; hazel flourishes on the steep sides of downs. The lime and walnut will grow luxuriantly upon the acclivities of the most rugged and rocky hills, whilst the sycamore braves the fiercest blasts of the summit.

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Although every species of tree seems to affect its peculiar soil, yet they are reared indifferently and successfully upon all. Thus we find good oaks in very poor grounds, and chesnuts flourishing in barren sands. There is also a species of the elm, with leaves resembling those of the hornbeam, which is a quick grower, and will succeed in almost any ground. A great object in plantation is shelter for the tenderest kind of trees, which should always be defended and screened by those of a more hardy nature. Care should be taken to assort the trees in such manner that the most valuable are not injured in their growth by such as are bad neighbours; in this class are reckoned the beech, fir, and the ash, the damage from which should be prevented by their timely removal.

The timber in woods is of great benefit to the underwood, by sheltering and drawing it up to its proper growth. Oak, elm, and Spanish chesnut, are the proper trees for timber: for underwood, those the most generally advantageous are, ash, maple, birch, beech, hornbeam, hazel; also the wild cherry, for the sake of the blossom, which is besides good underwood, and suitable to all soils; and for variety of colours, the asp and arbele, willow, and red sallow, with its broad and almost round leaves These last are very serviceable in common fencing. The sallow makes good hop-poles, and is also used by the turners and clog-makers.

The proper time to fill up the vacancies in woods, is one year, or at most two, after a fall of underwood. The young plants should be eight or ten

ten feet high, and an inch and half in diameter at the ground, and should be planted without cutting off. If the soil be dry, no other preparation is necessary than barely digging the holes for the plants: if wet, deep drains will be required. The earth from the drains should be thrown out on the lower side, and upon it the plants may be set.

Perhaps on an average of all circumstances, there is no wood of such general profit for the coppice as ash, which thrives upon the most opposite soils; upon flinty loams, sands, bogs, and mountains. The value of ash-poles, weight for weight, seems every where to exceed that of all others, being applicable to some use at all sizes; the timber also being in constant request, and saleable at any age, at nearly the price of oak, and the wood amongst the quickest in growth.

It is true, that for duration, chesnut poles are much superior to ashen ones, but they are slower of growth, and more difficult as to soil. As timber, chesnut is in some points superior to oak; it grows quicker, is more durable, and its wood is in the utmost perfection whilst young. It is probable that no wood would pay so well in this country, the soil being favourable, as a plantation of Spanish, or sweet chesnuts.

Alder and hazel may be propagated by taking up old roots and dividing them. Willow is commonly planted in cuttings and stakes, but the best way is to plash down the young shoots from old stocks. I do not observe much notice taken by authors of the Babylonian or Weeping Willow, but in moist and favourable situations, it produces

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an immense quantity of wood, more, I believe, than any other species; at least, so it appears from some which I planted in 1778. The French willow, growing in the neighbourhood of Lyons, is said to be of a superior kind, and worth introduction here.

The most advantageous periods at which to fell timber, is the instant it begins to prejudice the underwood by its dropping. In order to derive the greatest possible profit from plantations of wood, the timber and under-growth should mutually assist each other.

Great, but in my opinion, groundless apprehensions have been long entertained at the supposed decrease of timber in this country: a subject rather of exultation than otherwise, since it indicates an increased culture of human food. Grubbing up old woods, and converting them into arable and grass, have hitherto proved a beneficial speculation in every part of the country, and could this method be pursued with all our rich lands, it would be no doubt our interest to purchase timber from other countries, and in many parts, a supply of the best oak might be obtained for centuries to come. As to new plantations, none ought to be made in this country under the present aspect of things, but in soils unfit at the time for more material purposes. Some such are highly benefited, and receiving a new staple by laying a course of years under wood, may be afterwards returned to the plough with great advantage.

Nor is there the smallest necessity for those laws and premiums in the case, which some over anxious persons

persons are desirous to introduce. This, like every other article of human commerce, will best regulate itself. The present prices of timber and copse-wood are the best premiums for planting, and will doubtless be a spur to the due preservation of woods. Where woods and plantations will pay, with little trouble, and no risk, from one to two pounds per acre per annum, they will never be long neglected. As to timber, it is too beneficial, in every point of view, to be overlooked, and will always be a great object with those in opulent circumstances, who can afford to suffer a large capital to lie and accumulate slowly, but surely, and without trouble. The dignity and splendour of large possessions in timber will never cease to have their effect. Besides their majestic appearance in the country, it sounds high to be the possessor of a hundred, or a hundred and fifty thousand pounds worth of timber, some of the trees containing two hundred feet, and worth threescore pounds each!

Wood, for firing particularly, is too dear, which argues the want of internal navigation among us. Coal is much superior for every purpose but baking. In Hampshire, I found coal at 50*s*. per chaldron, beyond all comparison cheaper than wood purchased from the surrounding coppices.

Upon light and dry soils, the quicksets are often injured, in April and May, by a hairy caterpillar, that devours the leaves and tender branches. The only remedy is attention in the winter-season. Observe the cells or cobwebs upon the branches, which contain the eggs: cut off all the infected branches carefully, putting them into a sack, in order

order to burn them, for if they are thrown upon the ground, the eggs will escape and live.

We are informed, upon the authority of Mr. John Chalmers, architect, in Edinburgh, that green fir-timber may be seasoned and rendered fit for immediate use, by soaking the planks or round trees, barked, a few days in lime water, or paying them over with lime along with water. Lime-water is made by slacking the lime in water, and the hotter it is used after the lime is slacked the better. Mr. Chalmers remarks, that he has always found the Scotch-fir timber in ancient buildings, where connected with lime and kept dry, sound and untouched by the worm, and even more hard and firm than when first used.

In conclusion, it may be proper to caution those who are about to form new plantations, not to sacrifice every other consideration to that of cheapness and quickness of growth; for the object of waiting three or four extraordinary years is amply compensated by the worth and solidity of the wood: the best of the quick growers, and most deserving of attention, are the chesnut, and cedar of Lebanon. The making use of cheap and inferior timber is a very questionable speculation. Being lately informed of an American ship, built entirely of birch, in the bay of Fundy, I had the curiosity to go on board, where a sample of the wood was shewed me by the carpenter, by whom and the captain I was informed, that ships built of such slight materials were generally in want of great repairs in seven years, and that they were much dearer in the end, than if built with the best and most expensive timber.

ON TILLAGE,

AND ON THE VARIOUS CROPS.

FIRST, on FALLOWING. This practice, the miserable substitute of former times, for manure and the hoe culture, can be no longer necessary on any soils, under the present improved state of husbandry. Its former prevalence only served to evince our inferiority in rural economy, to many other countries, as does the tenacity with which the practice is at this instant defended, the existence of an almost inexhaustible fund of prejudice. It is not the rationality of the thing which supports it, but the jealousy and pride of ancient custom, ever unwilling to submit to examination or controul, for no man is an advocate for fallowing unless he belong to a fallowing district. If I should adduce any arguments to prove the utter inutility and great disadvantages of suffering land to lie idle in a country where the support of human life is in such instant and pressing request, it will be rather for form sake, than with the pretence of advancing any thing new. But what arguments can possibly be needed, after a quotation of notorious facts like the following!—In those parts where judicious cropping has been substituted to fallows, every species of product, including the rental, has experienced a wonderful increase to the certain emolument of all parties concerned, the landlord, the tenant

tenant, and the public. The same kind of land in all respects, whether rich or poor, has been proved, in numberless instances equally or more fruitful under constant crops, than under the fallowing system, including those particular species of soil, which it was pretended could never be successfully tilled without fallows. How often does it happen, that upon these very soils an enlightened cultivator shall be found cropping his lands according to the improved practice, and making larger crops of wheat than the surrounding fallowists? Upon the self-same soil, parted but by the hedge, one man shall make an expensive fallow for wheat, and gain two quarters and a half; his neighbour shall also obtain the same quantity of wheat, after a fallow crop of cabbages or carrots, the acreable profit of which shall far exceed that of the wheat itself, and his land shall be at the same time left in the best heart and cleanest tilth. I speak of facts, which I have myself often witnessed; and, were proofs necessary, I could fill my book with them, drawn from the most authentic records. The advocates for fallowing within my knowledge, and I have reason to believe in general, have contented themselves with mere assertions of the superiority of their practice, without ever once deigning to make trial of any other, or with making only a few desultory and ill-conducted essays, after which they have again relapsed, unconvincing, unconvinced, and unimproved, into their old habits. By indolent men like these, and by landed gentlemen, who are so ill advised as to commit the management and the letting their farms to persons totally ignorant of

any principle of agriculture, is the vexatious and unprofitable system of fallowing perpetuated.

There seems ever to have been a striking deficiency both of solid argument and experimental proof, for the necessity of fallows. The fallowists have contented themselves with simply asserting, that their lands will not do without rest, and with exclaiming against innovation and new-fangled practice. If they have brought forth any arguments at all, those have been generally of that well-known class which men are wont to use in the service of a favourite hypothesis, they have previously determined to support. It has been taken for granted, and with a confidence such a notion never merited, that the earth, like a system of animal organization, stands in need of rest, and that it may be totally exhausted by the action of perpetual vegetation; a notion which the earth herself, by her constant and invariable habits, has saved us the trouble to refute.

It may be very properly demanded of fallowists, how it happens, that a defect of this singular kind should inhere in their lands exclusively? and why the poorest lands in foreign countries, as well as our own, should prosper under continual cropping? Whence arises the difference between their farms and their gardens? and why do the latter never stand in any need of respite, but produce exuberantly under perpetual seeding?—They are well manured and well tilled. Should the garden-culture be rejected as a parallel example, from its presumed superiority, I insist it is entirely without reason, for the open field has the advantage, both

both in point of air, and even the possibility of superior tillage from the improved implements, and increased population of the present times.

The earth destined by nature to an everlasting round of vegetation, and whilst confined to her spontaneous productions, requires no assistance from the hand of man. The seeds of these productions she possesses in her own bowels, and the waste and loss of substance she has sustained, are amply returned to her in their falling and putrid remains, and in the rains, dews, and fat vapours of her atmosphere. Thus, production, maturity, corruption, and re-production, run in a necessary and everlasting circle. But if more be required than the earth would spontaneously produce, and the substance itself be withdrawn from the soil which produced it, an artificial amends must be made for the consequent exhaustion; hence the use of tillage and manure. This amends, however, being made to the necessary amount, the vegetable process will go on unimpeded, and the land continue to produce for ever, without demanding truce, or respite. Experience of a date too ancient for chronology herself to ascertain, has evinced the truth of this theory, on soils of every possible description.

Land, then, of a quality, however inferior, can never want to be fallowed, under the idea of giving it rest, which it will at the instant reject by spontaneous labour, to produce a crop of weeds; and as it must and will produce something, that something had surely better be such as will pay the

expence of culture. But the truth is, that excluding the idea of rest, the general system of tillage is so defective, and the operation of that most useful and necessary implement the hoe, so much neglected, that in the course of two or three crops, the farmer finds himself totally at a stand, he has been painfully and foolishly cultivating weeds, as well as corn; the former have so far occupied and exhausted his land, as no longer to leave either space or nourishment for a crop of corn, sufficient to defray the attendant expence, exclusive of all expectation of profit. He must, indeed, in this case, have recourse to a fallow, as the only method now left to extirpate a part of the weeds, that he may again crop his land; and this measure is at the expence of a year's rent, taxes, and labour, to fall as a surcharge on the product of the succeeding crops. That such surcharge is totally thrown away, and a positive loss to all parties, is irrefragably proved by the new practice, and if a landlord should suppose that he spares his land, by making a covenant for fallows, he also ought to take into the account, that unless he permits the new practice, he can have no title to expect a new rent.

The following, as I conceive mistaken ideas, struck me in the Staffordshire Report, but I was still more surprized to find them approved in a note by Mr. Boys, as the evident result of observation and experience: yet, no doubt, of that kind of experience, which, however ancient, has never travelled beyond the bounds of its own accustomed practice. Mr. Pitt, the respectable author of the survey, gives it as the opinion of the best farmers

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in that county, that " fallowing for wheat, on cold, wet, or strong lands, and on all such as are unfit for turnips, is absolutely necessary; and that he who shall attempt to manage such land without fallowing, will have occasion to repent his mistake," —" and as the mixed soils now in question, which are too moist for turnips, have a particular propensity to the production of these (root) grasses, summer fallowing becomes absolutely necessary, and every attempt to crop without it, for any length of time, on such land, has terminated to the injury of the land, and the loss of the occupier."

If these farmers will be at the pains to search out of their own county, they may find numerous practical refutations of the above doctrines, in the very converse of which, I really believe the truth to reside. I have never observed couch to be eradicated by fallowing, a portion only is destroyed, and a sufficient quantity of roots left to produce a crop, which will speedily demand another fallow, and so on for ever. Regular periodical fallows, may, in truth, be styled the nurseries and hot-beds of couch, since, on lands subject to the practice, we ever see the greatest quantity of it. Not that I entirely agree with the too sanguine advocates of the hoe, that it will, of itself, entirely root out couch-grass; at best, such would be a long and tedious method, at which even Tull himself hesitated. Nevertheless, after a good dragging, and burning the roots, during a month or two of dry weather, to the hoe only, we must look for their gradual and total extinction; and this method I have never known to fail in the worst possible cases

cases of couch, coltsfoot, and *id genus omne*; with the reserve, however, that the lands must never be withdrawn from the hoe-culture, whatever be the crop, until the enemy appear to be totally extinct, which will seldom be delayed beyond the third year. It seems singular to admit, that fallowing may be superseded by turnips, and yet not by cabbages and beans, the appropriate hoe-crops of strong lands: surely the latter will bear constant tillage, at least equally well, with the light and weak.

Whilst I contend that the earth requires no rest, but rather exercise and good nourishment, I would not thence desire to be understood, that she derives no benefit from rest: all experience declares the contrary; her spontaneous growth being returned to her bosom, this also laid open by tillage to the absorption of the fattening dews, there can be no question but she is so nourished and restored. All intended to be proved is, that the price is infinitely too high for the benefit received, and which, in truth, to its fullest extent, may be otherwise obtained gratis, and even with a premium annexed. Nor am I at all prepared to say, that those styled ameliorating crops, whether carrots, turnips, cabbages, grasses, or what not, are such, in the simple and restricted sense of the word, that they are really the vehicles of nourishment to the earth, like a fallow, or, that the putrid fermentation occasioned by their shade, enriches, since, if it really have that effect, themselves are extracting the benefit of it. No, all vegetable productions carried off the land, although not in equal degrees, detract from the strength

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of the soil, which may be impoverished by the scythe as well as the sickle, yet grass surely exhausts it the least: those plants abounding most in vegetable gluten, in weight and substance, are the greatest exhausters; at the head of them, undoubtedly wheat ought to be placed; potatoes, perhaps, next. Crops, then, can only be said to be ameliorating, on the score of their being hoed, and of a considerable part of their produce being returned to the land, in the dung of the animals which they feed. Omit the hoe, and sell the crop, and instead of amelioration, you would soon find galloping consumption: and then, if in want of a convenient phrase, you might say, your land was tired of such or such a crop.

Even the best tillage under the fallowing system, stands self-convicted of deficiency, since it needs the invariable repetition of that expensive aid; it evinces a defect of crops for the support of cattle, of consequence a defect of manure, and of hoe-tillage. If the sowing of white-corn by broad-cast must be persisted in, there is no possibility of keeping the land clean (generally speaking) but by the intermixture, in due course, of pulse-crops which are hoed; with the aid of which, and a strict attention to hand-hoeing, and weeding the broad-cast corn, the necessity of fallowing will be for ever precluded. It will be understood, that a summer's respite is necessary at first, in order to clear the soil of root-weeds, and afterwards the usual intervals between the crops, the weather being dry, will afford opportunities of again using the drag, or cultivator, to the same end. These occasions always

ways being diligently laid hold of, the roots will soon be totally destroyed. As to the seed-weeds, contrary to the common custom of farmers, those ought to be encouraged by all possible means of pulverization, to make their appearance, that they may be drawn or cut off previous to their bloom. Various circumstances in tillage may induce the necessity of an occasional winter-fallow, which, the land being laid up clean, will always be beneficial.

THE ROW-CULTURE.

THE cultivation of corn in rows, for the purpose of admission to destroy the weeds, by one of those seemingly strange revolutions in human affairs, now styled the New Husbandry, is, in reality, the primitive practice, and derived from the most remote antiquity. There needs no better proof of this, than the existing practice of various nations in the east, where, it is well known, they have ever retained the customs of their ancestors, with the most superstitious veneration, and where, according to the most authentic records, no change in their agricultural system has obtained for thousands of years. According to the latest accounts, they both drill and dibble their corn of every species, in Arabia, China, and Japan; in the latter of these countries they use a drill-barrow, of very simple construction,

construction, drawn by hand; and in three points, the most important in the whole range of the husbandman's art, I fear they are at least a century before this boasted seat of improvements; they cultivate their whole country, even to the summits of the hills; they collect, with unremitting attention, every possible article of manure, and they suffer not the existence of a weed upon the surface of the earth. The Belgic districts, on our own continent, justly boast a similar superiority over us.

The drill-husbandry has been probably known, and practised by individuals of this country, for ages; but was first essayed upon a regular and permanent plan, about a century since, by the learned JETHRO TULL, who professed to have caught the idea from the vine-culture upon the continent, and to whose ingenious mind the mechanism of an organ suggested the rudiments of an implement for the delivery of seed in drills. In the course of thirty years' culture of his own grounds, under every disadvantage of ruined health and embarrassed circumstances, this enthusiastic and splenetic genius, reduced the tillage, seeding, and weeding of land, to a system, which being founded in nature and philosophical truth, we may venture to predict, no length of time will be able to overturn. Most of our drilling and hoeing implements, are either copies, or improvements upon the invention of Tull; and his book, in which theory and practice are properly blended, evincing the labour of an acute and penetrating mind, ought to be in the hands of every agriculturist, who aims at principles, and who is laudably ambitious to take his draught

draught of science at the fountain-head. The grand error of Tull, has not always been fairly, or accurately stated. He no where denies, that dung is an improver of land; but with that inequality of reasoning, generally to be observed in men of strong prejudices, he weakly attempts to support the fanciful notion, that dung acts merely by dividing the soil, without being, in any sort, the food of plants, which quality he attributes exclusively to earth—as if dung, to go no farther, was not naturally and spontaneously convertible to earth. It is extremely probable, this notion of Tull was the pure offspring of his spleen. Like too many other cultivators, he had no knowledge at all of cattle. His pride took the alarm at the vulgar occupation of a grazier, although not sharp-sighted enough to perceive any derogation in the business of a mechanic. Such things are hobby-horses. A late writer has drawn, as he supposes, powerful arguments against the drill-husbandry, from the ill success, in pecuniary affairs, of Tull, without reflecting, that a man of genius may just as easily broadcast, as drill away his money. But whatever were his defects, it would probably be difficult to name a man, whose works have conferred a more solid and permanent benefit upon his country; yet whilst so many others, for services of a very different nature and tendency, have enjoyed the most splendid rewards, Jethro Tull, whose honest labours were to contribute to the feeding, and the employment of countless millions, was suffered to pine out his days in misery and distress: his reward consists in the glory of being hailed by posterity,

terity, as THE ILLUSTRIOUS FATHER OF THE HORSE HOEING HUSBANDRY.

Dibbling, or setting corn in the earth, grain by grain, was known long ago in this country, and practised early in the last century, but laid aside: about thirty years since, the practice was revived by Mr. Varlo, author of the Yorkshire-Farmer, and has spread considerably in Suffolk, Norfolk, and Lincolnshire.

To a man unacquainted with the proverbial aversion of the generality of English farmers to all improvements, and their rejection of the most obvious benefits, merely on the account of their novelty, the slow progress of the row-culture, with its perfections staring even indolence itself out of countenance, would indeed seem somewhat miraculous. But what conclusions are we to form from a perusal of the works of certain of our most profound writers on agricultural topics, where they tell us, with so much apparent gravity, that we may, or rather must, drill, or dibble pulse; but that we may not drill white corn; and yet notwithstanding, we may *dibble* white corn! Out of respect to those gentlemen, from whose writings I have received so much instruction, I shall suppose they have argued in this way, from pure complaisance to the majority, whose hour, or minute of conversion was not arrived, who were not yet bit for drilling.

To prove the practicability of setting corn in rows, or to disprove the necessity of scattering it about at random, for the benefit of all the fowls of Heaven, is a task, which carries very much of the ridiculous about it; and yet seems to be necessary.

As

As to the first, whole countries have immemorially performed it, on soils of every possible description, upon the plain, in the valley, and to the very summit of the mountain. The most enlightened men of this country have preferred, and successfully practised it, upon every kind of soil. If light lands are best adapted to the practice, so also are they to every other species of culture, but beans are both drilled and dibbled, by custom, upon the stiffest, and roughest soils, which demonstrates the practicability with other corn. The quantity of land in this country, which cannot be either drilled, or dibbled upon, is indeed very small, and in my opinion, the setting corn of all kinds in rows, upon the steepest ascents, where the operations of the hoe-plough are impracticable, would amply repay the extra expence of hand-hoeing.

Where now lies the pretended impracticability of setting all plants in regular rows, upon the farm, as well as in the garden? No where upon earth, but in the breach of sacred custom, and in the indolence of those who can live without breaking it. But the vast expence of the practice. What of that?—since granting it doubled, or even trebled, the bounteous earth repays all. I must repeat, that in business, *it is not the expence of a measure which ought to be the question, but whether there be a cetainty of spontaneous repayment;* and here generally lies the grand error of persons unhabituated to calculation. To allow this (greater cost) is merely gratuitous on my part, for I am convinced, that the drill-culture, in its most expensive variety, if judiciously conducted, is far cheaper than the broadcast: that

it

it may cost more money at the outset, is beside the question. It has been said, where shall we find skill and labourers?—I answer, seek and ye shall find. No man in the country, who has *diligently* sought, in this business, has been ever yet disappointed; and our population, in the despite of Dr. Price, and his disciples, has been upon a progressive increase, for a long series of years, and obviously so much of late, that the want of labour is likely to become a very dangerous want, and one that should be instantly supplied. As for the skill required, to borrow the sense of Tull, and to acknowledge the obligation (which, by the bye, I wish every one would do also) surely our trouble is well repaid, in learning a beneficial art or science, whether it be corn-drilling, geometry, or navigation.

The very best conducted system of random, or broadcast husbandry, is liable to great defects, all which, as far as possible, are remedied by the row-culture. As to the worst part of the common husbandry, it has ever been, and of late especially, most highly injurious to the first interests of the country. The place occupied by weeds and fallows, and the seed wasted, would supply a very large part of our population with bread and flesh provision.

The theory of vegetation is well enough known, in the general, that is to say, well enough for the advantageous practice of husbandry. A plant, like an animal, is furnished by nature with organs for the attraction of its food, the ejections of its excrement, and the respiration of the common air.

These

These organs, are the fibres, or suckers of the roots, and the filaments and vesicles of the leaves. The earth is a pasture to the animal plant, the substance, or essence of which, it absorbs, most probably, as has been already said, in the form of vapour, or gas, the recrement of which is excreted through the leaves, into the atmosphere, whence, in due time, it again returns to the earth. The matter which descends from the clouds, must, I conjecture, ever be received by the roots of plants, through the pores of the earth, and not by the leaves, which only perform the function of lungs, and do not appear to me to possess recipient organs, for any substance, excepting air, which is necessary to them, as to animals, for respiration only. I am thence inclined to slight the notion, of vegetables with large and succulent leaves, drawing their chief nutriment from the air, which must be a light and windy diet to either plant or animal; and, to conclude, that their supposed quality of non-exhaustion, is to be attributed to a very different agent; the hoe probably.

We see, in the case of weeds most plainly, that pulverization, or reducing land to the finest particles possible, rapidly promotes vegetation. Seeds are locked up, and may perish, in hard, cloddy earth, and growing plants are starved, and stunted, in such; but by reducing it to fine particles, the delicate and minute vegetable fibres are enabled to shoot through it, and extract their nutriment; and the fibres themselves, with analogy to those of the animal body, in certain cases, increase, with the increased quantity of food, until the plant has attained

attained its greatest possible size. By this loosening and rendering fine the soil, another indispensible point is gained, it is made pervious to the genial heat of the sun, to the corrective rigour of the frosts, to the dews, and to all the fructifying bequests of the atmosphere. The surface of the earth being hard and impenetrable, the atmospheric manures cannot find admission, but remain to be dried up, and exhaled by the heat of the sun.

We now approach the celebrated hypothesis of Tull. He contends, that earth being the sole food of plants, infinitely divisible, and possessing within itself the means of restoration, can never be exhausted, provided we are constantly giving those vegeto-animals fresh pasture, and destroying their competitors the weeds, by PULVERIZING THE SOIL, which operation, both on the score of penetrating to sufficient depth, and of economy in point of expence, must be performed by the HORSE-HOE.

Without giving up the sovereign use of manures, particularly the animal, I freely acknowledge I have ever been disposed, respectfully to accompany this philosophic agricultor a great length. The case is equal between the poorest, and the richest soils, the produce will be proportional on both, with, or without manure. What tracts of land there are of all degrees of quality, which have been tilled, time out of mind, with barely manure enough to make a difference in the question, and yet have produced, and supported their occupants. I have known a man who farmed near fifty years, without a fallow, and with very little attention to manure, and yet his crops were generally

generally on a level with his neighbours'; what is truly singular, he was a man of the old stamp, in all other respects, and lived in a fallowing district. These are not conclusive.—But to come closer—suppose the manure bestowed upon land is barely adequate to the support of the weeds suffered to grow upon it, you may then just as well omit the manure, and extirpate the weeds. In the old husbandry, quere, whether the quantity of manure ever exceeds, does it equal, the fair demand of useless vegetation? I am convinced, that many farmers of that sort within my knowledge, would succeed, at least equally, upon the Tullian plan, rejecting manures altogether. Their lands would have less straw, no weeds to support, and from pulverization, enjoy at least the benefit of the dew of heaven. As it is, they are doubly cropped with corn and weeds, their surface is ever rough, and the quantity of manure bestowed, scarcely worth a note. A certain young farmer of my acquaintance, once lost a favourite Chinese boar, for several weeks; after searching all the country, for twenty miles round, the hog was at length found asleep, in a cover of docks, thistles, and oats, upon a fallow, into which the men were about to plough some manure, in order for wheat seed. This piece had grown oats the year before, and six weeks previous to the time I am now speaking of, a few small heaps of dung had been deposited, which the rays of the sun had reduced to a powder, truly Bakewellian!

I will now submit the making up of my mind on this subject to better judgments: I believe the mere horse-hoeing system, without any artificial manure,

manure, far superior to the old English one in which the land was and is, in many cases, exhausted by weeds in a three-fold greater degree than benefitted by dung; with this important superiority of the hoeing plan, that supposing the arrival of both parties at stark poverty, or mere *caput mortuum* in the soil, the latter would possess the striking advantage of being sent to Bath, that is, fallowed for grass, perfectly clean, and in proper state to receive all the restorative benefits nature has to bestow; whereas, in the old way, land is always turned to grass with its surface and its bowels full of the most devouring and exhausting trumpery, which is nourished with the crop, adulterating and poisoning it, and attracting to itself great part of the benefit of the fallow. Hence there can be no pure, or sufficiently ample grass-crops, on the old plan. I hold the present improved broadcast system, with sufficient courses of pulse and green crops hoed, for the attainment of the *due* quantity of manure, far superior to the naked system of Tull: but, after mature reflection, reading all I have been able to lay my hands on, upon the subject, and attending to a number of experiments, I give a decided preference to Tull's practice, aided by manure. It being left to my election, I should just as soon think of broad-casting cabbages, as wheat, or oats. The admission of air and of moisture to the roots, through the loosened soil, is of the first consequence to all plants equally, culmiferous, or otherwise; and if space and hoeing will cause beans to kid to the very bottom of the stems, it will also occasion wheat to tiller, and ear, in proportion. If beans require

more space than wheat, it is simply on account of their greater bulk, and for the same reason, that a cart-horse may need a larger stall than a saddle-horse.

The advantages of the Row-culture, whether by drill, or the dibble, are,

1. Superior quantity and quality of product, with considerable saving of seed.
2. Perfect command of the land under culture, for any needful purpose, of hoeing, weeding, dressing, thinning, gathering, &c.
3. The most precious opportunity of A TOTAL ERADICATION OF THE WEEDS, of applying the whole strength of the soil to the growth of useful vegetables, of keeping it in constant heart and condition, and of superseding the necessity of change, or of particular courses of crops.
4. The power of depositing the seed at its proper depth, securing it from birds, insuring a more regular and certain growth.
5. The benefit of tillage, whilst the crop is growing, by which the soil is *fallowing* for a future crop: this benefit is also of the utmost importance to the growing crop, in hot and dry summers, securing to its roots all the moisture descending from the atmosphere in dews, which, in such seasons, are very copious and constant.
6. Little or no danger of the corn lodging, or falling, the weight of the ears being supported by the strength and shortness of the straw, which is also farther strengthened by earthing-up in the last hoeing.

7. Less danger of blight and mildew, and opportunity of gathering separately, and at small expence, the ears which may chance to be blighted.
8. Less charge at harvest, and less danger, there being no green weeds.
9. The necessity of a tillage superior to the common, a circumstance of the most beneficial tendency, in slovenly and ill-tilled districts.
10. A delightful garden-like neatness, which must be highly gratifying to the proprietor of the soil, both creditable and profitable to the cultivator, and honourable to the agriculture of the country.

OBJECTIONS, WITH REPLIES.

It is remarkable without being at all wonderful, that nearly every individual objection, made at this time, to the drill husbandry, have been previously made, and satisfactorily answered by Tull. In truth, the *wholesale* practical answer, that drilling has had for years together the most unquestionable success on all soils, and is still in a prosperous course, might well preclude the use of any detailed replies.

The same mode of rejoinder, in the behalf of Mr. Kent, may well serve for Mr. Brown, author of the survey of the West Riding of Yorkshire.

Equally strong and wet, probably stronger clays, than Mr. Brown ever has had the opportunity to cultivate, have been long and advantageously tilled in South Britain, without fallows.

Objection 1.—The difficulty of obtaining proper implements, and well-skilled labourers.

Reply.—As to the first, enquire at the Board of Agriculture, and of the various Societies; of Messrs. Cook, Ducket, Amos, M'Dougal, and several scores of other ingenious artists, dispersed all over England. How have those, who have been drilling these twenty years past, instructed their labourers?

2. The fine tilth necessary.

Reply.—A most unlucky objection. If it be meant, that some land cannot be made fine enough, the remark is groundless: no land should be sowed in a state of puddle; if properly dry for seeding broad-cast, it may be drilled, or dibbled as beans are on clays in the spring. A certain farmer said, if he took the pains to get his land sufficiently fine for drilling, he could then get a good crop independently of it; granted. But could he get as good after-crops, and as clean?

3. The danger of too *thin*, or two *rank* a crop, subjecting the corn thereby to blight and mildew, or to being beat down.

Reply.—A common risk to both methods; but if any practicable remedy, sure more so with corn in rows. All experience seems to prove drilled corn least subject to blight and mildew. As to lodging, it was perfectly reasonable to presume strong, elastic stems, the least liable, and experience has confirmed that theory.

4. The plants too thin upon the ground, and land lost in the intervals.

Reply.—No. Because most drilled crops exceed the broadcast in quantity. Is there any advantage in the spaces being occupied by weeds, which they undoubtedly would under the random-culture? Drilled crops producing more, or even equally on less space, is a sufficient answer.

5. Later at harvest. I have neither observed this of drilled crops, nor have I heard such a complaint from the drill-husbands. It may probably have arisen from too late sowing of Lent-corn.

6. Straw for fodder rank and coarse.

Reply.—Mr. Exter consulted his oxen on this head, and received a very satisfactory answer. I think it not improbable that the straw may be more substantial and nutritious. Granting the validity of the objection, it is infinitely overbalanced.

7. Clover not succeeding in drills.

Reply.—This objection, if good, is also infinitely overbalanced; but all the drillists declare themselves satisfied with their clover-crops. In the drill-husbandry, there is not that necessity for mixing clover with corn, nor for any particular course, and I should choose a different arrangement of crops. But clover, or any grass, may be drilled with the corn in the rows, and immediately after the last hoeing, the alleys may be also seeded with grass.

The objections to drill-husbandry, which Mr. Young has lately brought up from Lincolnshire, amount simply to this, the farmers are there too rich

rich to attend to so troublesome a process: for example, Mr. Harrison at Norton, after trying it upon a friable sandy loam, laid Cook's drill aside, not from any defect in the tool, but that the husbandry "wont do here;" a good old-fashioned reason, which, it is probable, his father, or grandfather before him, applied also to the culture of clover. There was a time, (see Ellis, Tull, and later writers) when both clover and turnips *would not do here*. Mr. Graburn, of Barton, has been a successful driller of barley, and various other crops, yet he finds *the system so tedious* (there's the rub) that he has given it up, and now sows all broadcast. We all remember Mr. Billing's successful culture of carrots, and his (surely not consequent) relinquishment of that culture. Twenty five years ago, I remember a farmer took it into his head to cultivate twenty acres of fine rich sand, with a certain garden crop; he made an immense profit, yet although the London seedsman, who was the purchaser, year after year importuned him to repeat the crop, it was all to no purpose, the farmer was inflexible, never would, nor ever did, to the day of his death. I leave it to the naturalists to account for these phenomena.

Mr. Cod, of Radby, approves the Drill for turnips, and all corn but oats, with which he could obtain no success, assigning, I think, a whimsical reason for his failure. Drilling of oats, has been successful in every quarter, as far as I know, without excepting Lincolnshire. From this accidental deviation, which, on a near inspection, would, no doubt, be easily accounted for, this gentleman (as

has ever been the fashion amongst agriculturalists) will no doubt form an erroneous general conclusion. It is thus agricultural *principles* are fabricated, without any very near relation to nature or logic. A respectable farmer and stock-breeder in Sussex, I am told, will not hoe his broad-cast wheat, because the hoe destroys the fibres of the roots: now as those fibres are and ever have been, increased both in number and strength, by the salutary operation of the hoe, *upon all sorts of soils*, it is perfectly allowable to place the objection to *the old account*. A writer (in a note M. S. of the Board) never knew drilling to answer any good purpose, but for beans; for those, it was the best method. Which being interpreted, will stand thus:—The *custom* of drilling beans is established. As to the comparison of drilling beans with drilling white corn, is as follows: Broadcast either beans, or wheat, on a clean tilth, and one may get a good crop; drill them, and in all probability you will get a better, and in much the same proportion.

Mr. Walker has drilled all corn, to a large extent; from drilling nine gallons an acre of wheat, he has had forty-four bushels per acre, over eight acres, yet has totally left off drilling, except of turnips. Mr. Young has spoken sufficiently of the ample crops of thistles, and other similar blessings of husbandry, in Lincolnshire. All arguments on the subject are superfluous.

It is now necessary to exhibit some actual experiments, as specimens of the practice of drilling, and these, in preference to any memorandums of my own, I shall select from the authorities of our most

most celebrated cultivators. I shall begin with Mr. Amos, author of the Theory and Practice of the Drill Husbandry, and Manager for Major Cartright, at Brothertoft, Lincolnshire, who has favoured the agricultural world with a connected series of comparitive experiments, of nine seasons continuance.

Mr. Amos began the experiments in 1783, upon various kinds of soil, and in every one of them, employed two acres of land, laid up in eleven feet ridges, and drilled, and sown broad-cast alternately.

EXPERIMENTS

EXPERIMENTS ON OATS.

The soil a hazel coloured stiff Loam, worth Twenty Shillings per Acre.

DRILLED ACRE.

1783.		DR. £.	s.	d.
March 6,	Ploughing from swarth	0	5	0
10,	Five harrowings, one rolling	0	3	0
	Drilling two inches deep, eight asunder	0	0	6
	Harrowing	0	0	6
	Twelve pecks seed, at 9d.	0	9	0
April 20,	Rolling	0	0	6
May 14,	Brest hoeing, first time	0	2	0
June 5,	Ditto, second time	0	2	0
	Hand-hoeing	0	1	6
	Rent, &c.	1	1	0
		2	5	0
CONTRA.		CR.		
Sept. 19,	Crop, 56 bushels, at 2s. 3d.	6	6	0
	Profit	£. 4	1	0

BROADCAST ACRE.

1783.		DR. £.	s.	d.
March 6,	Ploughing	0	5	0
10,	Eight harrowings	0	4	0
	Seed sixteen pecks, at 9d.	0	12	0
	Sowing	0	0	3
April 20,	Rolling	0	0	6
May 24,	Hand-weeding, first time	0	2	6
June 15,	Ditto, second time	0	3	0
	Rent, &c.	1	1	0
		£. 2	8	3
CONTRA.		CR.		
Sept. 19,	Crop 50 bushels, at 2s. 2½d.	5	6	3
	Profit	2	18	0
	Superiority of the Drill Crop	1	3	0
		£. 4	1	0

COLE-SEED AFTER THE OATS.

DRILLED ACRE.

1783.		DR. £.	s.	d.
Nov. 4,	Ploughing across five inches deep	0	5	0
1784.				
March 1,	Break-harrowing, first time	0	1	6
26,	Ploughing, second time	0	5	0
April 24,	Break-harrowing, second time	0	1	0
	Harrowing and rolling	0	1	0
May 16,	Ploughing, third time	0	4	0
30,	Lime, 4½ chaldrons charged	1	0	0
	Drag-harrowing	0	1	6
June 12,	Rolling and harrowing	0	1	6
28,	Ploughing, fourth time	0	4	0
	Harrowing and rolling twice	0	2	0
29,	Drilling every other land one inch deep and twelve asunder	0	0	6
	Seed a quarter peck	0	0	6
	Harrowing	0	0	6
July 24,	Breast-hoeing, first time	0	2	6
Aug. 16,	Ditto, second time	0	2	0
	Rent, one year, &c.	1	1	0
	Expences	£. 3	13	0
CONTRA.		CR.		
Nov. 24,	Value of Crop appraised	4	0	0
	Profit	0	7	0

BROADCAST ACRE.

1784.		DR. £.	s.	d.
	Four ploughings	0	18	0
	Six harrowings	0	3	0
	Two rollings	0	1	0
	Lime	1	0	0
June 28,	Sowing seed, harrowing, &c.	0	1	9
July 10,	Harrowing	0	0	6
18,	Hoeing, first time	0	3	0
Aug. 12,	Ditto, second time	0	2	6
	Rent	1	1	0
	Expences	3	10	9
CONTRA.		CR.		
Nov. 24,	Value of Crop appraised	3	16	0
	Profit	0	5	3
	Superiority of Drilled Crop	0	1	9
		£. 0	7	0

BARLEY AFTER THE COLE-

BARLEY AFTER THE COLE.

DRILLED ACRE.	DR. £. s. d.
1784.	
Dec. 24, To ploughing, and all expences to June 4, 178$, last hand-weeding rows	3 4 0
CONTRA.	CR.
Aug, 20, Crop reaped, and in a few days thrashed, produce 58 bushels, at 3s.	8 14 0
Profit	£. 5 10 0

BROADCAST ACRE.	DR. £. s. d.
1784.	
Dec. 24, Ploughing twice, hand-hoeing, hand-weeding, &c. June 4	3 8 3
CONTRA.	CR.
Aug. 26, Crop reaped, and in a few days thrashed, produced 51 bushels at 3s.	7 13 0
Profit	4 4 9
Gain by the drilled crop	1 5 9
	£. 5 10 0

BEANS AFTER THE BARLEY.

DRILLED ACRE.	DR. £.	s.	d.
1785.			
Nov. 4, Expences on drilling eight pecks seed, three by twenty-four inches; horse-hoeing twice, hand-hoeing rows, twice; earthing-up ditto, twice, &c. to July 10, 1786	2	9	6
CONTRA.	CR.		
1786.			
Sept. 29, Produce 36 bushels at 3s. 6d. . . .	6	6	0
Profit	3	16	6

BROADCAST ACRE.	DR. £.	s.	d.
1785.			
Nov. 4, Expences in sowing twelve pecks, hand-weeding twice, &c. . .	2	9	9
CONTRA.	CR.		
Sept. 29, Produce thirty bushels	5	5	0
Profit	2	15	3
Gain by the drilled	1	1	3
£.	3	16	6

WHEAT AFTER THE BEANS.

DRILLED ACRE.

		DR. £.	s.	d.
1786.				
Sept. 8,	Ploughing, first time	0	5	0
Oct. 6,	Break harrowing and weeding	0	3	0
8,	Second Ploughing	0	4	0
	Harrowing thrice, rolling once	0	2	0
	Drilling every other land, 1-third by 1-eighth	0	0	6
1787.				
	Seed seven pecks, harrowing 6d.	0	9	10
April 20,	Rolling and harrowing for weeding	0	1	0
May 6,	First hoeing intervals, and hand-weeding the rows	0	3	0
30,	Second-hoeing	0	1	6
June 4,	Hand-weeding rows	0	1	0
	Year's Rent, &c.	1	1	0
	Expences	2	11	10

CONTRA.

		CR. £.	s.	d.
1787.				
Aug. 24,	Produce 36 bushels	9	18	0
	Profit	£.7	6	2

BROADCAST ACRE.

		DR. £.	s.	d.
1786.				
Sept. 28,	Expences on sowing nine pecks seed, &c. to June 12	2	13	3

CONTRA.

		CR. £.	s.	d.
1787.				
Aug. 26.	Produce 30 bushels	8	5	0
	Profit	5	11	9
	Gain by the drilled acre	1	14	5
		£.7	6	2

TURNIPS, ON A LIGHT SANDY LOAM, WORTH 18s. PER ACRE.

DRILLED ACRE.	DR. £. s. d.
1789.	
Feb. 11, Expences in tillage and drilling one pound sugar loaf seed, one inch by twelve; rotten dung ten loads, one half charged; sown June 18; hoeing, &c. finished August 18	3 4 0
CONTRA.	CR.
Dec. 10, Crop appraised	3 15 6
Profit	£. 0 11 6

BROADCAST ACRE.	DR. £. s. d.
1789.	
March 1, Expences, tillage, dung, &c. . .	3 0 3
CONTRA.	CR.
Dec. 12, Crop appraised	3 3 0
Profit	0 2 9
Gain by drill crop	0 8 9
	£. 0 11 6

BARLEY AFTER THE TURNIPS.

DRILLED ACRE.	DR. £. s. d.
1789.	
Dec. 20, Expences, 1-half the dung (before charged) seed, eight pecks, put in April 10, two inches by nine, &c. .	2 17 2
CONTRA.	
1790.	CR.
Aug. 26, Produce 52 bushels	9 1 0
Profit	£. 6 3 10

BROADCAST ACRE.	DR. £. s. d.
1789.	
Dec. 20, Expences, seed 12 pecks, &c. .	2 18 6
CONTRA.	CR.
Produce 47 bushels	8 4 6
Profit	5 6 0
In favour of the drilled crop	0 17 10
	£. 6 3 10

RED CLOVER AFTER THE BARLEY

RED CLOVER AFTER THE BARLEY.

DRILLED ACRE.		DR. £.	s.	d.
1791.				
	Seed 1 stone last year	0	7	0
March 29,	Bush harrowing 1s. raking and gathering off weeds, 3s. 6d. rolling 6d.	0	5	0
June 30,	Mowing and making first crop	0	5	0
	Carting home	0	15	0
	Expences on second crop	0	15	6
	Year's Rent, &c.	0	19	0
		£. 3	6	6

CONTRA.	CR. £.	s.	d.
First Eddish	0	4	0
First Crop, two ton hay	6	0	0
Second ditto, one and a half ton	4	10	0
Second Eddish	0	5	0
	10	19	0
Expences	3	6	6
Profit	£. 7	12	6

BROADCAST ACRE.		DR. £.	s.	d.
1791.				
March.	Expences (same quantity seed)	3	1	0

CONTRA.	CR. £.	s.	d.
First and Second Eddishes	0	8	0
Ditto Crops $3\frac{1}{4}$ tons	9	15	0
	10	3	0
Expences	3	1	0
Profit	7	2	0
In favour of drilled	0	10	6
	£. 7	12	6

WHEAT AFTER THE RED CLOVER.

DRILLED ACRE.	DR. £.	s.	d.
1791.			
Oct. 4, Expences	2	7	0

CONTRA.	CR. £.	s.	d.
1792.			
Aug. 30, Produce 42 bushels	10	10	0
Sheep feed April	0	3	6
	10	13	6
Profit	£. 8	6	6

BROADCAST ACRE.	DR. £.	s.	d.
1791.			
October Expences	2	6	9

CONTRA.	CR. £.	s.	d.
Sheep feed	0	3	6
Produce 36 bushels	9	0	0
	9	3	6
Profit	6	16	9
In favour of drilled	1	9	9
	£. 8	6	6

POTATOES ON A LIGHT SANDY LOAM, WORTH 20s. PER ACRE.

Being a comparative Experiment between the Horse and Hand-hoe.

POTATOES ON A LIGHT SANDY LOAM, WORTH 20s. PER ACRE.

Being a comparative Experiment between the Horse and Hand-hoe.

HORSE-HOED ACRE.		DR. £.	s.	d.
1789.				
Feb. 2,	First ploughing	0	5	0
28,	Harrowing 6d. Dung twelve loads, and spreading	0	16	6
March 1,	Second ploughing	0	4	0
April 2,	Ditto Harrowing	0	0	6
24,	Ploughing with three ploughs	0	4	0
	Planting with twelve hands three inches deep, nine asunder; thirty inch alleys, 4s. seed thirty bushels, cutting, &c.	2	4	0
	Rolling	0	0	6
June 1,	Harrowing for first hoeing	0	0	6
10,	Skim-hoeing, 1s. hand-hoeing rows, 3s	0	4	0
26,	Ditto, ditto	0	4	6
July 1, 15,	Earthing-up rows	0	2	0
August 2,	Picking out weeds	0	1	6
Oct. 20,	Taking up, pying, &c.	1	16	0
	Expences	6	3	0
CONTRA.		CR.		
	Product 500 bushels at 8d.	16	13	4
	Profit	£. 10	10	4

HAND-HOED ACRE.		DR. £.	s.	d.
1789.				
Jan. 12,	First ploughing	0	5	0
Feb. 24,	Drag-harrowing, 1s. dung twelve loads, one-half charged, &c.	0	17	0
March 1,	Ploughing second time	0	4	0
30,	Twice harrowing	0	1	0
April 24,	Ploughing with three ploughs	0	4	0
	Planting with twelve hands, three inches deep, eight asunder, twenty-four alleys	0	4	6
	Seed thirty-six bushels, and cutting	2	8	0
June 1,	Harrowing for first hoeing	0	0	6
14,	Hand-hoeing, first time	0	5	0
26,	Second ditto	0	4	0
July 6,	Earthing-up	0	15	0
August 3,	Picking out weeds	0	1	6
	Taking up, pying, &c.	1	14	0
	Expences	7	3	6
CONTRA.		CR.		
Oct. 24,	Product 420 bushels at 8d.	14	0	0
	Profit	6	16	6
	In favour of horse-hoed acre	3	13	10
		£. 10	10	4

BARLEY AFTER THE POTATOES.

DRILLED ACRE.

1790.	DR. £	s.	d.
Jan. 18, Expences on half the dung, the tillage, &c. in drilling seven pecks of seed	3	1	0
CONTRA.	CR.		
Sept. 4, Produce 56 bushels 4s. 6d.	9	16	8
Profit	£.6	15	8

BROADCAST ACRE.

1790.	DR. £.	s.	d.
January, Expences, &c. with 12 pecks seed	3	4	3
CONTRA.	CR.		
Sept. 6, Produce 49 bushels 3s. 4d.	8	3	4
	4	19	1
In favour of drilled acre	1	16	7
	£.6	15	8

RED CLOVER AFTER THE BARLEY.

DRILLED ACRE.

1791.	DR. £.	s.	d.
Seed, one stone, sowed last year, and all expences to July 4.	3	3	0
CONTRA.	CR.		
Produce of the two crops, three tons	9	0	0
First and Second Eddish	0	10	0
	9	10	0
Expences	3	3	0
Profit	£.6	7	0

BROADCAST ACRE.

1791.	DR. £.	s.	d.
Expences	3	0	6
CONTRA.	CR.		
Produce two tons and a half, Eddish 9s.	8	14	0
Profit	5	13	6
In favour of the drilled	0	13	6
	£.6	7	0

WHEAT AFTER THE RED CLOVER.

DRILLED ACRE.		DR.		
1791.		£.	s.	d.
	Expences on drilling eight pecks, &c.	2	8	6
CONTRA.		CR.		
Sept. 14,	Produce thirty-six bushels at 6d. Sheep feed 3s.	10	19	0
	Profit	£. 8	10	6

BROADCAST ACRE.		DR.		
1791.		£.	s.	d.
	Expences on sowing eight pecks	2	7	6
CONTRA.		CR.		
Sept. 18,	Produce thirty bushels at 6s. seed 3s.	9	3	0
	Profit	6	15	6
	In favour of the drilled	1	16	0
		£. 8	11	6

N. B. The value of the straw supposed equal to the expences of reaping, thrashing, and carriage to market.

EXPERIMENTS ON CABBAGES, ONE ACRE HORSE, THE OTHER HAND-HOED.

Soil a stiff hazel loam, 20s. per Acre.

HORSE-HOED ACRE.

1790.		DR. £.	s.	d.
Jan. 14,	Ploughing	0	5	0
Feb. 20,	Harrowing twice	0	1	0
March 11,	Dung twelve loads at 3s. half charged to this crop	0	18	0
14,	Ploughing second time	0	4	0
April 20,	Dragging, harrowing, couching	0	3	6
May 14,	Ploughing into four foot lands	0	4	0
	Five thousand plants at 2s. 6d. per thousand	0	12	6
	Planting 48 inches by 30	0	8	6
June 10,	Ploughing from the rows	0	2	6
	Hand-hoeing and hilling	0	3	6
July 1,	Ploughing to the rows	0	2	6
20,	Earthing-up with horse-hoe	0	1	6
August 1,	Hand-weeding and vermin killing	0	1	6
	Rent, &c.	1	1	0
	Expences	4	9	0
CONTRA.		CR.		
Dec. 21,	Value of Crop, fifty tons	10	0	0
	Profit	£. 5	11	0

HAND-HOED ACRE.

1790.		DR. £.	s.	d.
Jan. 15,	Ploughing	0	5	0
Feb. 21,	Harrowing twice	0	1	0
March 11,	Dung	0	18	0
14,	Second ploughing	0	4	6
April 20,	Dragging, harrowing, couching	0	4	0
May 14,	Third ploughing	0	4	0
	Plants 5,500	0	13	9
	Planting 36 inches by 30	0	10	6
June 10,	Hand-hoeing and earthing-up	0	12	0
July 20,	Ditto second time	0	7	6
August 1,	Hand-weeding, &c.	0	2	6
	Rent, &c.	1	1	0
	Expences	5	3	9
CONTRA.		CR.		
Dec. 21,	Produce forty-one tons	8	4	0
	Profit	3	0	9
	In favour of the horse-hoed acre	2	10	9
		£. 5	11	0

A single word, by way of commentary on the above experiments, would be unnecessary. When two and two, by the obvious rule of addition, are made into four, men neither make objections, nor call for an explanation. It will be much more to the purpose, to make public demonstration of our gratitude to this sedulous and respectable cultivator, and to profit by his rules. In various other trials, upon inferior land, worth about twelve or fourteen shillings per acre, Mr. Amos declares, he never found the profits less than twelve or fourteen shillings per acre, per annum, in favour of the practice of drilling. Mr. Amos's drill machine is an improvement of one recommended in Duhamel's Husbandry, constructed with spherical cups. It sows 8 rows at 8—7, at 9—6, at 10—5, at 12—4, at 16 and 18—3, at 20—24 and 28, and 2 from 28 to 56 inches between the rows; and with one man, a boy, and a horse, can drill an acre of land in one hour. Expence of workmanship and materials for this machine, six guineas. It plants all kinds of grain, pulse and seeds, turnip, carrot, rape, &c. also acorns, haws, holly-berries, or the like, on any kind of land, in any given quantity, and at any depth and distance required.

The following extracts are from the prize essay of Mr. John Exter, of Pilton, Devon, for which he was lately rewarded by the Bath Society with a piece of plate, value ten guineas. Mr. Exter is a cultivator of character and eminence in the West, a correspondent of the Society, and of the Board of Agriculture; and in the habit of instructing pupils in the theory and practice of husbandry. Mr. Exter's

Exter's experiments, during six years, made with a critical and impartial attention, upon an extensive scale in every soil and situation, have uniformly and decidedly proved the superiority of the drill-culture.

He began in 1790, by drilling barley, at six inches, with Winter's machine, on a small part of a field, the intervals of which were hand-hoed. The success of this, under other disadvantages, besides poverty of soil, convinced him of the advantages of the system under better management, and excited him to make farther comparisons between the drill and broadcast methods.

In November 1791, Mr. Exter received, by sea, from London, Cooke's Drilling Machine, which he prefers. This, I believe, is on the same principle and construction with that of Mr. Amos, already mentioned. The implement arrived somewhat too late for the seed-season; but Mr. Exter drilled with it, on a piece of two acres and half, one bushel per acre, red Lammas wheat, in rows with nine inch intervals. The land was light, dry, loamy barley soil, worth twelve shillings per acre, but in the state of a very foul and poor pea-stubble. A servant-man, thoroughly orthodox in the old system, and extremely averse to the supposed complexity, and loss of land by the intervals in drilling, was directed to fix on any part of the field which he considered as best in tilth and condition, to sow broad-cast, and manage as he should think proper. He confessed, the part he chose was better than the average of the drilled land, by five or six shillings per acre, and sowed his part, at the

rate

rate of two bushels per acre; and, during the growth, paid unusual attention to keep it clean from weeds. The drilled crop being thin sown, made but a poor appearance until June: the broad-cast, on the contrary, looked much more verdant and thriving, during winter, and the beginning of spring, till the end of May, at which time, it became rather sickly and yellow. The drilled crop was scarified once in March, and horse-hoed in the last week of May; after this operation, it improved greatly, and began to shew a decided superiority over the broad-cast, which evidently continued to decline. At harvest, the drilled part yielded nineteen bushels, three pecks, nine gallon measure per acre; the broadcast yielded not quite five bushels per acre.

In March 1792, drilled one bushel white Lammas wheat, on one acre potatoe-fallow, worth a pound rent, prepared by once ploughing and harrowing. The plants, when double-leaved, had one scarifying: and immediately after, were harrowed across with the common harrow, and were horse-hoed when six or eight inches high. The crop, very thin till after Midsummer, yet a great product, both of grain and straw, at harvest. The acre yielded twenty-nine bushels, three pecks of wheat, nine gallons measure. This successful experiment on SPRINGWHEAT, is most important, and deserves the utmost consideration in the present state of the country.

The same spring, tilled thirty acres of land, worth from 35 to 40s. per acre, with barley; fifteen acres were drilled, at two bushels per acre, with rows

rows at nine inches; and fifteen acres broad-cast from three to four bushels per acre; the preparation of the land, manuring, &c. in every respect alike. The season very wet, both during the growth of the crop, and at harvest. The broad-cast was lodged, stained, and with great difficulty harvested at all. The drilled stood better, was scarcely at all lodged, and being free from grass and weeds, was all saved, without the least injury, at half the expence of the broad-cast; the produce of grain from ten to fifteen bushels per acre more, and a shilling per bushel better; and this, notwithstanding the whole of the broad-cast crop had been first-sown, a remarkable advantage that year.

In the following October, Mr. Exter tilled and manured a field of ten acres, for wheat, drilling at nine-inch intervals one half the land, with half the quantity of seed with which the other was broad-cast: but, as some doubts were advanced, respecting the value of the land, in different parts of the field, two-twelve furrow ridges, by way of proof, were gathered through the middle of the part intended to be drilled, and the drilling was begun on each side of those ridges. The ridges were ploughed, sowed, and manured, according to the common husbandry of the country, by the person before-mentioned, and every attention paid to weeding them in the spring: the drilled crop was scarified and horse-hoed once. At harvest, the two ridges were cut first; and immediately after, a breadth of the broadest on each side of the ridges, was cut, and each part stacked and kept separate, until it was dry enough to thrash, when it was cart-

ed

ed into two different barns, and immediately thrashed and winnowed; when the drilled crop yielded 29 bushels 3 pecks, the broad-cast 20 bushels 1 peck. In order to guard against any suspicion of fraud, the whole was winnowed and measured by the same man, the person who was so very averse to the drill system.

From these successful experiments, Mr. Exter has been induced to drill the whole of his white-corn crops ever since, excepting only a part, sown in the random method, by way of proof; and, in all his trials, has experienced an invariable superiority in the drill-culture, without even a single instance of equality of product in the broad-cast method. All the pulse-crops he leaves out of the question, since, with regard to the superior fitness of the row-culture for them, there seems to be but one opinion; but he avers, confidently, the same thing, respecting turnips, in which opinion I have the fullest conviction he is right. To drill-turnips, is to put in for a fair chance of doubling the worth of the crop. Having reconsidered the matter, and, from some late observations, I would also advise the drill and horse-hoeing culture for carrots, more particularly if manure be scarce.

This worthy disciple of the Tullian School, exhibits an account of several farther experiments on barley, oats, and turnips, drilled at twelve inches apart, in which the result was similar to the above stated, with the mention of a fine crop of beans drilled in two rows, at nine inches, with an interval of twenty-seven, which became quite a thicket. It happened, from this luxuriance of growth, that part

part of the rows could not be hoe-ploughed a second time, which fortunately served to demonstrate the immense difference that omission made, in the friability of the fallow, and the vast importance of the horse-hoe; the part twice-hoed, worked afterwards better on a single-ploughing and harrowing, than the other part would with three times the tillage. The one appeared a fine mellow loam, the other a clay. Mr. Exter also records Mr. Secretary Young's frank acknowledgment of the superiority of the drill-culture; a circumstance which will, as it reasonably ought, have great weight with the majority of our cultivators.

The following facts and opinions, respecting the mode of culture in question, are also extracted from the papers of the Bath Society, being the substance of a letter from the Rev. H. J. Close, of Hordle, near Lymington, Hants, a worthy and estimable character, as his various agricultural correspondence, for many years past, fully evinces; and a real practical cultivator, upon a considerable scale. I have a sincere pleasure in this opportunity of paying my share of that tribute of applause, due from his country, to this patriotic votary of the plough, whom I had formerly the honour to know personally, but whom I have not had the pleasure to see for near thirty years.

Mr. Close formerly asserted, that he saved full £.200 *per* year in seed, by drilling his corn upon 500 acres of land, although, by no means so perfect in drilling and horse-hoeing as he has since been. In proof of this, he gives the following quantities, which he actually has, and still continues

tinues to drill, on 131 acres, with a comparative statement of the quantity broadcast in the common husbandry.

Expence of seed-corn upon 131 acres of land, sown in the usual broad-cast husbandry.

	Bush. per Acre.	*per Bush.*	*£.*	*s.*	*d.*
31 Acres Wheat,	3	at 7s.	32	11	0
20 - - Early Peas	4	8s.	41	12	0
18 - - Dun Peas	4	5s. 8d.	18	18	0
15 - - Tick Beans	3	5s.	11	5	0
6 - - Early Maz. Beans,	3	6s.	5	8	0
12 - - Oats - -	4	3s.	7	4	0
13 - - Barley - -	3	3s. 6d.	6	16	6
12 - - Vetches -	3	6s.	10	16	0
		Total	134	10	6

Expence of seed-corn upon 131 acres of land, in the present improved drill-husbandry.

	Pecks. per Bush.	*per Bush.*	*£.*	*s.*	*d.*
31 Acres Wheat, per Acre	3	8s.	8	2	9
26 Early Peas - - - - -	3	8s.	7	16	0
18 Dun Peas - - - - -	1	5s. 3d.	4	14	6
15 Tick Beans - - - -	3	5s.	2	16	3
6 Mazagan Beans - - -	3	6s.	1	7	0
12 Oats - - -	1 Bushel	3s.	1	16	0
13 Barley - - -	1	3s. 6d.	2	5	6
12 Vetches - -	1½	6s.	5	8	0
		Total	34	6	0

Seed

	£.	s.	d.
Seed broad-cast - - - - - - - - -	134	10	0
—— drilled - - - - - - - - - -	34	6	0
Saving in seed upon 131 acres by drilling - - - - - - -	100	4	0

It is the opinion of Mr. Close, that a clear saving of FIVE MILLIONS sterling a year might be made, in the article of seed-corn, and double that sum, in the produce, and application of that produce, by the improved system of husbandry, as at this moment practised by some few spirited farmers, that, (without pretending to minute accuracy of calculation) 8,000,000 bushels of wheat, 3,000,000 bushels of barley, 1,000,000 bushels of rye, 4,000,000 bushels of oats, and 1,000,000 bushels of peas and beans, which are yearly thrown away, in superfluous seed, might be saved, independently of the additional produce, which, by the new system, might be obtained. Thus it is possible to add fifteen millions annually to the national wealth! That more than double the present scanty portion of tillage, now given to the lands of England, would amply repay the farmers for their extra labour and expence;—that four times the stock might be wintered, and the aggregate produce doubled. On the latter part, at least, of these statements, I agree with Mr. Close, without the smallest hesitation—they are capable of the most palpable and satisfactory proofs.

Mr. Close acknowledges his obligations to the agricultural, as well as mechanical skill, of the ingenious Mr. Cooke, by whose implements, namely, the

the SCARIFICATOR, CULTIVATOR, and QUITCH-RAKE, he was enabled to pulverize his strongest land to the fineness of dust, and to cleanse it from weeds, at a little more than a quarter part of the expence necessary to make an equally good fallow, with the common implements of husbandry.

The following account of two crops of drilled turnips, is interesting in the highest degree. "Two adjoining fields were taken at Lady-day, from a little farmer, in a very foul and impoverished state; and well pulverized and cleaned, by frequent scarifying, rolling, and harrowing. The quitch-grass was drawn out by the quitch-rake, and burned on the land. After these operations, which cleansed, levelled, and pulverized the land about six inches and half deep, one field of four acres was thrown on two ridges, by one bout of the plough, three feet from the centre of one ridge to the centre of the other. A triangular sled of wood, drawn by one horse, and held by a boy, was passed at the bottom of each furrow, to make them about two feet wide, which operation was necessary, merely to widen the bottoms of the furrows, that the rows of plants might be exactly over the manure. In these furrows, some long wet straw, from the farm-yard, half rotted, was laid, about ten common carts per acre; the ridges were then split and reversed, throwing all the pulverized soil on to the dung; one horse and a boy, with a long bar of wood with handles, beat down the tops of two ridges at once, leaving a surface about eighteen inches wide, and prepared the land for drilling. The horses then walked in one furrow, each wheel occupied

cupied another, and four rows of turnips were drilled on the tops of two ridges, 11½ inches from row to row, on each ridge, and 22½ inches interval.

"As soon as the turnips were in rough leaf, the corn scarificators were passed through them, a furrow was taken from each side of the ridge, with the common Suffolk plough, and the turnips, in the rows, were hand-hoed. These operations were performed twice, and the whole land thrown up to the turnips by the common plough, which finished. The field was sowed in the first and second weeks of July. Before Michaelmas, no appearance of intervals could be seen, and the whole field exhibited the finest and most regular crop of turnips ever beheld; many of them weighed 25l. each, and measured 3 feet 3 inches in circumference. Agriculturists and farmers from many parts of the country, visited the farm, and were astonished at the regularity of the crop, and the size of the plants. The average weight of each turnip about 12 or 14lbs. The acreable weight was ascertained, by weighing a few rods, to amount to 55 tons. The turnips were most of them drawn, their tops and tails cut off, and stacked before the frosts, and are NOW, THIS FIFTH DAY OF MARCH, perfectly sound and good. Never, indeed, did bullocks fat faster than on these turnips: *They were lean, working beasts, put up the beginning of November, and will soon be very fat, as they already weigh about 45 score each, and it is supposed they will reach 50 score each by the middle of April.*

"The other four acres were treated exactly like these,

these, except being sown without any dung, and ten days later than the first field; yet, to shew what extra tillage, and throwing the whole of the soil to the plants will effect, these were a very even and beautiful crop of turnips, allowed to be the best in the country, excepting the adjoining field, and a neighbouring one, tilled in the same method. The advantage of this system must be apparent, the young plants, when the land is mucked, are absolutely on a hot-bed, and grow so rapidly, that they are in little or no danger from the depredations of the fly. The intervals admit sun and air, without loss of land, as the whole of the pulverized soil is thrown to the part of the land occupied by the plants. The land is better tilled by the use of the horse-hoe, and common plough, than it can possibly by hand-hoeing; and the expence of hand-hoeing is reduced one half, by having merely to hoe the rows of turnips, and to single the plants. Thus a more complete fallow is made, and a much heavier crop obtained, at about one quarter the expence of ploughing four times, dragging, &c. as in the common system: but great success must not be expected, without first obtaining the most complete pulverization."

THE HALF-HUSBANDRY. The following experiments were upon a larger scale, but the accounts were reduced to an acreable one, for the convenience of the reader. "One field was fallowed for two years, and dressed very highly: September, 1795, thrown on two ridges, 4 feet eight inches wide, exclusive of the furrow. October 1st, every other

other ridge was drilled with red wheat, a little more than 3 pecks per acre, 11½ inches from row to row. It was twice horse-hoed in the spring, and the 4 feet 8 fallow ridge was ploughed up to the wheat, and back again, and then one furrow was thrown up to each outside ridge, on which the wheat had been drilled. The wheat was so very luxuriant, that it was laid in the grass, and I was obliged to feed sheep with it, until the middle of April. One row of potatoes was then planted on the centre of the fallow ridge; these were ploughed between, and well hoed. The produce of the two acres of land was, wheat seven quarters three bushels per acre; potatoes, per acre, one row on each fallow ridge, fifty sacks.

"The following year, the potatoes were grown on the ridge occupied by the wheat the preceding year; and the wheat upon the fallow ridge, where the one row of potatoes grew. Both crops looked equally strong and good the second year; but the result was not ascertained. But there can be no doubt, but by thus alternately cropping and fallowing, the land would improve every year. A similar experiment was made in an adjoining field, trusting entirely to pulverization, without manure. From this field, two successive good crops of potatoes were taken, without any dressing. The potatoes were planted with three feet intervals, and ploughed between; the land was in very high tilth, drilled at the same time, and in the same method, as the other field. In the spring, the wheat looked thin, but of a good colour. It was twice horse-

hoed,

hoed, &c. At harvest, to Mr. C.'s surprise, this produced seven quarters, one bushel, per acre; only two bushels less than the field which had been manured at 5*l.* per acre expence. Forty sacks only, of potatoes, were produced from the one row, on each fallow-ridge in this field. The same year, in an adjoining field, there was a fine crop of broadcast wheat, to appearance, after beans, well dunged; and the farmer assured me he had only three quarters and a half per acre. Indeed the ears of the broad-cast corn were very small, and about three or four inches long. In the drilled red wheat, were many ears eight inches long, measured by numbers of gentlemen who went to see the crop."

So convinced is this true patriot of the soil, of the superiority of the new, over the old, or random method of husbandry, and of the great public utility of having this superiority clearly ascertained, to the conviction of all farmers, that he has challenged all England, to cultivate 24 acres of land in a six year's course of crops, row against broadcast, for A THOUSAND POUNDS, the drill annually to exceed the broad-cast crops, one guinea per acre. Mr. Close, at the same time, most generously declaring his intention of bestowing the money, should he prove a winner, in charitable purposes; that in fact he is, from pure motives of public good, nobly risking his own property against nothing. Bath papers, vol. 9. p. 44.

A. Collett, Esq. of the county of Suffolk, a cultivator of great skill and experience, as his observations in the report from that county fully evince,

thus speaks of Cooke's drill, and of drilling in general. "It has nine coulters, goes with two horses, and will keep pace with the plough; in barley-sowing it finishes ten acres every day, with ease to the horses, and can never be affected by rain or wind, and will deposit the corn the same, whether the land is hilly or level. A one-horse roll should follow the drill, to close the land upon the seed, and then the more the land is harrowed the better. Farming should come as near to gardening as possible: but, nothing will accomplish it like drilling. Let any judicious agriculturist examine the rows of pease, or kidney beans, in a garden, and see which are most productive, the thick or the thin ones. Let him examine the young plants of clover, in drilled barley, and in barley that is sowed broad-cast, it will soon be distinguished which has the preference. Dibbling and drilling corn have been attended with the best consequences to the poor, by encouraging the farmer to weed it in a ten-fold degree, to what he did when sown broad-cast: and, as the ploughing, rolling, and harrowing, are more attended to by the farmer, the land is in a better state of tillage than ever was thought necessary before they were introduced."

In Mr. Collett's opinion, very little seed is saved by drilling; but the Rev. Mr. Hill, of Buxhall, same county, an experienced cultivator also, finds that he saves, at least one-half his seed, by drilling it; and, I have been often enough convinced that he is right. This gentleman has found, by repeated experiments, a superior produce of wheat, planted eighteen inches asunder, than at a nearer

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and more fashionable distance: in this particular, also, thorough tillage pre-supposed, I fully concur with him. In one crop, his eighteen-inch rowed wheat, produced more straw, (a thing uncommon), than that at nine inches. The former produced 8 coombs, 1 bushel, 1 peck of wheat: the latter, 7 coombs, 1 bushel, 2 pecks.

DIBBLING wheat, upon a considerable scale, and of all kinds of corn, in some degree, is practised in Suffolk and Norfolk; of the former, chiefly in the maritime district. Some farmers in that quarter, dibble their whole crop, to the extent of two or three hundred acres. The ground being rolled with a light barley roller, a man, walking backwards on the *flag*, or furrow-slice, with a dibber of iron in each hand, the handle about three feet long, strikes two rows of holes, about four inches from one row to the other, on each flag: then follow three or four children to drop the grains, three, four, or five, in each hole. Six or seven pecks of seed are equally deposited, in the centre of the flag. It is not common to hoe these double rows, but sometimes single nine-inch rows are hoed. A narrow-set plough, of only seven inches wide at bottom, is used for wheat; then follows the one-horse roll, to level the furrow for the dibblers; when the wheat is deposited, a two-horse roll follows, afterwards the harrows, twice in a place; the field being finished, is harrowed up again obliquely; thus the wheat will stand in the middle of the flag, in nine-inch rows. The two-horse roller is of material use in closing the holes, and preventing the wheat from being disturbed by the harrows;

the land is also rendered so solid by rolling, that very little apprehensions need be entertained of the slug or worm. Sandy land is here treated of; but, I think, upon all sorts, without exception, a roller of properly apportioned weight, should immediately follow on drilled or dibbled work. Each dibbler, employing three droppers, will set half an acre a day, making eight holes the length of every foot of the flag; whereby, two dibblers, with six droppers, will find full employ for one plough.

Beans are generally dibbled, in Suffolk, one row upon a furrow, and planted square, at nine or ten inches. When the plants are all up, they are rolled, and, in ten days, harrowed with heavy harrows. They hoe across the land first, and lengthwise the second time, by which means, the plants are better earthed up than in the common method. Dibbling, in general, from nine shillings to half-a-guinea per acre, which may sometimes be saved in the seed. Another considerable saving is supposed to arise from planting on the first earth, instead of sowing on the third.

The practice of dibbling, confined, as it may be said, to one particular district, of no very great extent, and of which I have seen enough, always seemed to present to my mind a variety of curious circumstances. However the system may have commenced, in Suffolk, or Norfolk, it seems by no means to have been practised on its original principle, of the possibility of obtaining vast product from a single one, or two, grains, of corn, being allowed ample space to tiller and increase, since the modern custom is to bunch them, four or

five,

five, or, I rather apprehend, they know not how many, in a hole, and to set the rows very close. As to hoeing, it seemed, (at least some years since), a matter of secondary concern with all, and, by many of the dibbling farmers, was not even thought of. The superiority which they have experienced in dibbling, over broad-casting their corn, yet has, no doubt, arisen from the airy space allowed by the rows, and from the more solid and convenient bed, which the seed finds in a loose running soil, in the round hole made by the dibble; with respect to compression by the tread of the dibblers, it is probable the end might be fully answered by judicious rolling.

It is not usual to dibble barley, because, at barley seed-time, the sands being dry and running together, it is difficult to make holes; but, to persons accustomed to dibble their corn, for the most important purpose of all, that of cleaning and weeding, the propriety of drilling barley, would surely occur, when it could not be dibbled. Far be it from me to aim at detracting from the great merit of the Norfolk and Suffolk farmers, or to deny the obvious improvement of the method in question, upon their ancient system: no, I would be among the first to hail their growing openness to conviction, which may, and indeed must, naturally lead to such great public ends; but, for people who are in the habit of making eylet holes in the earth with iron pins, and dropping therein single grains of wheat, by a *posse comitatus* of men, women, and children, to talk of the tediousness or complexity of a drilling machine, which, with a boy and horse, will

will completely seed so many acres in a day, carries with it no little of the ludicrous, that is to say, is precisely in the common order of things. When dibbling light lands shall have proved itself superior, in point of economy and produce, to drilling them, I will most willingly become a dibbler. I dare say the dibblists will plead their experience, since their practice has had the sanction of custom for a number of years. By the bye, no subject has afforded streams of purer nonsense, than that of experience. On the first entry of the dibble into Norfolk, no doubt but it was opposed by broad-cast experience. The experience of the men of Berkshire, and of other counties, has taught them the absolute necessity of four or five horses to turn up light land. Ask an Essex farmer, as I have done, why he cannot till his land with oxen, as well as horses? he tells you, he knows by experience, that it will not do; enquire farther, and you will find that all his experience consists in his never having tried it.

But dibbling, or setting wheat has, in former days, given rise to most important speculations. Mr. Randall says somewhere, I think in his Semi-Virgilian Husbandry, that one acre of a fine loam, exquisitely prepared, experimentally and actually produced one hundred and forty-four bushels, or eighteen quarters: adding, that it is not known, what the increase may be brought to, on rich lands, by high cultivation. Thirty-nine bushels of wheat have been produced, from nine pints of seed, set upon an acre of land, two kernels in a hole, at a foot distance. It would be, by no means a useless

or unpleasant experiment, to dibble single grains over an acre, at half a foot distance, with sufficient intervals for horse-hoeing. The same may be said of transplanting wheat; experiments on which may lead to the most astonishing consequences, and are well worth the attention of gentlemen cultivators. To conclude with dibbling, a Suffolk cultivator says, "that when land is stiff and unkindly to work in the spring, for oat-seed, no method is equal to dibbling them;" and, for my own part I would always prefer dibbling corn of any kind, upon land in too rough, or even too moist a state for drill-work. I mean, should there be a necessity for sowing land in that state; even then the advantages of rowing the crop, and subsequent culture, will greatly outweigh the supposed damage of treading by the dibblers; but the most poachy land, in its properest state for seed, can receive no damage of consequence from such a trifling cause. As to the employment of children, in dibbling, I have seen plague and inconvenience enough in it; and should always prefer the steadiest young women I could find, for that business; the backs of old women complain of so much stooping; and the snuff-box is a mighty consumer of time. That dibbling occasions a vast increase of employment for the poor, is most true; but in the present state of our population, I have no idea of the possibility of a want of labour, in a thoroughly-cultivated parish.

In the section on implements, I have just mentioned those of the celebrated Mr. Ducket, of Esher:

Esher: it may not be improper, in this place, to give a slight sketch of his drilling-system, as practised a few years since. He drills white corn at nine, tares, pease, and turnips at eleven, and beans at eighteen inches asunder.

Mr. Ducket has, for a great many years, drilled all his crops. He was, at first, contented with hand-hoeing, until he discovered the vast superiority of the horse-hoe, to which he has ever since adhered. He has been accustomed to drill in both methods, that of East Kent, by striking out the furrows, but with a new implement of his own, having five shares, and then broad-casting the seed into the furrows; and also by delivering the seed from a drilling machine of his own invention. To the latter, I believe, he has, of late years, given the preference; and he executes it as follows: his land being in fine tilth, and usually thrown into ridges, he draws five channels, with the implement just mentioned, having as many shares and broad-boards; his dropping-machine follows, shedding the seed into five channels, which are closed by a harrow. The crop being high enough, he horse-hoes it with two hoes, each guided by a man, and these, at once, hoe five rows each. They work one on each side of the furrow, which divides the beds or ridges: of course, hoeing at once five rows on each bed, or two half-beds. The horse is led in the furrow by a boy, and by the help of a long whipple-tree, draws both the horse-hoes, which completely hoes the ten rows. When the work is strong, two horses are used, but no injury is ever done

done to the beds, the horses always going in the furrow. He has also six shared tools, which, in course, hoe twelve rows at once.

Mr. Ducket preferring narrow furrows, his ploughs are constructed to turn them only nine inches wide; although so much work may not be done in a day with these as with larger tools, the soil is much better broken and divided. His trenching or skimming plough, is a most effective implement. It is double-shared, the one directly over the other, for the purpose of trenching, or taking one narrow, shallow furrow off the surface, and another beneath it, to any moderate depth desired; it will work from five to ten inches deep. The use of this implement, in putting in one crop on the back of another, in burying green manure, or long-dung, out of the way of being a hindrance to tillage, is equal to every idea of excellence: it has turned in green rye, six feet in height, upon which a crop of turnips was immediately after obtained. Not an atom of the crop turned in, remains sticking out of the furrow-seams; the whole is completely buried, and the surface left perfectly free and clean for the reception of seed.

This cultivator did not formerly aim at any great saving of seed, by his practice of drilling, since he used nearly as much, as many others do in the broad-cast method, even to the extent of two bushels and half of wheat, three of barley, four of oats, three of beans, and two pounds of turnip-seed. He abides by no particular course or rotation of crops, but sows that, which he judges, either from the fitness of the soil, or the state of the market,

ket, will answer best. He has cultivated spring-wheat with success, and even several years successively, on the same land, which practice he recommends, whilst the price of wheat is high. In this intention he prefers the Siberian wheat, as of quicker growth, and not so great an exhauster as the common, and which nourishes grass-seeds, equally well with other spring-corn. He has reaped this wheat the 25th July, sown turnips on the stubble, fed those off by Christmas, and resowed the ground immediately with Siberian wheat; this course he has pursued three years successively. Wheat harvest being likely to prove late, he broad-casts turnip seed, upon the cultivated rows of corn, with a prospect of rain, which buries the seed; but I should conceive it had better be rolled in by a short roll drawn by hand. One of the fundamental principles of his tillage is, the practice of alternate deep, and shallow ploughing. One deep ploughing with the trench-plough, is given to every other, or every third crop, with very shallow intermediate stirrings, by the two-share plough. From deep ploughing, fresh virgin earth is brought up for the nourishment of the plants, by not repeating it too often, the moisture is retained in the soil, being neither too loose to overdrain, nor yet too hard for the roots of the plants to penetrate.

The above particulars have been lately confirmed to me, by an acquaintance of the Ducket family, from whom I farther understand, those eminent cultivators have abandoned the practice of broad-casting their seed, from a conviction, no doubt, that smaller quantities are equally productive,

tive, and that a great saving of seed, is really among the advantages of the genuine drill-husbandry.

But a truce with arguments to prove *the advantage to vegetation of a pulverized soil, the profit of growing corn, in place of weeds, or the probability that plants will prosper equally well, nursed and trained up, in regular rows, as if the seed were cast at random, and committed to the nursery of blind chance.* Some useful hints, tending to forward the attainment of those advantages already proved, will be now more in place. The immense advantage of pulverization, as has been remarked, is fully proved by the sudden crop of weeds, sure to succeed the operation of fining land; and, to the finer powder it is reduced, by so much the more abundant will be the crop; and, that so many seeds fail upon sown land, is to be attributed to its clodded and rough state, whence they are actually starved, from inability in their tender fibres, to perform the act of absorption, on such a rugged surface. Were it possible for any farmer to dispute this fact, or to call for proof, amongst a hundred other instances, I could quote that of a certain field, which, previously to being pulverized for a crop of carrots, was the cleanest upon the farm; but, from the tillage afterwards given it, became such an entire bed of weeds, as to attract the notice of all who passed; yet, its subsequent cleanness was equally remarkable. Generally speaking, it is the powdered part of the soil, from which plants draw the chief of their nourishment, the entire, or unbroken, remains either perfectly useless, or affords them only a scanty

scanty and precarious subsistence. Land thoroughly powdered and tilled, during vegetation, will freely give up the whole of its genial virtue to the crop, and under incessant tillage, without a proportionate quantity of manure in return, will, after a certain period, when the food of vegetables shall have been completely exhausted, become totally barren and effete. Tull, it is true, has denied the possibility of exhausting land by tillage, and surely upon better grounds than we assert it; since it must be acknowledged ours are assertions only, his, proofs by long-continued experiments. Without any question, we know how to exhaust land most perfectly; but who among us has effected this purpose, with constant and accurate tillage? Tull so far proved the truth of his system, as to grow wheat, and other corn, many years in succession, trusting entirely to a constant powdering of the soil, and to freeing it from the exhaustion of weeds, without the aid of a single bushel of manure, of any kind; and his crops were yet better than those of his neighbours, and his land, too far removed from fruitfulness by nature, still improved under his hands. I have now no need of Tull's arguments to convince me, that no kind of land, whether the best or the worst, can ever be exhausted; on the contrary, the most barren will be improved by cultivation, the tillage being perfect, and manure being in proportion to the quantum of food drawn by the crops.

Two grand objections to the drill husbandry, are, the intractability of clays; in sands, the too great natural looseness, and want of tenacity: the one

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species cannot be wrought sufficiently fine, the other is, conjecturally, apt to be rendered still lighter and more spongy, by much stirring. Probably, as to light lands, the plea is merely notional and unfounded; partial and insufficient stirring may, indeed, render them still more hollow and spongy; but effectual and repeated work will consolidate, and make them lie still more close, an end obviously to be attained by comminution or reduction to small particles. Poor land, also, by being often stirred, acquires the more frequent supplies of elementary manure.

The difficulty of working clays and strong rough lands fine, for the row-culture, (bean-crops, however, form a good exception), has been the grand bar to its progress upon such, and yet upon clay lands, of all others, it would be most signally advantageous, because of the benefit they would receive from the operations of the hoe-plough, in the attainment of the great object, friability, by which they are rendered the most powerfully productive of all soils. This kind of land must, at any rate, be tilled at the greatest expence; at least, although such is no where half-tilled in any part of this island, within my knowledge, great strength is always kept upon a clay farm, on that pretence. A part of this strength, generally misapplied, or ineffectually employed, in a perpetual turning up of immense and solid clods by the plough, would pay excellently well by being applied to the cultivator and horse-hoe. This stubborn earth, from constant pulverization, would, in time, submit, become friable, and almost change its nature to a dark,

dark, crumbly, and fruitful loam, a favourable metamorphosis, in consequence of stirring, which I have repeatedly witnessed with pleasure. It is known, although not so generally as its importance demands, that the most sour, harsh, and infertile subsoil, of whatever colour or quality, by dint of exposure to the atmosphere, and by the aid of frequent stirring, will become good and fruitful land; what, then, may not be expected, by continually working a good strong clay, draining it, and at the same time, rendering it pervious to the enriching dews, which will otherwise remain to be exhaled, upon its hardened surface? The operations of the horse-hoe, immediately previous to the frosts of the winter-season, will have an effect equally beneficial; for, indeed, nothing, whether natural or artificial, confers so great a benefit upon a clayey soil, as severe frost; manure comes in no competition with it, at least for present assistance; whence I have been always inclined to slight the advice of those who direct us to keep poachy land whole, or in ley all winter, for the sake of an earlier passage upon it in the spring; a very poor, perhaps totally worthless, recompence, for so capital an advantage as is given up; for, if the lands are well and skilfully fallowed up, before winter, it is probable you may approach equally early in the spring, and even if otherwise, that you will lose no ground by waiting a reasonable time. I once manured very highly, in the autumn, a piece of strong, deep, baking clay, intending to sow it. Much rain falling, the land changed into such a puddled, soapy state, its ill condition also doubly increased by the dung intermixed,

intermixed, there was no possibility of getting in the seed, with any good prospect. The land was therefore left as it chanced to be, in ridge and furrow, by which it was well drained, until the spring, and a hard frost intervening, it broke up in perfect powder, of a darker hue than usual; and with the dung (which had been laid on green) well rotted and mixed. In fact, it appeared the real *putre solum*, or rotten and mouldy soil, so highly celebrated, and fitted for the instant reception of the smallest seeds. It must be observed too, that, on trial, this beneficial effect reached no farther than the plough had penetrated, which proves the advantage of deep ploughing in autumn. A part of the same land, which had been left whole throughout the winter, turned up in the spring, in immense and stubborn clods.

The unsuccessful attempts at drilling, have chiefly arisen, either from an improper beginning, with a soil full of couch and root-weeds, under the vain expectation of eradicating them with the hoe, or from an almost total neglect of the hoe, after the first essays, and when the novelty of the work had become extinct; to pass over, in silence, the exertions of those redoubtable agriculturists, who have waxed weary of the labour of success. Land, intended for row-planting, should be, at first start thoroughly cleaned from roots and grass, as well as in a finely pulverized state; the hoe will ever afterwards preserve this desirable condition.

To speak of strong soils, for in good truth, light ones present no difficulties at the out-set, for drilling; I would not at all hesitate, upon such, to use

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the Devonshire clodding-beetle, if I found the land rougher, after the usual operations, than I approved. It stands for nothing to talk of the dearness of hand-labour, provided it pays, which it surely would, supposing it effective in this case. It would be only needed in the beginning. I have been told by a west-countryman, who worked for me, that there, a man will break the clods over about an acre and half, or more, in a day. The drill, or wedge-roller of Norfolk, has also been mentioned as excellent in this intent. Tull, also, recommends a stone cylinder, three feet long, two and a half in diameter, and of eleven hundred weight, drawn by a simple pair of limbers, held together by two bars, firmly penned in at their ends, instead of the common frame, which is expensive. This is, doubtless, an effective implement for crushing clods, but ought not to be used but in dry weather. The land being sufficiently worked, should be gathered into ridges or beds, of a width proportionate to the condition of the soil for moisture, and to the number of rows intended to be set upon them. Ridge-work seems generally advantageous; it preserves wet land from being flowed, and in shallow land, affords a bed of greater depth, and of course a more ample pasture to the plants.

Those farmers, who may be inclined to make an experiment in drilling wheat, or other white corn, but may neither choose the expence or trouble of using new implements, may do it to every satifactory purpose, in the most simple way, and with the most common tools. They may make their first essay upon a single well-tilled acre, pursuing afterwards,

wards, or rejecting the practice, as they shall be warranted by success. Can any reasonable complaint be laid against the trouble, the expence, or the risk of such an improvement?—Can experience of value be purchased at a cheaper rate? Most farmers have been accustomed to set their beans in rows, which practice may be exactly followed with other corn; or shallow drill-furrows, equally distant, may be drawn by a common light plough, space being left between them for the hoe-plough, at any width which may be deemed sufficient, not exceeding eighteen inches. The seed, one bushel of which is a fair medium quantity for an experimental acre, may be cast into the drills by a steady hand, and covered (should that care be judged necessary) in the garden-style by the hoe, the lands afterwards lightly rolled, and finished with the harrows. With respect to quantity of seed, in general, it may, perhaps, be safely laid down as a rule, that seed must be increased in proportion to the poverty of the land, from which cause so many kernels always perish for want of nourishment; whereas, in a rich seed-bed, nearly every individual seed vegetates. These rows, whether of twelve or eighteen inches width, may be hoed with the same plough which drew the drills, and the corn kept, by hand-weeding, in the finest garden style. Should the farmer desire to pursue the method of culture in a more expeditious way, and over a greater breadth of land, the artificers already quoted, will furnish him with all the necessary implements, particularly with drilling-machines, from five to eleven

guineas each, and with ample instructions for their management.

A comparative use of the hand and horse-hoe has invariably turned out in favour of the latter, from its superior power of loosening the soil to a greater depth, and thereby sending a greater quantity of moisture, and of atmospheric manure, to the roots of plants. Hence the vast importance of the operation of horse-hoeing, during continued drowth, in the spring or summer: and to this cause, in great part, at least, it may probably be owing, that lucern, usually rowed and horse-hoed, is said to endure drowth so much better than natural grasses, and to appear green and flourishing, whilst these are withered and burned up. The almost instantaneous benefit conferred by this operation, upon cabbages which are root-bound, from a baked soil; or upon wheat which appears yellow and sickly in the spring, are its best recommendation. I have seen these crops, after being worked in the rows, from a withered, sickly hue, and flagging condition, turn erect, and change their colour to a deep and flourishing green, within twenty-four hours. Nay, of such importance is the operation of deep and effectual hoeing held, by experienced people, that I have known a Kentish farmer, in a time of great drowth, send his men, with their spades, into the alleys of pease, being afraid of damage from horse-work. He inclined very much to Tull's opinion, that "English hand-hoes were fit for little else but to scrape chimnies." I had, myself, an idea of them not very dissimilar,

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long before I had read Tull: they are yet admirable implements, where the more powerful, among which is the spade, are not within command.

If the hand and breast-hoe could be sufficiently efficacious upon any, they must be the lightest soils, but even on such, from the idea of economy both of time and expence, horse labour would be intitled to a preference. The experiment, so often decided in favour of horse-hoeing, may be easily repeated between narrow rows, and a larger allowance of seed, and economy of seed, with alleys of sufficient extent to admit the full advantage of the hoe-plough; also, between the expeditious method of hoeing, at once, a number of rows, and the more forcible application of the simple hoe-plough, making but one furrow.

The old method of very wide intervals for the horse-hoe, whilst the seven-inch rows upon the ridges, were trusted entirely to the operation of the hand-hoe, seems now to be exploded, and to have given way to the improvement of horse-hoeing the rows, a considerable number at one time. From the best enquiries in my power to make, Mr. Ducket was the first who used this expeditious process. There can be no doubt of the superiority of the practice over hand-labour; but, practised upon strong and rough soils, I am inclined to question both its efficacy and correctness, and to prefer the superior steadiness and force of the single operation of the hoe-plough. I ought, however, to observe, that on stating this objection to the Rev. Mr. Cook, he assigned reasons for holding a different opinion, which he supported, by quoting the prac-

tice of several cultivators of strong soils, particularly Mr. Boote, of Atherstone, near Stratford-upon-Avon; Mr. Jones, of Chailey, near Lewes, Sussex; and Mr. Thorn, of Ealing, Middlesex. With all possible deference, however, to superior experience, I remain still unconvinced. There is nothing of greater consequence upon clays, than deep and effective tillage; and upon such soils it is, that the farmer is so commonly injured by the dishonest indolence of ploughmen, whose constant aim is, as light a surface skimming as possible, in defence of which they have a fund of the most plausible reasons; and really it is wonderful how sophistry oftentimes abounds, in proportion to the want of real knowledge. I have observed, very frequently, upon strong lands, a fine and apparently mellow and well-pulverized surface; but, taking the spade, to be convinced, this fine tilth has proved to be only half-spit deep, all beneath, turning up in clods, which would submit to no tool of inferior force to the mattock. Now the part of such a soil left untilled, is nearly useless for the purpose of vegetation, and if labour will at all repay its expence, the more effective it is, the more certain, and in the greater proportion, will be the repayment. For reasons like these, I have doubted the advantages of scuffling in, seed; unless, indeed, upon soils which have had the previous advantage of deep, and thorough pulverization from the hoe-culture: and such reasons operate in my mind, equally in favour of the superiority of the single hoe-plough, and sufficiently capacious rows. A machine will drill four or five rows at once, at the requisite distance.

Respecting the depths in the ground, at which corn ought to be planted, the matter must vary in different soils and circumstances, and the depths must be greatest, in sands, and dry seasons. Wheat and rye will require to be placed near three inches deep, in some soils, in others, barely two; oats and barley, two inches; beans and peas, three inches; and all small seeds from half an inch, to an inch.

The number of hoeings required by this culture may, perhaps, be generally stated at four, although five may be required, by extraordinary circumstances. The chief rule, in course, is the presence of weeds, which are never to be permitted, whatever may be the number of hoeings required.

The first hoeing of wheat, (of such, I mean, as has been sowed sufficiently early to admit that operation in autumn,) must never be performed until the plant shall have more than one blade; and it may be deferred until it hath four or five leaves, provided no urgency appear, and that the operation be completed before the setting in of winter. Tull directs to hoe from the rows, up and down, the first time, which leaves a ridge in the midst, and a furrow, or channel, on each side, between that ridge of the plants, to catch the rains and snows of winter; and doubtless, by that method, the greatest possible superficies of the soil is exposed to the influence of the atmosphere. He asserts, on experience, that you can scarcely plough too deep the first time, nor approach too near the rows, provided you do not cut the plants, or absolutely root them up; and, that by thus laying the roots almost bare, and exposing them to the severity

rity of the frosts, you do them no manner of injury, a practice, about the rationality of which, I am at present uncertain, having always entertained the idea, however erroneous, that the roots of all plants were comforted and strengthened, during the rigours of winter, by being earthed-up; and, I believe Miller held the same opinion. Tull, however, acknowledges, that in very light lands a greater caution is necessary, in approaching the rows. He remarks it, as a common error of servants, in the use of the hoe-plough, that they merely skim up and down the midst of the alley, neither going sufficiently near the rows, nor sufficiently deep; and recommends, as an amendment of this error, to trench, or draw a second furrow to a proper depth, immediately, if practicable; otherwise, before the ridge be turned back in the spring. The plants will thus stand, as it were, on the brink of a trench, by which they will be drained, and kept constantly dry; they will also be sheltered by the ridge which has been thrown up. It will occur to those who drill upon strong soils, that there is danger in deferring too late their first horse-hoeing, lest the land become too wet to work.

The spring-hoeing may be given, as soon as the frosts are out of the ground, and the surface is sufficiently firm and dry to carry the cattle; the ridges between the rows are then to be split, and the mould finely pulverized and manured by the frost and snows, thrown to the roots of the plants, the fibres of which, expanding to the general warmth of the season, are now ready to attract every particle of nourishment within their reach.

Nor

Nor is there the smallest damage done to roots, by the breaking or disturbing with the hoe those numerous filaments or threads, which branch out on every side, since nature (as may be observed in all vegetables,) in a very few hours not only remedies the defect, but ever provides mouths or suckers, in proportion to the nourishment offered; nor is it possible, the nourishment being simple earth, or manure not too gross, to overfeed or glut a plant; which, nevertheless, may be effected, according to my observation, by excessive and superfluous quantities of rank dung, poisonous to the vegetable juices, whence atrophy or consumption will ensue, and the plant become stunted, or even wither away. The cultivator will judge of the necessity of lightly harrowing and rolling, previously to the spring-hoeing the rows.

The succeeding hoeings, the number and periods of which must of course be at the farmer's discretion, have two objects; to turn in the weeds the instant they are ready, and to move the surface, before it become baked, and impervious to the dews: this last object must be watched with the utmost attention in a thirsty season, as the weight of the crop absolutely depends upon it; and here the superiority of the row-system will clearly manifest itself. There may subsist a farther reason for an additional stirring, in exhausted and impoverished soils, the plants on which, having extracted all the food of their last pasture, may require an earthing-up, of fresh moulds, at the critical time of their coming to perfection. Shallow ploughing can never do any injury, at whatever season; but

deep

deep ploughing must never be admitted, near the rows, in spring or summer. The middle of wide alleys may be ploughed deep, and in this case, at the last hoeing, the plants are left well earthed-up.

I shall subjoin the opinion of the Rev. Mr. Cook, on certain implements, and their use in preparing the land for drilling; the agricultural reader will have it in his power to form a judgment thereon, from actual experiment. I particularly recommend to the farmer's notice, Mr. Cook's method of using the harrow.

The mechanical power, called *The inclined Plane*, constitutes the true principle of the COMMON PLOUGH.

"From the imperfections which I observed in the work of common ploughs, some furrows being set too much on the edge, others laid quite flat, (both extremes equally wrong), I concluded, that their medium could not be far from being right; I therefore fixed on the angle of five and forty degrees, for the form of the fore and hind parts of the plough, with a mould-board uniformly twisted, as best adapted for taking up, or raising the furrow, with the greatest ease, and delivering it with the greatest regularity.

"Being satisfied with the principles of this plough, and that the exact form might be preserved, I had it cast in iron, with the land and furrow sides growing together, which renders it not only strong and durable, but unalterable by workmen. It is made without wheels; but I prefer wheels, two before and one behind, a deal of friction being thereby obviated, and consequently less draught required. "The

" The strongest proof of accuracy in the construction of any plough, consists in every part of the mould-board bearing an equal resistance to the approaching furrow, which is ascertained by every part of the mould-board receiving an equal polish from the friction of the furrow.

" THE CULTIVATOR may be considered as an appendage to the drill, being applied to the drill axes when at work. It is particularly useful in making clean fallows of all descriptions, at half the expence of ploughing, &c. It consists of a diagonal beam, with from three to seven shares of different sizes, for various uses, applied to two handles, by which it is guided laterally, and may also be forced into the ground, to any given depth, at pleasure. It is used as a substitute for ploughing and harrowing, by tearing or lacerating the soil internally without tearing a furrow. The narrow shares or scarifiers, are, in some cases, used for obtaining a tilth in light soils without ploughing at all, and the broad shares for cutting up a fleece of weeds, and afterwards leaving them to perish at the surface of the land.

" In strong compact soils, if land is ploughed once before winter, or early in the spring, the remainder of the business, in making a clean fallow, may be performed without repeated ploughings, better than with them, and at half the expence. By the action of *the Plough*, some weeds are turned down and buried, others are transplanted: by the action of *the Cultivator*, they are all brought up to the surface, and left there exposed.

" In

" In preparing land for barley, &c. after turnips, I cannot consider the plough and harrow of any other use than to attain a proper tilth or pulverization of the soil, all which may be obtained by a proper and seasonable use of the cultivator, in half the time, and at half the expence, with the richest and clearest portion of the soil left on the surface, for the reception of the seed; instead, as in the first instance, of its being turned down by the plough, out of the reach of the fibres of plants; and a raw and less fertile soil brought up, for the reception of the seed.

" I never see common HARROWS at work, but I am presented with ideas of aukwardness respecting the process and danger, both to men and horses; both which are obviated in my practice, by *applying a proper harrow to the under side of the coulter beam of the drill.* The harrow, in that case, supplies the place of the coulters, and may be lifted up at pleasure, to discharge the accumulated weeds, or forced down, so as to overcome the resistance of compact soils: and by being lifted up at the ends of land, it clears off the ground, and all danger, while the horses are turning round, is thereby done away." *Foot's Survey of Middlesex.*

Dr. Darwin's Phytologia did not come abroad until after publication of the first edition of this work, but I have since perused it with the utmost pleasure; and I hope with profit, which indeed every attentive reader may reap, in full measure, from the writings of that profound and indefatigable investigator of nature's secrets. There is something, in my ideas, exceedingly conciliating and inviting,

inviting, in the manner of this celebrated Doctor; his perpetual quotation of authorities is at once highly useful, and a signal proof of a noble and ingenuous mind, fully confident of its own great original powers. In a former work, if I took the liberty to question certain principles maintained in *Zoonomia*, I also was beholden to that great work for instruction on many points, which I failed not to acknowledge. Neither had I seen the two quarto volumes of Communications to the Board of Agriculture, from which so much various and important information may be derived.

The best advice I can give to the scientific cultivator, is to provide himself with Dr. Darwin's book; but to those who have not seen it, I shall occasionally present a few quotations which may lead to useful purposes.

I am elated to find my humble work in perfect agreement with the Phytologia of Dr. Darwin, on the grand principles of agriculture, particularly on the important point of drilling; on which head the Doctor's sentiments are as follow, with his attempt to improve the DRILLING-MACHINES at present in use. "So many great advantages seem to accrue from Mr. Tull's method of drill-sowing, and horse-hoeing, that a curious question offers itself, why it has not been more generally adopted? First, I suppose, because it is difficult to teach any thing new to adult ignorance, so that the master must for some time attend the process with his own eye. Secondly, I believe the axle-tree of Mr. Tull's sowing machine did not accurately emit the proper quantity of seed from the hopper, and was liable to bruise and destroy

stroy some of it, in its passage. And thirdly, that the improved drill-machine of Mr. Cook's patent, is too expensive for the purchase of small farmers, who fear that it may not answer the expected advantages.

"I have therefore given a print at the end of this work (Phytologia) of a machine constructed on a cheaper plan, which is simply an improvement of that described in Mr. Tull's book, by enlarging that part of the axle-tree which delivers the grain, into a cylinder of some inches diameter, with excavations in the rim; which rim rises above the surface of the corn in the seed-box, and lets drop again into the seed-box, whatever grains fill the holes above the level of the rim, as that side of the cylinder ascends. Whence the quantity delivered is uniform, and no grains are in the way to be bruised or injured, as explained at large along with the print; and the whole machine is simple and of small expence." Pa. 290.

"1. The simplicity of this machine consists first in its having only a seed-box, and not a hopper and a seed-box, as in the Rev. Mr. Cook's patent drill-plough.

"2. The flues which conduct the seed from the bottom of the seed-box, into the drill-furrows, are not disjointed, about the middle of them, to permit the lower part to move to the right or left, when the horse swerves from the line, in which the coulters pass, as in Mr. Cook's patent drill-plough, which is done in this machine at the simple universal join at *z*.

"3. In this machine the horns or shafts behind, between

between which the person walks, who guides the coulters, are fixed both to the coulter-beam, and to the axle-tree; whereas as in Mr. Cook's patent plough, these are all of them moveable joints, like a parallel rule, for the purpose of counteracting the swerving of the horse, which in this machine is done by the simple universal joint at *z*, beforementioned.

" 4. The altering the dimensions of the holes in the axis of the seed-box, by only turning a screw, so as to adapt them to all kinds of seeds, which are usually sown on field-lands.

" 5. The strong brush of bristles which sweep over the excavations of the cylinders, beneath the seed-box, strickle them with such exactness, that no supernumerary seeds escape, and yet none of them are in the least bruised or broken, as I believe is liable to occur in Mr. Tull's original machine.

" Lastly it should be observed, that the less expence in the construction, the less propensity to be out of repair, and the greater ease of understanding the management of this machine, correspond with its greater simplicity; and will I hope facilitate the use of the drill-husbandry." Pa. 608.

A description of the newly invented SEED-BOX of the ingenious Mr. Swanwick of Derby, follows in the same page, to which the reader is referred. The above description may afford useful hints to the cultivator or artificer.

I had omitted to quote the practice of the illustrious Norfolk husbandman, T. W. Coke, Esq. of Holkham, but can now remedy the inadvertence from Dr. Darwin's book.

" Mr.

" Mr. Coke, of Holkham, in Norfolk, assured me that in thirteen years experience on a farm of 3000 acres, he had found the drill-husbandry in that county, greatly superior to sowing seeds of all sorts by the hand, in what is termed the broadcast method, but differs in the number and arrangement of his rows from the method of Mr. Tull, in the following circumstances.

" Mr. Tull drilled two rows of seed a few inches from each other, and then left a space of two or three feet, and then drilled two more rows near each other, for the purpose of passing a hoe between each double row, drawn by a horse, which was therefore termed a horse-hoe; but Mr. Coke drills all his rows of wheat and peas nine inches from each other; this is performed by a drill-plough made by the Rev. Mr. Cook, which drills six rows at a time, and thus sows an acre of land in an hour, and is drawn by a single horse; and the quantity of seed consumed is about six or seven pecks to an acre, which is about half what is used in the sowing by the hand, in the broadcast method.

" Early in March, Mr. Coke uses the hand-hoe, which for hoeing the rows of wheat and peas is about six inches wide, and for hoeing those of barley, about four inches wide. By this hoe the surface is not only turned over, and the weeds between the rows rooted up, but it is also accumulated about the roots of the growing corn, and covers and consequently destroys the low growth of poppies, amongst them, which are a very frequent weed in that part of the country. A second

hoeing

hoeing is performed about the middle of May, and the soil is again not only cleared from weeds, but accumulated against the rising corn, each of which hoeings costs about twenty pence per acre." Pa. 438.

"Nevertheless I am informed that some attentive agricultors use the horse-hoe, belonging to Mr. Cook's drill-machine, though the rows of corn are but nine inches from each other; and assert that this occasional trampling of the horse, on the young plants, is of no very ill consequence, a circumstance well worth observing, as it removes the principal disadvantages of the horse-hoe, which consists in the too great distance of the alternate rows of the corn-plants.

"By the earth being thus accumulated against the roots of the corn, it is said to tillure, or tellure much, that is, to throw out four or six stems or more, around the original stem, and thus to increase the number of ears, like transplanting the roots; insomuch that Mr. Coke obtains by this method, between four and five quarters of wheat on every acre, which in the broadcast method, did not yield more than three-quarters an acre, besides saving a strike and half of the seed-corn, unnecessarily consumed in the broad-cast method of sowing. To this should be added another advantage, that as the land is thus kept clear from weeds, and has its surface twice turned over, and thus exposed to the air, it is found to save one ploughing for the purpose of a succeeding crop of turnips."

Here we have another most respectable and irrefragable

refragable proof of the immense superiority of the drill, over the broadcast husbandry. I have before observed, that I always feel the propriety of bringing forward the experiments of eminent and well-known cultivators, in preference to any memorandums of my own, not always for want of such: I have seen Cook's drill very successfully used in a shallow calcareous soil, where, according to the opinion and practice of Mr. Coke, the hand-hoe was preferred. In very light soils, where the hand-hoeing can be given as deep as the soil will admit, it may be doubted whether hand-labour be not really preferable, and whether it be worth while in narrow intervals, to incur the unavoidable (if small) damage, of the treading of cattle; I say this without at present giving up my opinion, as to the preference due to wider intervals, and to the horse-hoe.

I had attributed to Mr. Ducket, the invention of the multiplied shares for the purpose of hoeing a number of rows at once, without at the instant recollecting, that Ellis had used and recommended them long before; and I have since read in the Board Communications, that such practice has been long known in some parts of India. On those soils, where hand-labour is preferred, the improved hand-hoe, already mentioned, will be found of material consequence.

Dr. Darwin observes—"By the earth being thus accumulated against the roots of the corn, it is said to tiller, or tellure much, that is, to throw out four or six stems or more, around the original stem,

and

and thus to increase the number of ears, like transplanting the roots.' It has however been observed, that drilled corn is apt rather to over tillure, by which, the original root becomes exhausted and less productive of seed-bearing stems, an effect which I have not witnessed; but I am inclined to believe, that the superiority of drilled corn arises rather from the weight, than the greater number of ears.

The Doctor quotes Mr. Kirwan, for the opinion that clay, in its usual state of dryness, can absorb two and a half times its weight of water, without suffering any to drop out, and retains it in the open air, more pertinaciously, than other earths; but that in a freezing cold, clay contracts more than other earths, squeezing out its water, and thus parting with more of it, than other earths. Every practical man will agree with Mr. Kirwan in this observation, but the conclusion drawn from the premises, namely, that clay, either from the drying effects of frost, or sun, 'becomes less adapted to the purposes of agriculture,' I will venture to assert is not equally fortunate or just. Whoever has attended to the working of clays, after a frosty winter, or a wet one; or after a dry summer and a wet one, will not be at a moment's loss to form an opinion. The retention of moisture is the grand disadvantage of clayey earth, for however dry it may have been rendered by the weather, a very few showers will make it fit to work. Clay is insusceptible of tillage in either extreme, but that of moisture is of infinitely the worse consequence. Without having recourse to the existence of nitre in

the air, I conceive the old practical idea to be perfectly correct, that the winter's frost ameliorates the soil in various ways, and most particularly that which is argillaceous. It ought to be an invariable rule to have all the material tillage of heavy lands finished by the end of August, in order to avoid the disagreeable dilemma of being caught by the autumnal rains, in which it is absolutely impossible, either to work clays to advantage, or to lay them properly to endure the winter.

COURSE OF CROPS.

The general intent of a Course of Crops is such a change, or succession of them, as to relieve the land from the exhaustion and foulness, naturally consequent upon bearing corn sown broadcast—by the interposition of pulse-crops hoed by fallow, and finally by laying down to artificial grass, after the presumed benefits of which respite the same course is repeated. These courses are so various on different soils, and in different districts, that it would be almost endless, and, in truth, totally useless to repeat them. Courses, of one and twenty years' length have been, ere now, prescribed. But I hope to be excused, when I venture to say, there seems to me to be no little of the pedantry of the science, in the injunction of such invariable rules.

As

As to the obligation of any particular course, as a legal condition, whereby the farmer's judgment in his own business is controlled, and his efforts at improvement strangled at their very birth; nothing can be more absurd or inimical to the true interest of the proprietor of the soil. *That man observes the best course, who drains, pulverizes, and cleans his land, keeping it in constant heart, with animal manure:* he may so bid defiance to all regularity of cropping, and at any time, take from his field the species of crop, judged most advantageous, whether corn, pulse, roots, or grass. In the best broadcast system, it is held, that corn ought never to be succeeded by corn; but I know of no farmer who adheres to so excellent a rule.

An entire extirpation of weeds, and the treatment of a field like a garden, is repaid by the advantage of perpetual cropping. Without including warped lands, or those slips of sea-coast, the fertility of which is almost inexhaustible, it is well known that potatoes, and even wheat, have been grown many years together, with the greatest success; and I have, myself, known very middling land bear seven successive crops of beans, the last, the best of all, and the land left in the finest tilth. Hoed wheat repeated, would be a great and infallible mean of replenishing our markets, after a scarcity of that indispensable article; and even where the culture is not so perfect, but the wheat broadcast, alternate wheat and beans, a course well known as successful, might have great effect. It is not, however, to be denied, although not to be otherwise than conjecturally accounted for, that

the earth delights in variety, and that it is the most prudent practice to indulge her, changing the crops from grass to arable, and after a while, from arable to grass, intermixing roots and pulse with corn, as the markets, and the great object of cattle-feeding, shall require: the main point being never lost sight of, *to grow winter-provision adequate to the support of such a stock of cattle, as, with their dung, will keep the farm in constant good heart.*

In the mean time, should the farmer have only a particular part of his land, calculated for certain crops, and those in constant demand, under the restrictions already stated, he may repeat them safely and successfully, to any length of time.

Poor and exhausted land is sometimes recovered by a three or four years' course of such as are styled the green crops, equally well as by being laid down to grass. Courses of these will pay exceedingly well, indeed far better than corn, with those farmers who know how to dispense with such crops upon their own premises; and they who do not, stand much in need of information. Land, which would not grow corn enough to pay for harvesting, has sometimes been reclaimed by this method, and left in the finest tilth and condition. For example—Clover, two years: tares, turnips, or rape, manured; pease well hoed; wheat, with seeds.

BLIGHT, MILDEW, SMUTTINESS, BLAST.

All these vegetable maladies, the last excepted, seem peculiar to northern climes, and to be nearly unknown under the more genial and settled atmosphere of the south: the blast from lightning, or the scorching heat of the air, is consequently more frequent in hot climates, and very little known in the temperate, or cold.

The effects of blight and smut upon corn, and vegetable of all kinds, are too common and well-known to need description; but it is far different with the cause, to which, in my opinion, custom has assigned a most fanciful origin. To suppose that corn caught blight or smuttiness from the seed, is, perhaps, about as rational, as to attribute an accidental cold to a defect in the parental seed of the patient; and, to steep the seed of corn, with a view of preserving the future crop from smut, is a proceeding equally sage, and entitled to equal success, as if a man should apply to Dr. Brodum, or any other doctor of equal celebrity, for a medicine to be taken at Gunpowder Treason, in order to cure a cold, which may possibly attack him the Michaelmas next ensuing.

All these affections, under whatever term, blight, or mildew, originate in obstructed circulation, stagnation, and corruption of the vegetable juices. The immediate causes are, sudden changes of the atmosphere

atmosphere from opening heat to pinching cold, which instantaneously close up the vegetable pores, and obstruct the circulation of the sap; those fat moist vapours, called honey-dews, which, descending from a thick and hazy atmosphere, alight on the plants, and not being exhaled, from defect of sun and air, remain to promote obstruction and disease; or the chill occasioned by superabundant moisture, either of rain or dew, remaining unexhaled or unabsorbed, upon a hard and retentive surface of soil. It is a disputable point, in my opinion, whether the honey-dew originate in vapour from the atmosphere, or consist merely in the extravasated juices of the morbid plant.

Should these causes of the disease approve themselves legitimate, both in theory and experience, to what end are we troubling our heads with others, which can pretend to no certain ground in either? How happened it with the crops, before brining and steeping came into fashion? It was then held, according to Tull, that a good season would cure the smut, the obvious interpretation of which is, that the matter depends entirely on the season. In the year 1725 there was a general blight, which affected all the wheat alike, steeped or unsteeped. I have known a field of wheat, the seed of which had been fashionably brined and doctored, blighted in those parts most exposed, particularly in those ears which stood up erect above the rest, whilst the lower corn escaped; and it appeared plain to demonstration, that the sheltered corn, or that which was fortunately out of the reach of the atmospheric stroke, owed little thanks to the doctor;

as to the exposed and blighted, there could be no longer any question about the power of prevention. How often have experimenters found their brined seed blighted or smutted, whilst their unbrined has escaped? How often is part of a plant blighted, and part left sound? I have been assured by a man, who farmed near half a century, that he could never discover any difference; but that his dressed seed was equally liable with that which he sowed in its natural state; nay, that he had never scrupled to sow smutty wheat, from which he had grown as pure corn as from the purest seed. Bradley, who was a whimsical and inaccurate reasoner, after a string of windy speculations on the cause of blight, and as knowing a prescription for the cure of smut, as could be furnished by any of us of the present day, concludes with *note*, "many farmers steep their wheat in brine, yet have plenty of smutty wheat, because they don't make their brine strong enough, and take their wheat out too soon." When Dr. Sangrado's patients died, in spite of the infallible specific, he also declared their misfortune arose because they had not been dosed enough. Mr. Middleton, a better reasoner than Bradley says, "I have *prevented the smut* in wheat, by putting lime recently burnt," &c. That no evil accident of the winds or dews might occur, to blight or discolour a crop of wheat, is happily a common case. Mr. Marshall's grave account of the effects of the miraculous barberry bush of Norfolk, has the following unfortunate conclusion: "The tail (of the blighted strip) pointing towards the south-west, so that probably the effect took place during a north-

east

east wind." Could this bush act as a conductor to the wind, any other might perform the same office: but we know, too well, that, in order to blight strips of corn, larger or smaller in length and dimensions, the north-east wind needs neither barberry, nor gooseberry bushes as conductors; and farther, that in other parts of the country, where it is not the fashion to suspect the barberry-bush, it stands innocently, like any other, overlooking fields of unblighted corn.

The sagacious Tull himself, for want, no doubt, of having thoroughly considered this subject, has fallen in with the popular notion; and, with his antagonist Bradley, has mistaken the effect for the cause. They suppose blight to be occasioned by insects, instead of attributing the generation of insects to the corruption consequent upon blights, a thing which admits of ocular proof; and Bradley makes a voyage to the north-east, " where the cold is intense enough to give life to these small creatures!!" bringing across the seas myriads of them, to blight our vegetables, as if it were not so much the easier to manufacture them logically at home, than to import them from such a vast distance as *Nova Zembla*. Equally ingenious are our modern reasoners on the origin of worms in the bodies of animals, which they prove so clearly in their dissertations, decked out in all the technical finery of the day, to originate in the eggs of flies, taken in at one or other end of the animal. A wonderful deal of ingenious conjecture, to be sure, is lost, and rendered useless, by simply saying, that stagnant fluids whether vegetable or animal, naturally

rally produce corruption, and that corruption as naturally teems with the seeds of animal life. I had once a balm of Gilead standing at my window, by chance exposed to a severe north-east wind, for several hours; on taking it in, I perceived it to be blighted; the leaves were shrivelled up, the juices became stagnant and extravasated, oozing out in the usual form, from which, no doubt, the insects, afterwards observed were generated. I took the opportunity of looking very particular into this natural process. At first, the shrivelled leaves contained nothing, but were perfectly dry and parched; in a few hours, the liquid, vulgarly called the honey-dew, appeared, and every curled leaf had become a *nidus* for small green insects, which, in a few days, nearly covered the plant. It was plain, to demonstration, that the wind brought neither the *ova*, nor insects to the plant, nor aught, but corruption to the juices, by its chilling and astrictive effects.

It is probable that blight might be cleared from corn standing in rows, but that the expence of the hand-labour would exceed the profit. With regard to trees under this misfortune, I have never failed to be successful. I had a fine morella cherry-tree, which, from an eastern exposure, had been blighted for a number of years: it usually blossomed well, and the blossoms knit, but the fruit, in a short time turned yellow, and fell. A whole host of ants coming annually to this tree, for the sake of their prey, the honey-dew and its insects; the barrenness of the tree was, in course, attributed to the ants. I caused the curled leaves,

and

and yellow-blighted fruit, to be all carefully picked and burned; and the blights and dews, as soon as they appeared, to be washed off, by throwing pots of water upon the branches. After repeating, as often as needful, this cleansing operation, no ants appeared, the remaining fruit stood, and ripened to perfection, to the no small wonder of those, who had for many years, witnessed the perpetual barrenness of the tree: these precautions being used early the ensuing season, were repaid by a burden of fruit of the finest quality, and so ponderous, as to endanger the branches.

It is a common practice in some orchard districts, to makes fires on the coming of a blighting wind, which they suppose brings the insects, upon its wings; but as it is impossible to counteract or prevent the blast, the fire and smoke will be more efficacious in destroying the eggs or seeds of the insects, just on the appearance of the honey-dew. Those flies which commit such ravages upon hops, turnips, and clover, and which have been supposed to come from the Lord knows whither, most indubitably have never travelled a hair's breadth from home, where they were generated and hatched; nor is there any possible remedy, as has been observed in the calendar, but in the hand-labour, which has been so successfully employed in the extirpation of the *curl* in potatoes: this curl, about which so much has been written, is nothing more or less than a blight; and to talk about the propagation of it from the seed, is equally rational, as to pretend to the propagation of north-east winds. With respect to turnips and clover, the first, or seed-

leaves,

leaves, as most tender, are ever most liable to blight; and should no blight happen, until the plants have attained their rough leaf from the increased strength and vigour of circulation in its juices, they will, most probably, escape obstruction and contamination. It is submitted to hop-growers, upon a small scale at least, whether washing and picking the bines, might not have good effects: the operation of washing might be performed with a garden engine.

The only remedy, preventive, or otherwise, against blights in corn, upon any rational principle, is, to set it in sufficiently spacious rows. In the first place, drilled corn being the most stout and robust, is the better able to encounter the cause of the malady; and, besides, it is not equally liable with the broad-cast and weaker, to the variety of morbid causes which exist. Lodging, or falling, or even standing so thick upon the ground, as to prevent a due circulation of air, and the penetration of the solar rays, may be causes of mildew, or of immaturity of production in the grain. Rowed corn, from the shortness and strength of the stem, particularly at bottom, can never be so subject to fall, as that which is sown at random; and the spaces, admitting both a free circulation of air, the rays of the sun, and even, should it be necessary, the opening of the soil by the hoe, for draining off any superfluous moisture, afford opportunity for the most effectual remedies. Should, nevertheless, the corn have suffered partially, as sometimes happens, when the smutty ears are very easily to be distinguished, the rows afford opportunity of gathering

gathering them, at a very moderate expence per acre.

Before I dismiss this subject, on which I have dilated, for the purpose of attempting to dispel the mists of prejudice, and to promote rational enquiry, I would wish to be clearly understood. I by no means take upon me to assert the utter incapacity of infection, in the smut of wheat, or the literal impossibility of an importation of flies from Norway, but their improbability only, and want of foundation in experiment and fact. I should certainly counsel no man to trust to unsound seed-corn, when sound might be obtained; or, in a case of necessity, to make use of the former, without taking every possible method to wash and purify it, for which purpose I should deem a strong soap lye equal to any thing. As to steeping sound corn, for the prevention of the next year's blights, it is a mere Abracadabra, and stands upon the same foundation of rationality with blessing a thorn out of the flesh, or saying the Lord's Prayer backward, in order to raise the devil. But the ancients acted still more unreasonably, who, in this case, when charms of red cloth, and the feathers and heart of an owl, and all other remedies failed, threatened their deities with bloody axes. I have tried various pretended fructifying steeps, consisting of solutions of nitre, sheep's dung, and I know not what, without the smallest success.

I have, since last year, turned my attention and my observation pretty much, towards this mysterious subject. The following quotations are an additional proof of the futility of the common expectations from steeps, which may be farther

corroborated

corroborated by the remark, that the eggs of insects could not possibly survive, and retain the power of communicating animal life, after the usual immersion in brine and lime. The following quotation, is from Ellis Abridged and Methodized, where the reader may find a variety of similar cases. 'The sickness in wheat happens sometimes to only one side of the ear, when the other parts remain seemingly sound; as was once the case of a whole field of wheat, near Hazlemere in Surrey, where only the west side of the ears was smutty, and the rest free throughout the field; which seemingly shews the disease to be occasioned by infectious wind.'

Case the second. 'A man having but one field, it was sown for him with naked wheat-seed, by a neighbouring farmer, who wanting a little more to finish the field, sent for some of his own that was brined and limed. The latter proved smutty, but the former clear, though both were sown in one day. It is remarked that the unbrined might be sound seed, and the brined unsound, but the remark is of no consequence but to prove, that brining is of no utility in case of unsoundness.' Pa. 216.

Case the seventh. 'One of my neighbours, an ancient curious farmer, not only changed his seed but brined and limed it well, yet, the year 1740 had a smutty crop. This seems to be owing to *a long, frosty winter, cold spring and dry summer*.' The reasonings of Ellis on this subject are not always so accurate, but his facts deserve attention.

The following experiment of the respectable Sir John Call, Bart. is extracted from the Board Communications, vol. 2. p. 428. 'In the year 1797, when

when my men were thrashing out my wheat, I desired them, as well as some of my neighbours, to save all the ears they met with, which were affected with the smut: having collected all I could get, previous to the beginning of October, I found some ears wholly decayed, some with one, two or more grains apparently perfect, all which I caused to be rubbed out with the hand, into a bag of paper, smut and all together; and after mixing and rubbing the grain in the smut, all I could get perfect out of the smutty ears amounted to 72 grains, which were carefully dibbled in, and marked in a ridge amongst other wheat, in a field then under tillage. Their growth from the first was similar to the rest of the field.' The following is a certificate signed by the rector and two farmers, of the condition of this experiment at harvest. Pa. 432.

" We whose names are hereunto subscribed, having been requested by Sir John Call, Bart. of Whiteford, in the parish of Stoke Climsland, in the county of Cornwall, to view and examine a field of wheat just then fit for reaping, and to take particular notice if we saw any difference in the appearance of some parts from others, do declare, that in a ridge marked No. 2. (where seventy-two grains of smutty wheat, after being rubbed out in a bag, and mixed up with the smut, and in that state had been dibbled in) we only found two ears out of about three hundred which grew out of the stocks from the smutty seed, that had apparently smutty grains in them, and we found many similar ears in other ridges of the field, so that it did not appear that the smut had been particular in that part.

" That

"That having examined a ridge, No. 5. sown with shrivelled wheats, the crop appeared as productive as any part of the field that was sown with the best seed wheat."

August 2, 1798. Signed.

The above experiment, on the back of so many others of similar proof, is altogether decisive as to smut, which, in all probability, has no more power of propagation, than the rust of iron; and so far, I suppose the question may be deemed settled and at rest. The reader is referred to Sir John Call's letter, the whole of which is highly deserving of attention. I ought previously to have stated, that Sir John has been several years in the habit of sowing tail wheat, or the thin shrivelled grains, from which he has been so successful as to reap wheat equal in quality, and as he thinks, superior in quantity, to the product of the finest seed. This indeed would be a vast national advantage, could we be assured of its constant success, but I am sorry to say, I once made the experiment myself, very unfortunately, with both wheat and barley: this however, is but a single instance.

In same vol. of the Communications, page 200, may be found many curious and interesting observations on the subject of blight and smut, by Robert Somerville, Esq. to which, particularly as they militate, in many respects, against the principles I have laid down, I am desirous of directing the attention of the sedulous cultivator. Granting the existence of the eggs of insects in the seed-corn, a steep,

steep, or some measure, is doubtless necessary for the purpose of destroying those, although it can have no possible future efficacy, in the prevention of blights from the inclemency of the weather. Mr. Somerville very properly cautions the farmer against the caustic qualities of brine and lime steeps, and those of stale urine, which doubtless have the power of destroying the vegetative virtues of the seed, particularly when the seed is kept ready brined a considerable time before it is committed to the moist earth, or when sown in an arid soil. I have seen rows of young bean plants totally destroyed by a top dressing of lime and pickle, intended as a defence against the slugs. However, that a moderate brining and liming, the seed being used immediately, is perfectly innocent, every farmer well knows. Chalk is recommended instead of lime; also to well wash the seed in fair water, with a broom, which was, I believe, originally a nostrum of Ellis. Barbadoes aloes, tobacco, and powdered hellebore, are said to be equally efficacious and harmless, with respect to the seed. As to my own choice, I should prefer the trouble of hand-picking the seed, and drying it gently on a kiln, in little more than a sun-heat, which will, at a certainty, destroy all animal life, without in the smallest degree affecting the vegetative power of the seed. An exposure to heat on a kiln, or in an oven, has the same good effect in destroying worms, bugs, and their eggs in wood, and I have found it a good method with old wood which is to be again converted to the purpose of building; probably after being steamed, the wood would be farther benefited by soaking in limed water.

To destroy vermin on the growing crop, a steeped flannel, with leads affixed to it, is proposed: this is to be carried by two men, one on each side the ridge, so that it brushes the ears of corn. If I remember aright, Tull mentions some such thing. I can judge nothing of the probable success of this measure; but I once did some service to beans and cabbages, by brushing off the flies from the former, and the mould, or eggs of flies, from the latter, with long painting brushes; the hoes immediately following, buried and destroyed myriads of insects: I am convinced of the goodness of this plan, when pursued in time; as to the expence, that is totally out of the question, if any thing is to be attempted; since nothing but the most accurate hand-labour can possibly be effectual. Ellis recommends a drove of turkies to clean beans, which would be useful in a certain degree, if they did not damage the crop.

Mr. Somerville complains, and with much reason, that in dressing corn, 'the fanners are generally placed so near the barn doors, as to blow the whole of the chaff into the dung-yard, by which means, not only the seeds of all the different kinds of annual weeds, that grew among the crop, but also the eggs of those insects that are known to be destructive to the grain, and which have been either deposited in the chaff, or mixed with it in the operation of thrashing, are put among the dung, the warmth and nourishment of which is highly favourable to their propagation. In that way, the weeds and vermin of one season, are again committed to the earth, where they multiply beyond

conception, and destroy the crops of the succeeding year, and prove an endless source of mischief.' Instead of this reprehensible practice, it is enjoined to place the fanners in such wise, as that the whole of the chaff and dust may be blown into a corner by itself; that the walls and roof of every barn be smooth plastered, so as to admit of being swept clean, and that the dust and refuse be carefully taken abroad in sacks, and burned.

These precautions are perfectly useful, as far as the nature of the case will admit their effect, and in truth, in any sense of good husbandry, ought never to be omitted; but that they will have the radical effect which Mr. Somerville so sanguinely expects, I must take leave to question. A few days continuance of the blighting north east wind in May, or an alternation of hot gleams of the sun, by day, and sharp frosts, by night, will fill your crops with blights and vermin, maugre all your autumnal precautions: on the other hand, you shall find a free and favourable year succeed one of the most blighted and vermineous habit, no thanks to any precautions at all. This seems to prove the immediate origin of *blighting* insects at least, from the corruption of morbid and stagnant juices, and it appears to be the same, whether in the animal or vegetable body.

The instance I adduced, a few pages back, of the balm of Gilead blighted, and covered with insects, from being exposed a few hours, withoutside a window, during a sharp N. E. wind, appeared to me very striking at the time. There were several plants, but only that which was exposed, suffered any

any blight, or produced any insects; nor had a warm or southerly wind a similar effect; and it seems to me inconceivable, that a chilling and parching wind should teem with the seeds of animal life, a thing never countenanced, in the smallest degree, by observation or experiment.

'It is well-known, (says the ingenious Mr. Somerville) how readily both men and other animals are hurt by vermin, and with what difficulty they are rendered clean; it is also known, that when they are freed from them, *they will continue always so*, unless some tainted animal is introduced amongst them. The same thing applies to grain:'—But Mr. Somerville did not perhaps, at the instant, recollect the shoals of vermin sometimes consequent upon a mere corrupted state of the animal fluids, in the *morbus pediculosus*, for example; nor those living worms, and *animalculæ* bred beneath the skin, in the human face, to which it seems almost impossible to assign any other origin, than that just mentioned. Is the disease induced by the vermin, or are the vermin bred by the disease? A respectable and acute critic (Editor of the Commercial and Agricultural Magazine) demands of me, whether, in defiance of the celebrated position of Harvey, and the experiments of Malphigi and Lewenhook, I mean to attempt the revival of the exploded doctrine of equivocal generation? My reply is, that I have ever esteemed the term equivocal, as most appropriate, considering the extreme uncertainty of the case; and that even allowing the principle *omnia ab ovo*, it seems that eggs or seeds may exist independently of sexual, or even

paternal generation. If a polypus can be produced without the help of a mother, I see no reason why a worm, or an insect may not be also brought to light, without the help of either father or mother; and I conceive the higher this idea is traced the more probable it will appear. The generation of eels has often puzzled the curious of both ancient and modern times. Mordant, in his Complete Steward, says, 'In ponds where there are springs, there is no want of eels, though none were ever put in: and what is more strange, I apprehend no person ever saw the least sign of propagation in an eel, either *milt* or *spawn*, so that how they are bred and produced, as yet remains a mystery unresolved.' vol. 1. p. 103.

But there are confessedly insects, the progeny of which may be accurately traced, as the aphis, and the caterpillar, the latter of which proceeds from the eggs of the butterfly, that the destruction of butterflies is an object of consequence. Dr. Darwin advises to burn the leaves of fruit trees, in autumn, on account of the number of those eggs preserved by them from the severity of winter. The procreation, habits, and degrees of ability to do mischief in insects, are extremely variable. Caterpillars, locusts, slugs, grub-worms, centipedes, earwigs, maggots, &c. devour the whole substance, external as well as internal, of vegetables, whilst those particularly called blights, only suck the vegetable juices, the leaves remaining to contract or curl, and wither. Every vegetable seems to have its peculiar blight, or insect, corresponding in colour with itself; that of lavender is singularly beautiful, being of a pale green, the belly half white

white and half green, with six legs, and fine black eyes; this insect envelopes itself in a large bladder of frothy matter (the extracted juice of the plant) which appears in distinct globules, like quicksilver. The common earth worms are carnivorous, and I believe never feed on vegetables; they are very troublesome in gardens, where they abound, and I have been in the habit of thinning them, by causing them to be picked up, on moist evenings, in vast quantities. Insects originating from dung and animal matter, never prey, I believe, upon vegetables; nor those of vegetable origin upon flesh: and although the genial warmth of dung may be favourable to the preservation and hatching of the eggs of insects, I could never observe that manuring for the wheat crop (a common practice in poor countries) was particularly productive of blight or smut; it may possibly tend to cherish the eggs of the slug and grub.

By some it is proposed to encourage the breed of acertain insect, which subsists by devouring that destructive fly, the aphis; a proposal, with which, the farmers will be very merry, and which, in truth, carries about it something more of the ludicrous than the practicable. Supposing it practicable, it would be an unlucky result to find these giant-killers a worse nuisance than the vermin they had destroyed. I was not aware of it until the present year, but the centipes is a great enemy to beans, and on digging up a great number of plants, which were withering from some secret cause, and in the vacant places, I found the seed eaten through, and filled with that insect. Where the radical virtue seemed not to be

be destroyed, I filled the beans with snuff and pepper, and replaced them; they afterwards did well. I think it is worth while, where bean plants miss, in any considerable degree, to fill up the vacancies with fresh seed, dibbling in with beans, a little lime, sand, or ashes.

The Rev. Mr. Stacy has lately published a pamphlet on the common failures of the turnip crops, which well deserves the farmers attention. Mr. Stacy justly observes that the failure of turnips, is more frequently owing to drought, and to the destruction of the seed, by its being merely cast upon the surface of the land, than to the ravages of the fly, the fashionable cause assigned, but which is often an invisible agent in the business; hence another manifest advantage in drilling turnips, the seed being by that means placed out of the reach of injury. I believe the sight of swarms of dung-flies hovering over a failed crop of turnips, has often induced a suspicion that the damage has been done by the said flies, when, in all probability, they have not tasted a single leaf.

Mr. Buckland, our justly celebrated orchardist general, some where says, 'blights on fruit trees as on every vegetable, proceed from weakness only; a strong, thriving tree or plant is not infested by insects, or not injured by them,' yet I have, this year, seen cabbages, apparently the most luxuriant and robust, suddenly covered with mould, or the eggs of fly or maggot, proceeding nobody could tell whence or how: these eggs were found in myriads upon the leaves, and in the hearts; the cabbages sickened gradually and never perfectly recovered:

covered: some of them were cape-cabbages, and the bulbs were eaten through with maggots. Considering the length of time, this subject, of the nature and habits of those insects which infest our cultivated lands, has been under discussion, it appears to me not a little extraordinary that we have made no greater progress thereon, and I should be happy to have leisure allowed me for its thorough experimental investigation.

In treating of the Course of Crops, I have acceded to the general idea, that nature affects variety, although when viewed through the medium of her own spontaneous efforts, she gives the most striking proofs of a contrary tendency; and, perhaps, our conviction or our deception, arises from a deficient statement of the case. The three famous propositions of Tull, on change of crops, appear to me unanswerable, upon any philosophical, or fairly experimental ground. 1. "*That plants of the most different nature, feed on the same sort of food.* 2. *That there is no plant, but what must rob any other plant within its reach.* 3. *That a soil, which is proper to one sort of vegetable once, is, in respect to the sort of food it gives, proper to it always.*" These propositions militate not against the truth, that various plants affect various soils; but, the vegetable *pabulum*, or food, is the same thing in all.

On change of seed, or of individuals, of the same species, we are generally guided by analogy with the prevailing notion on the change of species; granting it a delusion, it is surely a very harmless one; but, in certain cases, it may be of some little consequence to a farmer, to be convinced, that no harm

harm can happen, nor any defect of produce arise, from resowing the seed on the same ground whence it was produced. The earth, of herself, produces and reproduces most luxuriantly, from the same seed, for centuries, or for ever, without weariness, or desire of change. The idea of a necessity for occasionally crossing the breeds of animals has prevailed in a similar degree, and does still prevail, notwithstanding the most satisfactory proofs of the futility of such maxims, derived from the invariable success of breeding in and in. If a man possess seed, perfect in its kind, and the species equally adapted to the soil, he may, perhaps, get harm, but surely ought to expect little good from a change. There can arise no possible benefit from crossing with inferior stocks: but changes ought to be indefatigably pursued, until the best be obtained; then remain the grand objects, either of farther improvement, or the prevention of degeneracy; and these will ever slip through the hands of men unpossessed of the virtue, or the habit of persevering industry. No pains, no expence, no distance, are ever too great, to obtain the best stock, dead or alive, or the best implements.

To sow imperfect seed, is a practice nearly allied to madness, or folly; a folly, of which our wives are never guilty, who ever take especial care to put new, at least sound eggs, under their hens; and seeds are the eggs of vegetables. More cannot be had from a thing than it possesses; and if we sow bad seed, or deficient in the true seminal qualities, we ought to expect a crop defective either in quality, quantity, or both. Green and shrivelled

shrivelled corn, such as has not stood long enough to arrive at maturity, should never be sown; much of it, as I have experienced, will not vegetate at all; of that which succeeds, the sample, at least great part of it, will be lean and steely, most clearly demonstrating its hereditary defect. I would certainly not sow black, or smutty wheat, by choice; but, of two evils, I think I should prefer heavy black wheat, for seed, to the unripe, lean, and shrivelled. Smutty wheat often happens to be the plumpest, and most weighty of the crop, and its flour as full of the vegetable gluten, which arises from the blight having taken place subsequent to the perfect formation of the kernel, whence, from its maturity and power of resistance, the infection may be no more than skin-deep.

The celebrated axiom, in cattle-breeding, that "like produces like," so successfully proved in practice, may, no doubt, be equally depended upon in the vegetable creation; and it is sound and rational advice in Marshall, to select seed from the most forward and vigorous plants, of every species: yet it is an old opinion, that the smallest-grained wheat, if plump and perfect, is as likely as any, to produce a luxuriant plant, and fine stock; whence an advantage in sowing such, with respect to the measure, as the object is the number of kernels. The greatest attention should be paid to the cleaning seed-corn, which ought to be perfectly free, not only from the seed of weeds, but from every weak, and apparently unfruitful kernel, since these last, granting they vegetate, may only help to encumber and exhaust the soil with unhealthy and useless plants.

plants. I never think the expence thrown away of having seed-wheat picked over carefully by hand.

The opinions and practice of Mr. Joseph Cooper, a reflecting and philosophical American cultivator, appear to be perfectly decisive on this interesting subject. Mr. Cooper, disregarding the ancient prejudice of a necessity for the change of seeds and roots, and the procurement of them from distant and different soils, on the contrary, has, for many years, been in the habit of selecting the best seeds and roots of his own; and although he has continually sown and planted them on the same soil, every article of his produce is greatly superior to those of any other person who supplies the market, and they seem to be still in a state of improvement. This, without his knowing it, is the very same plan that was adopted by Mr. Bakewell, in England, with respect to animals.

Mr. Cooper was led to his present practice, which he began more than forty years ago, by observing that vegetables of all kinds were very subject to change, with respect to their time of coming to maturity, and other properties, but that the best seeds never failed to produce the best plants. Among a great number of experiments, he particularly mentions the following:

About the year 1746, his father procured seeds of the long watery squash; and though they have been used in the farm ever since that time, without any change, they are at this time better than they were at first.

His

His early pease were procured from London in 1756, and though they have been planted in the same place every season, they have been so far from degenerating, that they are preferable to what they were then. The seeds of his asparagus he had from New York, in 1752; and though they have been treated in the same manner, the plants have been greatly improved. Mr. Cooper has experienced precisely the same result with potatoes, and attributes the failures of other people to their planting the refuse, instead of the largest and best shaped.

Mr. Cooper is also careful to sow the plants, from which he raises his seed, at a considerable distance from any others. Thus, when his radishes are fit for use, he takes ten or twelve which he most approves, and plants them at least one hundred yards from others that blossom at the same time. In the same manner he treats all other plants, varying circumstances according to their nature.

In 1772, a friend sent him a few grains of a small kind of Indian corn, not larger than goose-shot, which produced from eight to ten ears on a stalk. They were also small, and he found that few of them ripened before the frost. Some of the largest and earliest of these he saved, and planting them between rows of a larger and earlier kind, the produce of them was much improved. He then planted from those that had produced the greatest number of the largest ears, and that were the first ripe; and the next season, the produce with respect to quality and quantity, was preferable to any that he had ever planted before.

From

From this corn he has continued to plant ever since, selecting his seed in the following manner:

When the first ears are ripe enough for seed, he gathers a sufficient quantity for early corn, or for replanting; and at the same time, that he wishes his corn to be generally ripe, he gathers a sufficient quantity for the next year's planting, having particular care to take it from *stalks that are large at the bottom, of a regular taper, not very tall, the ears set low, and containing the greatest number of good sizeable ears, and of the best quality;* these he dries quickly, and from thence he plants his main crop; and if any hills be missing, he replants from the seeds that were first gathered, which he says will cause the crops to ripen more regularly than they commonly do, and which is of great advantage. The common method of saving seed-corn, by taking the ears from the heap, is attended, he says, with two disadvantages; one is, the taking the largest ears, of which, in general, only one grows on a stalk, which lessens the produce; and the other is, taking ears that ripen at different times. For many years, he renewed all the seed of his winter grain from a single plant, which he had observed to be more productive, and of better quality than the rest, which he is satisfied has been of great use. He takes particular care that different kinds of the same vegetables do not bloom at the same time near together, by which they injure each other.

On every kind of soil, Mr. Cooper prefers planting the rows of Indian corn six feet asunder each way, as nearly at right angles as may be,

and

and leaving not more than four stalks on a hill.

It is alledged, that foreign flax-seed produces the best flax in Ireland; but Mr. Cooper says, that when it is considered that only the bark of the plant is used, and that this is in perfection before the seed is ripe, it will appear that his hypothesis is not affected by it.

Mr. Cooper had the following instance of the naturalization of a plant in a different climate. He had some water-melon seed sent him from Georgia, which he was informed was of a peculiarly good quality; knowing that seeds from vegetables that grow in a hot climate, require a longer summer than those of Pennsylvania, he gave them the most favourable situation he had, and used glasses to forward their growth, and yet few of them ripened well; but saving the seeds of those that ripened first, and continuing the practice five or six years, they came to ripen as early as any he ever had.—Dr. Priestley's Letter to Sir J. Sinclair, Board Com. Vol. I. p. 363.

The above method of managing exotic seeds has been lately found successful in France.

Whilst writing, I am informed, that it has been found very efficacious to fire serpents from a gun amongst flocks of crows; and, I believe I have not before mentioned, that a London watchman's rattle has proved a most useful implement to me, and much more successful in frightening birds, than the usual bawling of the boys.

ON THE GREEN AND ROOT-CROPS, FOR THE SUPPORT OF CATTLE.

Provision for cattle, as has been sufficiently often repeated, is one of the first objects in husbandry, and the late improvements in this department, form, perhaps, the most striking feature of superiority in the new, over the ancient system. Although, by this method of grazing, (so to term cattle feeding in general,) a considerable portion of the farm is necessarily withdrawn from the culture of bread-corn, yet, both reason and experience demonstrate, that the crops of corn will be infinitely heavier, than if the whole, or the too great portion allotted to that purpose, by the old system, were so employed; and that, instead of the land being exhausted, as of old, it may thus be maintained in everlasting vigour. It is by this method alone, that our present immensely increased population can be fed; and to the hitherto too narrow limits of the improvement, we are to attribute, in great measure, the exhorbitant rate of the first necessaries of life. Granting the truth of the Tullian hypothesis, that constant turning and dividing the soil, and exposing every possible superficies of it to the atmospheric influence, will render unnecessary the introduction of stercoracious manures; yet, in a roast-beef country, like ours, vast herds of cattle must be kept, and winter, as well as summer-fed, which can alone be effected under our present circumstances by aid of the crops in question.

It

It is somewhat strange, that at so late a period, such groundless opinions should prevail, or that men should be so grossly ignorant of their nearest concerns; yet, what numbers of farmers there are, who go on, to the end of their lives, driving and impoverishing several hundred acres of land, without keeping cattle enough to manure, properly, a tenth part of their farms. Ask these men for an explanation of a conduct so extraordinary, and they will tell you, very gravely, and in truth, with equal self-sufficiency, that, indeed they should like well enough to keep more live-stock, but that theirs is an arable, not a grazing farm, which circumstance necessarily renders the thing impossible. This is the kind of reasoning, which generally and currently passes under the respectable name of experience, although it afford nothing of impartial proof: but it is a fully established truth, that an arable farm will maintain much greater stocks of cattle, than such as is commonly stiled a grazing farm, granting a sufficient home-stall; that the green and root-crops will go much farther, for that purpose, than natural grass; and that it is arrant nonsense to talk of a want of herbage upon an arable farm, a defect, which is so easily and so speedily supplied.

There is a kindred error prevalent amongst another and somewhat superior description of cultivators: these will keep, and summer-fat a considerable quantity of stock, but either neglect or seem ignorant how to provide winter provision of sufficient quantity and quality for their support; the evil consequence of this error is, that they are usually

usually obliged to part with a considerable quantity of stock, half-fat, at great disadvantage, on the approach of winter; and of that which they retain, some are fed at an expence too great, whilst the bulk are left to encounter hunger, wet, cold, and to lose as much per head, during the winter months, as they are likely to profit in those of the following summer. But this plan of subjecting cattle to loss, or even to remain stationary, during the winter, is a great public and private disadvantage, partaking nothing at all of misfortune, but wholly of error and neglect. The business of fattening may, and ought to proceed equally in winter as in summer; and in store-feeding of cattle, the practice of keeping them hard, as we phrase it, that is, exposing them, half-fed, or half-famished, to all the rage and inclemency of the elements, is absurd in the extreme. These scape-goats pay nothing; but cattle comfortably wintered, and kept in good store-condition, would pay something, particularly by requiring afterwards much less time to fat; and is it not our object to make the most, and the speediest profit from them? It ever seemed to me a strange commendation of any species of cattle, how well they would endure to be starved, and how few of them, *per centum*, would die under the operation; it would be a much greater recommendation, in my opinion, that they were well-shaped, and would stand under a considerable burden of meat. All I would demand, in point of hardiness of any kind of stock, would be, that they would thrive, during winter, with good meat, and under good shelter. I have my doubts upon the necessity

of

of winter-exposure, in most of those parts, where, perhaps, custom and ignorance alone have rendered it necessary.

The confinement of cattle to comfortable quarters in the home-stall, during winter, is at length generally allowed to be good practice by our ablest cultivators, and yet, strange to tell, even these make an exception in the article of sheep. On what grounds? That such hath hitherto been the custom: but a parity of reasoning from the case of other animals, and of all animal nature indeed, ought here to be our rule; and rational theory is ever a safe guide to experiment. How came men to be so out of their wits, as to doubt the propriety and the profit of sheltering poor sheep, as well as other animals, from the horrors of winter, unless they have, from habit, forgotten to enquire into the numerous instances of that successful practice, both at home and abroad? There is a certain country, where numbers of men are annually frozen to death with cold, in thin clothes, by custom: that so few perish, and so many escape, is an illustrious proof of their hardiness and bravery, as well as of thickness of skull, and hardness of heart, in their proprietors.

It ever excites a smile in me, to listen to the plausible theory of your true practical folks;—"Oh! men will always follow that which they find most for their interest, of which, surely, they themselves must be the most sufficient judges, after many years' experience." Let us see how this aphorism stands. A farmer has a few acres of beautiful meadow, and is short of keep. He turns his cattle

into the high grass:--After gorging themselves, they proceed to trample under foot this precious commodity, with all possible expedition, rendering no small quantity of it perfectly useless, with their excrements. They fare sumptuously for the first week or two, perhaps, after which, their keep, and with it their condition, declines; till, at the last push, like spendthrifts, they find themselves, and their owner finds them, in actual want. Now had the good man thought proper to take the grass to the cattle, instead of the cattle to the grass, he might probably have forestalled want, and have obviated every difficulty; his herbage would have gone thrice as far; and, granting he mowed too quick to have had a second cutting ready, a good pasture would still be left; his cattle, in the interim, being safely sheltered at home, from the sun and flies, and the whole of their dung preserved, which is by no means the case when dropped at random: Is it, or is it not at all strange, that in a country like this, where, at all times, cattle-provision is of so much consequence, that this moon-blind custom should be almost universally prevalent? I have been accustomed to cut and carry the green feed to the yards, for cattle of all kinds, throughout the summer, and have found the superiority of profit over the old method, so great in every view, and I think it must appear so evident, that, to offer the reader a calculation, would be ridiculous.

Every body knows, that upon certain of the best cultivated districts of the opposite continent, no cattle are ever suffered to range at large, to tread down and spoil the products of the earth, poach the soil,

soil, or waste their manure, either in summer or winter; and, that several of our most enlightened cultivators have, of late years, adopted the same provident maxims. The advantages of the SUMMER-FOLD are truly great, and capable of being extended to benefits almost beyond calculation. Our lavish expenditure, or rather improvident waste, in the summer-season, by the barbarous method of suffering cattle to tread under foot, and destroy so great a part of their most nutritious food, is one great cause of our winter distress, for that prime article, good hay; for which we are necessitated to have recourse to that which often proves a most comfortless substitute.

Of the following crops, chusing such as he may judge most suitable to the nature and circumstances of his land, let the prudent farmer cultivate as many acres, as will soil throughout the summer, and supply, with hay, and other necessaries, throughout the whole winter, his stock of cattle; never fearing to overstock himself with winter-provisions, a commodity, for which he need not doubt of a ready sale, in the month of April, nine seasons out of ten:—

UPON CLAYS.——NATURAL GRASS, FOR HAY.——CLOVER.—COW-GRASS, FOR HAY AND SOILING.—TARES, WINTER AND SUMMER.—TARES, AND OATS, OR BARLEY, FOR SOILING, OR HAY.——FOG.——CABBAGES.——MANGEL WURZEL, FOR SOILING WITH THE LEAVES, THE ROOT FOR WINTER USE.—-BORECOLE.—-RUTABAGA, TO STAND FOR LATEST SPRING-FEED.

Deep healthy loams. The reader need not be told, that these fortunate soils will grow any thing and every thing: What excuse, then, can be made for the cultivators of such, who submit to remain in want of any production, conducive to their profit, or convenience? I call on them to attend to the following catalogue, the benefits of most of which I have experienced on inferior soils:——Lucern.—Saintfoin.—Burnet.—Tares.——Rye.—Chicory.——Indian Wheat.——Mangel Wurzel.——Rape, and cole.——Rowen.—Fog.—Cabbages.—Coleworts.—Swedish turnips.——Carrots.——Parsnips.——Potatoes.—Turnips.

Light and poor Soils. Saintfoin.—Burnet.—Chicory.——Furze.—Brank.—Tares.—Cole.—Turnips.—Turnip-cabbage, or, bulbous brocoli.—Borecole.—Swedish turnip.—Coleworts.

I have, in the above catalogue, assigned the species most to be depended upon in each general class of soil; but it is plain, a greater latitude may be allowed. For example, upon clays, although the grand winter-dependence must be on cabbages and hay; yet, upon the lightest, and dryest part of the farm, potatoes may be grown to considerable advantage; and to forward this end, a copious manuring of sand, or sandy gravel, supposing it procurable, at any reasonable distance, will be found of great use. I have tried the same expedient with carrots, on deep healthy clays, not, indeed, with all the success I could wish; but, I think, the measure deserves further attention, considering the very great

great value of a carrot-crop, with which, for general winter-use, nothing, as far as our present experience extends, can be placed in competition. Carrots need no cookery, and will make capital beef and mutton, with good hay; but are not so proper to fatten any other animals. For store-feeding, they suit all our animals, given either with hay or straw. Young cattle, horses, deer, pigs, rabbits, turkies, geese: for milch cows, they are of first-rate excellence.

Some reasons have been assigned, why I would wish to recommend the drill-culture for carrots. The horse-hoe will save an immensity of expence, besides affording to the roots, the full benefit of the atmospheric manures. Take Mr. Amos's method. "Two pounds of seed per acre. Steep the seed in rain-water twenty-four hours, and lay it upon a floor, until speared. Mix, thoroughly, with three pecks dry saw-dust, and three pecks of fine dry mould. Drill one inch deep, and fourteen inches between the rows, with the same cups used for wheat, or barley. Harrow once in a place. The plants will appear in eight or ten days." I intend to make trial of the drill for cabbage-seed also, in the spring-culture, to spare the trouble of transplanting. In both these crops drilled, there is this inconvenience; the strongest plants would sometimes be cut up, in the setting out: but which might be avoided by a little extra labour and attention with the dibble.

Fog, or autumnal grass, left for winter and spring consumption, is, no doubt, a most certain supply, dependent on no contingency, since the quantity only

only forms a question, and that is at the farmer's option. Several considerations hang here. The first crop of grass is out of question; it would never pay to leave that. Whether is it better, to make, and stack the rowen, or lattermath, in September; or leave it as fog? The quantity of the latter, will, in course, be superior; but the quality must be weak and faint, and the cold season demands dry meat. The superior call for grass, or dry meat, it should seem, must regulate this business. To turn cattle into fog of any height, soaked, perhaps, and beat down with rain and snow, upon poachy land, must be a miserable business truly, it would be half trodden into the earth; and, upon firm land, there can be no occasion for any waste. Opportunities should be taken, if favourable weather, to cut and cart a considerable quantity, which, in the cold season, would take no harm; and the cattle might so eat it, in comfort, at home. A stack might be made, a layer of fog, and a layer of straw.

In point of quantity, the CABBAGE-CROP is equal, if not superior, to all others, upwards of sixty tons having been drawn from an acre of good land. Cabbages, with good hay, will make fat beef and mutton; but it is with them, as with turnips, their power of nutriment depends much on the richness of the soil. Hard store pigs will grow upon cabbages, with tolerably good wash.

A most dishearting circumstance attends the cabbage-culture: You shall see, in October, a flourishing field of them, teeming, absolutely, with mountains of victuals. Look at the same field,

four,

four, or even two months afterwards, the weather having been severe, and your mountains, comparatively, are degenerated into mole-hills. I had once a beautiful piece of three acres, of the hardest kind, which, by February, were reduced by the weather, to, I believe, less than one, including the reduction of quality. It is, surely, time for us to do away the disgrace of being inferior, in the article of winter-provision, to our continental neighbours, to profit by their experience, and to endeavour to improve upon it. In Germany, they stack, or house their cabbages, while in full perfection and weight; and, if I am rightly informed, they keep them in good preservation all the season. I was prevented, by an accidental circumstance, from making the experiment this year.

The larger, and hard species of cabbage, is always recommended for cattle; but, from certain observations, I have been led to question, whether the superiority does not really belong to the Savoy, the quality of which is surely more nutritive: it is equally hardy with the Scotch, or any other winter-species. The material question is, whether, granting a crop of Savoys, inferior in weight, the defect will be repaid by superiority of quality. They may be set thicker than the large Scotch cabbage; and, upon first-rate land, will average at ten pounds per plant. There is an instance of a large winter cabbage, grown by Mr. Baker, of Burstal, in Leicestershire, reaching the enormous weight of ninety-two pounds.

I have, this season, had a patch of the MANGEL-WURSEL and the RUTABAGA. Of the former, which

which is the white, or sugar-beet, lately so celebrated in Prussia, I have been induced, by this small experiment, to entertain a high opinion. It does not succeed ill on heavy land, but on dry and friable soils, it will produce a vast quantity of very nutritious saccharine food, capable, as I should conceive, of fattening a pig, for market at least, which is saying every thing. For milch cows, too, in winter, it must be equal to any thing, probably superior even to carrots. The leaves have somewhat the flavour of the cocoa-nut, and seem to be more nutritious, at least they are more substantial, than those of any other plant within my knowledge; they would be good summer-soiling for cows and pigs, and, perhaps, even superior to clover for the latter. The green crop, or leaves, afforded by this article, is considerable; but there remains a doubt with me, whether the depriving any plant of its leaves, in considerable quantities, does not materially detract from the quantity of fruit, or ultimate product. That such is actually the effect with cabbages, I know, by repeated experience, having materially injured several crops, by gathering and carting away their superfluous leaves, for store-pigs. It is singular, that the plant should be weakened to such a degree, as to prevent its loaving or cabbaging, by stripping off leaves, which, in a short time, are destined to fall spontaneously. I know not, practically, that the beet is thus injured; but, granting such to be the case, the grower will be determined by his superior call for summer, or winter-food. It is not fact, that insects avoid the Mangel-wurzel; the slug and caterpillar

pillar had a small share of mine. The beets, when stored, appear to resist the frost well. Grown in an adhesive soil, there must be a considerable trouble in cleaning their numerous roots; the same slight disadvantage attends the

RUTABAGA, or SWEDISH TURNIP. In my small patch, I have no roots of any considerable size; and should suppose, such advantage must be expected in deep sands, and good loams only; and that on clays, the rutabaga must remain an article of inferior consequence. It is not strictly correct, that this plant is impenetrable to the frost, since some of mine were frozen in the ground, and rotted. The quality of the rutabaga, I must hold, notwithstanding the flattering account in the Nottinghamshire Report, to be inferior to that of the carrot; and I must own, I have always been upon my guard against similar accounts, since reading, some years ago, of turnips being found nearly equal to oats, for labouring horses! I believe, however, the rutabaga to be superior in nutriment and warmth, to our common turnip; and upon deep soils, to be a far more advantageous crop, with the proviso, that the fact of their approximation, in point of quantity, can be established. As to the fact of their facility of preservation, there can be no question. Nothing will harm them when once out of the ground. I can easily conceive the extreme hardness of these roots may break the teeth of crones; and there are, probably, circumstances under which boiling would repay itself. Notwithstanding the number of fangs into which this root

is divided, I have not found the difficulty I expected, in drawing them from the ground.

I have read, with the utmost pleasure, an account of the TURNIP-ROOTED CABBAGE, in the Bath papers, vol. 9, given by one of the most experienced men in England in the matter, Mr. Tugwell. The curious reader is referred thither. I am still of opinion, that it must be far more profitable to harvest and stack this root, or rutabaga, than to leave it in the field, until the *rising of the sap*, in April, for reasons too obvious to detail; nor can I approve, supposing it left, of that wasteful method of expenditure, turning the sheep upon it. Mr. Tugwell has found the produce of those roots uniformly, and on an average, adequate to the support of seventy sheep, during four weeks of the most hungry, the most trying, and most critical season of the year—his land, worth thirteen shillings an acre, each acre producing seven and 8000 plants, of about four pounds weight one with another.

Upon the following experimental data, the farmer may form a judgment:

	lbs.
Mr. Tugwell's turnip-rooted cabbage, per acre - - - - - - -	32,000
Mr. Close's drilled turnips, 55 tons, ditto, or, - - - - - - -	123,200
Dr. Parry's prize-crop of winter-cabbages - - - - - - - - - -	73,920

The two last, it need not be observed, are no common crops, the turnips an extraordinary one. Both rutabaga,

rutabaga, and turnip-rooted cabbage, should surely be drilled early, upon well manured land, in order to raise a large quantity, and to determine how near they will approach the acreable weight of our common turnips, to which, in quality, they are much superior.

CHICORY. Desiring to obtain some experience in this crop, I was astonished to be informed by the seedsman, of whom I purchased the seed, that Chicory was nothing more than cultivated dandelion. Did our writers think its old, home-spun name, would not sufficiently set off, and recommend it, and so imported a fine name, (*Chicorium intybus*), with the seed, from France? It will produce a considerable quantity of food, and is not nice as to soil: but I have a particular objection to it, which yet, on account of my very slender experience in the article, I shall not name. I should prefer drilling it, for several reasons. It is said to make good hay.

INDIAN WHEAT, or MAIZE. Of this grain, I know nothing, but by report. Any warm soil will suit it: and it has been successfully cultivated in Essex. Seed-time, April, when it may be dibbled, at eight or nine inches distance, the rows being left wide enough for the horse-hoe; or they may be hilled, or set in squares, for the convenience of horse-hoeing both ways. One particular species of seed only, it seems, will suit our climate. This crop produces much excellent green seed, or corn, fit for all kinds of cattle and poultry. A pamphlet on the culture, may be had of Baldwin, London.

THE

THE TURNIP-CABBAGE, OR CAPE-CABBAGE. This is a plant of a fat and most nutritious quality, of the species brocoli. It is excellent for the table; and, I believe, in high repute at Bristol, in which neighbourhood it is successfully cultivated. It is said to rank next to corn, in fattening sheep, which require no hay with it. Cows thrive with it, and even horses, for which it is highly nutritious, in its withered state, being free from acid juices. This plant produces its bulb above the surface of the ground, being an enlargement of the stalk, surrounded with leaves, nearly resembling those of brocoli. It defies all weather (a character I have had from the gardeners of brocoli, in general) and will last as late in the spring as rutabaga; and may be as safely housed, or stacked, in autumn. The sprouts may be cut off, even when in blossom, and left to wither for sheep and cattle. Culture same as for rutabaga. Small two-bout ridges are recommended. I have now before me turnip-cabbages, from four to eight pounds each, some of which are perfectly sound, others decayed by the frost.

Upon soils where WHEAT is apt to grow rank, or winter-proud, it is the custom to include it in the cattle-crops, and feed it down in the spring, with sheep; in some parts of Kent, and elsewhere, with even bullocks and horses, which are left upon the land to the month of May. Without pretending to decide upon the propriety of this practice, which I never did, and most probably never shall essay, I shall barely hint, that the wheat-crop may

may be injured by it in various ways; and, then it might be advantageous to have a more safe method of reducing the quantity. In the accidental trespasses of sheep on wheat, the particular spot on which they have laid, and which they have nibbled closest, have proved, from old and frequent observations, the lightest in grain, at harvest. A rank field of wheat affords a fine opportunity to those curious-husbandmen, who may desire to try the experiment of transplanting: the plants being thinned, will admit the hoe, which affords the best mean of feeding the root, under the circumstance of exuberant vegetation. An irregularly sown crop, thick and bare in patches, may be much improved by this practice, and at an expence trifling, compared with the profit. As to the trouble, that, in my idea, is infinitely over-balanced by an after-view of the regular beauties of the crop. On the other hand, corn is said to be perennial; and that if it be prevented, by grazing, from growing to seed, it will endure as grass. It remains to be determined, by experiment, to what degree it is advantageous to grow oats and barley as soiling, or hay for cattle; at any rate, the nutritious and fattening quality of such provender, cannot be questioned. The crop being cut, whilst the stalk and blade are yet in full succulence, the season will admit of a new crop of turnips, rape, or rutabaga. Oats and barley, so damaged by a wet harvest, as to be judged not worth the expence of threshing, have succeeded wonderfully in fattening bullocks; and in a cheap year, a crop of oats and clover, would probably return much more profit, in that

that mode of expenditure, than in the usual one of threshing the oats for market.

The chief winter-dependence, in light, shallow, stony, and poor soils, must be on turnip, and, perhaps, saintfoin hay. An attentive culture being bestowed upon these, the quantity will be ample enough to encourage a liberal expenditure; and the saintfoin, from its warm and absorbent quality, moderating the too loose and watery nature of the turnip, both together, will form a rich and fattening food, from which, under careful management, excellent beef and mutton may be expeditiously made. Some sands, and fertile stony soils, will produce good crops of all the *brassica*, or cabbage species, shallow sands will also produce good carrot and potatoe, as well as turnip-crops; thus upon such, a man cannot be at a loss how to prepare for the exigencies of winter.

The culture of FURZE, or WHINS, for the purpose of feeding horses, is a curious and not unimportant article, beside being new to a great number of people. The profit and convenience must be considerable, on dry, thin soils, scarcely fit to produce any thing else. This practice has prevailed in Wales for a century. The green tops of the furze may be cut, or mowed, afterwards chopped with a cleaver, into pieces an inch or two long, then the spines bruised, or broken with a flail. The Bath Society have the model of a mill for bruising furze. It must be eaten in a day after being bruised; and if chopped straw be given with it, one hundred of straw will serve a ton of furze. Two bushels *per* day, of this food, with hay,

served

served three horses, which worked as usual when fed with corn. It had a good effect upon broken wind, and grease, in horses. The sort was the French furze, and only the tender green tops used.

Whins are sowed in February, March, or April, upon a fine tilth, made very clean from grass; seed six pounds per acre. They are cut at Michaelmas, or sooner, the same year, and yearly, and may be stacked; will continue to grow to Christmas, and be fit for use until March. An acre will produce from ten to fifteen ton, which will equal, in feed, as many tons of hay, *Only what is the growth of one year* must be cut.—*Bath Papers.*

This food, it is probable, might be very suitable for store-cattle, as well as horses; for the latter, when working, I should rather chuse it as a substitute for hay than corn. I should also cultivate it in drills.

On expressing my surprize, at seeing good long carrots grown in very shallow sands, to a person who had been many years bailiff to several estates, he told me, he had been accustomed to obtain carrots of full length and size, in such land, by dibbling the seed to a great depth, with an iron dibber; and when I objected, that the plants, from the seed being so deeply buried, would never get above the surface; he assured me, in his numerous trials, he never observed any such consequence. Another curiosity, respecting this celebrated article, is the experiment of that eminent agriculturist, the late respectable Mr. Baker, of Dublin. Mr. Baker converted an acre of carrot-tops into two tons of hay,

mowing

mowing them, whilst in perfection of sap, without going so close as to wound the crown of the root. I have already stated, that I greatly damaged a cabbage-crop, by gathering the leaves: and submit it to experiments to determine, how far the same effect may obtain with carrots: but, putting this circumstance out of the question, I should conceive the hay would be valuable, as I know by experience, the green tops of carrots are nourishing and agreeable food to sheep and rabbits. BUCKWHEAT will mow twice in the season, as green food for cattle of all kinds; and is reported to succeed with milch-cows. PARSLEY has been cultivated as sheep-food, a species of plant which I should never think of recommending for the purpose of fattening any animal; from its medicinal and diuretic qualities, it may be beneficial, green or dried, to sheep afflicted with the scab, or red water; and with such view, some patches of it may be advantageously cultivated. It is efficacious in the recovery of greasy and surfeited horses.

Thin, cold, spewy CLAYS, whether hill or dale, in their unimproved state, are, perhaps, the most disadvantageous of all other soils to cultivate, and the very properest to starve a poor farmer. I have waded over such in autumn, when the wretched spindly stubble, which they had produced, with, may-be, two sacks of coarse, steely, brown wheat per acre, appeared to me a very good antidote to farming. On these lands, pigs are the most proper stock, and for the sake of the dung, which here is highly valuable, the fattening system ought to be pursued. This requires skill in hog's flesh. As to what

what other cattle can be kept, the chief dependence must be placed on clover. Cabbages cannot be had here, without very ample manuring. But these soils, luckily have not always the impediment to draining, experienced, now and then, in deeper clays; and after the performance of that noble operation, the case will be wonderfully altered. Deep ploughing, and good winter-fallows, will then absolutely change the nature and properties of the soil, and enable it to carry good crops, of any species, to which it is adapted.

Should any one yet hesitate, or suppose, that I have laid too much stress upon the necessity of a more generous treatment of our domestic animals, during the winter-season; and, that I have overrated the consequence of the above-described articles of provision, let him, in any season, compare the spring-condition of animals under either regimen: but more particularly, let him attend to the dreadful accounts of the last bitter and inclement season, exhibited in the annals of agriculture, by the laudable diligence of Mr. Young. The following melancholy account, was quoted by Mr. Tugwell, (already mentioned) from the Bath newspaper, of the 19th May. "The loss among the sheep, through the severity of the season, has been immensely great, in various parts of Cumberland and Westmoreland. Only 30 are stated to have been saved, out of a flock of 300;—300 to have been lost, off one farm, containing about 1000;—and 500 to have suffered, out of a flock of 800. All the hay and straw in most counties, have been nearly consumed, in support of the cattle,

without the probability of any grass, at May-day, to receive them. Young ewes, of all the principal flocks, which lambed down late, will not rear half their produce," &c. " A collector of mort-skins, in Mr. Tugwell's neighbourhood," (*i. e.* of those sheep having died of hunger, disease, &c.) " bought a few days since, of a neighbouring farmer, whose flock before amounted to only 240 sheep, 60 skins at a purchase. Another, with a flock of 100 ewes, has, already, only 30 lambs left. A third, we are told, had, some time since, 160 ewes, without lambs. Fortunately we had, almost every where (in the west) a double stock of hay in hand, otherwise the general disaster must have been still more dreadful. This, however, it must be allowed, arose from no extraordinary foresight, or economy of our own; and as it is now nearly consumed, should the inclemency of the ensuing winter be equal to that of the one now past, the severity of its effects must be every where felt, to an extent not easy to appreciate." There cannot, surely, be a more forcible appeal to our understandings, and our feelings; nor a fairer opportunity of converting misfortune itself into a benefit, by immediately acting upon well-grounded resolutions of future providence.

There is a most unfortunate prejudice, amongst farmers of the old style; they believe nothing can be profitable upon a farm, but corn for the market. I was once walking with a man of this stamp, over a fine piece of cabbages, which I praised very highly, calculating how many beasts they would fatten, with the help of some good hay. My companion,

panion, after hearing me out, replied, drily, "Aye, but you know, cabbages will pay no rent,"—and beyond that I could not get him to advance an inch. But let the farmer, unaccustomed to these crops, first of all, make the experiment, and afterwards fairly calculate the cost, and the profit in cattle, manure, and condition of the land; comparing this last with the condition of the land after a crop of corn. It is by taking things upon trust, that men contrive to keep themselves constantly hood-winked.

It is an objection of long-standing, and by no means without grounds, against books of agriculture, that, although, in truth, they recommend good practice, good implements, and profitable crops, they leave the reader wholly in the dark, as to the means of taking advantage of such improvements. I shall do my endeavour, not to leave my book liable to such objections. In respect to the new implements, I have already given the names of a number of the most skilful artificers, both in the metropolis, and in various parts of the country. In the SEED department, I beg leave to recommend to the farmers in general, who desire to extend their cattle-crops, or to stock their grazing grounds with the most pure and valuable grasses, natural or artificial, Messrs. Gibbs, Half-moon-street, Piccadilly, London, seedsmen to the Board of Agriculture. I need say nothing of the fitness of this house, for the appointment, since they obtained it, under the auspices of a cultivator of such distinguished eminence for talents and experience, as the noble President of the Board.

On a point of the highest importance to the interests of agriculture, I am happy again to be obliged to the writings of the Rev. Mr. Henry Close, whose practical diligence in the various pursuits of husbandry, and whose disinterested patriotism, are above all praise. The reader will recollect the observations I have already made, upon that common and almost insuperable bar to agricultural improvement, the prejudices, wilful obstinacy, and ignorance of servants: on this head, I commend to the serious attention and imitation of gentlemen and farmers, the following plan of Mr. Close, contained in an extract from his letter to the Bath Society, dated May 2d. A plan, than which, in my opinion, nothing could be devised, better calculated to go to the root of the evil. " But, Sir, the purport of this letter is, to state to your Society a plan which I have in agitation, the most likely to promote the general agricultural interest of the country. Nothing impedes the introduction of the new husbandry, and the use of the most improved instruments so much, as the obstinacy of the workmen. To surmount this difficulty seems a great object; and it appears to me, that by taking eight clever, active young men under my tuition, for one or two years, I may essentially serve my country.

" At Michaelmas next, I therefore intend to make the experiment. I have a house ready, and a Suffolk bailiff, a very clever, and intelligent fellow, and his wife, a very tidy woman, who are to have the sole management of the family. Thus I shall be able to send a fresh supply of converts

verts to the new system of husbandry every year, into places in various parts of the kingdom. Other workmen will learn from them, though not from a master so readily. Be pleased to lay this outline before the Society for its opinion."—*Bath Papers, Vol.* 9. p. 308.

MISCELLANEOUS ARTICLES.

POTATOES. Where pigs are bred, or a large stock of them kept, this valuable root is almost indispensable. Although it be an exception to a general rule; I have seen them thrive to admiration, on the deepest and strongest clays, as I have also seen lucern. The largest and most farinaceous potatoes, and the largest and hardiest cabbages, which I have ever seen, were at the house of —— Pierrepont, Esq. during his former residence at Sudbury-Green, near Harrow on the Hill. Many of the cabbages weighed near forty pounds each, cut in the height of the frost of that remarkable season, when the Thames was frozen, about twelve years since. This honourable gentleman has a great and meritorious attachment to agricultural objects, and is particularly curious in selecting the choicest seeds. At that time, I lived in Middlesex,

sex, and having obtained, at Mr. Pierrepont's, the favour of a peck or two of these fine potatoes, I planted them on a patch of deep, heavy, clayey loam, without any dung, the spring preceding the hard winter just now mentioned. The culture was much neglected, and we began taking them up, as early as they were fit for any use, which was repeated frequently, until the whole were ripe, when the quantity was most abundant, equal to any that I have witnessed in the best potatoe-soils. The colour inclined to yellow, and the meal of these roots seemed to contain more gluten, than any I have had since. Being desirous to preserve them through the winter, and fearing the loam adhering to them, might rot them, I washed and dried them, previous to storing in a safe place. They were washed with short brooms, in a large wheelbarrow, having a hole and peg at bottom, to let off the foul water. Notwithstanding the rigour of that winter, they remained untouched by the frost, and perfectly sound, until late in the spring, that they began to grow.

Draining, the effective tillage of the drill culture, and the beneficial pulveration obtained by those frequent winter-fallows, rendered necessary by a constant, regular system of cattle-crops, will gradually prepare and fit clayey soils for potatoes and turnips, but whilst strong lands are yet wet and cold, those plants should be set as high upon the ridge as possible. Potatoes are said to succeed well after cabbages, the roots of the latter forming a beneficial manure. Rotten ditch-earth also, and such as may be collected from woods and coppices,

has

has been lately found to answer well with potatoes, when an economical expenditure of dung has been necessary.

The expence of the sets, in the potatoe-culture, amounting to so many bushels per acre, is, no doubt, an important object, whether considered in a public or private view; and it is a most valuable discovery, ascertained by various experiments of the Rev. Mr. Whittle, near Salisbury, that the rind, or paring of the potatoe, or the young shoots from the small refuse, are equally fit for planting, and equally productive with the whole roots, or pieces cut in the usual way. When the potatoes are prepared for planting, one or two eyes should be carefully preserved in every piece; and a small portion of the potatoe, about the size of an horse-bean, to every eye. The precaution may be used of planting the parings of the largest roots, and those of the finest quality. Mr. Bartly, of Bristol, is making experiment of drilling the seed of the potatoe.

The stems, or haulm, should never be cut, or fed down, by cattle, which I have observed to injure the crop; and which fact I find confirmed by an experienced cultivator in the north. I have stated my opinion of the disease called the curl, in the plant; it ought to be farther observed, that on pulling up a curled plant, the root will often be found half-destroyed by the grub, which insect, and the worm, so destructive to the roots of wheat, (described by Mr. Anderdon's bailiff, p. 129. Bath Papers, before mentioned), it is probable, may be generated from the corruption consequent upon dry

dry and blighting weather. As far as my observation goes, these worms do not owe their origin to manure of any kind; but that all such, as are produced by manure, are of a larger, and apparently different species, altogether harmless, in the respect in question. As to the remedy, I should conceive nothing would bid fairer for success, than the application of lime, ashes, malt-dust, or the like, either as top-dressing, or if the corn stand in rows, to the roots. If quick-lime will reduce bones to powder, so expeditiously as is asserted, it must surely be more advantageous to adopt that method, than be at the expence of grinding, or breaking them: it has been lately hinted to me, but I cannot vouch for the authority, that the advocates for bone-manure have been far too sanguine.

In the north, potatoes, carrots, &c. are preserved throughout winter, in a *pie*, or pit, dug in the earth; having never used this method myself, I shall present it to the reader in the words of Mr. Parkinson.

" Chuse a dry piece of ground, dig it about eight inches deep, and lay the sods or mould so taken out, bank-wise, on each side the intended pie, which will prevent the potatoes from running out. Let the pie be from six to nine feet wide at the base, and the sides fronting the east and west, one end only being exposed to the north. Raise it as high as you please, diminishing it to a sharp ridge, like the roof of a house or barn. If it be brought to a single row at the top, the pie will be the better for it. You must then cover the heap first with straw, and then with mould, regularly a foot

foot thick: but if you add a greater thickness, you will better ensure the safety of your pie from intense frosts, which, if suffered to penetrate, would spoil the whole. After incrusting your pie with a sufficient covering of mould, it will be most adviseable, as it is absolutely necessary to keep the contents dry, to thatch it in the same manner as a corn-stack."

I should apprehend this method proper upon a dry soil only. Another objection to a pie, is, it precludes that occasional examination, which I find all roots and fruits stored, to require. Root-crops are always safest when housed, with the proviso, that they are dry before they are heaped. This condition must be obtained, either by spreading in the field, or at home. Hurdles are convenient in storing or housing, for making partitions, when either sand or straw may be used; but it is necessary to be cautious in the application of straw, should the roots be damp. I nearly spoiled a whole crop of carrots, by placing layers of straw between them, and, indeed incurred no small risk of firing the barn in which they were stored.

Mr. Baker, of Leicestershire, preserves his CARROTS, by digging a trench about three feet wide, and eight or ten inches deep: the tops of the plants are cut off, and the roots laid close to each other, perpendicularly. When the trench is full, they are covered with straw, and over that, the mould of the trench. They are kept thus perfectly good until May or June."

TURNIPS, to preserve throughout winter, from Mr. Varlo. " One load of any kind of dry straw, suffices

suffices to stack an acre of turnips, of fifty tons. Draw the turnips, top and tail them, throw them into a wind-row, and let them be a few days to dry. First, place a layer of straw, next the ground, and upon it, a layer of turnips, about half a yard thick; then another layer of straw, and so on alternately, every layer being made narrower, until it comes to a point, or sugar-loaf top.

"The last layer must be straw, which serves to keep all dry. Observe, at every layer of turnips, to stroke, or lap up the ends of the under layer of straw, over them, in order to keep them close, and from tumbling out. The heap should be as large as a large hay-cock." As I recollect, I used to bottom with faggots, placing the straw upon them, and taking care the turnips did not come too near the edge or outside; the straw being carefully drawn down, left a good secure thatch. Would not this method of preservation be equally secure for mangel-wurzel, potatoes, and carrots? I should suppose that stored turnips, their crude and watery juices being exhaled by several months' keeping, would be more nourishing food for sucking ewes, and not so liable as is common, to produce an exhausting flood of their milk.

My own rough method of washing potatoes in a wheelbarrow, has been noted; the following is a more commodious one, from the writer abovementioned. "Take a vessel, made in the form of a barrel-churn. The sides must be composed of pantile-laths, or something like them, nailed to the two ends, at such a distance from each other, as to prevent the carrots or potatoes from falling out,

out, and to suffer the water to pass freely through. A door must be left on one side, to put the carrots in and let them out at. The vessel is hung over a square tub of water, so that about one-half of it and of the carrots is immersed in the water. You must turn it quickly round, and by these means you will soon wash great quantities. Fix the vessel over the tub in such a manner, that when you have sufficiently washed your roots, you may lift it from the part it turns in to a higher one near to one side of the tub. Then open the door of the vessel, turn it round, and deliver the roots into a wheelbarrow." This method seems particularly applicable to rutabaga, beet-roots, and artichokes.

LAVENDER is a very valuable crop, in situations whence it can be conveyed to the metropolis. It is by no means tender, or very nice as to soil, as I have seen it flourish in clayey ground, where burnet and tares have perished, during a severe winter. The culture in rows, from slips, is too well known to need description.

FIELD-GARDEN. Mr. Parkinson seems determined, at any rate, to overthrow the main argument of those who will allow of no analogy between the field and the garden-culture. He has practised, with success, the culture of all sorts of pease and beans, cabbages, carrots, parsnips, onions, spinage, &c. in the field, instead of the garden, obtaining every species of the garden-produce, not only at a much cheaper rate, but even earlier, his green pease being ready for market by the 10th of June, and this upon old ploughed land. The twelve-inch rows

rows were hoed by a small plough, drawn by an ass; and very little labour was done by the spade. The carrots standing in drills, instead of digging them up, as usual, he ploughed the earth from them with the Rotheram plough, after which they were easily pulled up by hand. He recommends the field-culture for cucumbers. This is certainly an excellent plan, where much garden-produce is consumed, and where a surplus can be disposed of either at market, or in the farm-yard. Garden productions, I have often remarked, will come to greater size and perfection in the field, from the benefit of a more free circulation of air.

WATERED MEADOW, from the substance and earliness of the crop it produces, is of material consequence in winter-feeding. It has often surprised me, that our strongest advocates for irrigation, should omit to recommend the practice upon arable land, since, "conducting water in furrows over arable grounds, has been practised immemorially in Scotland." The improvement would be great in parched or scalding soils, and driving sands, some of which I think I have noticed, within the reach of water.

QUANTITIES OF SEVERAL SPECIES OF WINTER-FOOD REQUIRED BY CATTLE.

CABBAGES. A middle-sized ox, whilst fattening, will consume, of this vegetable, in twenty-four hours, about, or upwards of 180lb.—a SHEEP 15lb. and upwards, a small quantity of hay being allowed;—a YEARLING-CALF, 70lb. of refuse and leaves, with straw. When hay is in plenty, it is, perhaps, cheapest in the end, with fattening stock, to give a liberal allowance. No food produces so large a quantity of manure as cabbage. The product of a moderate acre of cabbages, will completely fatten, in five months, three large beasts, put to them lean; or thirty sheep. The old accounts of the use of this article, always appeared to me very high and flattering; but it ought to be observed, they were derived from the most respectable authority. The following is extracted from Mr. Young's Northern Tour:

Produce of 36 acres of cabbages, cultivated by C. Turner, Esq. of Yorkshire.

		s.	*d.*		£.	*s.*
14	Fat beasts, 20 weeks, at	4	0	-	56	0
25	Milch Cows, do. - - -	4	0	-	100	0
12	Calves, - - - do. - - -	2	0	-	24	0
8	Bulls - - - - do. - - -	4	0	-	32	0
400	Deer - - - - do. - - -	0	6	-	200	0
					412	0

Or £.11. 9s. per acre.

"OXEN

" OXEN of eighty stone (fourteen lb. to the stone) upon an average, eat fourteen stone per day; and, fattening in four months, eat, in the whole, nine tons, sixteen hundred weight of cabbage, and seven hundred weight of hay. HEIFERS eat nine stone per day, fattening in three months, eat, in the whole, four tons, fourteen hundred weight of cabbages, and five pounds of hay, per day each, or three hundred and half of hay in all. YEARLINGS eat five stone per day, with straw, during a winter of six months; or five ton, five hundred weight each, in all." The quantity of hay allowed the fattening cattle, seems to me very small indeed.

From an account in the Bath Papers, vol. 4, twelve acres of cabbages fed 45 oxen, and upwards of 60 sheep, for three months, during which time they throve as fast as in the height of summer. The cabbages were carted to the stock in the fields, and given without being cut.

Cabbages will finish bullocks and sheep, from the summer-grass, without occasioning them to recede in condition, as is the case with turnips, and other food, at first; and cabbages are preferable to turnips, for ewes at lambing-time; in short, they are excellent for bullocks and sheep; but I cannot join in those high encomiums that have been bestowed upon their use for dairy-cows and pigs, with both which I have tried cabbage, without any remarkable success. I have found plenty of good hay, alone, more productive of butter, than cabbage and hay: As to cabbage and straw, I have seen nothing amongst dairy-cows, from such diet, but mischief; but I believe, that the goodness of all other

vegetables,

vegetables, as well as grass, depends much upon the natural richness of the soil. For an acre of cabbages to fatten five oxen, as has been stated, appears a profit almost incredible to me, who have been accustomed to moderate crops only. I used to reckon the expence upon an acre of this crop, about £.4. The reader will recollect Mr Amos stated it at £.4. 9*s.*; no one will suppose that gentleman has over-rated the worth of good cabbage, at four shillings per ton.

TURNIPS. The culture of these, between rows of wheat, or beans, and their culture with wheat, to be succeeded by beans and potatoes, with an annual continuance of the system, has been recommended upon various high authority, beginning with that of Tull. Whether such double crops be really preferable to single, or whether the system partake most of curiosity or use, I have no means, or right, to determine; but the experiment is sufficiently easy.

SHEEP will eat, upon an average, twenty pounds of turnips each, in twenty-four hours: BULLOCKS near two hundred pounds. An acre of good turnips (in the field) between November and March, will keep 100 sheep, six weeks; of rutabaga, the same number of sheep a month or five weeks. An acre of turnips, drawn, making about forty cartloads, will fatten an ox, with straw, on good land; on inferior soils, they must be assisted by hay, and generally by corn also.

The following account of cattle fed upon five acres of TURNIP-ROOTED CABBAGE, by Sir Thomas Beever, is taken from the Bath Papers, vol. 4.

Four

Four acres were eaten upon the land, folded with hurdles, into portions of an acre each, the remainder pulled, and carted to the house. Began feeding April 13th, finished May 11th.

	£.	s.
12 Bullocks, weight 40 stone each, 4 weeks, at 2*s*. - - - - -	4	16
8 Two-years olds, at 1*s*. - -	1	12
15 Full-sized Cows, at 2*s*. - - -	6	0
40 Sheep, at 3*d*. - - - - - - - -	2	0
18 Horses, fed in the stables with hay at 1*s*. - - - - - - - -	3	12
	£. 18	0

Besides 40 store hogs and pigs, which lived upon the broken pieces and offals, without any other allowance, for the whole four weeks. Sir Thomas found this crop full 24 tons and half per acre, and refused, in April, ten guineas for it. Mr. Young has known 40 tons of this root raised upon an acre, in the isle of Thanet, which is most encouraging intelligence to cattle-feeders: he recommends to take them up, by ploughing the rows without a coulter, with a round share and blunt edge. There seems to be some confusion made by our agriculturists, between the rutabaga and the turnip-rooted cabbage: I had, erroneously, I find, in the first edition of this work, made those terms synonimous; but am informed by Mr. Gibbs, that the rutabaga is, properly, the Swedish turnip, to which the turnip-rooted cabbage is far inferior. They are, doubtless,

less, of the same genus, if not precisely the same species, varying only from difference of soil and culture. His grace the Duke of Bedford has, I hear, twenty or thirty acres of the rutabaga, this year, at Wooburn.

Of raw POTATOES, a middling ox will eat a bushel in twenty-four hours, with which, the common allowance of hay is ten pounds. A SHEEP will eat a gallon in the same time, with a small quantity of hay, said by some to be so small, that half a pound per day will suffice. A HORSE will require, from half a peck to a peck per day, with hay.

Potatoes have proved worth a shilling per bushel, for fattening stock of all sorts, (swine excepted), on an average of years. The gold-finder, champion-potatoe, and golden-globe, seem to have the preference.

Mr. Mayo, of Sussex, fatted yearly, 6 oxen, 2 steers, and 4 cows, or heifers; killed one of 160 stone, that had 32lb. loose fat within him. An ox of 140 stone, eat rather more than a bushel of potatoes per day, and 10lb. hay. Has had beasts on turnips, that ate three bushels a day, and as much hay as if they had no other food. With this feeder oxen fed as fast on potatoes, as on oil-cake.

I this day consulted a Surrey farmer, one of the first in the neighbourhood of the metropolis, who applied raw potatoes to the purpose of fattening beasts. He prefers them to any other food within his knowledge, when their price at market is not too high, the case at present. His practice is to put up middle-sized bullocks, in October, not quite

half fat, which he makes ready for the butcher in three months, allowing, as I understood, as much hay as the beasts will eat.

Forty LAMBS eat greedily four or five bushels cut potatoes per day, in December and January, and they throve well upon them; when the potatoes scoured the lambs, a little hay amended that defect.

The Rev. Mr. Fuller, Sussex, takes up his SHEEP, (South Downs), from the after-grass, middle of November, to a yard, with a shed adjoining, and there feeds them on potatoes, with a little hay, morning and evening; until the end of February or beginning of March, when they are fit for market. The roots are cut into two or three slices, and given in troughs, under shelter. The lambs generally cost 12 to 14*s*. At two years old, fatted to nine or eleven stone, and sold at 4*s*. per stone. The internal fat of one weighed 15lb. Mr. Fuller supposes potatoes equal in fattening sheep, with corn, oil-cake, or grass.

When in p. 19, I treated as a whim, the feeding cattle with raw potatoes, the reader ought to understand my meaning to be *labouring* cattle. But although such considerable things are done, in the fattening way, with this excellent root in a raw state, I am clear the profit will always be greater, and the quality of the flesh meat superior, from the root steamed or baked; and a commodious kiln, of a reasonable price, which would bake or roast a large quantity of potatoes, is yet an object for the attention of our ingenious artists. Raw potatoes have been found to injure milch-cows, rendering their

their milk so thin, as to be unfit even for suckling. Mr. Billingsley found the water in which potatoes had been boiled, injurious to hogs. Mr. Turner proved the same by experiment.

The expences upon potatoes have generally amounted to six or seven pounds per acre, (on which, however, a considerable reduction may be made by improved culture); and if the experiments have been accurate, an acre, producing about 350 bushels, will, with a little hay daily, completely fatten three large beasts, put up with very little flesh upon them, in, from twelve to sixteen weeks, some roots being left.

CARROTS. I do not recollect any accurately detailed experiments of the use of this root, in fattening oxen and sheep; but I should suppose, from its luscious nature, one bushel a day would suffice a middling ox, and that he would be fattened with such allowance, and a small quantity of hay, in twelve or fourteen weeks. A working cart-horse will eat from a bushel to seven pecks per day, with hay; a yearling colt, a peck. The expences upon this crop, with me, have run as high as six or seven pounds per acre, from the circumstance of growing them upon land, which, having been always under the common method of tillage, was, in consequence, in a rough, cloddy state; being thoroughly pulverized, for the carrot-seed, the crop, and successions of weeds, were beyond all conception; but under the horse-hoeing husbandry, I see no reason why the culture of carrots should be more expensive than that of turnips.

No single vegetable article has employed the pens of our agricultural writers, more than this of carrots; some controversy has formerly arisen on the subject; but, since, we have had time to wax cool, it may be safely allowed, that the virtues of the root, however great, were, at first, much exaggerated to those who collected accounts for the worthiest purposes: for example, a lean porker was fattened with carrots, in ten days—horses hunted two or three times a week with them, throughout the season, equally stout as with corn; and as to labouring cart-horses, if there were any difference respecting them, between oats and carrots, it was in favour of the latter!

Having resided, in the early part of my life, in our chief carrot-county, (Suffolk), and occasionally, ever since, used those roots in feeding all kinds of domestic animals, bullocks and sheep excepted, I shall put down, impartially, what has occurred to my experience. Of the roots, (unless we may be, by and by, induced to except the mangel-wurzel), and of all our cattle-crops, carrots are the most substantial, and most nutritious, next to corn. I have invariably found this to be the case with pigs, which alone is sufficient to determine the matter, since those animals, it is well known, require the most nourishing food of all others, to fatten them, nor can that be done to any good purpose, without corn or milk. Carrots never gripe and purge, or are rejected, like potatoes, but keep the cattle in constant thrift and comfort; in this comparison, however, I must be understood as speaking of both

articles

articles raw, otherwise the question is materially changed: potatoes cooked, are unexceptionably excellent; now, carrots do not boil, at least, to advantage, their great merit lies in their being so very nutritious, and at the same time, void of all objection in a raw state.

I have given carrots to horses of every description, and the practice is perfectly familiar to me. Neither cart nor saddle-horses, although they will perform very well, whilst fed with carrots, are able to go through so much labour, or to do it with so much ease and safety to themselves, as when they are allowed corn; and the only proper application of carrots to horses, is to such as either do not work at all, or very moderately; but, should the carrots be substituted for hay instead of corn, it makes a very material difference in the question, and in many cases, such a dispensation might be advantageous in all points. If a man can maintain his cart-horses in good working-order, and good health, as many really do upon these roots, instead of oats, I have nothing farther to say, except in praise of his economy; I only insist, that the very severe labour which I have been accustomed to see horses go through, could not be endured without corn; and that I have known horses absolutely ruined by working them upon carrots, when the labour was by no means hard enough to have injured them, had they been properly fed with corn. I have little to seek on this subject, since I have, myself, sufficiently often, ridden and driven horses carrot-fed, watching their daily condition, and marking even the dew upon their coats, the heaving

ing of their flanks, and the comparative tone of their muscular exertions.

A few months since, I accidentally met with an old Suffolk carter, whom I had formerly known in that county. This man had been, in his day, a famous ploughman and foot-ball player, was born near Woodbridge, and perfectly knew the culture and customs of the sand-lands. I had a great deal of discourse with him, on the carrot and turnip-husbandry, rice-balking, paring, &c. particularly demanding of him, whether he thought carrots equal to corn for labouring horses? He quickly retorted, by the question—"Who could ever be fool enough to think of such a thing?" immediately adding, "because you know carrots loosen horses' bodies, instead of binding them, like corn." I then related to him the accounts which had been published: to which he answered—"these people know nothing at all of the matter; we who drive their horses know best about that: and do you think we are such fools as to tell them what oats we give our horses? In light work, carrots will do well enough, but better with a little corn; as to chalk-cart, and heavy work, carrots would wash a horse's guts out." He then related the case of a farmer, known to us both, with whom he lived, who ruined a team or two of capital horses, at chalk-cart, although they were full-fed with oats and beans, through the job.

The mention of this man brings me to the vile and stupid custom, of farmers permitting their ignorant and conceited servants to stuff and pamper their cart-horses, and even to quack them with drugs,

drugs, under one silly pretence or other. Many farmers are constantly suffering losses in this way, and yet are too indolent to apply an effectual remedy to an evil of such real consequence; they even wink at the crime of stealing corn, if accompanied with the pretence, that it is for the benefit of the horses, notwithstanding the folly and danger, in every point of view, of accepting such an apology. This apology has passed current, I am informed, many times before the magistrate, to the great triumph, but by no means the amendment, of the culprit.

The experienced reader, who knows that the ability to labour, in cattle, depends so materially upon bodily constriction, or tightness, will immediately fix his attention upon the jet of our carter's argument, "carrots loosen horses," and he will wonder equally with me, that a certain physician, who must so thoroughly have investigated the brute, as well as human physiology, should expect horses to labour upon a diet so loose, watery, and even debilitating, as raw potatoes. In this, and all other cases, where common-sense is palpably violated, *in limine*, or in the first instance, the pretence of experiment and utility is mere harlequinade: who does not know, that force can establish a custom, with or against the grain, and dignify it with the name of good? I remember a dragoon, who used to beat his horse with a broom-stick, until he forced him to drink: and I have heard of compelling horses, by dint of starvation, to eat raw potatoes, in spite of the gripes, scouring, staring of the coat, hollowness of the flanks, and every symptom of

of the impropriety of the food; but habit has blunted the edge of these ill effects, and the animal, for a while, makes a miserable shift. To experiments of this kind, unfounded in reason, or our general experience, I should pay little attention indeed. Should a man tell me, he had fattened hogs with saw-dust and cremor tartar, allowing them distilled vinegar, by way of wash, I should say, it was a noble and extraordinary experiment, and the more so, in that it owed no sort of obligation to reason and common-sense.

I have enlarged upon this subject, because I have known the rage of experiment, novelty, and the desire, perhaps, of attempting to sail almost in the wind's eye of economy, lead many persons into error, and some almost out of the limits of humanity. System will frequently harden the tenderest hearts. It is mean and groveling, in a country like this, teeming with such an exuberance of productions for the support of man and beast, to pinch the belly of the latter, who so dearly earns his keep; to shorten the useful term of his existence, to deteriorate even the value of his dung, for lucre of the hypothetical saving of a few shillings.

My own very slender experience, in feeding with raw potatoes, is as follows: I have given them in large quantities, with bran and wash, to large store-pigs in styes, without any good effect; also to young pigs, running the yard, with ill effect. I tried my stables round, with the same success that a certain German cultivator experienced (see Annals of Agriculture:) I could persuade only one old mare

to

to bite a raw potatoe, and she spat it out again; so horses, it seems, as well as doctors, disagree.

Carrots, by themselves, are entirely useless in the fattening of pig-stock, excepting, perhaps, in that kind of store-fattening, for market, which is also performed with clover; but for beef and mutton, perhaps, nothing is superior. In the following experiment, I hope there was no error, or misreckoning; but the crops sound immensely high, and the weekly quantity consumed by the beasts, very moderate. I should like, wonderfully, to grow such crops, and to apply them so profitably. Be the matter how it may, the account came from a most respectable clergyman, and as a cultivator, of high repute, the Rev. Mr. Onley, of Stisted, in Essex.

" Mr. Gainsborough, at his farm at Notley, next Braintree, on a similar, but fresher soil, with the same ploughing and seed, without manure, the preceding crop on a grass-lay, having too been an extraordinary crop of carrots, (of which I gave an account last year) with one nice hoeing at eleven shillings per acre, and three rough weedings, that in all, for the whole field, amounted to thirty shillings, took up from a full four acres of ploughed land, two thousand and nine hundred bushels, many of which, after being cocked in the field, (in small upright cocks, of twelve bushels each, the tops and tails cut off and laid over them, standing a month) and carted dry, were injured, probably from the state of this mild winter, in being too closely packed in a dry barn: twelve stalled bullocks, bought in October, computed to rise to thirty score each, are

are fattened with them at the allowance of *twenty-six bushels* of carrots, and *half a hundred* of hay, to the whole lot, per week. In this instance of comparison with turnips, the carrots stand as three to one; for four acres of good turnips would not fatten more than four such beasts; but this was fresh land, and the produce great." Mr. Onley had from a wheat stubble, one acre, six hundred bushels of carrots, which he believes, of all vegetable food, (meaning vegetables for cattle) to be the least laxative. In slicing a peck-full of each, the carrots exceeded the turnips, in weight, four pounds in the bushel: when perfectly dried by keeping, carrots shrink much, become less beneficial for milch, in Mr. Onley's opinion, and more profitable probably, for fattening cattle; and certainly so for horses.

To make a precise statement of the comparative worth of an acre of each of the cattle-crops, would be impossible and useless, under the various circumstances, in which they are, or can be cultivated; but with regard to those, whose land will bear them all, the appropriate merits of each of the three great leading articles, seem to stand as follows:— Carrots will go farthest in fattening, and it may be presumed, will produce the richest meat; they are also the most salubrious for store-feeding. Potatoes rank next; with the advantages of being much improved in value, by cookery. Cabbages produce great abundance of food, far inferior in quality to the two former articles, and of more limited use, since with horses, they stand as nothing; and with store-pigs, as a mere make-shift. Turnips, although

though of such general use, indubitably come in the last place, in all and every respect, standing in no degree of comparison with any article but cabbages; and to those, turnips are very inferior in quality, and upon soils equally adapted to both, and under the most advantageous culture, in quantity also. The cause of the more general culture of turnips, subsists in custom simply, or in their adaptation to poor, light soils; and no proposition can be more clear, than that the cultivator of a deep, rich loam, whatever he may gain, must always lose money, by growing either turnips or cabbages. The idea of cabbages, taken from the land, to be spent at home, drawing it; or of this crop, or the other, succeeding best after cabbages, after carrots, or after turnips, are pure agricultural badinage. The question is not, whether cabbages exhaust the soil, of the truth of which, indeed, I make no question; but, whether they pay for the exhaustion? And as to the specific merits of each, or any of these crops, towards succeeding ones, examine the whole experimental field, in the volumes of that grand repository of economical knowledge, the Annals of Agriculture, and you will find six proofs on one side the question, and half-a-dozen on the other.

I had omitted to mention in its proper place, that the culture of parsnips for cattle, is, according to my information, increasing; and that the best method is to sow them in autumn, as they receive no damage from frost. They boil in considerably less time than carrots, and, like those, are unobjectionable in their raw state.

The

The following simple and unexpensive method of STEAMING potatoes, is practised by Mr. Crook, of Tytherton, N. Wiltshire, who fattens oxen with them upon a large scale. "He takes a vessel fitted to the size of the boiler; one that is generally made use of for heating water, for washing, is sufficiently large, holding eight or ten gallons. In the bottom of this steamer, there are a number of holes, about the size of a common auger, which allow the steam to pass through the potatoes, with which the boiler is filled; the bottom where it rests on the mouth of the boiler, being made tight with a wet cloth, to secure the steam from escaping. The steamer, for ease in emptying and filling, does not hold more than from one to two bushels. The potatoes are quickly dressed, and the water draining from these, supplies the exhausting of the steam; they are then overturned into a cooler, and more put in their place: the potatoes are afterwards mixed with chopped hay and straw." (Annals of Agriculture.)

The following superior method, recommended, I believe, by the Bath Society, I have transcribed from the Phytologia. "A small boiler is set in brick-work, under a shed, so that the flame of wood or coal may pass spirally round it. It should be covered with a double lid of tin or wood, to prevent much heat from escaping; and may have a sand-joint to keep the steam in, or a little moist clay, or even a wet flannel put circularly round the cover, may answer this purpose.

"Near this furnace, is to be fixed a large barrel on one of its ends, with a cover on the other end; which

which may be occasionally opened to admit potatoes, and closed again so as to confine the steam, which is to be derived into it from the boiler, by a double pipe, one within the other, of tin, or wood, about two inches in diameter."

The reader is farther referred to p. 44, vol. 1, Board. Com. for full instructions on this interesting subject: he will there also find the difference ascertained by the most infallible token between feeding horses with raw and cooked potatoes. It is however proper for me to observe, that from what I have experienced of steaming within doors, for culinary purposes, it appears to me, to be very wasteful of fuel; on which account, were that the only one, a convenient drying, or baking kiln, is yet a desideratum.

In this method, both turnips and parsnips may also be steamed, for any particular occasion. My own practice has been to boil potatoes, and sometimes carrots with cabbages, for pigs. Two faggots and half of wood, usually boiled three bushels and half of roots, the expence full one penny per bushel, labour, and wear and tear included.

The article of potatoes affords me an opportunity of exhibiting to the reader a specimen of the real market-worth of *practical* opinions, for which I again stand obliged to the Annals of Agriculture, No. 184. The reader cannot suppose, that I mean any disrespect to the authors of such enquiries, who are engaged most usefully for the interests of their country, and for whose experience and science I have the utmost deference.

Opinions,

Opinions, entertained in different counties, on the *ameliorating quality* of potatoes:

Sussex. Wheat as good as after any other crop.

Chester. The culture (of potatoes) has a tendency to impoverish every estate on which it is introduced.

Lancaster. Wheat after them bad and feeble—exhaust greatly.

Durham. Wheat after them good and clean.

York, N. Riding. In the opinion of some they exhaust greatly, and the culture restrained.

Were I to extend these various readings upon agriculture and live-stock, (for my collections are large,) into what a field should I enter! The above, and several other examples, dispersed herein, all serve to shew, that the opinions of pretended experience are not worth the paper on which they are detailed, for that may be applied to a useful purpose. In the formation of these opinions, fortuitous and variable accidents are ever substituted for permanent principles; and it is remarkable, that those who are most ignorant of real grounds, are ever most industrious in the fabrication of fictitious ones. On any subject, beside that which is styled practical knowledge, it requires a certain share of natural logic, to form a rational proportion. I will go farther,—it is necessary to be extremely cautious, with respect to the admission even of *facts*, which are liable to distortion and variation, from prejudice, or want of care.

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But with submission, the ameliorating quality of potatoes, for reasons already assigned, seems a strange expectation, particularly when connected with the quantum of vegetable gluten, the root is supposed, by a physician, to contain. I should not marvel, if, in the course of our improvement, we find wheat, also, to possess an ameliorating quality! In the analysis of potatoes, the physician alluded to, has discovered, that they contain nearly as much gluten as wheat: and he thence concludes, that they afford nearly as much nourishment; a conclusion unfounded in just theory, and universally contradicted by fact. Vegetable glutens are, undoubtedly, various in quality, nor is weight always the true standard of the nutritive power.

ON MEADOW AND PASTURE.

This country and Ireland are justly renowned for the most verdant pastures, and the finest natural grass upon earth; our management also, at least as far as relates to the preservation of vegetables, or the hay process, is eminently superior, and has probably arrived within a very few degrees of perfection; but in other respects, and those of prior consequence, in the seeding, culture, and economical expenditure of grass, whilst growing, we are by no means so far advanced, as is evinced even by our best-managed districts. Why the culture of grass has

has been so much neglected, whilst the tillage of corn-land has been so fondly and sedulously pursued, throughout every stage of improvement, forms an important object of enquiry, an advantageous light thrown upon which, would be highly conducive to the public interest. Natural grass is an article of great consequence in our economical system, both in regard to its quality and quantity; it is a prime instrument in the production of manure, for the support of our arable lands; on it chiefly depend both the plenty and the luxury of our tables (for our epicures of most travelled taste, universally prefer a grass-fed animal), it contributes equally to the labours and pleasures of the stable.

With the exception of the clean and well-managed mowing grounds in the vicinity of the metropolis, and other large towns, and of some particular spots, in the hands of our best cultivators, meadow and pasture are generally committed to the custody of nature and blind chance, and indolently suffered to remain for ages, as a seed-bed, in which the purest grasses, and most noxious weeds are indiscriminately jumbled together; no one, from father to son, ever entertained an idea of the necessity of doing any thing farther to a pasture-field, than feeding, mowing it, and once or twice a year, shutting the gate. But this economy of labour and reflection is most unprofitable, since grass-crops will make an abundant return for judicious culture; and a farmer, who has a large feeding and mowing tract, laying in the ancient and usual condition of waste, that is, studded with ant-

ant-hills, and over-run with every thing but good grass, has within his reach an unlooked-for profit, the certain means, with well-directed exertions, and some expence, of raising a new rent. Grass, happily does not require the labour and attention, so absolutely necessary to ensure a profitable crop of corn; it is not so much in danger, from the intrusion of weeds, yet as one plant must necessarily rob another, every weed which exists, not only deprives the valuable herbage adjoining it, of part of its food and nourishment, but also stands in the place of a valuable herb; thus both the quantity and quality of the herbage, green and dry, are reduced, the progress of the cattle is checked, and the quality of their flesh rendered far inferior to that, which might be expected from the pure, and genuine gramineous production of the soil.

The source of the mischief lies in the difficulties (already explained) which generally occur, with regard to breaking up old meadow; in rooted prejudices, by which a man is led to fancy his land unfit for the production of grass, in habitual neglect, and in the difficulty of procuring good seed.

As to the first, without a power in the tenantry, of breaking-up old meadow, become unimprovable, and which hath ceased to be productive, it is in vain to look for general improvement; and in this case, if the expedient proposed, page 133, should be deemed inefficient, no doubt, but others of greater validity, might be discovered and substituted. If the breaking-up of land of this kind, in order to convert it to arable, would be attended

with great profit to a tenant, its re-laying to grass, in a clean, husband-like state, or the immediate laying down of a like number of acres, would be no less advantageous, in the end, to the landlord, from the improved condition of the new meadow; and thus the landlord, the tenant, and the public, would be equally benefitted.

The vulgar notion, that a good sward can scarcely ever be replaced, at least under a great number of years, is a mere notion, unless, indeed, with reference to the common injudicious, or rather crazed method of seeding land for grass. A farmer, having received permission to break-up a piece of old meadow, proceeds to make a tour of all the white-corn crops, oats, wheat, barley, in constant succession, until he has thoroughly exhausted the accumulated virtue of the land, and replenished it with an exhaustless crop of weeds. As he can plough no longer, with the hope of getting his expences, his remedy is to relay the ground, foul as it is; which he manages, by casting upon a rough and clodded surface, a certain number of bushels per acre, of hay-seeds, with the addition of some rye-grass, clover, and trefoil. One half of the hay-seeds never vegetate, and that portion which does, being well replenished with the seeds of all kinds of trumpery, is perfectly fitted to associate with its kindred rubbish, already so well established in the soil. Such is the origin of the greater part of our modern meadow.

But there are certain districts, on which, from long and inveterate arable habits, the farmers have actually inherited a belief, that their land

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is unfit for the production of grass!—And the notion may have undoubtedly acquired a species of confirmation, by the bungling attempts now and then made to lay it down. This whim would be very pardonable, and, in fact, harmless enough, if they made amends for their defect in meadow-grass, by a proportional quantity of the green crops. Some soils are more favourable to the growth of the natural grasses than others, some are peculiarly adapted to it; but we have no lands in England, upon which certain species of them may not be advantageously cultivated: it must yet be acknowledged, that a too great drowth in the soil, seems to indicate a preference of the artificial, to the natural grasses.

The first step towards making good meadow, is, to be well skilled in the natural grass-seeds, and to know how, and where to procure them. I doubt whether they are to be had, in any tolerable perfection, except in the northern, and eastern parts of the country; as to the hay-seeds of London, I know, by experience, they are not to be depended upon in any respect. The only method the farmer can take, with any certain prospect, is to notice that species of grass most affected by his soil, and carefully to gather the seed from a piece of old meadow, purposely left three or four weeks longer than common, or at least, long enough to become sufficiently ripe. I should not scruple the trouble of selecting the heads as they lie in the swathe; but they who desire not to be so particular, will thresh out the seed together, either in the field, or before

it shall have heated in the mow. In addition to seeds thus procured, quantities of the most valuable species will be procurable, by and by, from Messrs. Gibbs and Co. of London, at whose house I have lately seen very excellent samples, and who have, for some years, taken great and meritorious pains to collect seeds, by hand, in various parts of the country, most remarked for the production of the best grasses.

Messrs. Gibbs have particularly selected the following grasses, as fittest for laying down pastures in general, in consequence of directions received from the Board of Agriculture. *Meadow Foxtail.—Meadow Fescue.—Crested Dogs-tail.—Common Meadow-Grass. — Great Meadow-Grass. — Rough Cock's Foot.—Sweet Vernal*, being a new variety of the Rye-grass; the same, I suppose, which bears so high a character in Gloucestershire. They have also the seed of a very excellent turnip, calculated, by its shape, to throw off the wet in winter; and of the SARIDELLA, a species of tare, from a warm climate. It is proper both for green feed and hay, and cattle are fond of it; but its peculiar merit lies in its producing a crop upon the poorest lands, where scarcely any other plant will grow. It must be considered as an annual in this country, and may be sown in April, or the beginning of May.

To ensure a correct knowledge of the various species, I refer the collector to vol. 9. Bath Papers, where he will find a catalogue of all the English meadow-grasses, with very accurately engraved specimens

cimens of twelve of the most valuable, so ranked by Mr. Sole, an eminent botanist. Their names and characters are the following:

1. GREAT MEADOW-GRASS ranks first, in all respects. All cattle fond of it;—makes the best hay;—affords the richest pasture;—best meadows abound with it;—abides for ever in the ground.

2. MEADOW-FOX-TAIL. Excellent, either for pasture, or hay, and very productive;—one of the first dairy-grasses.

3. SHEEP-FESCUES, THE COMMON, AND THE FINEST. Celebrated for feeding mutton and venison—the predominant grass of downs, and the fittest for bowling-greens and lawns.

4. MEADOW FESCUE. Next in value to the Great Meadow-grass;—sweet, luxuriant, quick in growth, making rich pasture, and good hay.

5. RYE-GRASS. Well known. Although this grass runs all to bents, yet its juice is said to be so concentrated in them, as to afford greater nourishment to a horse, than twice its quantity of common hay. (This, I fear, is considerably exaggerated.) In its clean and pure state, horses are very fond of it; and it is highly favourable to their wind. It will thrive on stoney land.

6. HARDISH-FESCUE. Of delightful verdure;—affords rich pasture, the finest hay, and grows from three to four feet high.

7. COMMON MEADOW-GRASS. Useful both for pasture and hay, but apt to go off after mowing, and to suffer itself to be supplanted by other, and inferior, grasses; but manure and feeding kept it in vigour. Its radical leaves, and those of the stalk, grow

grow much longer than those of the great meadow-grass. Its usual height two feet.

8. Compressed Meadow-grass. A down-grass, and being of a dwarf species, the blade seldom exceeds two inches. It makes a fine turf, fit for parks and sheep-walks, and the flesh of animals short and sweet-flavoured.—Deer and sheep affect it.

9. Marsh Meadow-grass. A fine exuberant grass, equal, or superior, to any for the dairy;—grows every where in marshes, and over-flowed grounds;—excellent for laying down spongy grounds;—height, four or five feet;—its panic, fully blown, wonderfully fine and flowing.

10. Crested Dog's-tail. An upland and park-grass, very fine, and good both for pasture and hay.

11. Knotty Cat's-tail. A fine, exuberant, upland dairy-grass, affording great quantities of rich milk, and much relished by cows. Horses and sheep reject this, where their favourite grasses abound.

12. Sweet Spring-grass, like Rough-Cock's Foot, is always to be found in flower, in well-stocked pastures; whence it seems not be over-relished by cattle in general. Very sweet and fragrant, and affects poor sandy grounds;—proper to be sown in the ratio of one-eighth.

Out of the above catalogue, let the farmer select those species he may deem most suitable to his soil. He may, and, indeed, ought, if he aims at superior culture, to form a rich and clean seed-bed, for the grasses, of whatever extent he may judge sufficient, for

for his purpose. Thence a continual supply of pure and genuine meadow-grass seed.

Respecting the method of laying down land to seeds, I am aware, there will be a great shew of hands for sowing them with corn, brank, rape, flax, or some other crop. I am not about to deny the utility or convenience of the practice, in the common husbandry, particularly; but it has also its inconveniencies, which are obvious enough: and I have never doubted, but the readiest way to obtain a large crop of grass the first season, and an early sward, is to sow grass by itself, upon soils of all kinds. The whole *pabulum* of the soil, is then given to the grasses, the seeds have the advantage of being cast upon a fine tilth, whence few of them (if good) will miss, and the plants have nothing to retard their growth; if defended in winter, they will be strong enough in the spring, to need no farther defence.

Grass-seeds may be sowed in summer or autumn, showers being expected, after any hoeing crop, as a fine and clean tilth is required. On the approach of winter, it is highly advantageous to cover the young crop with a slight coat of manure, long yard-dung, old thatch, or even sand, or earth. It ought to be occasionally weeded, the root-weeds drawn and the patches fresh seeded; or they will be sometimes killed, by cutting them off in the summer, and applying quick-lime to the wounds. As to annuals, they are, surely, to be destroyed by a judicious use of the scythe.

Old turf ought invariably to be broken up by paring

paring and burning; and should circumstances render such a thing desirable, the land may be instantly resown with grasses, and with as fair a prospect of success, probably, as from the common method of previous corn-crops.

About three bushels of grass-seeds are the proper quantity to broad-cast upon an acre. The following quantities are assigned by Mr. Curtis, the celebrated author of the *Flora Londinensis*:—— *Meadow-Fox-tail*, and *Meadow-Fescue*, each one pint;—*Smooth and Rough-stalked Meadow*, each half-a-pint;—*Crested Dog's-tail*, and *Sweet-scented Vernal*, each, one quarter of a pint;—*Dutch Clover*, *Wild Red Clover*, (*Trifolium pratense*), or, *Broad Clover of the Shops*, half-a-pint.

Where a piece of land may want seeding immediately, and the above curious grasses are not easily attainable, the following seeds, to be had in all parts, sown upon a clean tilth, will, in a few years, make a good meadow: Broad clover, or cow-grass, or both; white clover, trefoil, rye-grass, and the soil being sufficiently dry, burnet. The clover, and rye, will produce an ample swathe for mowing, the first year or two; after which, these giving way, will be succeeded by a luxuriant crop of the white clover and trefoil, united with the natural grasses of the soil.

But no success ought to be expected in laying down wet and boggy lands, independently of the operation of draining; such, also, should be thrown into broad ridges, or beds, and be carefully water-furrowed. The description of a draining-

plough,

plough, which completely under-drained fourteen acres of pasture, in four hours, may be seen in the Bath Papers, vol. 9.

Great difficulty, I well know, has been experienced, in laying down, to profit, old worn-out arable lands. Large tracts, producing little else besides rubbish, instead of pasture, have been, from despair of success, returned to the plough. This has generally arisen from mismanagement, and the vain expectation of spontaneous crops. Such land being previously laid dry, and scrupulously clean and fine, seeded with the proper herbage, and top-dressed and dunged for two or three years, will fully recover its former fertility. A few loads per acre, of sand, or fine sandy gravel, is said to produce fine herbage.

I am about to ask a question, at which the farming reader will smile. Would it not be more profitable to drill the natural, as well as the artificial grasses? As to the latter, I make no question; and when I said it was unnecessary to drill saintfoin, I meant no more than that its broad-cast culture, in my neighbourhood, was successful. It is said, grass cannot be too thick upon the ground; but is not one hoed and cultured plant, of whatever species, far greater in bulk and weight, than an infinity of the thickly sowed? All vegetables are alike injured by a hard and baked, and benefitted by a loosened, surface. A pasture, whether of animals, or plants, being overstocked, the vegetable, or animal cattle, grazing thereon, will be weak, spindly, and defective in nutritious juices; and although more in number, will be far inferior in value, than if the quan-

quantity of food, being fairly apportioned, each individual shall have the power of drawing a sufficient portion to augment it, to its utmost capacity. There is an ancient, but a miserable reason, commonly assigned for loading the soil with seed, and covering the entire surface with plants; *to prevent the extrusion of weeds*, which, nevertheless, despitefully exist beneath, watching the first opportunity to emerge: *every supernumerary plant is a noxious weed, diminishing, in proportion to the nourishment it draws, the value of the crop.*

The true reason why LUCERN is so little cultivated upon the dry loams, the sands and chalks of England, must be acknowledged a most ridiculous one:—there is too much trouble in setting it out in rows, and cleaning it? Ten pounds per acre per annum, clear of all charges, is an insufficient recompence. This famous grass has ever stood preeminent, and at the head of all the artificial grasses; but I have sometimes suspected, that it is indebted, in no small degree, for this superiority, to its superior method of culture. Drill, and manure saintfoin, or even clover, and the difference, in point of profit, between those and lucern, if any, will at no rate be so considerable, as hath hitherto appeared. As to quality, clover agrees perfectly with all cattle; but its effect upon swine, is decisive, in point of nutrition. Of the virtues of saintfoin, whether green, or in hay, all cultivators seem agreed. Its price, in hay, is much higher than that of the best meadow-hay. Its character for the dairy stands high, both as to quantity of milk, and of butter. It would, probably, agree as well with pigs,

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as does clover, since it has been long known, by experiment, that the seed of saintfoin will fatten them.

It is, perhaps, not too much to say, generally that SAINTFOIN may be successfully cultivated upon all dry soils. I have seen it very flourishing, and attended with constant profit, upon a clayey surface, the subsoil being calcareous, through which the tap-roots of the plant draw nourishment from an immense depth. A well-known cultivator, formerly, gave an instance of the ill-success of saintfoin upon a good sandy-loam—it was a poor plant, choked with grasses. Can there be a doubt as to the cause of this failure? Not only grass, but every other plant, is peculiarly injurious to saintfoin, which succeeds infinitely best alone; and, in fact, to succeed in any eminent degree, requires precisely the lucern-culture; nor can land be too rich for saintfoin, although it thrives so well upon poor dry soils.

The seed being good, scarcely any of it will miss, but it has been sometimes sowed in so bad a state, that, perhaps, not more than one seed in ten, retained the power of vegetation. The signs of perfection are, brightness of colour in the husk, the kernel plump, and of a light grey, blue, or shining black colour. If you are suspicious, divide the kernel across the middle, and should the inside prove of a greenish, fresh colour, the seed may be depended upon; but, if a yellowish colour, and friable about the navel, and thin or shrivelled, the contrary. Six or eight gallons of seed may be drilled upon an acre; and should the

the crop appear thin at first, the farmer need not be discouraged, since those thin plants, another season, will produce double the bulk and weight of the thickly sown, having an ample pasture; and as it is probable, that plants perish at the end of a certain period, merely from defective nourishment, there is no saying to how late a period, drilled and well-manured saintfoin, might survive: it has been known, upon the continent, to last forty years. This seed, the proper depth for which is half an inch, should be lightly harrowed and rolled, always lengthwise of the drills.

I have been accustomed to see saintfoin-hay too dry, and harsh; but no herb dries to more advantage, in the shade; and I have heard of this hay stacked in a moist and milky state, when it turned out so nutritious, as to fatten sheep, and to satisfy labouring horses, without corn. When threshed successfully in the field, there is still a difficulty in preserving the seed from heating. The best method is to winnow it rough; and in the barn, to spread a layer of straw or hay, on which may be thrown a thin layer of seed, and so on, straw and seed alternately, to the heighth and breadth of six or seven feet. As many of these small stacks may be made, as wanted, and the seed will be thus preserved safe until spring. Or the crop may be stacked in the common method, with the disadvantage, however, that unless it be perfectly dry, the seed will be spoiled.

In the early period of the culture of this grass in England, improvements of vast consequence were made by it. Tull relates, that an estate in Oxford-

Oxfordshire, of one hundred and forty pounds per annum, sown with saintfoin, was sold for fourteen thousand pounds, and held its value: that a farm of ten pounds a year, ruinous to the tenant, whilst arable, being planted with this grass, was let by the owner, at one hundred and ten pounds a year, and proved a good bargain. These farms were of thin, slatey land, at only one and two shillings per acre; and yet the saintfoin they produced, would fatten oxen. The long tap-roots of this plant, where they have power to penetrate, will provide themselves a pasture, independent of the upper stratum of the soil.

But whoever desires to witness the perfection of the saintfoin-culture, must repair to Holkham, the residence of Mr. COKE, one of the greatest patriots, and most experienced cultivators of the age.

I know it is contrary to the general opinion, but I think I have sufficient reason for agreeing with those who assert, that the heaviest, and most durable crops of CLOVER, may be obtained from drilling it alone, upon well-tilled and manured land. It is a plant of great substance, and will always thrive in proportion to the richness of the soil: and where the chief aim is a great crop of this article, such ought to be the method. On good and warm soils, it may be drilled in autumn; but on the opposite, if sown late, the seed would most probably perish. In some parts, the land is supposed to be tired of clover; again, some persons have attempted, by fresh sowing, to render it perennial. I apprehend drilling

ling and manure to be the proper remedies, in either respect.

Cow-grass, or perennial clover, differing from the common red clover in little else than the solidity of the stalk, whence, it is said, cattle are in no danger of being hoven by eating it, produces a great bulk, and early, upon indifferent soils. It is, of course, much valued by those who have experienced its benefits. I have seen much of it grown, but have not observed, whether it be really inferior to the common clover, in point of nutrition, according to the received opinion. Several persons have complained of being unable to procure the genuine seed, which I believe may be always obtained in Hampshire, and Berkshire; of course, in London, from thence.

From the method of heightening the quality, and increasing the quantity of our pastures, I shall revert to what I have already hinted, of their economical expenditure. When I propose to cut all our grasses, natural and artificial, and carry them to the cattle of every kind, sheep and swine among the rest, I do not mean, that, right or wrong, conveniently or otherwise, every thing should be compulsively made to give way to this system; I only assert, and from experience, that upon it ought our general practice to be founded; and that way-wards should every farmer bend his practice, until the plan shall have become as agreeable to his convenience, as it most manifestly is, to his own and the public interest. Convenient stalls, or feeding-places, must be provided for the cattle, at home,

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or they may be foddered upon any piece of land, in want of treading and manure: sufficient assistance, also, must be kept to cut and cart, and to move the cattle about for their health-sake. I will warrant, that the extra quantity of manure thus made, will, alone, more than defray half of the extra expence.

I have practised this plan throughout the summer with milch-cows, horses, colts, young cattle, and pigs, and found them to thrive equally well as in the field; but the cows, I reckoned, missed nearly one-third of their milk, rather gaining in flesh. The late Mr. Muir's large and well-conducted experiments on stall-feeding bullocks, upon green tares, are fully decisive, as to the vast benefit of the practice, in all respects; the thrift of the cattle, the saving of seed, and the quantity of manure. But nothing can speak more home to the point, in this affair, or more powerfully to our common sense, than the following experiment from Young's Eastern Tour, vol. ii. p. 147. "Mr. Ramey begins the second week in May, to soil twenty horses with CLOVER in the stable, and continues it till the wheat-stubbles are ready to turn into; seven acres feed twenty horses, and seven cows: the latter in a house or rack-yard, but drove twice a day to water; also five calves, and as many pigs. The horses have neither corn nor hay. This, according to a moderate estimate, gives more than nine pounds per acre." On a very minute attention of this gentleman to the same quantity of stock, field-fed, by a tenant, it appeared, that the farmer's cattle had consumed thirty acres of clover at the time

Mr.

Mr. Ramey's had eaten five acres, and were yet in an inferior condition. At that rate, one acre of clover cut and carried is better than six fed. Now it is well known, that to summer-feed a cow abroad, will require two acres of good grass, besides an acre and half for her winter-provision in hay. As to wintering cattle abroad, in poachy lands, the damage may be laid at nearly one quarter of the ensuing grass crop.

The saving of dung, both in quantity and condition, must be very great, while the fields and fences are kept in the most perfect order, and the cattle preserved, in the dog-days, from a variety of accidents. It may be said, that land will not bear perpetual mowing, which, however, we know to be practised upon large tracts of all kinds of soil. I am aware of no peculiar virtue that resides in the teeth of animals; it is, doubtless, the quantum of dung which forms the object; and if you can afford to lay upon meadow more manure than the live-stock which it might support, would make, your scythe would indubitably possess more virtue than their teeth.

Little can be said in the regard of stocking and management of feeding-grounds and marshes, which must depend entirely upon local experience. As to Downs and sheep-walks, the controversy upon the breaking up of which has been rather warm, on one side, at least; I am either purblind, or there is no reason to be discovered on one side of the question. All experience has proved, (granting it necessary to prove culture superior to neglect), that downs broken up, produce, and continue to produce, twice

twice or thrice as much as when left in their natural state. But our Epicurean reasoners, are afraid of losing the fine venison flavour of the down mutton: let the downs, then, be re-layed with the proper down grasses, or inclosed as they are. Common fields possess nothing in common, with common-sense.

ON THE

NATURE AND MANAGEMENT

OF

DOMESTIC ANIMALS,

OR

LIVE STOCK.

ON

THE NATURE AND MANAGEMENT.

OF

DOMESTIC ANIMALS, &c.

IN every art and science, however various the practice, there are certain fundamental principles, which are necessarily simple and invariable, and although a passable success may be derived, from acting upon extemporaneous and seemingly convenient, but devious ideas, we must never hope to approach perfection, by resting on any other, than fundamental grounds. I mean to apply this maxim to our breeding-system, an affair of great and increasing national importance; which, it is acknowledged, as far at least as regards animals for the slaughter, has been hitherto too generally conducted, either according to the various and uncertain dictates of caprice and custom, or upon theories unfounded in truth, or general utility. Without farther prelude, or the affectation of much regularity, or scientific order, I shall proceed

ceed to develope those, which the observation and reflection of many years, have represented to me, as the true principles of the breeding and feeding science; freely submitting my sentiments to the examination of all impartial judges, and inviting the correction of those who may be possessed of superior light and information.

The preliminary step towards a real skill in cattle, is to determine the proper shape of all, and each genus and species of animals, comprehended within the scheme; and I apprehend, they being all destined to a similar purpose, one common standard will sufficiently describe the merits of the shape in all. There are certain essential points, the harbingers of health, strength, and thrift, which nature has made common to every species, a definition of which, with small unimportant variations, will indicate the true form, indifferently, of OXEN, SHEEP, or SWINE.

Some readers will, no doubt, be surprised to see this question of shape reduced within so narrow a compass; but, on examination, I flatter myself they will not be at all dissatisfied thereat. The truth is, the question, like abundance of others, which might be determined by the easiest efforts of common sense, has been painfully enveloped in impenetrable mystery; and every species of cattle has had *true* shapes, as numerous as the ever-varying attitudes of harlequin. Every county, every district, nay every individual knowing one, have had their favourite forms, which, although diametrically opposite, were all exclusively orthodox and right; and pope B. would anathemize pope C. as cordially, as though they were engaged in a religious

gious dispute! To rehearse all the favourite points, out of the pale of which, to be sure, no animal could be worth saving, would take up too much room and too much paper, during the present dearth of that article: I shall, therefore, only introduce the following marks of goodness, which I am convinced, have so much the sanction of common-sense, that, no connoisseur would venture to call the beast, fully invested with them, a bad one.

General symmetry and harmony of parts; that is to say, an equal and proportional union of length, depth, and substance;—the head not large, or long, but neatly shaped;—eyes full and clear;—neck not long, but inclining to thinness, decreasing, or tapering towards the head;—chest wide and full;—legs by no means long, fore ones straight, the shanks clean and fine;—feet even and sound, the toes turned neither in nor out;—girth deep;—back and loins straight and broad;—belly capacious, without swagging;—quarters deep and capacious, the flesh reaching down to the hocks, from which, the legs forming an angle, the feet will stand sufficiently under the loins; distance as great, at least, between the hinder as fore feet.

A very few comments on the above text, will suffice even those, who have but slightly considered the subject. Inequality of parts betokens weakness and imperfection, whereas, just and equal proportion, is the truest indication of strength, and of ability in the animal, to produce, and stand under the greatest possible load of flesh. Should there be a deficiency of length and depth, we shall not only experience a deficiency of general weight,

weight, but of lean, by far the most valuable part of the animal's flesh. Short and round animals, although quick feeders, and of hardy constitution, fail in weight, and are apt to produce entire masses of fat; and the whole body being, as it were, crowded into the form of a tun, we in vain seek that depth and substance in some of the noblest parts, which are to be found only in a well-proportioned carcase. On the other hand, the carcase being too long, denotes delicacy, inaptitude to fatten, a demand of much food, and great length of time. The loins being narrow and thin, and the feet standing too close, are both signs of weakness, and very unsightly defects. When the fore-legs approach too near, it may be presumed, from the consequent narrowness of the chest, there will not be sufficient room for the action of the lungs, during the period of fattening; and that the risk may be incurred of that common accident, their adhesion to the ribs. Sickle, or crooked hams, or the standing out too far of the hinder legs, that they appear to drag after the body, are very unfavourable indications, and of a most disgusting appearance, in any animal. Thus, whatever be the height, or size of the beast, the three grand requisites of form, are the proportional union of length, depth, and substance, which assures the inherent and desirable qualities of each. The peculiar points of each species of stock, will ever be found in a perfection, commensurate with the general good shape of the animal.

In the above detail we have been confined to the characteristics of strength and utility solely, leaving untouched

untouched the lines of beauty, which may be defined to consist chiefly in the oval form, or in the neat rounding of the parts. Thus in horses and neat cattle, particularly, instead of that excessive squareness and flatness of the shoulder, the side and the buttock, depth ought to be relieved by a gentle fulness and swell, which are the tokens both of beauty and substance; nor should there be any sharp, boney protuberances, either upon the shoulders, or hips, to offend the eye, by detracting from the plump and even proportion of the form.

Our object with cattle being simply that of fattening their carcases, it may be observed, that any strong and healthy animal, however awkwardly proportioned, will answer the purpose; which is, indeed, true; but it is no less true, and has been confirmed by all experience, that attention to form is rewarded by quantity of product. The general indications of health, in the hairy animals, when in a lean or store state, are suppleness of the skin, and gloss upon the coat: in sheep, perhaps, brightness of the eyes, liveliness, and good plight, are the only signs to be depended upon.

Animals differ essentially under the variations of soil and climate; but they are always found of the fairest stature and finest flesh, in countries abounding with herbage, and moderately warmed by the genial heat of the sun. Under the tropical heats, cattle are small, lean, and black-fleshed; there is yet an unaccountable anomaly in the case, since the most parched and barren deserts of the south, produce not only those bulky animals, camels

mels and dromedaries, but the finest and best horses upon earth.

Hills, downs, and high-lands, produce a small or middle-sized, and lively breed of animals, having small and hard bones, firm, finely-grained flesh, inclining to the wild, or venison flavour, and abounding with the celebrated black gravy. This species is obviously proper to be purchased for situations where the keep is not very abundant; and they will also thrive in good keep, to a pitch of fatness they never attain upon their native downs, and their breed is susceptible of great improvement in bone and size, but, probably, with the loss of a considerable share of the original flavour of the flesh, unless, indeed, that could be retained, by the cultivation and use of the down grasses.

Low country pastures and marshes, affording a full bite of rich and rank grass, make large, boney and fleshy cattle; their flesh, generally of a paler or more florid red, than that of upland cattle, and, the gravy fatter, and of lighter colour. Our gravy connoisseurs have not yet determined the precise cause of the difference which subsists in the colour, consistence, and flavour of the beef and mutton juices, or whether it ought to be attributed to the age, species, or food of the animal. Low-land stock is apt to over-top the mark, in point of size; its flesh to become coarse-grained and insipid, and to lose in flavour and nutritive power, as it gains in weight. It will immediately occur to all, that large and bulky animals like these, can never be supported

supported upon poor land and short pastures; but the farmer who feeds at home, or stall-feeds, enjoys the valuable privilege of being able to keep a superior kind of stock, in any part of this country.

In regard to the FLESH of animals, and its proper state for human food, I apprehend we have long been in an error, and the current of fashion still runs strong for its continuance. It is the presumption, that fat is the most valuable part of the carcase, and that a propensity to the laying on of fat, is the most, or rather the only valuable property in cattle. It is true, that the advocates for this opinion, the major part of them at least, pretend to ground it in the principles of economy solely; but even that ground, I do not scruple to assert, is untenable. The lean of flesh-meat, granting it thoroughly ripe, is not only the cheapest, most salubrious, and nourishing part of the food, but most agreeable to the palates of nine out of ten, of all mankind, poor as well as rich, the fat holding a secondary place in their estimation, to be eaten in a smaller proportion, as a sauce to relish the lean. The consequence of over-fattening an animal, (bacon-hogs excepted, and their flesh, being ripe, must ever be most valuable in proportion to depth of lean) is, that great part of the fat is either totally wasted, or sold at an inferior price, by the butcher, for tallow, and by the cook in the shape of kitchen-stuff. In truth, far too large a quantity of our famous and improved mutton, instead of being consumed by the poor, is wasted in the kitchens of the rich, to the great loss of the public, a loss which, in these times, we are not able to bear. In the lean

of

of good meat, there is not an atom wasted. Mutton, indeed, is the meat chiefly intended here, since far enough from being in the habit of over-fattening beef, our bullocks are too commonly driven to market, barely half-fat; and the poor, even in the metropolis, find difficulty in obtaining good mellow beef. The plea, that the superfluous mutton-fat is consumed by the manufacturing and peasant poor, only serves to shew how little the assertors of it are acquainted with the habits and inclinations of those descriptions of people: and were it valid, the cause would gain but little, by pretending to serve the manufacturer, often a sedentary person, with an extravagant, wasteful, and unwholesome article of food.

The above are among the objections to that form in animals, which occasions them to lay the fat on so thick and fast externally, that they deceive us with the appearance of ripeness, before they have made any progress within; and when really ripe, are converted into mere masses of blubber, like sea-calves: also against the over-fattening any animals, which is purely an ostentatious waste of food, since after the lean, from its thorough ripeness, hath ceased to grow, and the future product shall be nothing but fat, to be partly wasted, and partly sold at an inferior price, in the ordinary course of things, the profit ceases, and the balance of the account turns against all parties: the surplus-meat would have been more profitably bestowed upon another animal. The criterion of ripeness, in fattening animals, is a matter dependent upon practical circumstances: the period of time,

time, demanded by all the different species, which we usually fatten, varies between eight, twelve, and twenty-four weeks, according to the nature and size of the animals, and the quality of the meat. Milk and corn, of course, fatten the quickest, and produce the most firm and substantial flesh. I had supposed, that corn-fed beef must, necessarily possess the highest flavour, but it seems, the palm is due to the grass-fed ox. How strange does it appear, that grass, which will fatten the largest ox, will starve the smallest pig; and the circumstance fully establishes the immense worth of the artificial grasses, upon which swine thrive so wonderfully.

I ought to apprize the reader, that, in decrying the over-fattening animals, as a general practice, I by all means intend to except those which are candidates for the annual prizes; in that case, the necessity is obvious, of emulously pushing them forward to their utmost weight.

The flesh of those animals, which are from form, naturally apt to run entirely to fat, and of all those which are over-fatted, is insipid, *woolley*, and devoid of flavour and high-relish. On the other hand, our down-fed mutton is sometimes dry, harsh, and bitter; and when those small-boned animals are fattened in rich pastures, they may become too fat: that, perhaps, although the flesh of small animals is always esteemed most delicate, as that of the over-sized is coarse and rank, no mutton is equal in richness and flavour to that of a fair-sized sheep, thoroughly fed, in which there is a deep cut of lean, as well as plenty of fat to lard it. Difference of flavour, however, is by no means the most

most prominent distinction between our varieties of the same species, sameness of victuals pretty nearly levels all, in that regard: the grand distinction lies in *proof*, and there the difference is immensely in favour of form, resulting either from nature or improvement.

Individual colour of the flesh, (so to express it) intending the fair and brown, those common indications of the delicate, or insipid flavour, or of the savoury, is always natural and inherent, nowise dependent on food, and generally correspondent to the colour of the skin. But this last indication is not to be depended upon, with fattened calves. This division of colour naturally runs through the flesh of all animals, and often occurs very *mal apropos*; as for example, when flesh of the savoury class chances to be white, and that of the delicate, brown; when we get black veal, and white beef; strong, dark chicken, and white insipid, chickeny duck: the defect, constitutional as it is, appears to admit no remedy, since a pair of animals, perfectly alike in colour, external and internal, will frequently produce young, intirely dissimilar to their parents, in either or both respects. Some years since, there was a great deal of beef in the North, of a colour almost black, coarse in the grain, flabby, and barely eatable: I know not whether that defect was natural or acquired, but have good grounds for believing, that yellow mutton is so made by disease; such sheep are, probably, convalescents from the rot. Ill colour and flavour may also be derived from food; I have even known these defects epidemic, during some seasons, from whatever

whatever cause; the fat of the beef, mutton, and pork, unusually white, the flesh hard, and of a peculiarly disagreeable scent and flavor, resembling, if I could compare it to any thing, those of fennel. The characters of good flesh, living or dead, are a waxey firmness, elasticity, and mellowness, which admit not the idea of hard, or harsh.

THE DISTINCTIVE QUALITIES of animals, generic or specific, are, doubtless, in certain essentials, unchangeable and everlasting. As to those of genus, there is no question; it is now too late in the day, to cram a man to the degree of inducing him to believe, that a horse, by virtue of short and poor herbage, may be degenerated into an ass, and in due time acquire a swinging pair of characteristic ears, and an harmonious bray: but respecting the specific distinctions, or those which subsist in the different species of the same kind, people have not so well made up their mind. On this head, I recollect with pleasure, the many amicable sparrings I have had, with an ingenious and intelligent friend, who has occasionally sent West-country boars and sows into Essex and Suffolk, the produce of which have invariably become completely Essexized and Suffolkized, in a few years. Nor can I yet persuade my friend, that an inter-copulation with the Essex and Suffolk stock, rather than any influence of soil and climate, has effected this miracle. Dependence on the care of the good folks of the country, to keep the boars and sows from intermixture, through a considerable length of time, is no very strong ground of argument.

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There is yet no doubt, but that food and climate operate considerable changes in the animal constitution, chiefly, perhaps, in respect of weight, colour, and temperament; but there are certain of nature's land-marks, which can never be removed by any change of place or diet: a breed of short-horned neat cattle, will never become long-horned; polled cattle will never acquire horns, nor horned cattle become polled; the essential distinction between the blood-horse, and the horse without blood, although their size and weight be nearly equalized, can never change; nor will a true-bred, lop-eared pig, ever become prick-eared, to the end of time. These are the pure *dicta* of experience, which every one may trace; and those infinite changes, varieties, and sub-varieties, which we daily witness, are the pure effects of a mixture of breeds and nothing else. Men are misled on this question, as on most others, by confining their researches to the superficies. By way of illustration—attempts are made to introduce a variety into the animals of a district, this is, of course, begun upon a small scale; perhaps, after a while, that the novelty of the thing is over, the pursuit is discontinued, and the new variety, being small in number, is soon blended, and the traces of it lost in the general mass. The loss is always attributed to the soil, which, in time, it is taken for granted, converts all animals into its own peculiar breed, instead of the real agent in the business, an insufficient quantity of the new variety, to complete the intended change. For example, Shropshire produces

duces large, boney, lop-eared pigs; Suffolk, small, prick-eared ones; make a complete change in each county, to the last individual, substituting the one for the other, and persevering in it: in fifty years' time, the Suffolk-men would not believe that their county had ever produced a small, delicate, and prick-eared pig. Even the natural characters of great and small, in size, will always remain visibly distinct and unalterable, although the one species may be, in degree, debased from their original standard, by inferior, and the other proportionally exalted above it, by superior keep. The flesh of females is generally supposed less savoury and nutritious, than that of males; with respect to those females which have bred, I doubt not the fact; and if we were to fatten cows, without previously having them bulled, (a method often enough successfully practised, both here and in Ireland), the public, I believe, would be great gainers, both in the quantity and quality of the beef: the butchers' common reasonings on this head, seem inconclusive, and merely *ex parte* of the custom.

SIZE, as well as quality, in animals, is admirably varied by nature, and thence adopted to all possible circumstances of locality and human convenience. Largeness of size, in the species, which assures *growth*, a technical term to denote that increase and spread of solid flesh, independent of mere fat, and which may be said to be given gratis by nature, is, beyond all doubt, the grand medium of weight and abundance, granting the quality to be coarse: smallness, contrarywise, if it produce delicate meat, ever falls short in aggregate weight

and quantity. The best practical proof of this is, that the former can always be afforded at considerably less money per pound. The larger species being equally well-shaped with the smaller, and brought to perfection, it is evident, will always pay by their superior weight, for a superior quantity of food, and longer time, if feeding at all be profitable. If you put up to fatten a small-boned, tortoise-shaped animal, you acquire nothing but fat, for your good meat; nature affords you no *growth*, and the carcase, when ripe, perhaps possesses not a larger quantity of solid lean flesh, than when in its store state; but with a creature which has sufficient frame and bone, or room enough to work upon, you are rewarded with ample weight of the most valuable flesh, as well as with a sufficient quantity of sauce to it, in the shape of fat. To what purpose call out about the greater weight of bone and offal, if those be amply compensated by the superior quantity of flesh, more wholesome, more palatable, less subject to waste, and worth more per pound than fat?—And what if these advantages are not to be obtained (as they surely are not) independently of sufficient size of bone, and capaciousness of frame? The circumstance of waiting longer for the return, only simply amounts to this, we must ever pay the price of a good thing, our only concern being, that the goodness of the commodity, and the price, hold due proportion.

But the circumstance most in favour of feeding large stock, has not yet been noted, which is, that the rule is by no means general, or to be depended upon, that small animals require a sustenance proportionally

portionally small. The quantum of food required, depends on such a variety of accidents, of age, form, and constitution, that it may sometimes, and does really often happen, that animals of an under size, will require as much meat, and nearly as much time, as those which are larger. This has been proved by a number of experiments, particularly by those of Mr. Billingsley, on the feeding of hogs; and I have, myself, frequently found two styes of hogs to consume each a like quantity of food, although one of them, from inferiority of size, has made between twenty and thirty shillings per head less in price than the other. It is not always the quantity eaten which determines this matter, in which the strength of the digestive faculty is a prime agent; and I believe width and substance in the loins, may be in general considered as a token of great powers of digestion. It may sometimes happen, that a large species shall consume less than their proportion, which assures their superiority beyond all doubt.

Thus much on the question of size generally; and to generalize still farther, although in practice, local circumstances may require this or that particular size, we may, perhaps, safely assert, that an animal of middle-sized bone and frame, thorough-shaped, is most likely to combine all the valuable properties of each, and to subserve most the public, as well as private interest. Small and delicate animals, as well as very young ones, for the slaughter, minister rather to luxury, than plenty; and where uncontroulable circumstances relative to keep, or the state of the markets, require a small

species, those are most valuable, which carry their substance in a deep, rather than too round a form, since, in the latter extreme, the fat will be out of all proportion to the lean. The convenient size of joints, is certainly a great recommendation of small cattle, yet the price must be considerably enhanced to the consumer; and even with the aid of this extra price, and the superior number of individuals, which ought to be kept in proportion, I doubt whether the feeder be generally so well paid by small, as by sized stock.

In treating of IMPROVEMENT, it is necessary to determine the precise signification of the term; it is, then, simply to restore the degenerated animal to nature's pristine, purest model. The animal frame is subject to degeneration, whether in the wild or domestic state; and demands, as well as every other worldly object, the constant care and culture of man. In a state of nature, or one bordering upon it, the most common deterioration of beasts is that of a dwindling, or diminution in size, the forms remaining pretty near the original model; but in the domesticated state, they are more apt, for a variety of reasons, to degenerate in point of form, and to run through all sorts of irregular and disadvantageous shapes:—for instance, to coarse, heavy heads and necks, small sunken eyes, narrow shoulders, loins, and quarters, crooked hams, coarseness of flesh and bone, inordinate length of leg, or carcase. The truest models of perfect form, from some of which I have, I hope, with sufficient accuracy, drawn my rules, are to be found upon our own island, celebrated, from the earliest

earliest times, for the superior excellence, as well as abundance, of its flocks and herds; and equally so, in latter times, for renovation and improvement from foreign sources. In that other genus of animals, next in the order of utility, in horses of every species, our superiority over all the world, is equally unquestionable; we have even surpassed in elegance, symmetry, and speed, as well as in substance, the beautiful originals of the desert. Possessed of such ample means, of a soil so peculiarly adapted to the growth and improvement of cattle, of immense wastes courting cultivation, of an annually increasing population, assuring a never-failing market, and certain recompence, we must be extremely indolent, or extremely unfortunate, if those excellent and productive forms, which are at present confined to certain species, or individuals of cattle, are not, in course of a few years, communicated to the aggregate body of the live stock of the country.

The grand maxim of improvement in the animal frame is, (in the popular phrase) that *like produces like*; and although objections have been started to this principle, on the score of certain casual failures, yet such will always be found mere exceptions to a general rule, which according to the scheme of nature, do but partially detract from its general utility. The first business of one then, who aims at the highest style of improvement, is, to select thorough-shaped males and females, from the most celebrated stock in the country, of that genus of animals of which he intends to become a breeder. These, with their progeny, must be maintained

tained with a constant sufficient quantity of wholesome food, without ever being suffered, from defect in that respect, to sink in condition, throughout both summer and winter, enjoying, during the latter season, the most ample comforts of a good warm straw-yard, or shed. A thorough-shaped male must always be retained, or the females sent to such an one; of the young stock, females of the truest form should be preserved, or the desired number kept up from the original source. Every defect should be watched, (and some must remain even with the most successful and discerning breeder), in order to an attempt at its amendment in the next generation, which will be effected by pairing the faulty individual with one of the other sex, free from the blemish in question. This is the whole secret of breeding cattle to ultimate perfection; and I believe it is a secret of nature's own telling: whether she made the late justly celebrated ROBERT BAKEWELL her confidant in the business, or some other before him, of obscurer fame, I have not been able hitherto to discover.

Much has been written and said, but not always understood, of CROSSING the breeds of animals, with the view of improvement. The rationality of the matter, I have before stated to stand thus:—If you have the best-shaped breed, you can obtain no advantage, but may very probably lose ground by crossing; and as to breeding in and in, or from the nearest affinities, prejudice alone has degraded it, uninterrupted experience has proved its success. If you set off right, feed well, and care-

carefully select your best-shaped males and females, for procreation, observing all the needful rules, you may breed from your own stock only, with increasing success, to the end of the chapter. The reason why the cattle of persons breeding from their own stock alone, have, in process of time, degenerated in size and shape, running away to legs, and becoming spiry, has subsisted in their ignorance and inattention merely; having a male or a female at hand, although of the most beggarly form, such have been made use of for breeding, rather than incur the trouble of sending to the adjoining parish, or farm, for a proper cross.

The term *blood* has been transplanted from the horse-course to the grazing-ground; and with no sort of impropriety, since it means natural and inherent qualities in a species, exhibited in certain external and visible signs; it can, however, never be of that peculiar use in this, as in the former case, because equality of shape and size levels pretty nearly, in value, all the varieties of a species of eatable stock; but no horse, whatever may be his shape, can be fit for the purposes of the turf, unless his blood be pure and unmixed.

In every species, however pure the blood, or regular the characteristics, nature, ever delighting in variety, has established this original diversity of form.—Some individuals will run more to length and depth, others to shortness and rotundity: these modes of form, are, besides, the distinguishing marks of entire species. Such are the breeder's means of improvement, the tools with which he must work. By mixing the extremes of long and

short

short in his own stock, he will preserve a proper medium form. Should his case require external assistance, and a cross, he will obtain hardiness, and aptitude to fatten, from the short and round breeds, fineness and delicacy of flesh, from the small; and an addition of size and weight, from the long and deep. The most common breed, by a strict adherence to the proper rules, may be considerably improved, from its own resources alone, and a valuable variety, perhaps, obtained.

Notwithstanding the superior form of our own stock, in most respects, it is not at all improbable, but advantages may yet be derived, from occasional crosses, or by the introduction of new species, or even new *genera* of animals. Some of our cattle running away too much to size, or to sponginess of bone, and coarseness of flesh, from extreme rankness of pasture, or other causes, may be ameliorated and restored, by imparting to them a portion of that fineness and solidity of bone, and delicacy of flesh inherent in the southern animal. We want speed in the labouring ox;—Would not that essential be obtained, and without injury to the beef, by coupling our cows, intended to breed for the collar, with the American buffalo, which, I am assured, will walk five miles in an hour? If my information be correct, His Grace the Duke of Norfolk is in possession of one of these animals, and will, no doubt, make this breeding experiment, for the good of the country. According to Dr. Anderson, a sound theorist on the subject of cattle, it is not a vain speculation, that some wool-bearing animals, intirely new to this country, may yet be obtained,

obtained, by a diligent research, in various parts, to the great probable advancement of our manufacturing interest; and as the strongest possible encouragement to every suggestion of this kind, it ought to be remembered, that almost all foreign animals, even the natives of the most sultry climes, thrive to admiration, and improve in their progeny, upon the fruitful soil of this country; good winter care bestowed, the risk with them is reduced to almost nothing.

Having discussed the general means of improvement, it is time to advert to the actual state of it in the country; and, with the utmost pleasure, I can aver it to be proceeding in the fairest train. When such great and good men, as the Duke of Bedford, Lord Egremont and Mr. Coke, the pride and honour of their country, and possessing the love and veneration of their countrymen, independently of the silly and odious distinctions of party, sedulously attempt an object, of which they, of all mankind, are the most practised judges, they cannot ultimately fail. Nothing can be more judicious, than the method taken by these noble and honourable improvers, to excite an emulation in the country, the good effects of which have been fully apparent in the fine samples of stock, produced at the various cattle-shews. This patriotic business, in all its branches, seems to be conducted upon a plan truly enlightened; all ideas of prejudice are excluded, and the fair comparative experiments, which are constantly proceeding, will soon determine those questions of specific merit, in which both the farmer and the public are so highly interested.

The

The business of keeping live-stock, naturally divides itself into three branches, BREEDING, STORE-FEEDING, and FATTENING; and the choice of these must generally depend upon local circumstances; but where a man is free to chuse, the matter ought to depend upon calculation, proved by experience. A man who has not much sensibility for brute creatures, and shrinks at the idea of trouble with them, will always be able to buy cheaper and better than he can breed: but judicious breeding will always pay; it affords the breeders profit, the chance of improvement, and the advantage, in respect to fattening, that animals will generally prove quickest and best, upon the spot on which they were bred. Cautions have ever been given against breeding from animals too young; and in order to obtain good stock, and for the safety of the individuals themselves, it is recommended to decline the first indications of nature. This advice may be very sound, in a general view; I have, however, often seen the earliest progeny of a female, superior to any of the succeeding, and it is prudent to lose no time. Much depends on good keep, from the very birth of the animal. The caution is of most consequence, as it respects the male, which should be never, or sparingly used, in this way, until arrived at a state of maturity. The system of cutting green meat, is of vast consequence in breeding; and granting room for a range, stock may be advantageously bred any where, within twenty miles of the metropolis. The old notion of breeding counties, in its vulgar acceptation, is laughable indeed. Store-feeding is attended with the least risk,

risk, and generally pays; but the dung will always be inferior. Fattening will often render no other profit, than a market-price, at home, for the product consumed, together with the dung; and such may, in the case of a demand for manure, be a great profit. In most situations it is proper, and indeed usual, to unite these plans, keeping the different kinds of stock, but most largely of those, to which the soil is chiefly adapted.

Since the publication of this work, I have received applications from friends in various parts of the country, and in the metropolis, on certain very interesting points of the subject of live stock; I shall here endeavour to speak to these according to the best of my knowledge, and with the utmost impartiality, without intending the smallest disrespect to the honourable society of improvers, of whose patriotism and good intentions I entertain the highest opinion.

My London correspondents (including butchers) are universally against the practice of fattening animals to excess, urging, that it is in a high degree inimical to the interests of every party concerned. Of this I have already spoken sufficiently.

Some persons express a doubt, whether any improvement at all has really been effected in the form, or size of our domestic animals, horses excepted; on their side of the question, they adduce the examples of the species in different counties, which retaining their original form, are yet the prime stock of this country. This idea, in my sense, is carried full far; I will nevertheless acknowledge, that the chief merit of improvement has consisted

in

in emulation, and in promoting the practice of breeding and feeding, by rendering it fashionable. Although some unnatural, and consequently inutile changes have been wrought, it must be allowed beneficial ones also have been compassed, probably by a reproduction of the original form of the animal.

Not a few in the country, look on the proceedings of the cattle societies with an envious eye. They say, they can neither attend such meetings, nor otherwise obtain the smallest benefit from them: they pretend, they have hired males at high prices, to no sort of use, and have purchased store-stock of improvers at an enormous price, without having their expectations proportionally answered. There are probably some degrees of jealousy and prejudice in this: however,

To persons of this description, ambitious yet of equalling the improved stock, the following seems to me, the proper track: let them procure the best stock of every species, from those counties where improvement, at least, change, has not been hitherto held necessary; I warrant, they will have no need to be ashamed of a comparison with their neighbours, however deep in improvement. To begin with beef, what feeder is so extravagant in his expectations, as not to be content with the return made by our prime Devons, Herefords, Sussex, Welsh, and Scots? As to milk and procreation, the Bakewellian improvement, it is sufficiently notorious, has been ever inimical in that view; as an extreme, and almost exclusive tendency to pinguefaction must ever prove. For mutton, I know of no chance for profit equal to that which may be rationally

rationally expected from our Lincolns, Gloucesters, Dorsets, South-Downs, and Herefords.

The best pigs of Hereford, Oxford, and Buckinghamshire, the former for bacon, the two latter for pork, seem to me to approach very near perfection; the former would, however, be improved in beauty, by the short Berkshire head and ear. I have lately taken some pains to enquire into the date of that change in the Berkshire breed, by the introduction of the short species, commonly called in that county, the *pug, or pompey:* the cross first took place, if my information be correct, about sixty or seventy years since, and not with original Portugal or China, as has been generally supposed, but, with stock from the West India islands. This latter, represented as the best pork in the world, has thus been the basis, of the no less celebrated pork of Oxfordshire. The Rudgewick hogs of Surrey, mentioned by Mr. Middleton, I have seen alive and dead. They are a mongrel breed, no otherwise remarkable for their high weights, than as corn fattened, and having large bone. They appear to me to be good hard stock, and to have great depth of form. It is probable they have originated in a mixture of the North-west stock, with the large white *tunky* breed.

It is an old and interesting question, how to obtain, from a considerable distance, at a fair market rate, the best stock of the breeding counties. In Mr. Marshal's books, I think the farmer is somewhere advised always to go himself into those counties to purchase his own stock, and even to attend the London market as his own salesman. The advice

vice is plausible, and I have frequently tried it; and being unwilling to discourage enterprize, I would wish others to make the trial, and find out the objections at their leisure. For myself, I am fully convinced that an honest middle man, or salesman, can do much better at market for either purchaser or seller than they can do for themselves, and that it is highly for the interest of farmers and improvers, to rear and encourage a breed of this kind. As to the generality of the present race of jobbers, I am sorry to be compelled by experience to say, they scorn to concede the palm, for certain accomplishments, even to the fraternity of the bridle.

I have not room, nor do I stand engaged to say any thing of cattle-medicine, although not altogether unprepared for the task. A word or two of the best advice on the subject in my power to give, is heartily at the service of the country. The best medicine for all cattle, is *prevention*; for setting aside a few acute cases, the doctoring of numerous patients of this kind, is, at best, a tedious and uncertain business. Animals living in a natural state, and on simple food, regularly and equally dispensed, would enjoy constant health; their disorders are generally brought on by our irregularity of feeding, and improper treatment: it is our interest to obviate these causes of disease, in the first instance; but when disease is already incurred, if timely discovered, it will gradually give way to a course, opposite to that which produced it, joined to a regimen and diet proper in the case. In all weak cases, during the winter-season, particularly, dry and comfortable provender, and

good

good lodging, are the true specifics:—In those of a redundance of the blood and humours, timely bleedings, with cooling salts. In wounds, exclude the air, and use turpentines and spirits, avoiding the old-fashioned, greasy applications. Nothing can be more ridiculous, than the common running after this or that nostrum, for the cure of incurable diseases, excepting the brother-folly of supposing a sow-gelder, or indeed any illiterate person, can possibly ever qualify himself to practise medicine. Where much stock is kept, the farmer should always, if possible, make interest with his family-surgeon, and induce him to prescribe for his out-door family. A medical gentleman, who will be at the pains to turn over some of our best veterinary treatises, (and the analogy between horses and the other animals, is sufficiently close), after a few practical essays, will not find himself much at a loss in the stable. In the operative branch, he should employ a cow-leach, or farrier, to act under his directions.

ON THE HORSE.

The mare may be put to the horse, any time in the spring, or the season may be extended, perhaps, to the middle of July, but no later: She is said, by Buffon, to go eleven months, and some odd days, but by the following extract, from my memorandums, this will appear to be a very uncertain matter, and to require vigilance:—" Brown Marske Mare, took the horse April 30, 1788, dropped a colt foal, April 28, 1789.—Horse, July 10, 1789; colt

colt foal, June 11, 1790.—Horse, June 21, 1790; colt foal, May 31, 1791."

All pregnant animals should be well kept, nor should the mare, in that state, know any but moderate labour, or be put to any quick exertions. If any error of that kind shall have been committed, and abortion appear probable, immediate rest, and warming mashes, may prove a remedy. Labour should not be continued too near the time of foaling. Signs of its approach; flaccidity, or looseness of the bag, decrease in the size of the belly, tail standing out, swelling of the parts, discharge. Attend the mare in a well-sheltered place. Water-gruel, with ale and spice, or cordial-ball, boiled barley, &c. in case of weakness, or defect of milk.

In a few weeks, cut a handful, or upwards, from the foal's dock, with any sharp knife, to spare after-expence and danger. In case of gripes and wind, give warm bran mashes, or a small ball of rhubarb and magnesia, equal quantities. Geld at any convenient period, previous to breaking. Wean before November. Feed, all winter, with a little corn twice a day, or carrots, with hay, oat-straw, &c. allowing a well-littered shed, or warm straw-yard. Colts fed at home with green meat, cut during summer, should have a daily range on a common, or elsewhere, for exercise. YEARLINGS to be carefully kept separate from the milch mares.

CART-COLTS are taken into hand, at two years old: and it ought ever to be made a point, *to teach them to back, and to go in the shafts.* SADDLE-COLTS may be broke at three years old, or the autumn pre-

preceding; and it is of the utmost consequence to give them a good mouth, although some persons affect to slight it. Learn them to canter handsomely, and if of sufficient size, they may be put to plough, the labour not being hard. Being quiet in harness, and good canterers, may greatly add to their value.

It is advantageous, to mix one-fourth of good straw, with the green meat given to labouring horses, or, indeed, any cattle, in summer; their work being hard, hay would be preferable to straw. For hard-meat, clover-hay cut into chaff, instead of straw, renders less corn necessary. A cart-horse labouring hard, will require more than a peck of oats per day, with the addition of nearly one-fourth well-dried beans. My Lord Pembroke experienced a vast saving, by breaking the corn for horses, a practice which Parkinson, of Doncaster, as strongly condemns, upon experience also. There is, certainly, a possibility, that horses finding their meat ready broken, may swallow it greedily, without taking the trouble of mastication; and the meat, not being pressed or divided into sufficiently minute parts, to assimilate with the juices of the stomach, may pass unconcocted and crude, without imparting its due quantity of nourishment to the animal. I have, however, used ground corn for horses, many years, never observing any ill effects, but always taking for granted the good ones usually attributed to the practice.

The heels, legs, bend of the knee, and hock, the twist, under the flanks: in short, all the parts out of sight, of CART-HORSES, whilst standing in, should

be kept perfectly free from dirt and scurf, and the skin supple; the parts more in sight *will take care of themselves*. In a deep country, it is much the better practice, notwithstanding the prejudice to the contrary, to trim their legs, coach-horse fashion. The number kept being considerable, it will pay to employ an odd man, or horse-keeper, to a certain number.

Never suffer a pretended-knowing carter to doctor horses, or to give them specifics for making their coats fine:—Nip all such mischiefs in the bud. Suffer not a parcel of silly fellows to strain the cart-horses to pieces at *dead-pulls*;—keep their vigour for useful purposes. Many very excellent horses neither will, nor have it in their power, *from certain concealed natural defects*, to draw dead-pulls; this hint is given from long experience, and from having often witnessed, indeed practised, much shameful and useless cruelty in that way.

The coarse garbage, with which farm-horses are commonly stuffed, profitably, or otherwise, is the real cause of the frequent occurrence among them, of blindness, grease, and cholic, more particularly the last, which, with care, might be prevented from happening so frequently. The remedy lies in physic, once or twice a year; either the regular aloetic dose, or salts given in pails of warm water, or sulphur and cremor-tartar, one third of the latter mixed in the corn. All horses kept in the stable, become, more or less, internally loaded; and it is an error to suppose cart-horses are not equally benefitted with others, by purging physic.

Attend

Attend to the late improved practice of SHOEING, suffer not the blacksmith to cut any thing, excepting that which is loose and rotten, from the sole, bars, and frog, of your horse's foot;—these are the defence nature has given to the feet, and labour will wear it down full fast. The foot preserved strong and sound, will require less iron, and smaller nails. It is a great advantage, when a horse can go upon his frogs, that is to say, when he can bear them to touch the ground, at every tread.

Our first-rate draft-horses, bred chiefly in the midland counties, and in Lincolnshire, are, from their weight, and want of speed, extremely unfit for farming purposes. The Suffolks are the best for that business, upon the island, be the soil and situation what it may; and a farmer cannot do better than supply himself at first from thence, afterwards amending any defect he may perceive in the breed, at his leisure. Chief points in a farming cart-horse: —*Neck not long, nor too thick;—short legs, rather flat than round and gummy;—fore-feet even, not too distant;—wide chest;—strong, but not high shoulders;—considerable length of waist, supported by a wide loin;—quarters full, and rather raised;—strong, muscular thigh;—size, fifteen, one inch, to sixteen hands high.* Being somewhat fore-low, gives them an advantage in draught; and a moderate length of waist, assures speed in the walk, very often an object of consequence, upon a farm. Care being taken to breed their heads light, handsome, and well set on, the stallions, or mares, with a proper cross, may produce high-priced coach, or cavalry horses.

To raise a BREED of the above description, for sale, would pay exceedingly well, beyond all doubt. *To breed a good horse, costs no more, except of skill, than to breed a bad one:*—but what a difference in the market-price! CART-COLTS are ready for sale very early, as every one knows. COACH-HORSES may be made from mares of the species just described, covered by a strong racer or hunter, or *vice versa*. Should a farmer desire to breed chapmens horses, or hacks, for sale, he will succeed best, by chusing both mare and horse of the fashionable hackney kind, that is to say, each having some blood; it is preferable to his having recourse to a thorough-bred horse, for reasons I have not room to detail. Breed them with *light heads, well set on; good feet and even, close before, wide behind; plenty of bone under the knee, and high, deep, and slanting shoulders; deep in the girth, handsomely rounded in the barrel, and on the hip-bones; straight in the back, but the waist long enough to give speed, with the loins and fillets strong in proportion; tail level with the back-bone.* Instead of breeding, a farmer, who desires to profit by this kind of stock, may always find colts and fillies enough for his money.

Let no man put his MARE to a HORSE, that has, the same day, covered a great many, or is known to have lately had too much work. This piece of good old advice, I well know is generally laughed at, but surely common-sense will make it plain, that there is a point, beyond which the animal powers cannot successfully go, in this case, as well as all others: the ricketty foals, that I have so often seen, *to me*, clearly prove the position.

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The AGE of a horse, is well known to be indicated by a cavity in the corner-teeth, bearing a black spot or mark, like the eye of a bean, which appears at four years and half old, and vanishes at seven years and half, the cavity being then filled up, and the horse's age no longer determinable with certainty. The horse has forty teeth; twenty-four double-teeth, or grinders, twelve front-teeth, or gatherers, and four tushes, or single teeth. Mares seldom have any tushes. The colt, or the juvenile teeth, are short, round, and white, making their appearance in a few weeks, and at a period between two and three years old, begin to fall, and to be replaced by horses teeth, with which the mouth of the animal is completely filled at five years of age.

To treat much at large on the subject of the horse, a very extensive one, will not be expected in a work of this kind; the few general ideas, already detailed, it is hoped, will suffice; to which, I must beg permission to add, that men are sometimes in the habit of making great mistakes, as to the value of animals of this species, which they have bred; at one while asking a considerable price for little or no merit, at another, selling a valuable and marketable nag for a mere trifle. I would recommend to all such, and indeed to all breeders, to provide themselves with a good general modern Treatise on Horses.

NEAT CATTLE.

The Cow goes with young nine months and a few days, to a fortnight over, seldom producing more than one calf; she will breed indifferently at any season, but some are very backward, and difficult in taking the bull, arising, probably, in the great exhaustion suffered by nature in a constant copious flow of milk, and from insufficient, or irregularly dispensed, keep. In this case, the cow's heat should be particularly marked where a bull is not constantly with her, as it may cease in a very short time, and the owner be disappointed.

It is infinitely safer and better, to provide all the domestic animals with shelter, at the critical time of parturition; and in truth, it is rank nonsense to talk, in the vulgar style, of such practice rendering them delicate and tender, since the reverse precisely is the fact. Colds, caught at calving, are the occasion of a number of disorders, which are seen to affect cows, particularly the retention of the cleaning, and the hoose or consumptive cough. In the latter case, warm, generous keep, mashes, ale, with cordial-ball, &c. The former is often attended with much difficulty.—Keep as above, currying and brushing twice a day, the cow being sucked dry, not milked, and walked about. Give as follows, three successive mornings, fasting, in three pints of strong decoction of juniper-berries and penny-royal, sweetened with honey—*Elixir Proprietatis*, compound tincture of Castor,

for, and *Spiritus Volatilis Aromaticus*, of each a table-spoonful, or more. The beast being costive, add to one of the drinks, a single drachm or two of the finest aloes in powder: repeat as needful.

The cow, brought to a safe place at the ninth month, will be in a way to receive any assistance, of which nature may stand in need. In difficulty of calving, help should be administered before the animal be exhausted, still not rashly or hastily, and always by an experienced person. As great force is sometimes required, extraction should not be attempted, until the calf be turned into the most favourable position which circumstances will admit. The YORKSHIRE SHORT-HORNED Cows are most subject, I believe, of any other, to difficulties of this kind, from the great size and squareness of shoulder in their calves; and on this account, it has been said in that country, that they care not, how low a cow may be, provided she be well-fed a fortnight before calving, as being low in flesh, she will have more room, and the calf be ejected with greater facility: a conclusion by no means to be depended on in my opinion; for the animal being low in condition and strength, her throes, at bringing forth, will be proportionably weak and languid, than which there cannot be a more unfortunate circumstance, or more likely to retard a difficult birth. The cases of this kind, which have come under my notice, have been chiefly with cows poorly kept, or recently harassed about in driving. After a difficult and exhausting labour, good beer-cordial, fine hay, corn, pollard, or malt-mashes, warm water, &c.

REARING

REARING neat cattle is not worth while, in a common way of business; it may pay those who have large tracts of land, which they cannot apply to a more profitable purpose, as also the respectable class of IMPROVERS. Much ink has been shed on the subject of the most advantageous method of WEANING CALVES: and although it be true, that discussion ever tends to elucidate and inform, yet I must own, I ever thought the reason of the thing to lie in a mighty small compass.

If you aim at capital stock, you must go to the price of it; in other words, you must afford the calves nature's full allowance of new milk, until they become able to graze, in the same way as horses, and other animals, are treated. Your repayment will consist in superior size and beauty, earlier tendency to breed and fatten, and more nutritious flesh. Granting the breeder expend twenty shillings, or five crowns extra, in new milk, and is afterwards repaid three or four pounds, in beef, I cannot discover, that either he, or the public, are sufferers by having acted right. The next method in point of profit, (I mean the profit of obtaining good stock), is, to make use of skimmed-milk, ameliorated, or rendered substantial with flour, or oatmeal: the last, or supposed plan of economy is, to depend upon linseed, hay-tea, &c. for which we have various receipts; the best, in my opinion, is that of his Grace the Duke of Northumberland.

It is a good and convenient plan, to bring up calves under a step-mother; an old cow, with a tolerable stock of milk, will suckle two calves, or more, either turned off with her, or at home, keeping

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ing them in good condition, until they are old enough to shift: they ought to suck the first of their mother's milk, for two or three days, although many are weaned, without ever being suffered to suck at all. Calves, whether rearing or fattening, should, also, always suck before milking, the cow being milked afterwards, as the first and thinnest of the milk is sufficiently rich. Old milk will, perhaps, scour a very young calf; but the effect will go off without any ill consequences.

The last calves I reared, I made use of skimmed milk, and second flour, sometimes oatmeal. Began the first week in March. They were of the large, short-horned breed, and consumed daily, at three meals, three quarters of a pound of flour each, boiled up in skimmed milk; it required the milk of more than two ordinary cows, to supply two calves. In a few weeks, they began to eat fine rowen, to which they were at first tempted, by its being made up into twists or bands. Flour omitted 14th May: milk, in part, June 1: totally, June 8, when they were turned into good grass. They were kept in part of a spare barn, at first, afterwards running out and in; but warmth and good bedding appeared of the first consequence to them, being affected by cold and change of weather. One, particularly, scoured a great deal, and always seemed affected by crudities in the stomach: the remedy, occasionally administered, and always successful for the time, was two small tea-spoons full of rhubarb, in pint of gruel, or hay tea. The animal could not, absolutely, have existed, without this aid, during its milk course, and died afterwards,

wards, rotten, at grass. One of the small breed, which would not make fat for the butcher, with the best milk and attendance, but heaved, losing flesh daily, and, in fact, laid dying in the pen, I ordered to be put up among the weaners; upon the diet of which it recovered, from the instant, and made a small, but strong and hardy cow. This calf was spoiled by the mother of her, a good large beast, being half-starved, when pregnant, upon a common.

The proper degree of warmth for the skimmed milk, on which calves are weaned, is plainly enough indicated by nature. After a while, and when the weaners have been picking about abroad, we are indifferent on the point, and give their mess warm, or cold, as it may happen. But what is common sense to think of a Gloucestershire farmer, who gives the milk, scalding-hot, to his calves, even to the degree of injuring their lips, in order to prevent scouring!!! Since heat is supposed to convey an astringent quality to the milk, this farmer concludes his calves cannot have too much of a good thing, unapprized that immoderate heat, necessarily produces laxity and debility in the stomach and intestines, whence morbid costiveness, alternating, probably, with scouring. But some animals are so naturally robust, or their managers so fortunate, that they will thrive and do well in despite of the most painful efforts. This is another instance of *practice*.

I have a good opinion of rice, for the feeding and nourishing, not fattening of animals, and have often wished it duty-free. I intend to try

rice-

rice-jelly, mixed with the skimmed milk, in this case.

His Grace the Duke of Northumberland's receipt: "Take one gallon of skimmed milk, and in about a pint of it add half an ounce of common treacle, stirring it until it is well mixed; then take one ounce of linseed oil-cake, finely pulverized, and with the hand let it fall gradually, in very small quantities, into the milk, stirring it, in the mean time, with a spoon or ladle, until it be thoroughly incorporated; then let the mixture be put into the other part of the milk, and the whole be made nearly as warm as new milk, when it is first taken from the cow; and in that state it is fit for use. The quantity of oil-cake powder, may, from time to time, be increased, as occasion may require, and as the calf becomes inured to the flavour of it."

Mr. Crook's method is to make a jelly of one quart of linseed, boiled ten minutes in six quarts of water, which jelly is afterwards mixed with a small quantity of the best hay-tea: on this, he rears many calves, without milk; and about ten years since, obtained the present of a piece of plate, from the Bath Society, in consequence.

Many calves are annually lost by artificial rearing, and more brought up with poor and weak stamina. The mischief arises, according to my observation, from crudities and indigestion, and want of care and comfort, and not seldom, of the proper natural food. In weak cases, give pollard, wet or dry, or bran and ground oats with fine hay. I have turned them out with their dams, the calves having a prickly

a prickly head stall, to prevent their sucking the cows: it is a silly and useless practice, plaguing and fretting both animals, to no manner of purpose. There is generally an objection to bring up white calves, or those with white noses, on the score of their tenderness.

The grand divisions of Neat Cattle, in our island, are into LONG-HORNED, SHORT-HORNED, and POLLED or HORNLESS; these characters indicate specific, or peculiar qualities. The long-horned have the thickest hides, afford the richest milk, but least in quantity, and perhaps are fattened soonest, and with least meat. The short horned afford the largest quantity of milk, and the deepest cut of solid beef. The polled originally from Poland, seem to partake of the qualities of both the former species, inclining most towards the latter. The intermixtures and varieties are endless. I have seen excellent dairy-cows, which the owner called *broad-horned*, being the produce of the long-horned, or Lancashire bull, and Yorkshire short-horned cow; they partook of the good qualities of either species, giving considerable quantities both of milk and butter, and afterwards grazing well, and to great size. HOME-BREDS, generally mean a random-mixture of all sorts, in a district where breeding for sale is not much pursued; and amongst such are often found thrifty and useful animals.

To speak of milch-cattle, Lancashire is the original county of the famous long-horned breed, whence the CRAVEN and CANLEY stock, the most celebrated of any on the island, as dairy-cows. Yorkshire is equally famous for the HOLDERNESS,

or

or short-horned cows, producing the largest quantities of milk, of course the best species for the purpose of those who sell milk, and for suckling calves. This large breed came originally from Holstein, and the Low-Countries, and were, indeed, until of late years, too coarse and Dutch-built; they have been much improved in symmetry, and fineness of bone and flesh, by a judicious cross with the Norman cattle: for this improvement, I understand the country is chiefly indebted to the exertions of the late Sir William St. Quintin. They are now very excellent and beautiful stock, and many of them are made fat at three years old.

The SUFFOLK DUNS, a small polled breed, probably of Scottish origin, are a very fashionable sort as dairy cows. Some of them are well shaped, and all milk largely, with the convenience of being unburthened with horns; but as *butter-cows*, I have ever thought them inferior to the long-horned species.

Alderney Cows are great milkers, in proportion to their weight, fine fleshed, but for the dairy, inferior to the long-horned breed. They make a good cross for coarse stock, and in that intent, would suit, excellently, certain of the common-bred, long-horned stock, which are defective in quantity of milk.

To come more particularly to beef, and labour in harness—The DEVONSHIRE OX, of a beautiful blood red, is supposed to stand in the first rank. This ancient species has great delicacy and show of blood, and comes up to a large size. They are, beyond a doubt, the fastest walkers we have; and

their

their flesh is boasted in the west, as the most delicate and finest-grained of any in England; a matter of which I am unable to judge, but which, on enquiry, I find not generally allowed, or rather unattended to, by the butchers in the metropolis. I have seen many of them too leggy, too thin in the hind quarters, and crooked in the hocks.

The SUSSEX breed, red in colour also, is, perhaps, of west-country extraction, enlarged by a midland cross. The HEREFORD, middle red, is a still larger but kindred breed, of the highest form, and in the first rank of improved excellence. The midland counties all produce large, long-horned stock. Lincolnshire short-horned, but large and coarse; some fine, improved cattle, in various parts, excepted.

The excellence of the SCOTTISH CATTLE, is universally known, for the fine grain and flavour of the beef: the stock, in those respects, yielding, perhaps, to none: there are also the finest natural models of shape, to be found among the Scots, and they need no foreign cross, to arrive at perfection; the bleak and cold hills of Scotland, affording a delicacy of flesh and bone, equal to that which we find in the cattle of warm climates. Both Scotland and Wales produce most useful, middle-sized, and small neat cattle, adapted to every purpose of milk, beef, and draft, which are annually driven in great numbers, and dispersed over the whole island.

The change, which the late Mr. Bakewell, with so great pains, wrought in the natural form of the Lan-

Lancashire and Leicestershire cattle, although it pleased the eye of many, and made a great figure at the hammer, was disadvantageous in some of the most important points. The new artificial form fattened quickly in the external parts, but never tallowing well within, was, in course, always defective in quantity and goodness of *flesh*, besides, losing the valuable quality of great milking. But I hope I am not deceived in afferting, that the Dishley form never prevailed very generally, and that latter improvers, in the midland counties, and to the westward, by retracing their steps towards the original sources, have produced better proportioned, and far more useful stock. The best dairy cows are now to be found in Leicestershire, Derbyshire, and their neighbourhood.

The YORKSHIRE SHORT-HORNED cattle are distinguished by their small, half-annular horns, the extremities curving towards each other; their size, depth of carcase, and squareness of form. In the LONG-HORNED species, the horns either spread horizontally, or are bent downwards, in various shapes, as we see them in Staffordshire and Warwickshire; the weight and downward tendency of the horns, denote a thick hide, and a heavy, sluggish animal: this species are deepest and heaviest in the forequarters.

The following marks, according to Mr. Mure, denote the true-bred DEVONSHIRE OX, to be found in the greatest purity of blood in the neighbourhood of Barnstaple:——*Colour, high red, without white spots, (which indicate a foreign cross), light dun ring around the eye, muzzle same colour; fine bone, clean*

clean neck, middle-length horns, bent upward; thin face, fine in the chops, wide hips: rather flat on the sides; tail small and set on very high; thin skinned, silky in handling; fat early, shoulder-points beautifully fitted for the collar.

Of the HEREFORD and SUSSEX, the former the heaviest and squarest, by Mr. Ellman, a principal Sussex breeder:——*Colour, red, fine hair, very thin skin, neck and head clean, middle horns, turning up at the points; well made behind; wide in the hips, rump, and surloin, but narrow in the chine; tolerably straight in the back; ribs or sides flat; thin in the thigh; middling bone.* An ox, six years old, when fat, will weigh from sixty to 100 stone of 14lb. forequarters generally the heaviest; they are worked to six and seven years old. Calves run with the cows two or three months; a good cow will afterwards produce six or eight pounds of butter per week, for three or four months; and double that quantity of skimmed-milk cheese. They do not give so much milk as the Suffolk's, but it is much richer in quality.

Previously to a purchase for GRAZING or FATTENING, a man will naturally determine upon the size, and species of bullocks, heifers, or cows, most probable to suit his food, situation, pocket, and other circumstances. It may be convenient, either to summer or winter-feed, to turn the money as quickly as possible, or keep on, large and improved beasts, even to the second summer-grass, by which they are brought to the highest pitch of excellence.

In the choice of a beast, that soft and yet elastic and

and mellow feel of the hide and flesh, that swell and fullness of the fattening points, and other indications of thrift, from general appearance, so much better intuitively known to, than described by, practical men, must be the purchaser's guide. I have a shorter rule; I have seldom known any healthy animal, well furnished in the loins, and with short legs, which would not make fat, sooner or later. Much has been said amongst us sages of the shambles, about the propriety of laying the greatest weight of meat upon the most valuable parts; and what has given the idea a most ridiculous air, is, that in the North the most valuable parts lie before, in the South, behind! After all, perhaps too much consequence is attached to such notions, in theory I mean; for an animal, *cæteris paribus*, will produce aggregate weight, which is the chief object, in proportion to the regularity of his shape. But in the markets of the South, hinder quarters bear the highest price, as in reason I think they ought, since the flesh in those parts, is of the closest texture, most savoury, and most nutritious. There are animals of all the species which never will fatten, and some of them deceive the best practical judges. Every body is aware, that full aged beasts, and such as have laboured, will take on fat best; but even young cattle of great growth, if well formed, will be made sufficiently fat for any purpose, with care and high keep. The opinion, that quick feeding is all in all, is absurd in this view also: the feeder's interest may, from season, the state of the markets, or other circumstances,

require an animal which will be a considerable time growing into size and price.

The great art in feeding cattle in the stall, to profit, is, to give them as much, but no more, than they can well digest; all beyond being somewhat worse than thrown away. The best rule to judge by, is, that they eat up their allowance with a vigorous appetite, neither leaving ought nor hankering after more, but appearing willing to take rest. Some, from over-voraciousness, will load themselves so much, as to produce intestinal obstruction, and consequent loss of appetite, and impediment to thrift: warm and aperient mashes, with sulphur, or salt, generally prove a remedy. Others, with digestive and ejective powers, equal to their voracity, will super-abound with blood, which will be discovered by inflammation in the eyes, warbles in the back and loins, and much rubbing; two or three moderate bleedings, at a fortnight interval, will prevent any ill effects, and forward improvement.

In winter-feeding, the best stock should be chosen, nor is it worth while, on account of the low price, to purchase barren cows, for if you make them good, in case of a declining market, your salesman's account from Smithfield, will not be pleasing, as I have once or twice experienced; whereas the high form of your commodity might, in some measure, shield you. There is another reason, *all females having bred are large consumers*, which I know from a number of observations. An old cow, of fifty or sixty stone, will devour more hay,

or

or other meat, than an ox of fourscore. Supposing a brisk demand, large and well-bred oxen, thoroughly made, will undoubtedly render the greatest profit; but at all times, from fourscore to one hundred stone, London weight, is a most saleable size; and this weight is very conveniently produced from the best of the Scots and Welsh cattle, either steers or spayed heifers. A considerable feeder should have the three sizes, to suit the various demand of the markets; very small beef is sometimes in great request; and I have lately seen a lot of the smallest breed of Scottish bullocks, the Kyloes, by no means fattened with the best meat, sold at a rate so extravagant, and out of all proportion, that I hesitate to repeat the figures.

Some noble-spirited and patriotic landlords, of late, have built ox-houses upon their tenants' farms, that their lands might not want manure; it is a most commendable example. I am yet an advocate for the oxen going occasionally loose, for several hours in a day, in a well-littered yard, where the dung will not be dispersed; yet to be always tied up in their stalls to feed. The necessity of darkness and close imprisonment, in order to the fattening of animals, I believe to be notions venerable only for their antiquity. The gaiety or activity of fat beasts, of any kind, need not be much apprehended; but fresh air and pleasant sensations, will increase the appetite, strengthen the digestion, and obviate the morbid causes. On this head, some of the various contradictory opinions and practices are truly laughable, being founded in bastard *soi-disant* experience, instead of the true, which is in

affinity with reason and common sense. It has been contended, that oxen ought to be kept in the atmosphere of a hot-house, in a constant state of the most profuse perspiration, until their hides crack and peel; and with this view, even the crannies and key-holes have been stopped with straw, in hot-weather; *e contra*, others insist, that the ox will not thrive kindly within doors, in a mild winter; sweating out all his keep! Again, who has not seen fattening beasts above the mid-leg in cold clay, or mire, their almost only bed; their backs and loins soaked with wet, cold at heart, and their bodies exposed to all the rigour and changes of the season? In spite of all this they thrive; but no man in his wits, surely, can doubt, that their thrift and his profit would be greater, under circumstances of comfort, shelter, and nourishing warmth. Every attentive and experienced feeder, must have observed the check given to fattening stock, by extreme cold, or foul weather. Another strange notion has been broached, from what quarter has escaped my memory, that fattening stock may, with safety, nay, even advantage, be reduced from good to inferior keep; this experiment I have sometimes made, not indeed voluntarily, or much to the benefit of my pocket.

Fat cattle, kept abroad in winter, upon long, watery grass, which has necessarily lost much of its nutritive power, should always have an allowance of good hay; as should those fed in the yard, upon dry meat, have a portion of something moist and succulent, to counteract a too astringent effect.

It

It has always appeared to me an out of the way practice, to feed with oil cake, in place of growing, less expensive, and equally good, not to say better, food at home. I should prefer the linseed itself; and there is an additional reason for a preference, when the article can be grown upon the farm. The linseed may be boiled to a jelly, and mixed with bean, or any kind of meal, and chaff, cut from clover, or saintfoin hay. I hold it to be deceptious, or rather plainly unprofitable, to use straw, in any shape, as food for fattening beasts, where hay can be obtained. Many good oxen, after the summer-grass, are made fat with hay, of which, from twenty to thirty pounds a head, suffices for a day. The old English method, of making beef in winter, was with hay and oats; nor is there a better, in a cheap time for oats, and upon land where large crops of them may be convenient.

The various kinds of food, with which bullocks may be made fat in the stall, have already been described; brewers grains, it is well known, are applied to that purpose; also malt-combs mixed with meal. Turnips or cabbages being the chief food, it is very advantageous to allow one feed per day of bean, oat, or barley-meal, mixed with cut hay. Substantial hay of tares and green corn, will not be forgotten. The beasts will drink plentifully twice a day.

An attentive feeder will easily perceive when a beast does not improve upon his meat; all such should be disposed of in good time, at any rate; that they may not, by useless consumption, hang as a drawback upon the aggregate profit. This ought to

to be a general rule in feeding. Success also materially depends on a vigilant attention to the state of the markets. In a very brisk demand, it will be generally right to sell, although, perhaps, the cattle may want a few weeks to be thoroughly ready. Some gentlemen have the convenience of weighing cattle alive, in order to determine their rate of improvement, and also their weight previous to sale; but in the latter respect, it is a good method to kill, or sell by weight, an average beast. A beast thoroughly fed, will handle full and well, upon *the nethermost rib, flank, navel, cod, loin, neck;* and *if the fat be thick and full upon his shoulder and tut, or setting on of the tail,* it is a sign of ripeness, or being well tallowed within. On sale, thickness and goodness of hide form a consideration; in dear times, there have been instances of the hide fetching a full-third of the price of a small beast.

In SUMMER stall-feeding, tares, and clover, from their succulence and substantial quality, are of great worth. Cattle which have been at winter-keep, should have a portion of hay, mixed with their green meat, to prevent its too laxative effect at first; and this rule should also be observed in wet seasons, when the grass will be weak, and abound too much in watery juices; and the cattle will even fall off, instead of improving in flesh.

MILCH COWS. The indications of large milking, are *a thin head and neck, clean chops, and free from leather, deep and rather flat carcase, wide hips, the bones, perhaps, inclining to be pointed, capacious udder, and large, plain milk-vein: the two last signs worth all*

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the rest. Great milkers are seldom handsome, but of a gaunt and meagre appearance; nevertheless, I have seen some thorough-shaped, although they never carried much flesh, whilst in milk. It is not within the scheme of nature, to give absolute perfection, so we never need expect to find cows, both capital milkers, and extremely apt to fatten; but many such will take on a great burden of fat, in length of time. The first consideration, beyond a doubt, is milking; although it be an object, to milk a beast that will feed up to a considerable size and price. A cow is in her prime for milk, at five years old; and none, however old, should be turned from the dairy, whilst they milk largely; on the other hand, it is extremely unprofitable to keep a small-milker: middling ones should only be kept long enough to take the flush of their milk, and be discharged after six years old. I believe all cows are benefitted, both in milk, and goodness of calf, by going dry a month or two before bringing forth. He who is well provided with winter-keep, will have great advantage in the purchase of cow-stock, always reduced in price on the approach of winter. It is a common plan in the breeding-counties, to job in cows, buying them in calf, in the autumn chiefly, to be disposed of at calving-time, in the spring: this plan pays well when the stock is well wintered.

With the common method of keeping cows, (I do not mean upon dairy-farms), I am totally at variance. I not only think it mean and stupid, but I know it to be unprofitable, and that the intended aim is missed. It is generally said, that cows in calf

calf will bear hard keep better than any kind of stock, and the idea is as generally followed up in practice: but it is inconceivable, that a pregnant animal, with her growing burden to support, should not require the most nourishing food. We do but deceive ourselves; we should be better paid for good keep, than for bad, even when sale is the object, as a good price is usually allowed for condition. By preserving the constitutional stamina of the animal firm and uninjured, we should be well rewarded with finer stock, more milk, and greater aptitude to fatten; which, if it needed any illustration, is amply proved by the superior stock of regular dairies, where the winter-keep is plentiful and of proper nutriment. The change from the succulent herbage of summer, to the dry, innutritious fodder of the straw-yard, ruins the constitution, and mars the produce of milch-beasts; neither good milk, nor good manure must be expected from dry straw; and it is scarcely possible to keep a milking-animal too well. I have known a farmer's five cows in January, produce less than a pound and a half of butter per week each, some weeks not more than three quarters each; surely it would have been more to his interest, to have well-kept one good milch cow, or two at most, and to have fed off his surplus straw, with young grazing-cattle, or lean beasts.

Distance of markets, nature of the keep, and still more, custom of the country, determine to what particular use cows are applied, whether to the butter-dairy, the cheese, suckling calves, or to breeding solely, as in Lincolnshire. The most profit-

profitable application of milk, as it reasonably ought, considering the labour, is to make it into butter.

SUCKLING, as it is sometimes practised, in the common way, I am persuaded can render little or no profit at all. I have seen a calf at ten or twelve weeks old, consuming the milk of two or three ordinary cows; it has yet been kept on, eight or ten weeks, and then sold at an inferior price. Those which I have fattened, I always found returned most profit, when they could be got rid of at seven or eight weeks old, and before they began to demand such vast quantities of milk.

The most profitable plan of suckling, I should suppose, is to keep great milkers of the short-horned breed, and to replace their own calves with a smaller kind. I have elsewhere recommended, to suckle calves three times a day; but was not aware, at that time, of such a method being any where practised. It gives me pleasure to be informed, that in Scotland, where the farmers reason, and are open to conviction and improvements, such has long been the custom. Acid crudities and indigestion, the common maladies of fattening calves, no doubt originate in the great load, laid at once, upon their stomachs; much of the mischief would be obviated, by dividing their milk into three meals. There is another cause of malady; the confinement, which is supposed so indispensably necessary to their thriving: I am an infidel on that head; I have been deceived by a few trials, if I cannot make equally fat, much better and more wholesome veal, with air and a little liberty. Whenever the calves have sour breath, scour, or

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are costive, apply the remedy already mentioned. Warmth and the most punctual cleanliness are necessary: and proper conveniences for saving the urine both of cows and calves, ought not to be forgotten. The scouring-calf should be washed with soap suds, and wisped dry. In Norfolk, calves are sometimes fattened by running with their dams until they reach thirty or forty stone. This would, no doubt, bring a certain profit, without any trouble, could we insure a good market.

The best BUTTER-COWS, as has been said, are of the long horned-species; the next, Suffolk polled cows; but, in one sense, all depends on feed. Mongrels, and home-breds, will sometimes turn out extraordinary milkers. I look upon the Kentish home-breds to be very good milkers, in proportion to their size; and am of opinion, the dairying-business might be very advantageously carried on, in that fine and well watered county.

The best cow I ever had, considering the smallness of her size, was a spotted, finch-backed one, bred in Kent. She would have milked well three times a day; she made twelve pounds of butter per week, for some weeks; and from eleven to eight, for a long time: a large cow, to have equalled her, ought to have given more than twenty pounds per week, which great quantity, some famous individuals have actually produced. On the average, three gallons of milk will make about a pound of butter, or three pounds of new-milk cheese.

A good cow is never of a bad colour, although objections are commonly made to black or white; the milk of the former, it has been said in print, is thin and little productive. I have yet known black cows

produce

produce milk of an extraordinary richness. There is great convenience in polled, or hornless cattle; and I have been thinking, that a Suffolk bull would be a good cross for long-horned cows; by breeding thus, in and in, it is probable the horns would, in time, be lost, and the variety turn out extremely valuable, both for quantity and quality of milk.

All animals should receive the most *patient*, gentle, and humane treatment, milch-cows in particular, which are necessarily, from their condition, subject to an increased share of irritability, and the damage the milk receives from their being flurried and ill-used, is very considerable. *I say this to masters and mistresses, who, however regularly they may go to church, are guilty of a high breach of their moral duty, when they do not enforce, both by example and precept, the humane treatment of all animals.*

It is much the safest way, to suffer no cows to be milked, without having both head and legs secured; for the quietest cow alive, milked loose, always kicks her pail of milk down, once or twice a year, at least. I am a warm advocate for the continental practice, of currying and brushing both milch-cows and fattening bullocks, convinced that it is attended with both pleasure to them, and profit to their keeper: whilst running abroad, in course they must only be wisped over, lest they take cold. The bag should be kept well trimmed, and the teats perfectly clean, more particularly on the approach of winter, when they are so liable to be chapped: they should not be washed with the milk, but warm soap and water, being after wiped dry with a cloth. Cows will not give their milk down freely to strangers: and

and it is of consequence to milk them thoroughly dry, not only because the last milk, or strokings, produces a greater quantity of cream than the first, in the full proportion of ten to one, but because cows are much injured, even ruined, by not being milked clean. This matter requires the inspection of the master, or a faithful deputy.

I have observed, that in SUMMER-FEEDING COWS at home, I did not obtain so large a quantity of milk as when they fed at liberty in the field; this arose, it is probable, from their want of exercise, which they ought to have had several hours in the day. Granting the disadvantages could not be obviated, it would still not be a valid objection against stall-feeding, since more cows might be kept upon the same quantity of food. The advantage of keeping them at home, or in a shady situation, in the dog-days, when they are often so harassed by the heat and the gad-fly, neither suffering them to take their meat, or to rest and chew their cud, is very striking; and the hay which may be saved by the economical expenditure of grass, must prove a great comfort to them in the winter-season. It is among the first of agricultural objects, to reduce the price of winter-keep, and to extinguish the shabby pleas of starvation.

The few loose hints I have to offer on DAIRY-MANAGEMENT, are from my wife, who has been accustomed, from her youth, to the superintendance of the dairy, as well as the business of farming and gardening in general. To speak of a dairy, as a mere auxiliary branch of the business of a corn-farm, ten or twelve cows are as many, perhaps, as most

most people will think convenient, since that number can be managed without any extra help of servants. Situation, in respect to markets, and custom determine, whether butter or cheese be made, and if the former, whether it be disposed of fresh, or salted for sale: in either method, great, I believe the greatest dependence for success, must be placed in the pig-stock, fed upon the skim-milk, or whey.

The most exquisite and punctilious cleanliness is necessary, in every part of dairy-management. Well-glazed earthen gallon pans are preferable to all other receptacles for milk; these must be scalded, perfectly clean, outside and in, besides being frequently boiled in a copper, conveniently situated; well scrubbed with a brush, and rinced in plenty of clean water. Dairy should be both glazed and latticed. Four or five cows in an hour, are as many as can be carefully milked by one person: milker not to enter the dairy with the dirty apron, and hairy from the cow-house. Milk to be set immediately: if the weather be cold, warm water at the bottom of the dish; if warm weather, the dishes to be previously cooled with cold water. Skim off the cream, in summer, every twelve, in winter, twenty-four hours. Shift the cream into clean pans, daily, in winter, twice a day in summer; generally stirring it, several times a day, with a clean wooden spatula. To make fine butter, cream should be churned within three days, in hot weather. In severe frosts, it is better to churn the *whole of the milk* daily, as in Scotland; frosty cream always

always making rank butter. German stoves, burning charcoal, are useful in a dairy.

In the North, they have butter-churns worked by a horse; but our chief improvement here, is the barrel-churn. In summer, cool your churn well with cold water; in winter, make it warm. Strain your cream through a fine sieve, or linen cloth. Butter, to be good, ought not to come in less than an hour; at the end of that time, if it need any help, use a small quantity of distilled vinegar; the method of using warm water, or taking the churn near the fire, prejudices the butter: the process complete, strain off the butter-milk, and put the butter into cold water: afterwards divide it into small lumps, upon a sloping board; beat it well with wooden pats, not *sweaty hands*, until it be entirely free from butter-milk, and perfectly firm, cold water being at hand to throw over the board occasionally, and to wash the pats. Salt, with fine beaten salt, to your palate. Make up according to art and custom. Spread separate on a cloth, that the lumps may not adhere.

To put butter down for keeping, let the salt be perfectly fine; a layer of salt at the bottom of the firkin or jar; beat the butter down with a hard wooden rammer, not *hot fists*, and cover the top with salt. The best colouring for butter, is good keep for the cows.

Not pretending to any dairy secrets, or improvements, I shall say nothing of the process of cheese making, so generally well-known, and so often described. I have ever had my doubts, as to the profit

fit of making or using the inferior kind of cheese, either to individuals, or the public; the materials would pay better in the shape of pork or beef: I have also presumed to question the exclusive excellence of the soil of Cheshire, Gloucestershire, and Essex; little doubting, but that *Cheshire* cheese and *Epping* butter, of equal quality, might be made elsewhere. Land of poor or middling quality, is said to be the most proper for the cheese-dairy. The meadows in Cheshire, I am informed, abound with a tall plant, bearing leaves and a yellow flower, which is supposed to be of great advantage to the milk: the same plant is found in the hedge-rows, in some parts of Kent.

The first milk of a cow having newly-calved, vulgarly called *beastings*, we never use, but for the calf or pigs; and it may be from two, to four or five days, before the milk attain a wholesome colour. Where the object is butter, the suckler, of course, is disposed of as soon as possible.

The arrangement of PIG-STOCK for the dairy, varies with situation and custom of the country. The regular butter-dairies, within the reach of the metropolis, make quick returns of fat pigs, perhaps every six weeks, or two months. The smallest may be made entirely with milk, but in general, skim-milk and barley, or pea-meal, fatten the greater part of the dairy pork. The dairy-men purchase store-pigs, breeding very few. With respect to the partial, or corn-farm dairy, it is more profitable to breed, or store-feed pigs; and the number need have no other limit than this, that the wash be sufficiently

ficiently good to keep them in high store-condition. Precise calculations on these topics, are generally more for shew than use, since circumstances are so infinitely various; but presupposing land of medial fertility, the best stock, skill, and attention; breeding the pigs, or at least buying the best bred young stores, and grazing, the barren cows, I should not scruple to state the net dairy profit at full eight guineas, annually, per cow.

The interesting question of HORSES or OXEN, for slow draft, has been often and largely discussed: I have already borne my share in it, and have little to add, but that the more I see and reflect on the subject, the more I am convinced, that *all the farming business of the island* might be performed, with equal advantages, by oxen, as by horses; nor do I know of but one objection to extending the use of oxen to every purpose of slow draft, which subsists in the presumed natural inaptitude of their feet, for long journies and hard roads. All the farming and carting-business of Italy is performed with oxen or buffaloes. The immense accession to our national stock of flesh-meat, to be derived from a general farming use only, of draught-oxen, is a consideration of too high consequence surely, to be postponed, to trifling inconvenience, or mere indolent custom. But in the setting on foot this salutary reform, nothing can be so efficacious as the influence and example of landlords, who would do well to follow the patriotic example of the Earl of Egremont.

I have paid due attention to the arguments of Mr. Billingsley, Mr. Middleton, and Mr. Brown.

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In my opinion, the principal reason of the faintness of oxen, in labour, and the presumed superior strength of horses, as three to two, subsists merely in the inferior keep of the former. Take a gang of potatoe and oat-meal-fed Scotsmen, or bread and water-fed Hampshire-men, and work them with London beef and beer-fed corn or coal porters, and attend to the event in point of speed and continuance. It is absolute folly to work oxen without corn, being matter of economy and saving to allow it them, since the extra labour, compared with the corn allowed, leaves a profit. But oxen naturally require less corn than horses; and bean-meal seems to agree well with them. Cabbages or carrots, bean-meal and clover or saintfoin chaff, with good oat-straw, will keep a labouring-ox in high condition. I have known oxen and heavy black horses work together on wet poaching-land, and without observing any difference, found both species did mischief enough in all conscience. As to the sluggishness of oxen, quoted in some particular instances, it does not bear at all upon the question. In Sussex, oxen have beat horses at plough in the deepest clays; in Herefordshire, they are held superior in long journies, at chalk-cart, over a hilly and flinty country. The Devonshire oxen are speedy walkers; —What would probably be the event, were they bred particularly with the view to speed, trained and fed as carefully, and as generally as horses? Four or five horses will till one hundred acres of land. I believe a man would find himself much in pocket, in the course of years, by the substitution of five, or half-a-dozen good Devon, or Hereford oxen,

 whether

whether on clay or sand, at plough or cart. I am aware of no county, Norfolk excepted, where their pace at plough is too quick for the best Devons.

Mr. Middleton would willingly revive the primitive and laudable custom of eating horse-flesh: some years ago, I knew a fair countrywoman of his, who, being above all narrow prejudices, actually put this speculation in practice, and never failed to beg five or six pounds of the prime of the flesh, from every horse killed at a neighbouring dog-kennel. I observed no other particular effect it had upon her, but that of imparting to her breath an odour equally savoury and pleasant with that of her mess-mates. The girl was under twenty years of age.

The AGE of Neat Cattle is commonly judged of, by the number of rings or circular marks upon the horns, the first of which, however, at the base, does not appear until the third year, after which, every year brings an additional ring: these, the cow-jobbers, (one in twenty of whom I hope may be an honest man), take especial care to rasp, and scrape out, in an aged beast. The calves-teeth begin to drop at two years old turned, when the animal gets two new teeth, and two additional every year, until five years old, when the mouth is full; but the two corner, or mark-teeth, are not perfectly up until six.

The CASTRATION, male or female, of these, and indeed, of all our domestic animals, horses excepted, is performed early; of calves at ten or fourteen days old.

The HORNS of calves, on the authority of a book, published

published in the name of Rowlin, a cow-doctor, may be easily and safely eradicated by the following method: the animal being two or three weeks old, the embryon horns, just beginning to grow, may be found lose, between the skull-bone and the skin, in the form of a gristly substance, softer than horn, and more compact than the skin: dissect these out, on each side, without cutting to the bone: sear up with an iron, just hot enough to stop the blood, and if the calf goes abroad, cover with a plaister of pitch.

That the vigour of the bull, and the ram, lasts but a few years, is owing to the early free use made of it, which is, doubtless, most advantageous. A cow, constantly well-wintered, would milk even to her sixteenth year; and an ox would probably labour to nearly that period; granting them of great excellence in their way, it would be, no doubt, profitable to keep them on, as instances have not been wanted, of very fat and high-flavoured beef at fourteen years old.

Great caution should be used, that cattle do not become hoven by gorging themselves, suddenly, with clover, or other succulent food; when it has happened, the remedies are well-known, amongst which should not be forgotten, the flexible tube, sold by M'Dougale, in London; this may be introduced into the stomach. Where the QUARTER-EVIL is frequent, or apprehended, amongst the young cattle, I should hope, that occasional bleedings, setons, and alterative, or purging balls, or waters, would entirely prevent the malady.

My memory having been of late refreshed, by the inspection of various cow-cases, it may not be improper to throw out a few hints for the use of persons concerned in the business of the dairy.

The FOUL IN THE FOOT originates generally in the irritation of continual dirt and nastiness between the claws; occasionally, in constitutional grossness or impurity, and may then be compared with running thrushes in the horse. Prevention consists plainly in cleanliness, and taking care that cows, which have a dirty *layer*, are often driven into the water; but where the foul is suspected to be commencing, manual labour will be absolutely necessary, and the more so, if there be a natural tendency to foulness. The disease having appeared, may be treated in the same method recommended for sheep. With some, constant care will be necessary. A cow leech remarked, that he had often seen beasts seized with the foul suddenly; the reason of this deception is, that the progress of the infection between the claws, may be slow and imperceptible.

Cows are apt to be foundered by long drift, and like horses, some are subject to the natural infirmity of weak and bad hoofs: in this state, neglected, they lose their milk, their bulling, and pine away all their flesh. In a confirmed case of this kind (I have now half a dozen before my eyes), there seems no better method than to turn the patient into a soft and clean walk, either meadow, or straw-yard, where no other horned cattle, at least, can come near her; for being weak and helpless, they

they would, according to the charitable impulse of nature, harass her about, and not improbably, gore her to death: there, her feet may be frequently inspected, and the impure and irregular parts cut away carefully and tenderly from her claws. In this case, it is too often the practice, to send forthwith for one of those conjurors, who, unfortunately for his neighbours and himself, is destined, indeed compelled, to eat the bread of imposition; and he comes armed with his tools, to cut, and hack, and hew the poor animal's tender feet, and perhaps to render all the benignant efforts of nature ineffectual.

I lately saw a remarkable case of universal rheumatism in a cow, caught, as I suppose, by a sudden transition from warm lodging and good keep, to the contrary. She wasted to a skeleton; but receiving after, some degree of care, and plenty of keep, recovered. A warm bath, in this case, if attainable, would be the most certain cure; but warm and generous keep, frictions, and even clothing, with cordial drinks, will no doubt succeed. To those who have a lively faith, and are fond of experimental practice, here is a fine opportunity for an essay of the virtues of the metallic tractors.

I submit it to practitioners, whether, in certain cases, the extraction of the *placenta*, vulgarly called the *cleaning*, in cows, by manual operation, would not be advisable, particularly, with those which have required assistance, and have yet not cleaned: numbers are yearly ruined by this retention. On this head, a cow-leech remarked to me, the danger to

to be apprehended of injury to the beast by the operation; but such argument does not apply to a skilful and intelligent operator, who patiently watching nature's efforts, would do nothing with rashness and violence.

It is asserted by a correspondent, in the Annals of Agriculture, that, the smelling to carrion, or any flesh in a putrescent state, will occasion cows to SLIP THEIR CALVES: whether or not this idea be well grounded, there can be neither harm, nor much trouble, in precaution. On the indications of an approaching slip, either in cow or mare, the mischief may be obviated by timely attention: the animal to be put by itself, in a comfortable place; warm water, with some gruel in it, nourishing mashes, and cordial balls or drinks, if they can be given without irritation. Rice mashes and gruel.

Those who are advocates for the constant confinement of milch cows, in stalls, at high keep, without the allowance of any exercise, ought to be reminded, that the animals, in such state, are occasionally subject to fatal disorders, of the apoplectic class. I have at different periods noticed about half a dozen of these cases: in the last but one, I attended particularly to the symptoms, several weeks before the death of the animal; these were, inaptitude to motion, enormous distention of the belly, heat of the ears and breath, inflammation of the eyes, difficult respiration and groaning. It was a neighbour's cow, and it was even betting with me, whether it would be more proper, to warn the bull, her husband, of the danger, or her proprietor: chusing

chusing the latter, I got myself laughed at, and in a few days, the cow, rearing herself up suddenly, fell backward, and instantly died. She had been at dry meat. All accidents of this kind arise from defect of precaution. One ounce of fine succotrine aloes, in a ball, administered in the early stage of the complaint, would, with little doubt, have preserved the life of this cow; an out-of-the-way, whimsical, nonsensical irregularity, of which, rather than be guilty, the sage owner would doubtless have patiently suffered the loss of half his dairy.

ON SHEEP.

The EWE may produce young at eighteen months old, and at that age, the RAM, or TUP, is capable of generation; but with improved stock, it is supposed early enough, if the ewe bring produce at the end of the second year. Sheep go with young twenty weeks, and in warm climates, produce twice a year; the same effect might be obtained in this country, with several species at least, by the help of high keep, and great attention, were the measure at all desirable, which, for very obvious reasons, it surely is not: they have generally one or two lambs at a birth; but certain species almost invariably produce two, and accidentally three, and even five. It is curious, that our largest breed, the TEES-WATER, of the North, should be the most prolific, generally bringing two lambs, and occasionally four or five. DORSETS commonly yean twins; the LEICESTERS,

CESTERS, and their rivals the SOUTH DOWNS, about one-third twins.

The usual TUPPING season is from August to Michaelmas; but it is otherwise with the Dorsets, which supply the markets with house-lamb. I know of no natural impediment to the ewes receiving the ram at any time of the year; the difficulties on this head are to be attributed, I believe, to the labour of driving and folding, and to poor chilling keep. Ellis, although an excellent practical writer on sheep, and a man of sound understanding, but abominably tedious, shewed himself a very poor physiologist, in his famous secret for forcing ewes to take the tup; to harass them about with dogs, until, from fatigue, they would stand still to urine! To those who desire to bring their ewes in, at any particular season, I would recommend to confine the ewe, as is practised with the mare; those forced embraces are known to be successful with the latter animal; and I have other reasons to make no doubt but they would be equally so with the former. The ewe should, however, be in full health, and good keep; and, perhaps, allowed a little corn, or other nourishing food previously. The improved method is, to keep the tup by himself, at least with only a female or two to quiet him, introducing the ewes in succession. Fifty or sixty ewes are as many as should be trusted to a shearling, or young ram: a full-aged tup will suffice double the number. The ram and ewe are kept for breeding four or five years.

Sheep first shed and renew two TEETH, at fifteen months

months old, and again every year, until the third, when their mouths are full; but it is a matter of dispute, whether they cast only six or all the eight fore-teeth. The curious technical phraseology of the old shepherds is still, in good part, retained: according to Ellis, "the first year a WETHER LAMB; second year, a two-toothed TAG, or PUG; the third year, a SHER-RUG, (shear-hog); the fourth year, a six-toothed WETHER; the fifth, a full-mouthed one. An EWE-LAMB, the first year; the second an EWE-PUG, or TAG, with two broad teeth; the third, a THAIVE, or four-toothed; the fourth, an EWE, or six-toothed; the fifth, full-mouthed." At present, weaned lambs take the strange name of hogs; wether, or ewe-hogs; and the age is reckoned from the shearings, one shear, two shear, &c.

LAMBS are generally weaned in three months, the males having been castrated early, unless in case of great weakness, when the operation is better deferred awhile. After weaning, the dams may be milked two or three times, to ease their udders.

The well-known method of disposing of this kind of stock, are in the shape of GRASS-LAMB, HOUSE-LAMB, WETHER, and EWE-MUTTON, of various ages, according to the interest and convenience of the feeder.

Of SUMMER-FEEDING sheep at home, in open sheds, littered yards, or upon any convenient spot, I can entertain no doubt of the profit, since it has been often enough proved in this country; invariably on some parts of the continent. These animals, loving a short and fresh bite, it is supposed by some, they would not fatten, in the grass season, upon meat

meat ready cut; but during the winter, they would have been inured to the custom; attention might be paid to giving them their food as fresh as possible, and to allow them sufficient exercise upon any cleared grounds. Being always, as it were, in hand, under constant inspection, they would be within reach of immediate assistance; nor would there be a fiftieth part of the usual danger from the fly, the scab, goring, the rot, and all those numerous maladies to which this precarious stock is constantly liable. The flock amounting to thousands, they might be divided, subdivided, and stationed into as many yards, or folds, on different quarters of the farm, as convenience might demand.

Against COTTING, or HOME-FOLDING sheep in the winter, a practice so ancient and well-established in Herefordshire, I have never heard or read one single valid objection. As to turning out these poor, delicate creatures, to bring forth in a state of misery and starvation, amidst the snows and deluges of winter, upon the bleak heath or marsh, coolly calculating how many *per centum*, ewe and lamb, we shall lose, and how stoutly they will starve; it is a practice barbarous as bull-baiting, and silly as pricking in the belt. They are kept to be fed, and they would never pay better for feed, than in the winter; during which, the loss, instead of thirty *per cent.* too often the case, would, probably, not exceed one, the flock going to summer-keep, in full health, and double the worth of starvelings. A large sheep will make a load of dung in the winter.

FOLDING,

FOLDING, as a general plan, does not belong to the improved practice, nor matters it how soon the plan be abolished. There is nothing but the expence of cartage and spreading manure, to set against the inevitable damage done to the sheep, and the inferior quantity, quality, and condition of the dung. Manure the object, more might be obtained from keeping the sheep at home, the animals improving the while, instead of being injured in wool and carcase, by travel and unwholesome layers. Partial folding on the lands difficult of access, may be of use; and these living dung-carts may well earn their keep. Where neighbouring commons are hard stocked, it is always worth a farmer's while to take his sheep, or cattle, home at night; the dung and improvement pay the night's keep, and the attendance.

WOOL, although a very important, is but the second object. It may be said to depend on soil, since we always find a long, coarse, and heavy fleece, in low grounds and rich marshes; and the contrary on high lands, bearing a finer, but less nutritious herbage. Climate seems to have less effect; for fine wool, as well as fine bone, is found in the extremes of warm and cold. There can be no doubt, that having our flocks more at home, within command, and better fed, would increase the quantity, and mend the condition of our national stock of wool: this must happen, indeed, merely from the number of lives which might be annually saved. Granting we cannot grow fine wool enough, our true policy would be to export our coarse, taking fine in return; a measure which must surely have

have the effect of increasing the quantity, both of wool and mutton; but greedy and blink-eyed monopoly will not suffer even itself to be benefited, if the generality must also partake.

To render ourselves independent of foreign supply, we must increase the aggregate quantity of our own wools, but particularly of the fine. It is, then, an object of national concern, to obtain, as soon as may be, a considerable quantity of the best Spanish stock; and very late intelligence gives great encouragement to this speculation. Citizen Lasteyrie, in a letter to the *Societé Philomatique*, in France, has fully confirmed, from facts, the opinion of our Dr. Anderson. Spanish sheep, bearing the finest wool, live and thrive in the most marshy grounds and rigorous climates; in Holland, and in Sweden, the wool has remained unchangeable to the fourth generation. Some of the Spanish sheep, bearing the finest fleece, are of great size.

Shearing sheep, in cold weather, is a cruel and unprofitable practice; if any thing be saved in the wool, much more is lost in the mutton; nor will the London butchers, now upon their guard, give so much per stone for sheep in that condition. Some sheared sheep have died in the late cold weather, absolutely glandered, and the flesh in a very bad state. Putting humanity out of the question, (and the sufferings of the poor animals, notwithstanding their flannel jackets, are pitiable), twice shearing will never pay.

Midsummer is the most proper season for SHEEP-SHEARING, in this country. The sheep being washed, should remain a few days, in a clean rick-

yard

yard, or dry pasture, and the shearing should, by no means, be made a scene of drunken and foolish jollity, as is the case in some parts, when the creatures are hauled about in a careless and boisterous way, besides being frequently wounded with the shears. Extra pay should be given, on condition of the liquor being kept out of the way until the conclusion of the business. A caution is also necessary against the knowing follies, quackeries, and tricks of shepherds, a mulish and conceited race, full brothers, in blood, to leeches, grooms, and farriers. Wool, kept dry, may be preserved any length of time.

The sheep is of a nature wonderfully irritable and timid, which is the real cause of that stubbornness, so distinguishable in the species; it is, at the same time, a caressing animal, extremely attached to a kind shepherd, and will lick his hands and face, with great fondness; it has even great regard for his own dog, which it will distinguish, and readily approach, at any time, having been properly used. Hence the necessity of the utmost patience of temper, in a shepherd, and the use of a dog being trained in a way to do his duty, without being a constant terror to the flock. A well-grounded suspicion of sheep-biting lying against a dog, he ought to be instantly shot. No man in the present times, would, surely, have recourse to the barbarous ordeal of former days, when, besides, in the insane supposition of witchcraft, they buried the harmless sheep alive! Ellis, with much *sang froid*, or approbation, relates, that a stupid barbarian, in his days, who, one would

would suppose, had received a West-India education, hung up a poor suspected dog alive, by the heels, two hours, in order to ascertain, by his vomiting, whether he had eaten mutton; but the supposed culprit proved innocent, and the tragedy was succeeded by, in my opinion, a very pleasant comedy: the dog, on being released, instantly flew upon the miscreant, and tore him nearly to pieces.

The business of suckling HOUSE-LAMBS, depends entirely on being provided with good keep; by the aid of which the commodity may be produced either at Christmas, or any other period, the year round. The Dorset ewes, and those of Wiltshire and Hampshire, had an exclusive preference for this purpose, long before the days of Mortimer; but I should suppose any other species, of convenient size, equally well kept, would succeed equally. The early grass of the watered meadows of Dorset, is supposed highly instrumental in bringing the ewes forward, an effect which might be produced with equal certainty, on a good soil, by cabbages, carrots, and hay. Sucking-lambs, like calves, should be kept very clean with straw, in their pens, and suckled every three or four hours, throughout the day; and I think Mr. Ducket's practice, who does more largely in this way than any one else, of suffering the ewes to sleep with their lambs by night, is much the best. It was the practice formerly, to give the lambs corn and fine hay, which may be very advantageous with the weakly: oatmeal, fine pollard, and ground malt, or wheatmeal, are proper. The ewes, rather than be suffered

fered to decline in condition, must be allowed a little corn; and Dorsets, and I believe all other sheep, well kept, will take the ram a few days after bringing forth; missing the first time, they may succeed at the next return of their heat, which is in about ten days.

I have known lambs very successfully suckled by cows; and a young tup so brought up to great size and beauty; much to the annoyance of the cow-house moralists, who stigmatized the practice as *boldumptious*, and as flying in the face of God Almighty.

I must make so free with Mr. Culley, as to borrow his SYNOPSIS of the different breeds of British sheep; at the same time recommending his observations on live stock, to all concerned therein, as the best practical view of the cattle of a country, which has ever appeared in this, or, I believe, in any other language.

A SYNOPSIS

A SYNOPSIS

OF THE

DIFFERENT BREEDS OF SHEEP IN GREAT BRITAIN.

				Average weight of fleece per lb.	Price of wool per lb. s.	d.	Average weight of wethers per quarter. lbs.	Years old when killed.
1	Dishley	no horns	white faces and legs, long wool	8	0	10	25	2
2	Lincolnshire	no horns	white faces and legs, long wool	11	0	10	25	3
3	Tees-water	no horns	white faces and legs, long wool	9	0	10	30	2
4	Dartmoor Natts	no horns	white faces and legs, long wool	9	0	8	30	2½
5	Exmoor	horned	ditto, ditto	6	0	8	16	2½
6	Dorsetshire	small horns	ditto, fine short wool	3½	1	2	18	3½
7	Herefordshire	no horns	ditto, very fine short wool	2	2	9	14	4½
8	South-Down	ditto	grey faces and legs, ditto	2½	2	0	18	2
9	Norfolk	large horns,	black faces and legs, fine short wool	2	1	5	18	3½
10	Heath[1]	ditto	ditto, coarse long wool	3½	0	6	15	4½
11	Herdwick	no horns	speckled faces and legs, short wool	2	0	6	10	4½
12	Chevoit	ditto	white faces and legs, fine short wool	3	0	11	16	4½
13	Dunfaced	ditto	dun faces and legs, ditto	1½	3	0	7	4½
14	Shetland	ditto	colours various, fine cottony wool	1½	3	0	8	4½

To this concise chart of our mutton and wool, may be added the improved Gloucester, and the Staffordshire Cannock-heath sheep, both sorts highly worthy of recommendation: the first, being a Cotswold, enlarged by a Warwick, or old Leicester cross, making full-sized, well-flavoured, and profitable carcases of mutton; the latter not unlike the South Downs, and highly improvable. It were a pity the old TEES-WATER, our largest and most prolific breed, should be suffered to become extinct, since, notwithstanding their size, they have fine bone, and their flesh is fine grained; they have good backs and loins, and need no other improvement, but shortening their legs, which may be effected without any cross. The Dishley tups will prove an excellent improvement to all coarse and leggy sorts, which are bad thrivers; whilst, in my opinion, the Dishley-sheep themselves stand in need of a judicious cross. It is somewhat remarkable, that almost all memory of the Tees-water sheep is worn out amongst the London butchers; but nine out of ten of them, I have reason to believe, prefer, in their own phrase, "a good old Lincoln." If it be a national object, to promote a larger growth of our own fine wools, (which seems to be the case, at least during the existence of the wool-monopoly), the end would be attained by increasing the breed of the best Hereford, Dorset, and Downs; all which species, in their present state, give a good carcase of mutton; but should we attempt to enlarge that carcase by crossing, the quality of the wool would be infallibly reduced, as it happened with the Cotswolds. It

would be a great gratification to me, to hear of an experiment made upon the Sussex Downs, with the Shetland, and dun-faced sheep of the North, bearing the fine cottony wool, which rivals that of Spain: their fine delicate mutton would find its utmost value in the neighbourhood of the metropolis.

The ROT in sheep, is known by *the dullness of the eyes, the livid whiteness of the gums, foulness of the teeth, ill scent of the breath, and the easiness with which the wool may be pulled off.* I have seen sheep in the last stage, when their horns would come off with the slightest pull. Signs of health:—*fine azure eye, florid, ruddy eye-strings and gums, sweet breath, skin red on the brisket, wool fast, feet cool.* The rot is, or rather is occasioned by, a dropsy, *sui generis*, common to sheep and rabbits, and I believe to deer. I have had young rabbits affected with it, when the lymph or water has distilled from their mouths and noses: and on dissection, I have found it filling up the entrails, and even extravased in the chest and belly; the liver, also, full of flukes, as in sheep. Sheep, it is well known, acquire this fatal disease from super-abundant moisture of food, or wet lodging, from perspiration obstructed by cold, from distress and low keep, and various other causes. Sheep are a species which require dry countries, dry lodging, and food, if succulent, rather of a warm and spirituous, than a cold and watery nature. They are not the stock for clayey or unsound soils. An incipient rot may be stopped, and the sheep restored, by being taken up to dry lodging, and drying absorbent keep; but the disease confirmed,

ed, is obviously incurable. Saintfoin, burnet, or lucern-hay, straw, green broom, pine-tops, juniper, worm-wood, the mints, thyme, sage, rue, carduus; with ground-malt, pease, or oats, and bran, or chaff, in which may be mixed bay, or common salt, willow, or oak-bark, according to symptoms, the animals scouring, or otherwise, are the remedies. High-fed, and tampered tups, should have, occasionally, their water impregnated with purging salts, and mashes, or scalded bran. The disease called the BLOOD, arising from too full and intemperate feeding, is plainly to be remedied by moderate retrenchment, bleedings, and, if any, by cooling aperient medicines. In the GOGGLES, so fatal, sometimes, in Dorsetshire, I should take the whole flock up from their pastures, and change their food, giving them such food and medicine, as the symptoms seemed to indicate. The RED-WATER is another termination of the dropsy, distinguished from the rot. It is sometimes epidemic: the most certain symptom is the colour of the urine. Full-aged sheep most liable. The causes, sudden transition from poor to high keep, eating great quantities of washey, faint grass; but, more particularly from winter turnip-feeding, without dry meat. Turnips, from their watery nature, are our worst winter-food for sheep. Remedy:—Remove from pasture, purge and cleanse with nitre and sulphur, either dry, in bran, or in solution with boiling-water, which may be infused in the sheep's drink; or tar-water, infusion of madder, &c. afterwards, the dry regimen, as in the rot. Bleeding generally improper. In an immoderate flow of

urine, lime-water. Judicious tapping, near the flank, below the wool, beneficial in all dropsical cases, where the extravasated water may be heard and felt.

In an inveterate scab, brimstone and bay-salt, or purging salts internally; externally, strong mercurial unction, mixed with Egyptian honey; or wash with lather of black soap, or sublimate water, lime-water, and spirits of turpentine. Same for maggots, fly, &c. LICE, TICKS, FLY; camphorated unction, butter and brimstone, or turpentine, camphorated; copperas water. The FOOT-ROT; this arises from bruises and wounds, in passing over rough ground in travelling, folding, &c.:—prevent in time, by washing with a strong lather, bathe with brandy, or tincture of myrrh, and put on a leather shoe. The disease confirmed, separate the diseased; cut off the corrupted parts of the foot, wash clean, then apply the following water:—strong lime-water, one quart, corrosive sublimate, half-an-ounce, spirits of wine, eight ounces, shaken. Or Egyptian honey and brandy. GIDDINESS; if from weakness, gradually mend the keep, and give dry food: if the contrary, bleed, and give diuretics and laxatives, as above: change pasture. Wind, chiefly from cold after shearing: two, three, or more table-spoonsfull of aloes-wine, in warm old beer, or gruel, to be repeated; warm, but no cold water, scalded-bran. Or boil Glauber's salts, two ounces, in a pint of water, till dissolved; add one quarter-ounce of jalap, and a glass of gin; give a quarter-pint, sweetened with coarse sugar, shaking well, every hour. This last remedy may also be useful for

for gorged, or hoven, cattle. It has been remarked by one or two graziers, that it is not the wet, or dewy state of the herbage, which does the mischief, in this case, according to the old opinion: I am clear it is not; but the quantity merely, or the stale quality, if mowed; the stomach is so filled and distended, as to be incapable of contraction, and of its usual functions. For WOUNDS, mix tar, turpentine, fresh butter, and a little brandy.

Lambs should be kept perfectly clean behind, and under the belly; and, particularly, ewes should be well-trimmed and cleaned in the udder. In fine, the fleece of the whole flock ought to be in a neat, clean, and sighty condition. With good winter-care, SMEARING, or SALVING can be of no use. For the purpose of marking, Sir Joseph Banks has invented a metal, from which the wool receives no damage.

I have already hinted at the facts stated by a celebrated Frenchman, respecting SPANISH WOOL; the facts are farther, or rather fully confirmed, by an official advertisement, of May 24, 1800, from Lucien Bonaparte, Minister of the Interior, in France, which at the same time, gave notice of a sale of two hundred and twenty ewes and rams, of the finest-woolled Spanish breed, part of the stock kept on the NATIONAL FARM of *Rambouillet*; also of two thousand pounds of superfine wool, being the present year's clip of this national stock; and of one thousand, three hundred pounds of wool, the produce of the mixed breeds of sheep kept at the menagerie at Versailles.

According

According to this official statement, the Spanish breed of sheep that produce the finest wool, introduced into France thirty years ago, has not manifested the smallest symptom of degeneration, although the district, in which they have been kept, is not the most proper for sheep: this is proved by samples of the finest wool, brought from Spain in 1786, still preserved.

The sheep sold annually from this flock have exceeded the expectation of the purchasers.

Weight of the fleeces, from six to twelve pounds each (supposed unwashed, or in yoke); the ram fleeces heavier.

Common-bred sheep, crossed by a Spanish ram, produce fleeces, double in weight, and far more valuable than their own: the cross being continued, by thorough-bred Spaniards, the wool of the third, or fourth generation, is nearly equal to pure Spanish.

These mixed breeds kept as easily, and fattened as cheaply, as the common breeds of the country.

The speculation of improving the wool of France, by the introduction of Spanish sheep, is now fully proved and realized, and all question or controversy on the subject, at an end.

The amelioration of wool, at *Rambouillet*, has made so great a progress, that in a circle from twenty-four to thirty-six miles in diameter, the manufacturers purchased thirty-five thousand pounds of wool, improved by two, three, or four crosses. Those who wish to accelerate the amelioration of their flocks, by introducing into them ewes of this

improved

improved sort, may find abundance to be purchased in that neighbourhood, at reasonable rates. Annals of Agriculture, No. 199, p. 291.

I refer the reader to the same number of Mr. Young's Annals, for what is doing by authority, in our own country, in this important article of national œconomy. The king has been pleased to give away to different persons who undertook to try experiments, by crossing, more than one hundred rams and some ewes; and this year, with the view of national improvement in wool, his Majesty is pleased to permit some rams and ewes to be sold, at reasonable prices, namely, five guineas each the rams, and two guineas the ewes. The rams to be delivered at Windsor, the ewes at Weybridge, Surrey. Letters on the business to be addressed to Sir Joseph Banks, Soho Square, London.

The mutton of the Spanish sheep was always excellent, but their shape varies from our ideas of symmetry; they are, however, plainly improvable in that respect. After this, there can be no farther room for argument, let us, in imitation of the example set us by our neighbours, proceed, without farther loss of time, to practice.

In the ROT, Dr. Darwin advises, for a sheep, sixty grains of iron filings in a flour-ball, to be given every morning for a week, with salt occasionally: exclusive of the respect due to such an authority, I have a good opinion of the efficacy of this remedy, for reasons which would be out of place here. It is probable, a longer continuance of the medicine, may, in many cases, be requisite, sometimes perhaps with a reduction of quantity in the dose.

ON SWINE.

SWINE are ready for procreation at seven months old; but the male is unprofitable for that use, unti twelve, and is in his prime at two years. In general, the age of swine is little attended to, but that they are seldom kept for any purpose, until they are old. The sow goes nominally four months, or 115 days, with very few days variation, bringing three litters, of from five to twelve pigs each litter, in about eighteen months, supposing the pigs to be weaned; but in two or three months, less time, the pigs being suckled for roasters. Nine is an advantageous number; and it is generally, perhaps, as profitable to remove, as to suffer the sow to be drawn low, by suckling any more. The number of the teats is a common rule. I generally have the pigs castrated, at seven weeks old, suffering them to remain a week after with the sow, in which time all those in health are recovered, and fit to be weaned: any, casually hurt by the operation, (which seldom happens with a good cutter), may continue awhile longer. This, however, in one respect, may be a disadvantageous practice, preventing the sow from "hogging," or being seized with her heat, which is always induced by the reflux, or turn of the milk. All the pigs being weaned at once, and the sow shut up in a secure place, with her usual good food, her heat will, in three or four days, be sufficiently manifest, by her

her loud groaning noise, and other signs. After having received the boar, let the sow be again shut up, a few days, until her heat be perfectly extinguished. Having conceived, she will shew no more signs of hogging until within a few days, perhaps hours, of bringing forth; and the indication ought then to be particularly attended to.

LATE-WEANED pigs, or young broods of chickens, as I have experienced, by the loss of hundreds of each sort, will not succeed in this country: the sow's hogging should therefore be suffered to pass, when the pigs would have to be weaned on the approach of winter; they should be at least three months old, to be able to encounter the severities of that season, otherwise, even the warmest room in the house would, sometimes, not secure them. Sucking-pigs stand the winter much better than the late-weaned: and should a sow farrow at Christmas, the litter, with warm and generous keep, may be very successfully reared, and weaned in the opening of spring.

IN-PIG Sows should have wash of some kind, twice a day, and they may then be made to shift upon cabbage, carrots, turnips, &c. with what they can forage in the fold-yard in winter; in summer there ought to be no want of keep. As a general rule, for both these and stores, their food ought to be sufficiently good and plentiful to impart a gloss to their coats, and to give them heart enough to *bark* upon any alarm. I well understand, and have often tried, during paroxysms of experimental *mania*, the plan of starvation, or keeping them *hard*, as it

it is called: it will succeed only a few times; but for reasons independent of that, I shall never repeat it.

The sow becoming heavy, from her pregnancy, should be lodged by herself at night; at least without the company of young stores, which, in cold weather, will be sure to lie upon her belly, and may cause her to lose her pigs; this caution is indispensable when her time approaches, since were she to pig amongst other swine, they would infallibly devour her offspring as fast as it appeared. The particular care of the swine-herd ought to commence a full fortnight before the reckoning of the sow; her increasing bags of milk, and at last of all, *decrease* in the size of her belly, perhaps sleepiness, with other well-known symptoms, will indicate, with sufficient plainness, that her time is at hand.

Let no one be persuaded, by the indolent and plausible reasons of his servant, to leave a pigging sow to shift for herself; because, although she may not be given to devour her pigs, she may lie down upon them, and crush them to atoms, if she be restless during her labour, or cannot place them to her mind; and in this way, several pigs of a litter are usually lost: it is, therefore, better for the swine-herd to attend with a hamper, to secure the pigs occasionally, and to place them at last, in a safe situation, at the teats. This should be repeated several days, at feeding-time, or whenever the sow is perceived upon her legs, until the pigs become strong enough to secure themselves. The pigging-house should be warm, and secure from the inroads of

of foxes and polecats, which I have often known to make free with a sucking-pig, during the heavy slumbers of the sow.

I could never yet please myself in a PIGGING-HOUSE; the sows are always in danger of crushing their pigs against the walls: this they will do also against the floor, if you allow too little straw; if too much, and too long, they will bury the pigs under it: a medium, and the straw short, are best. I have lined the wall with furze, in order to keep the sow in the middle of the stye, to no purpose; but intend to try something of an inclining or projecting rail, around the walls, under which the pigs may escape. I have had ten pigs, out of a litter of fourteen, crushed to death by the sow, which would not move, even whilst a pig was squeaking under her, until it could be heard in the dwelling-house. Sows which devour their pigs, or which are so excessively inclined to fat, as to be indolent nurses, giving besides an insufficient quantity of milk, should never be tried a second time: the teats of some are so large and coarse, that the young can with difficulty draw them. A sow should have a deep and large carcase; and there are some lank-bellied, store-like sows, which are little worth, as breeders: but the having once a scanty litter, is no objection; since it may be merely accidental, or probably occasioned by the want of age, in the sow or boar.

The sow's wash should be warm and nourishing, at first; as to the composition, wherever skimmed milk is to be had, that, doubtless, enters into it; and pollard is the common food, enriched, occasionally

sionally perhaps, with a small quantity of some kind of meal. In the defect of milk, the wash is made of pollard and water, with, or without any addition. Respecting the question of the practicability of breeding pigs to advantage, independently of the dairy, there really never was any question: the far greater part of the Hampshire and Berkshire pigs particularly, are reared upon pollard, with the trifling addition of the house and dairy wash, which, on some farms, is very trifling. The cottage-breeder, (and I have purchased very fine pigs from such), rears entirely on pollard.

The sow may be let out to air herself as soon as she desires it, and at her own discretion afterwards. On changing her bed, (and the utmost cleanliness is necessary), remove the pigs, until the sow shall have turned over, and cross-examined the fresh straw, which she will infallibly do, and in doing which, may be very likely to bury and crush some of the pigs.

Skimmed-milk and pollard, make nourishing WASH; but, in case inferior slop be used, or water only, one third good meal is necessary. Let me repeat, it is scarcely possible to keep a milch-animal too well, waste or intemperance being guarded against. I allow a suckling-sow slop victuals twice a day, and half a peck of carrots, (in their season,) with one pint of pease or beans, as a middle-feed. Boiled potatoes are very bad, as a sole dependence, in this case, for they run through the sow too quick, and produce poor milk; they are equally bad for the young pigs, which soon learn to feed, not only scouring them, but daubing and gluing them up to

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the eyes, matting their coats, and much impeding their thrift. Young pigs should not be put upon potatoes, either boiled or raw, until three months old; when, having been properly weaned, it is not a trifle which will hurt them.

Any of the litter, appearing under-sized, consumptive, and weak, perhaps unable to reach the upper story of teats, or to contend at all for their food, had much better be taken away, and brought up by hand. Being first drenched with a little horn, or suckled by the fingers of those who do not regard a few eye-let holes being made in them, the pigs will soon learn to drink skimmed-milk, blood warm. This, by the bye, and for especial occasions, and over-notable folks; for I believe few will be inclined to take upon them the troublesome office of wet-nurse to a litter of pigs. I have yet seen, at different times, as many as a score of good stores, which had been thus reared. Some few sows I have known to secrete a milk so exceedingly thick and glutinous, as absolutely to poison the pigs, which would drop off, one or two at a time. The sows are of a heavy, lethargic habit, foul about the ears, and of a scabby, or scrophulous appearance in the face and eyes. This morbid quality of the milk, I know, from one or two instances, is not confined to brute animals.

The pigs coming too late in the season, it is best to fatten them for ROASTERS, the only case, I think, in which roasters can possibly pay, in the country. As soon as the sucklers, intended for weaning, have learned to eat, and are able to take the air, in fine weather, with the sow, it is of great service, both

to

to themselves and the sow, to allow them corn daily, oats, barley, or pease; and this may be thrown to quiet them in the absence of the dam.

After WEANING, one month, at least, of delicate feeding, warm lodging, and care. Milk and pollard stand first, among the articles of food; but pollard and house-wash, with linseed jelly, will wean very successfully: feed three times a day, twice with the above; at noon, with hard corn. It is money very improvidentially saved, which is only another phrase for throwing money away, to give weaning pigs loose, rot-gut vegetable trash, under the notion of bringing them up hard.

On STORE-MANAGEMENT, the first object is keep. Wash may be made a number of different ways, and of various articles. Potatoes, meal and linseed, boiled, make rich and excellent wash: meal and cold water alone, will make good drink for pigs. Much has been said, and little understood, about *purposely* souring food for hogs. It is not that acidity can possibly tend to pinguefaction, but that it has been found that pigs will readily fatten upon acid, or rather acescent food, a sweetish taste, and glutinous quality succeeding fermentation; and that they will do so, still more readily, upon such as has never reached the acid state, I know, and have seen in hundreds of instances. Is a proof wanted? How much more speedily do the country hogs feed upon sweet, and unfermented food, than those of the starch-house upon the fermented and subacid wash, however rich? I say subacid, for did not the Starch-makers run off a great part of the really *sour*, they would kill, instead of fatten, their hogs;

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in fact, I have known hundreds of the strongest and hardest stores so killed.

Treating of growing food purposely for pigs, I exclude all consideration of the barn-doors. If the rough-meat be of the unsubstantial kind, such as cabbages, or turnips, corn is absolutely necessary; and even when carrots and potatoes are provided, a small quantity of corn, once a day, adds to the profit of the roots, as will be discovered on sale of the stock. I have great opinion of oats, for all sorts of cattle, either fat or store. Beans, every body knows, not only make bad meat, (beef, perhaps, excepted), but they will disagree with pigs shut up; not, indeed, with them when running about. It is good practice to give *stores* corn in the straw; they will be sure to thresh it well, and at no cost. A calculation should be made of the quantity given, which may be done with sufficient accuracy.

There is no need to repeat the particulars of what has been said, of the necessity of good warm lodging, for this species of stock, and of conveniencies for their necessary separation, in both lodging and feeding. Every one who has seen pigs run squeaking homewards, on the approach of a storm, or shivering about, and lying on their bellies, in cold, wet weather, has seen much better arguments than I can furnish him with. All swine should be well ringed in the nose, those in styes, as well as others, since they will not lie quiet to fatten, whilst they retain the power of rooting up the pavement.

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The summer is the pleasant season for pig-keeping, on all accounts; they will fatten much quicker, and the stores are so easily kept. It is generally supposed, but I believe entirely without the ground of experiment, that pigs will not thrive upon clover, if cut and brought home to them in the yard. An absurd supposition, *a priori*, I think. I have the authority of Mr. Wynt, for saying, that they will thrive well upon tares brought to them; nor shall I doubt, but the same would happen with clover; and the wash with which they might be supplied at home, would help them much, an immensity of manure would be raised, and those advantages before stated with other stock, with some additional, fully experienced. As to *grazing* pigs, I believe it to be merely losing time, which they would spend much more profitably in eating better victuals. In case of a considerable number of this stock, it is much the safest method for the owner, and the fairest for his neighbours, to have the drove attended by a boy, or keeper; and they might then, without fear, be sent to any part of the farm, which may afford them provision. In the stubble, and acorn season, there is a much better plea for swine being kept abroad; but even at that time, I always prefer driving them home at night. Heavy-eared hogs are apt to have those parts cracked and sore, in the summer, and much troubled with the flies; the ears should receive a small slit, so as to bleed, and the sore parts be anointed with a mixture of tar and turpentine.

Soiling hogs on green tares, has had the greatest possible success in Herefordshire. The reason of Mr.

Mr. Young's different experience in soiling, some years ago, originated, I have reason to believe, in the bad quality of the stock. Suffolk pigs are extremely tender, and require the best food. In fact, I speak feelingly, having formerly lost considerable sums, by suffering myself to be persuaded by a servant, native of Norfolk, to feed Norfolk and Suffolk pigs.

Excepting the case of a general overflow of pig-stock, in the country, (an event, which, from the facility with which pigs may be multiplied, usually happens every third or fourth year), there are the following items in favour of breeding: five months pigs may be bred from five to ten shillings a head cheaper, on an average, than they can be purchased; and the buyer not being situated in or near a breeding district, may meet with great difficulty in procuring well-bred pigs, an object of the first consequence in store-feeding, and so well understood by the farmers of the Hundreds of Essex, that they have annually, about Michaelmas, considerable numbers purchased for them, in Herefordshire and Shropshire; these go into Essex some shillings under five crowns a head, and are sold, the following year, out of the clover and stubbles, to the London salesmen, at three to four guineas each. Success in feeding store-pigs for market, depends almost entirely, on obtaining, either by breed, or purchase, stock of good shape and growth. Stores, from four months old upwards, seldom fail to be articles of very ready sale, twice a year, at least; yearlings, and two-year old hogs, still more saleable.

Being no longer useful, or wanted to breed, sows

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are, in course, spaded, a business of no kind of danger in skilful hands, and with care taken, that the animal be empty, and not hogging. It is best performed whilst the pigs are yet sucking. I am clear from observation, (having fattened hundreds of sows together), that it is to no farmer's interest to fatten them, as they always eat more meat than clean hogs of the same weight, and produce inferior flesh, in all respects. They pay best store-fed, and at the proper season, will be sold at a good price to the London feeders.

The *rationale* of PIG-FATTENING stands thus:—Milk and corn, the maximum both as to weight, flavour, and nutritive power in the flesh, other articles may fatten, or may come in aid to corn, for that purpose, but the commodity will be deteriorated in exact proportion; so that a man, fattening for his own consumption, and economically lowering the quality of the pig-meat, does precisely that of which we are all so fond, deceives himself. I have no sort of objection to any gentleman's amusing himself, by making pork or bacon, with half corn and half potatoes; or even to his eating grass, clover, carrot, parsnip, or acorn-fed pork, provided he can relish it. Feeding for market is a somewhat different affair; but then the superior weight of the corn, or milk-fed hogs, must be taken into the account, and therein consists the superiority of the country-meat, over that which is fed in town.

Barley, or oat-meal, with one-third of that of pease, make excellent pork, or bacon, next in goodness to the milk-fed. Pigs, at meal, must have plenty of water; and when gorged, and their appe-

appetites palled, a little sulphur, in their meat, twice or thrice, will remove the inconvenience. The witches, as they are called in Hampshire and Berkshire, or sliding boards, to prevent the pigs from spoiling their meat, are very convenient. A market being at hand, and the stores judiciously chosen, fattened pigs will pay a profit of from two to four shillings a head; bacon-hogs from four to ten, a profit not inconsiderable, the corn expended being reckoned at the market-price, cartage and market expences saved, and a great quantity of the best manure raised. Hogs will fatten as well loose as confined.

The DAIRY-PORK of Oxford and Buckinghamshire, chiefly sent up alive to the metropolis, is superior to any in England, both for delicacy and flavour; its superiority over that of Essex and Suffolk, arises from the quality of the pigs, affording a greater quantity of flesh, or lean, and a firmer fat; the rhind is thick, but gelatinous and nourishing. The suffolk and Essex pork has too little of lean, and the rind is thin and hard.

The KEEP of a sow, whilst suckling, may be reckoned, upon the average, at eighteen pence to two shillings and sixpence per week; at other times, from three-pence to one shilling: pigs weaned and cut, may be generally estimated at the cost of two shillings and sixpence each; their keep, afterwards, from five to eight-pence per week, until five months old.

Memorandum, in October, 1790, "Two pails of skimmed-milk, at a meal, served well, two sows and fifteen pigs, three months old; they had bean-meal and bran, mixed, one-third of the former; afterwards,

wards, cabbages and carrots, with three sheaves of beans in the straw, making about three pints of beans, twice a day, and thin wash, to a score of pigs.

The BACON of the western counties, nearest the metropolis, is very excellent and economical provision, and the pickled porkof certain others to the eastward, in the same degree, indifferent. This seems to be the opinion of strangers to both districts. It has been said, that the method of curing bacon, is made a secret; but that does not appear to be the case in Hampshire. The following is an account of a small spayed sow, fattened and made into bacon. Put up, September 20th, weight, by estimation 11 stone, of 8lb. worth 27*s.*: fed with pease, raw potatoes, and potatoe-wash. She eat two, sometimes three quarts of pease a day, at twice; whenever the whole of these were given at once, it glutted her, and stopped her thriving. Whole expence of keep, £.1. 5*s.* 6*d.* or 1*s.* 9*d.* per week, pease, at 38*s.* nine-gallon measure. Fasted twenty-four hours, and killed Nov. 30, sufficiently fat. Salted two days after; sides laid on the dresser, and rubbed with common salt, two or three days, to drain off the blood. Quantity of common-salt to the whole, including offal, one peck; petre, half-a-pound; bay-salt, half-a-pound. Filled the hocks with salt. Taken out of pickle, December 26; hung up to dry 27th: first side taken down January 14th. Weight of the dried sides 23 stone, 6lb. The pickle had not thoroughly penetrated the thickest parts. Bacon good flavoured, but boiled away, fat being rather loose, from the potatoes.

Of the DISEASES of swine, the most fatal is styled,

ed, in London, the HEAVINGS; it is an affection of the lungs, attended by a fever highly inflammatory, and violent panting, in the last stage. It is seldom known in the country, and may be the consequence of long drift, change of food, and confinement. Air and green meat would prove the best remedy. I have, in several instances, perceived it hereditary.

It has been hitherto supposed, that the only merit of swine, was that of eating up what would otherwise be wasted; and that no more pigs could be profitably kept upon a farm, than would answer such purpose. Mortimer, and other writers, caution us very gravely, to beware of entertaining too many sows, lest they should multiply beyond the possibility of supplying them with food, and so be forced to devour each other's progeny! Nothing can be more erroneous, than such reasoning: that of eating up articles of waste, is only a part of the merits of swine, which, besides being a general stock, fit for all soils and situations, are the appropriate one of some; such, for instance, as are improper for sheep: nor need there be any peculiar limits to the number kept. I never have any objection to a score of breeding-sows; and had rather increase the number, than keep less.

The largest and best breed of swine in England, at present, are the Shropshire, Hereford, Gloucester, Berkshire, and Hampshire. The midland counties, and Lincolnshire, breed large and good stock, somewhat quicker feeders, than those of Shropshire, also very handsome porkers. Kent, Surrey, and Sussex, possess an excellent race of home-breds, for both purposes of bacon and pork.

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The best breeds for pork are the smaller Berkshire pigs, and the Oxfordshire, a variety of those: these are the handsomest pigs of this country. Both the Yorkshire and Shropshire stock have been much improved of late years, by a Berkshire cross, giving them better loins and shorter legs. Essex, Suffolk, and Norfolk, (part of the latter, near Lynn, excepted), have a most unprofitable breed, which nothing but indolence and the strongest prejudice could retain in those counties. It has been fashionable to attribute a vast improvement to the introduction of the Chinese breed, but either on none, or very insufficient grounds. Granting the alledged improvement, we had no need of going to China, or even out of our own country for it. The truth is, I believe, that they have *not* improved our breed.

But for the best information on this subject, which indeed deserves great attention from all cultivators, I take the liberty to refer country gentlemen and farmers, to Messrs. William and Thomas Wynt, and Messrs. Edmund Cotteril and Sons, salesmen for pig-stock, at Smithfield, Finchley, and Barnet; men of the most extensive concerns, and first respectability in their line: and not only respectable for their solid, independent property, but for the well-known liberality and integrity of their characters. These gentlemen have taken great pains, during the last twenty years, to improve the breed of pigs in various parts of the country, and have succeeded as far as prejudice would allow. James Sewell, Esq. a gentleman farmer, of Sutton, in Suffolk, and a friend of Messrs. Cotteril, has, through them, obtained an improved

breed

breed of pigs, which exhibits a good example, and may, in time, be the means of introducing a valuable species into that county.

ON RABBITS AND POULTRY.

I have seen no warrens, but such as appeared to me, capable of producing some article of the cattle-crops; and, in my opinion, it would be much more for the interest of the country, to be supplied with rabbits fed at home, than running at large, in which state they are, in many parts, a great nuisance.

Rabbits, (I speak from experiment), are profitable stock upon a farm, and would be so, in a very eminent degree, were they not liable to so many casualties, and were they equally successful in winter as summer. The DOE will breed at six months old, and goes thirty days. Give hay a few days before kindling, for bed. The necessity of doe taking buck immediately, mere Pater-noster-row, stuff; wean the young at six weeks, then give the buck. Young weaned rabbits to be separated, as soon as they begin to fight. Keep clean, and dry, and warm, in cold weather. Feed fresh and often. An even hand to be kept, between moist and dry food. The weeds commonly given them from the fields, too faint and diuretic. Give clover, cabbage, carrot-tops, endive, carrots, &c. clover-hay, pollard, oats, barley, grains.

Poultry are an article of luxury, for which the little farmer never obtains an adequate price. He had better allow his wife a certain annual sum, for pin-

pin-money, than suffer her to keep these devourers. The best, whitest, and sweetest fleshed chickens, are the common barn-door fowls, and the game; they may be improved in size. Best breeders and layers, DARKING, and POLANDERS; they make large fowls, but of a yellowish, ivory white. The SHACKBAGS, or Duke of Leeds breed, the largest we had, are worn out. The CHITTIGONGS, or Malay fowls, are very large and coarse, fit only for soup; but they lay fine large eggs. Four hens to a cock, or five at most. Hens set twenty-one days. Leave plenty of nest-eggs when you desire them to set. Take away the strongest chicks as fast as they are hatched, securing them in wool, until the whole are hatched and strong enough to be cooped. Hens not to be cooped near, as they may kill each other's chickens. Young poultry fed by themselves, or under coops, as the large are apt to tread the smaller to death. Feed the chickens with split-grots, at first; afterwards with tail-wheat. The best food for this kind, barley; to fatten them, barley or wheat-meal and milk. Boiled-barley or malt, toast and ale, &c. to make hens lay in winter. The true shape of the COCK and HEN, short-legged, and long-bodied, but plump.

DUCKS set thirty days. One drake to five ducks. They begin to lay in February, and must be well attended, or they will lay their eggs abroad. Duck sets over eleven to fifteen eggs. To be watched and fed when they leave the nest. When hatched, trim the down from the tails of the ducklings, feeding first with barley-meal and ground-malt. Water in broad dishes, that the ducklings may not go to the pond too soon, whither they must not be allowed

ed to go, at their full liberty, until a month old, at least. A duck, with young ones, always to be kept away from others, being allowed plenty of clean water and straw. Ducks are great devourers of any kind of victuals; but will make but a poor figure without corn. In the acorn season, they will get very fat, and do not eat amiss; fed with the offal of the slaughter-house, they acquire the colour and flavour of wild-fowl. The RHONE breed, from France, are larger, but coarser-fleshed, and not so fine-flavoured as our own; they cross well with the English breed.

An exception must be made in favour of GEESE; which will graze to advantage, and make much good manure; they are, besides, useful in a farm-yard, for giving alarm, by night. One gander to five geese, setting and management similar to the duck.——The goose carries straw in her bill, as a sign she is about to lay, and must then have a nest prepared for her. Give chopped-cabbage, lettuce, or carrots, and some corn, (oats), particularly when they set, for the young ones, chopped-clivers and meal. Not to be sent out to graze too early, and always fed before turning out, lest they wander beyond their strength, which is the occasion of many being lost every year. Suffolk geese are as good as any. A goose fattens well on oats, in six weeks, littered down with clean straw; if from the stubbles in two or three weeks.

TURKIES, a staple article in Norfolk, where the good wives send their hens to some cock kept in the neighbourhood, to avoid the charge of keeping a stallion. Hen covers eleven or more eggs, according to her size, and will steal a nest abroad, unless

unless watched. Take away the chicks as fast as hatched. Feed with curd, barley-meal, ant's-eggs' &c. Keep the brood up for a month, turning out a few hours in a day, in a secure place, taking care the hen does not drag them through wet grass, she being entirely careless of them. Give skimmed-milk to drink. The practice of cold-bathing young turkies, and giving them a pepper-corn, is merely notional. Keep very clean and dry, and prevent the young from scouring, which is fatal. Gravel; boiled flesh-meat chopped up, is strengthening, both to young turkies and chickens.

PIGEONS set seventeen days, and always pair, seldom laying more than two eggs. The cock and hen set alternately. They breed all the year round, in the dove-house. The small sort, called TUMBLERS, are most attached to home, and very good breeders. Feed with tares, or any corn; but they are remarkably fond of bird-seed. Keep the dove-cote extremely clean, in which pigeons much delight; sand the bottom, whitewash the walls, and place the boxes against the wall, two to each pair, out of the reach of vermin. Pigeons ought to be fed at home, that they may trespass as little as possible.

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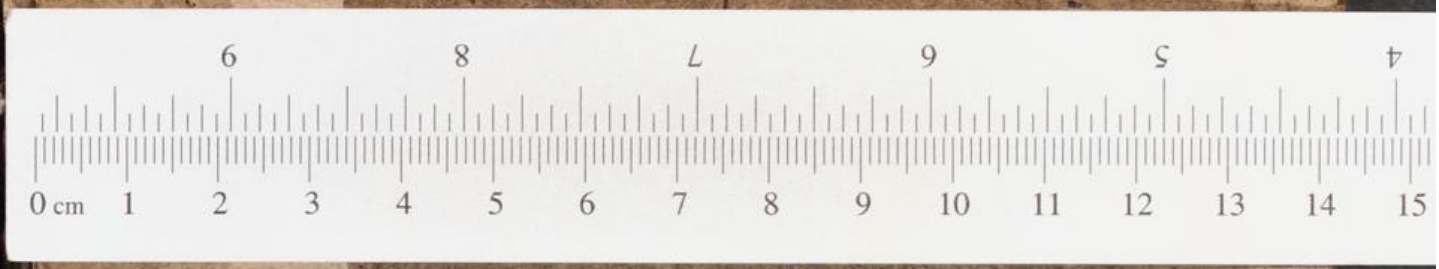
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