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METHOD OF PRESERVING TURNIPS FROM THE  
FROST.

*To the Editor of the Agricultural Magazine.*

SIR,

THE Magazine, containing the request of Agricola Northumbriensis, that I would communicate to your readers our method of preserving turnips from the frost, not being sent me till it was too late to send any communication for insertion in the succeeding number, prevented my complying with his request at that time. I fully intended to have sent it the following month, but I understood from Agricola Norfolciensis, that he had already done it. As for some reason his letter did not appear in the Magazine, I will thank you to insert this in your next, though I am afraid it will be too late for any advantage to be gained by it this season.

If the turnips are sown in the Northumberland method, a double breasted plough is passed up every fourth or sixth furrow; the turnips are then drawn from the ridges on each side and placed in it, two or (if they are small) three abreast in an upright position; the mould is then thrown up to the turnips, by a common plough passing up each side of them. In doing this, it will be necessary to use a long pulling tree, and to have a boy to lead the horses, to prevent their treading on the turnips. If they are sown on a flat surface, I prefer making the furrow with a bout of a single plough, as it will be found very difficult to make them sufficiently deep and wide with a double one. A better method, I think, is to cart the turnips from the field where they were grown, to one that is intended to be sown with turnips the following year, as the succeeding crop of barley is frequently very much injured, by the turnips remaining on the ground late in the spring. The additional expence will not exceed five shillings an acre. If any of your readers wish for a more particular description, I must refer them to the 21st volume of the Transactions of the Society for the Encouragement of Arts and Sciences, where they will find it communicated by the ingenious inventor himself, the Rev. T. C. Munnings, Rector of Howe, in this county, who received from that society the gold medal for the invention.

Notwithstanding what has been advanced by your two northern correspondents, I still retain my former opinion, of the impolicy of giving bounties either on the importation or

exportation of corn; and I confess my head is not sufficiently clear to see the aptness of the story of the Phrygian king, alluded to by Agricola Northumbriensis, for it is my opinion, that with a guinea a guinea's worth of corn may always be bought; and I have not the least doubt, that whilst we have either money or manufactures, any nation, which has more corn than it wants, will very gladly exchange with us, and the desire of gain is so universal, that whilst it is sufficiently high here to pay our merchants for importing, there is little fear of their not bringing it to us. A. N. says, it would not be contrary to my principles to maintain, that it would be better to depend entirely on foreign supplies. There is very little danger of this ever happening from a free trade, as, although corn may be lower in the North of Germany, Russia, &c. than it is here, yet, after adding freight, insurance, and the profit of the merchant, it will be found to be quite as high with us as in a plentiful year.

I may possibly be wrong in my assertion, that corn is generally higher in France than in England; I had my information from a French emigrant, who said, that though the luxuries of life were cheaper, bread was dearer. Wheat was then selling in England from 42s. to 50s. per Quarter. That barley, at least, is frequently higher in Holland, is an assertion which, I am confident, all our merchants will confirm. A. N. insinuates, that I ought to reason from facts and experience rather than theory. That it is a fact, that the expences of farming have kept pace with the price of corn, I think few will deny, more particularly if they have read the two letters of A. N. on that subject, and there is so little danger of commerce enervating our hardy sons of the plough, that he will find it to be no less a fact, that the most commercial nations have always been the most powerful. It is a fact also, that more than half our recruits are supplied by the large manufacturing towns. Even allowing that a bounty on exportation would increase the revenue of the landlord, that of the farmer certainly would not be increased by it, except during their present leases: for if it be as A. N. asserts, that commercial capital yields a profit so much superior to that employed in agriculture, there must be some cause for it, which cause would continue to exist, if, by bounties corn was raised to double its present price, and, consequently, the same effect would follow; and to endeavour to increase these means, the profits of the farmer would have much the same effect as an act of parliament, giving a bounty of 20 per cent. on all money laid out in the purchase of land, because that pays only four, whilst money lent on a note or bond pays five per cent. One reason for the superior profits of commercial capital, may be the independent life of a farmer compared with that of a trader of the

same fortune. He carries his corn to market, where he is sure to sell its value at that market, and as the corn is generally paid for within a short time after it is delivered, his bad debts are nothing compared with those of a trader. Nor is he obliged, every market day, to receive the visits of half a score old women, who, after examining and making observations on all the goods in his shop, assemble over his tea-table, to make matches between persons who never saw each other, and spoil half the reputations in the neighbourhood. But they are his customers and must be invited.

The measure proposed by Agricola Septentrionalis, of giving a temporary bounty on exportation, instead of being beneficial, would prove one of the most injurious that could be thought of. Many, from the advanced price of corn, would be tempted to take long leases of farms at an advanced rent: no sooner have they done it than the bounty is repealed, and, consequently, a diminution in the value of corn immediately takes place, and, unless he be a man of great property, bankruptcy and ruin must inevitably ensue. In all that I have here said, I would not have any of your readers suppose, that I attribute any part of the present high price of corn to the late corn act. Its effects cannot have begun to operate yet, as corn has never, since its being passed, been sufficiently low for the bounty to take place. We have no occasion to look for any other cause, than the deficiency of the two last crops of wheat. The last crop of barley is also, I am sorry to say, very defective.

There were lately two agricultural experiments made in this neighbourhood, which you may think worth communicating to your readers. One was on the efficacy of lime as a manure. Four ridges, about twenty yards wide each, in the middle of a large field, were alternately manured with lime and rape seed cake. The quantity of lime was, I think, three chaldrons to an acre. The part oil caked had a quarter of a ton an acre, drilled by a machine, which throws the oil cake, reduced to powder, and the turnip seed, into the same drills. The soil was a strong, dry, red loam, with a few spots of gravel interspersed in different parts of the field. On these gravelly spots the turnips were rather superior on the parts which were limed, but on the loam the oil-caked ridges produced, at least, double the weight of those which were limed.

The other experiment was between the Northumberland and broadcast methods of sowing turnips. The event must be very gratifying to Agricola Northumbriensis, as from a portion of each weighed, it was two tons seven hundred weight in favour of the Northumberland method, although it was the first time that any turnips had ever been sown, in that manner,

by the person making the trial, and consequently, it cannot be supposed to have been done in perfection.

I will thank A. N. to give us a particular description of the drill used by him to sow turnips on small ridges.

A Novice requests to have some information on the selection of live cattle for grazing. My advice to him certainly would not be to chuse thick skinned, large boned, hard handling beasts, and if these were his criteria of excellence, there is no occasion to account for the superior fatness of the beasts bought by the more experienced graziers, by supposing they had any artificial food given them with their grass, to promote pinguefaction. In every agricultural publication he will find very ample dissertations on broad loins, straight backs, short straight legs, smallness of bone, &c. &c. and after having read all this, there are so many undescribable minutiae which can be gained by experience, to be attended in the selection of stock, that he may go to a fair, and, very possibly, lay his money out just as badly as he did before, and the best advice I can give him, is to take some experienced grazier with him when he selects his beasts, and he appears to have so little knowledge of practical farming, that I would also advise him to hire a bailiff, who has lived with a person that had the reputation of being a good farmer, or, it is possible, he may find farming a very unprofitable business.

I am, Sir, your humble Servant,

Dec. 16th, 1804.

R. W.

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*For the Agricultural Magazine.*

We have the pleasure of laying before our Readers the following ideas of a very eminent practical writer on husbandry (Dr. Dickson) on the *SIZE* of Cattle. They will be the more acceptable, on account of the references which are made to them by several of our Correspondents.

ON THE SIZE OF CATTLE.

**A**S the principal object of the breeding farmer must constantly be that of obtaining such animals as will afford him the largest profit; it may be necessary to ascertain the nature and form of animal that may be most advantageous in this view, or which pays the best for the consumption of its food; as by this means it will be seen what points are the most desirable or useful in a breed or variety, and what circumstances ought to be attended to, so as to justify its introduction in preference to another.

The properties that would seem more particularly to deserve the attention of the farmer, in his different views and schemes of improving the breeds of live stock, may be considered under the different heads of *shape, size, disposition, hardiness, quick*

maturity, nature of flesh, fattening property, milk, hide, aptitude for labour, and what may be termed the quality of the breed, or, in the language of the art, blood.

In respect to the first, the ideas or opinions of breeders have differed very materially; but it is obvious, that there can only be one true or perfect, from which must be that which approaches the nearest to exactness in the shape and proportion of the different parts. Whenever this is met with, it indicates the true form, and is that which ought to be aimed at by the breeder, whatever the nature or breed of the animal may be.

In this view, a perfectly formed animal should have an exact proportion and consistency in all the different parts; the head neat and compactly formed, but neither too large or of too great a length; the eyes bright and prominent; the neck not of too great length; but somewhat thin, gradually narrowing from the breast towards the head, to which it should be neatly attached; the chest round, wide, full, and of deep girth; the length of the legs well proportioned to the size; the fore ones straight and clean, the hind ones forming an angle at the hock, so as to stand well under the loins; the distance between the feet in the different extremities equal; the feet round and even, the hoofs straight; the back and loins straight and broad; the belly firm and capacious; the quarters deep, full, and well fleshed downwards.

It is, however, difficult to convey any very correct idea of shape by words; but that which comes up in some measure to this standard would seem to constitute that "utility of form" which has been the great object of modern breeders. And it is probable that such a form is the best calculated for the chief object of the farmer, which is that of receiving and supporting flesh in the practice of fattening: as, where animals much exceed or fall short of such correct proportions of parts, there must be inconvenience or disadvantage, either in their being weak and less disposed to fatten,—of course requiring more food and a greater length of time for accomplishing the business,—or in their being deficient in the general weight and value of the meat, from their not fattening sufficiently on the best parts. It has been observed to have been the constant principle of a most intelligent breeder, to procure such animals, whether of the cattle or sheep kind, as were capable of weighing the "most in the most valuable joints," as there is a great difference between an ox of fifty stone, carrying thirty in roasting pieces, and twenty in coarse boiling ones,—and another carrying thirty in the latter, and twenty in the former. It must undoubtedly be an object of great importance, to have those parts which are of but little value, as small and of as little weight as possible. It may also be ad-

vantageous in particular cases, to attend to the nature of the consumption in the shape of the animals, in the manner that has been just seen, as, where some parts are more in demand than others, and consequently sell at much higher prices, that shape which is most favourable for this purpose should be more attended to.

It is probable, however, that it is on the just proportion and symmetry of parts in the animals that are employed for the purpose of the breeder, that improvement in this as well as other important points must depend. And of course it seems not improbable, but that the excellence of the most valuable points in all the different sorts of stock may, in some degree, bear a proportion to the goodness of the form in the animals.

That fine fullness of shape which has been distinguished by breeders under the term "beauty of form," has been considered as distinct from that of "utility of form," and to consist in a more perfect rounding of the parts, and a less appearance of bony protuberance. But though it must constantly be a very desirable object to bring the shape of the animals as near perfection as the difficult nature of the business will admit, yet utility, or what may in other words be termed profit, must be principally considered, as being the immediate object of the stock-farmer.

In the size of animals there is a variety, which admirably adapts them to the variations of soil, climate, situation, and food, as well as the different views and purposes of the farmer.

The long agitated question, whether large or small-sized animals are the most profitable, or pay the grazing farmer the most money for the food they consume, is not yet fully decided; nor is it probably capable of being easily ascertained, on account of the great difficulty of making experiments under an exact similarity of circumstances, in regard to breed, pasture, food, exposure, and other points; and what is the difference in the growth, or increase of weight, or of labour, between large and small animals, in proportion to the quantity of food which they take for their support. And lastly, what is the difference in the increase and quickness of feeding, in stock of different sizes, in relation to the quantity of food which they consume. A varied set of experiments, correctly made with a view to these different points, would no doubt lead to many useful conclusions, though they would not, probably, finally settle the dispute, on account of the great difficulties that must always attend such comparative investigations, from the variation of circumstances and other causes. It would seem, therefore, that, in the present state of our knowledge, no certain directions can be given, in respect to the size of cattle, that will be generally applicable in governing the conduct of the grazier. The largeness of size, though it is a property

that may be desirable, in so far as it affords the means of feeding to a great weight; yet, as this is probably acquired by a much larger and longer continued consumption of food, it is probable that, except in situations where food is abundant, the smaller-sized animals may be the more profitable. In deciding the point, it is not merely, as has been seen, the difference in the quantity of flesh that they are separately capable of affording, but the difference of such quantity in relation to the consumption of food, that is to be considered. It was found by Mr. Bakewell, that the "smaller the bone, the truer the make of the beast," and the quicker in fattening; which throws the advantage on the side of small size: and the experience of graziers in general seems to favour the same conclusion, as they commonly find that the middling and small breed are the most profitable, from their fattening with the greatest expedition. And it has been well remarked, that the Lincolnshire and Holderness breeds of cattle "are very large, but their size lies in their bones: they may be fattened to great loss to the grazier," but can never "return so much for a given quantity of grass as the small-boned, long-horned kind."

It may perhaps be objected by some, that the difference in the consumption of food between the large and small sized animals is not so considerable as is commonly supposed. But though it must be allowed that considerable latitude may take place in this respect, according to the state of the digestive organs and other causes, long experience among graziers has shown in the most decisive manner, that a number of small-sized stock consume much less food in a given time than large, as in some cases they can stock nearly in the proportion of two to one. Mr. Knight, however, inclines to the side of large cattle being the most profitable, from their not consuming food in the proportion of their weight; as, on putting the question of the difference in the weight of food consumed by the largest and smallest in a given time, to different breeders in different parts of the district where he resides, he found that they agreed, "that the same quantity of food was given to the smallest and the largest beast of the same age; that the largest, even when not master of the same fold, often kept itself in the best condition; and that every thing depended on the disposition to fatten, and very little on the size of the animal." In his own stock he also asserts the same thing to be precisely the case. It is however admitted, as just stated, that a certain quantity of large cattle will mostly consume more than the same quantity of small ones; but not by any means in proportion to their weight.

With regard to any difference that may take place in the quality of the meat from the difference of size, it would seem to be in favour of the smaller breeds; as the fineness of the muscular fibre, or what has been commonly termed the grain

of flesh, has been found to be the most delicate in the smaller breeds of animals. It is on this account, as well as that of convenience, that the mutton, beef, and other sorts of meat of small animals are so constantly preferred by the nice palates of those who indulge in the pleasures of the table.

In opposition to the idea that small animals, when fatted, are in common worth more for any given weight of meat than large ones; it is contended, that if the animal be taken as it stands in the pasture or stall, the contrary is the truth; but that, when the butcher merely buys what are termed the valuable parts, and receives the offal into the bargain, he will unquestionably, for obvious reasons, "give more for two cows of twelve store each a quarter, than for one of twenty-four." The offal is of much greater value, besides a considerable advantage in the hides. In short, it is concluded that "the differences between the weight of the animals when living, and of the four quarters when dead, is always in an *inverse* proportion to their size when their forms and merits are equal; but the bones will *then* be in proportion to the *living-weight*, and therefore small animals must be in this case most *disadvantageous to the consumer.*"

From the greater size of the muscular parts in large animals, the flesh would, however, seem to be more coarse in the very large breeds, and of course be less valuable, than in those of the small.

It is also supposed an advantage in the large animals, that the meat when preserved for future use is not only better, from the juices being more fully retained, but from there being less waste, on account of the external surface being proportionately less.

And it is observed, in regard to the opinion that animals of the smaller kinds are in general more hardy than those of the large breeds, that if it be meant merely that they are capable of subsisting on shorter herbage, it is right; as a large animal, though it may have exactly the same form as the small one, necessarily requires more time for rest. It feeds and removes itself with greater labour; and notwithstanding it may be as strong again, as having double the weight, it will still in relation to itself be a weaker animal. Its head and neck will be as heavy again, and from their greater length, the weight will recede further from the centre of motion in the shoulder; consequently increase in power in proportion to the distance: and the same thing holds good in respect to the whole of the limbs. In the stall, or the fold, where large oxen are mostly fed, these disadvantages are of no consequence, as the food is received without the trouble of looking for it; and if the necessity of a better pasture does not proceed from the larger animal consuming much more, but from less power in collecting food, the consequence will be, that it must "afford the largest weight of flesh with the smallest consumption of grass."

## ON THE MANAGEMENT OF BEES IN RUSSIA.

*For the Agricultural Magazine.*

**T**HIS, which in most countries of Europe, forms but a very insignificant branch of husbandry, is in Russia an important business, strenuously carried on, as the chief means of subsistence to some nations, it obtains a product which is even not indifferent to foreign commerce. So considerable a quantity of wax is produced in the Russian empire, that, after deducting the home consumption, about 12 to 15000 pood of it are exported only from the ports of the Baltic. Honey likewise forms an important article of inland consumption, as almost all Siberia is provided with this necessary from European Russia. The best sort is the white linden honey principally obtained from the hives of tame bees in those parts, where the Lindenmost forests abound, as on the Oka, the Don, in White and Little Russia, in the newly acquired Polish provinces, and in the western of the southern Ural. Of both products Russia exported in the year 1793 to the amount of upwards of 383000 roubles, whereof the export in wax and wax candles alone amounted to 378000 roubles.

The culture of bees is prosecuted in Russia in a way peculiar to itself, and more than any where-else in the gross. Bees are kept, indeed, in most of the governments, but the wild culture is by far more vigorously pursued, and particularly in the Uralian forests in the government of Ufa, whereas, beyond the Uralian mountains and throughout Siberia, there are not any bees. The nations which chiefly devote themselves to this business are the Bashkirs, the Tartars, the Tschuofches, the Tscheremisses, and the Meschtscheriaks, particularly in the governments of Kazan and Ufa. Among the Bashkirs are individuals who possess, besides their bee gardens, some hundreds, nay, some thousands of wild bee hives in the forests, and obtain yearly from forty to an hundred pood of honey. The manner of proceeding with the bees is with all these nations like that in use among the Bashkirs, accordingly we will give a brief account of only theirs.

Most of the bee staves are in the forests where these insects spontaneously enter the hives prepared for them by the people. To this end, the Bashkirs look out for the strongest and straightest trees of the hardest kinds of timber, on which, at the height of three or four fathom above the ground, they construct the bee-house, by hollowing out the trunk plain and smooth with a tool resembling a chisel, closing the aperture by a board in which are left little holes for the bees to enter and come out at. The dexterity with which the Bashkirs perform this work, and climb up the loftiest and smoothest trees, is

truly surprising. A sharp hatchet and a common rope is all that they require. The workman places himself against the tree, fastens his rope round his body and the trunk, makes with his hatchet a notch at a certain height in the tree, and setting his feet against the tree, springs by the assistance of the rope up to that height, whence he makes another notch as high as he can reach, and proceeds in this manner till he has attained the proper elevation. Here he must tarry longer: he makes his step more commodious, and resting in the rope, performs the necessary work, for which he has brought up the tools in his girdle. Below the bee-house all the branches are carefully cut away, to render the tree more difficult for the bears to climb. Notwithstanding which, these animals still pretty frequent in the Uralian forests, are the most dangerous enemies to the culture of bees, and therefore the most arms and other means are employed against them.

The most useful of these is the contrivance of furnishing the whole trunk of the tree with knives or iron spikes crooked upwards, which the bear indeed in clambering up, is cunning enough to avoid with great dexterity, but in sliding down they generally cost him his life. Yet there have been instances that old thieves of this species, even in climbing up, have loosened and destroyed these weapons with their paws. With surer success, a thick block of wood is employed, by being suspended before the aperture of the hive, which, as often as the bear with increasing fury throws back, swings back and hits him on the head on rebounding from the tree. At length, irritated to the utmost, he increases the violence of his efforts, and at last, exhausted by rage and exertions, he falls upon the spikes that are placed on the ground to receive him. But the most ingenious is a trap of the simplest kind, by a square board with a rope at each corner united at top (like a large scale we see in a wholesale shop) and fastened to a branch in such a manner, that the board is on a level with the door of the hive. The bear, finding this feat so conveniently placed to receive him, gets into it, and begins tugging at the slight fastening to the trunk of the tree, which hinders him from getting at the hive. Having loosed the catch, the board swings off with him to the perpendicular direction on the branch to which it is suspended, where he is obliged either to sit in the air till his pursuer arrives to shoot him, or to throw himself down on the pointed stakes planted at the foot of the tree. Another foe is the woodpecker, who is kept off by thorns or twigs.

It has been affirmed by Maraldi and other writers, that in one hive there are seldom more than 18000 bees. Counsellor Rytshkof Orenburg weighed in an accurate balance dead bees, and found that seventy-five went to a solatnik, but for greater certainty, reckoning only fifty to the said weight. A good

swarm contains in those parts from ten to twelve pounds, and the very worst, of which they generally bring two or three swarms into a hive, three or four pounds; yet there are even swarms of eighteen to twenty pounds. According to the foregoing weight, therefore the bees in twelve pounds must be reckoned at least at 57000, and in nineteen pounds, at least 112000 bees. If this observation does not refute the calculation of the French author, it at least shews, that the bees in France and in Orenburg, must be of very different kinds.

It has been further asserted, that the bees are very cleanly insects, collect their honey from trees and flowers only; but in the district of Orenburg it is uniformly maintained, that likewise blood, flesh, and other less cleanly substances, are of service to them. Rytchkof, desirous of knowing from his own experience, whether his bees would feed on flesh, caused a fowl to be killed and drawn, and put in a hive, which remained three or four days untouched, but as soon as it began to putrify, it was devoured to the very bones.

#### ON THE MANAGEMENT OF NEAT CATTLE IN A NORTHERN KINGDOM.

*For the Agricultural Magazine.*

**T**HE method in which the breeding of neat cattle is carried on in Russia, differs immensely from that pursued in other countries of Europe. What was before mentioned of the defects of cattle-breeding in general is particularly applicable to this branch of it; for no where can carelessness in the management of these beasts be carried to greater lengths than here. Immediately as the snow is melted from the ground the horned beast must seek his own nourishment on frequently very poor and distant pastures, and from this period he is not to expect a handful of provender at home, till the winter again renders it impossible for him to graze; in that season indeed he is foddered in the stall, but so penuriously that his bones seem ready to start through his hide, and he frequently cannot raise himself without the help of his keeper, as not seldom dry straw and cold water are all his nourishment. Only the cows when they have just calved receive a little hay and meal, and yet they suckle their calves, and here and there, e. g. in the provinces of the Baltic, yield during the summer, forty pounds of butter and more. Even the practice of having warm hovel is not in use in the most woody districts, and to all these deficiencies so baleful to the prosperous nurture of cattle, must still be added, particularly in Siberia, frequent distempers.

It is scarcely necessary to remark that this description only in general holds good; and that particular districts as well as particular farmers form many advantageous exceptions to it.

Yet for the fault that is in general so striking, some apologies are to be found grounded in the physical and civil state of the Russian empire; and against which, little or no reply can be made. The proper feeding, for instance, with such large droves as are in Russia, is, perhaps, not practicable in the governments where the rearing of cattle is pursued not as a principal trade, but only as a collateral branch of husbandry, it might certainly be more general; but in these there is no want of diligent countrymen who take great care to fatten the neat cattle. In this regard the governments of Riga, Revel, and St. Petersburg, have been already brought as instances, and besides these, several others might be named. The herds of the Nomadic nations fatten themselves on the rank steppes, and industrious peasants in many parts of the empire follow the grazier's business as a trade or for their proper use. Careless country people and herdsmen, indeed, leave their cattle to seek their provision, during the winter, under the snow, especially on such parts as feel a want of fodder; but who can blame them for it, when it is considered that the low price of cattle affords the owner but a very moderate profit, and that this circumstance, jointly with a total want of a demand, or the difficulty of obtaining a vent for them, holds out no encouragement to care and laborious attendance. The arguments against common pastures, and for their enclosure as well as for house feeding, may be completely justified in other countries by experience: but they do not every where, except under certain limitations, suit the Russian empire, in which are excellent pasture grounds in abundance, but proportionably few people. The short summers in the northern districts, may be employed in more profitable occupations than hay-making, as the multitude of field-labourers scarcely allow time to the inhabitants of the country to gather in their miserable crops. The richest common pastures consist of monstrous large flocks, the partitioning of which, would be attended with infinite difficulties; and how could the nomade, without the use of them, maintain his droves, which he numbers by hundreds and thousands, and which must be attended without hired people? these, and many other circumstances here unnoticed, shew that the methods of breeding of cattle in England, Germany, and Holland, can only be very conditionally applied to Russia. With all the real or imaginary defects to which it is here exposed, it, however, affords the inhabitants many, and in some districts all the means of livelihood; and yields besides, to commerce, a multitude of important products for exportation.

Here first present themselves to our notice, hides and tallow, two main articles of Russian commerce. Of the latter, in the year 1793, above 1,035,000 poods were exported, and the value of that quantity amounted to 4,279,000 roubles, not in-

cluding the tallow candles, the exportation of which, came in value to 170,000 rubles. Yufts and leather, in the same year, were shipped off to the amount of 2,249,000; and the other exports in the products, arising from the breeding of horned cattle, as live oxen and cows, salted beef, tongues, and butter, made a sum of more than 163,000 roubles. The whole value then of all these articles, was upwards of 6,862,000 roubles, for the most part, or entirely gained by the breeding of neat cattle, and in which the wrought up materials, as soap, &c. are not mentioned. So astonishing an exportation as this, confutes all theoretical objections, which entirely lose their force if we observe the rising proportions of the exports we have just been naming.

Yet great as the benefit is which Russia receives from this branch of her industry, it is not to be denied that it might be greater. All the districts that are adapted to the breeding of cattle, are not, by far, employed to that end; this may, particularly, be affirmed of the spacious plains of southern Russia, in which very numerous herds might be supported with the utmost convenience. The breeding of neat cattle would be the properest employment; for the scanty population of those districts where the pastures are richly furnished with spurry and golden clover, and the winters are short, and where the salted beef, by the navigation of the Euxine, might find an excellent market at Constantinople. Such an increase of horned cattle would likewise augment the production of hides and tallow, which at present is insufficient for the demands of the foreigner; and the preparation of these articles would be much the more facilitated, as the former imposts on tanneries and tallow melters, have been abolished since the year 1775. An important object of national concern is also the increase of the buffalo, of which there are already considerable numbers in the governments of Caucasus, Ekatarinoflaf and Taurida, where the breed of them ought to be encouraged by all possible means. This animal is also not only much stronger and better calculated for labour than the ox, but his hide forms an important article of commerce to Smyrna, and yields the best materials for sole leather which Russia annually imports. Cheese, likewise, made from buffalo's milk, is excellent; and it would be well worth while to make this commodity in the country, rather than continue to pay considerable sums for it abroad. By the introduction of the Tangutan horned cattle, the Russian breed might be considerably improved. This beast who lives wild in the Soongarian mountains, and is a domestic animal in Thibet and the Pouckhareys, affords good beef, yields a good deal of tallow and plenty of rich milk; their calves are easily tamed, but the full grown refuse to mingle with the common herds. This species might even become a domestic animal in the lower regions of the Don, and about the Terick,

or perhaps is already; if according to the supposition of Pallas, the buffalo, which is kept there, be only a degeneracy of the Tangutan neat cattle, or become more domestic.

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ON THE BREEDING OF SHEEP IN THE  
RUSSIAN EMPIRE.

*To the Editor of the Agricultural Magazine.*

SIR,

I THINK you will deem it consistent with the general design of your work, which has lately been particularly directed to the improvement of sheep, and the consideration of wool in different parts of the world, to insert the following account of the condition of that animal in a northern empire:—The breeding of sheep is, in the Russian empire, proportionably much greater even than that of neat cattle; but this department too, of productive industry, is far short of that perfection to which, by nothing more than an enlightened guidance, and a more active exertion of the art of husbandry it might attain. Almost every where the attention is only directed to increase the breed of this useful animal, without thinking of its improvement; and the immense pastures of Russia that are covered with flocks of sheep do not supply wool enough to enable the country to dispense with the importation of that necessary and common material of manufacture. Yet the Nomades are richer in sheep than any other species of cattle, and even Boors and Kozaks, in Southern Russia and Siberia, possess flocks of hundreds and thousands. The ordinary Russian sheep, particularly in the Northern regions, are not very large, short tailed, and bear a coarse and harsh wool, which, however, is sometimes mixed with finer; some few provinces are an exception to this, in which attempts have been made to improve this species by crossing the breed with better races, and by greater care and attendance. The long tailed Tscherkassian sheep, kept by the Kozaks of the Don, and in some districts of the Ukraine, yield a better wool: as also do the breed found in the governments of Kharkof, Kuisk, Orel, Tambof, Kazan, and some others, from which the greater part of the wool for the inland cloth manufacturers is fetched. The attempt made by Peter the Great, to improve the Malo-russian flocks by Silesian sheep and goats, has not been attended with any great consequence; however, the beneficent views of that prince have succeeded better in the present government of Viatka, where German breeds are still kept by German shepherds. The owners of estates, likewise, in the provinces of the Baltic, cultivate, at least, for their domestic consumption, a better race; but this breed thrives

excellently on the islands of *Æsel* and *Dagho*, where the abundance of nutritious herbs, and the salt sea-water are liked by them. The species found on the last mentioned island, yield a wool in equal estimation with the English, and the half-cloth which the land-owners there weave themselves, is frequently finer, and of a closer substance than what comes from abroad. In the governments of *White Russia*, they seem to have fallen upon a better method of culture; and it is hoped that the success which attended some folds of foreign races will operate as an encouragement to the farmers of those parts. *Lithuania* and *Little Poland*, have, for a long time past, delivered a considerable quantity of half-fine wool for exportation; and in the government of *Ekatarinoflaf* and *Vofnesenk*, the pasture of sheep forms a main sustenance to the inhabitants. *Taurida* is so rich with sheep, that common Tartars possess a thousand, and rich ones fifty thousand; and at the first enumeration notwithstanding the preceding, there was found to be upwards of seven millions of that animal on the whole peninsula. Their mutton is every where of excellent taste; but in regard to the quality of their wool, it is very different, according to the several places in which they have been reared. In the plains they are larger, but whereas the lambs of this species give a curled fur of such value that the sale of them alone forms an important branch of trade. The sheep in the mountainous part of the peninsula, are indeed smaller, but they bear a long, even, silky kind of wool, which, if this race were crossed with foreign rams, must, in quality, be at least equal to the English.

The *Kerghisian* and *Kalmukian* sheep which with the horse compose the principal wealth of these nations, are entirely different from the Russian. The former, in size and ugliness, are not excelled by any wool-bearing animal; they are higher than a new-born calf, and so strong and heavy, that the full grown weigh between four and five pood. In shape, they resemble the *Indian* sheep, they have the arched front of the old battering ram, prominent under lips, and large pendulous ears. Instead of a tail, they have a monstrous round lump of fat, like a cushion, weighing thirty or forty pounds, and yielding between twenty and thirty pounds of tallow. By this excrescence they are generally distinguished from the *Indian* sheep. Their wool is coarse, entangled together, and strongly mixed with hair. The rams are universally, and the wethers generally horned; some are even seen like *Icelandic*, with four or five or six horns. These sheep, the whole winter through, seek their own fodder under the snow, which, at the same time, serves them for drink, without becoming lean upon it. To this, the shortness of that season much contributes, as well as the circumstance, that the snow passes away more rapidly on the salt

parts of the steeps; and the animals are, in a manner, fattened by feeding on the vegetables of the saline soil. It may, perhaps, be owing to the same circumstance that this oriental sheep is become gradually degenerate among the Kirghises by the superfluity of fat; and instead of a tail, have got the clumsy fat lump, which being now become inveterate, they retain even in other countries. The Kirghisian sheep generally bring forth two lambs; and as they live on the steeps, entirely left to nature, and are consequently visited by no diseases, they multiply exceedingly, and the flocks of the Kirghises are, therefore, very numerous. The Kalmukian sheep differ from the Kirghisian in their smaller size; they present likewise not so curved a front; lesser, though pendulous, ears; a less hairy wool, and are seldom horned. This race is kept up also among the baptized Kalmuks, who live among the Russians, as in all places where there are Kalmuk rams, and where the flocks graze at full liberty, and even in winter are left to nibble the snow without watering them, as it is scarcely to be hoped that the Kalmuks will accommodate themselves to agriculture with a good will; the easiest and most natural manner of making these people useful to the empire, at least such as are converted, would be to introduce among them, instead of their wretched sheep, which are only fit for slaughter, flocks of a good breed, and try to encourage this pastoral nation to the shearing of wool.

The polished colonists in the Selenghinskian circle of the government of Irkutsk, keep a number of sheep of Mongolian race, with little fat tails, but are not much larger than the Russian. Many of the lambs that are dropped here, have fine curled furs, which are sold to the Chinese dearer than the famous Bukharian. It is the practice with the Poles to wrap up the new-born lambs in linen, which they moisten every day with warm water, and in this state leave them for a fortnight or a month under the mother, till the tender wool be crisped into little curls. These lambs are immediately killed when the wool is fine enough.

As the management of sheep, in all countries, form so material an object of political œconomy, it will not be improper here to make a few observations on the means by which this branch of national industry might be assisted and promoted. In this we must look either merely to the augmentation of the number of the flocks, or at the same time to the improvement of the wool. In Russia, the latter ought to be particularly the care of every enlightened and patriotic landlord, as the quantity of sheep seems to be sufficient for the present state of population and the national industry. Yet in this too, the national wealth might be greatly increased; among the tracts of land that are conspicuously adapted to this culture, the mountainous

steeps along the Sok and the Kinel, hold a distinguished place. Even the ordinary Russian sheep are here much larger, and acquire a cleaner wool. The gentle elevations, likewise, of the Valdayan ridge of mountains, and the southern Uralian and Altayan chain, as well as the high and saline ground of Caucasus Ekatarinostaf and Taurida, are, in a singular manner, adapted to the multiplication of this species of animals; and in the last mentioned province, the exportation of the salted flesh so much admired by the Turks, would be, likewise, increased. But the most material object of attention, is the improvement of the inland wool; a product which Russia imports annually raw, and wrought in so prodigious a quantity, that the surplus of the commerce is considerably lessened by it.

From the experiments of a sagacious practical landlord, who works up the wool produced on his estate, genuine Russian sheep unmixed with foreign races, besides the coarse hairy wool, yield a fine silky sort, which, with young or full grown sheep, is equally fine, and serviceable with the wool of Spanish sheep. The malo-russian border near upon it; but as the silky wool from all these sheep is superior in softness, and is, at least, preferable to the Turkish and Polish. According to the statement of the above-named land owner, it is therefore of not so much consequence to improve the Russian sheep by foreign races, as to separate the silk wool, by carefully cleansing it from the hair wool, since the former, as it is, and without mixing with other kinds of wool, is a very useful material for the weaving of cloth. But because there is a great difference between the Russian sheep, it would be not less important to employ the best kind of them, especially in the multiplication of this breed. This difference appears not in the greater or smaller proportion, between the silk and the hair wool, but also in the different lengths of them. A wool in which both are of equal length, may be easily separated by kulling every hair apart; but the profits on this product would not correspond with the expence, and as little would this employment repay the trouble, if the quantity of silk were too small in proportion to the hairs. The best kind of Russian sheep are in the southern regions of the Kama, and in the territory of the Kazan. Here the wool of this animal possesses the quality requisite to the being wrought into the cleanest and finest silk wool; with young grown sheep, this grows about the neck and on the breast, without any mixture of hairs, and even in regard to growth, the sheep are larger than usual in other Russian provinces, as in this respect they are nearly equal to those of the Ukzaine.

But though this Russian wool, after a careful separation, be proper for weaving cloth, yet it is not fit for fine unfulled stuffs, as cambletts, chalongs, and the like; for which there is no

doing without the fine long wool of foreign sheep, particularly the Spanish. The introduction and propagation of these foreign races is, therefore, a very desirable object in the general improvement of the country; to which besides the reasons already given may be added this circumstance, that, by that means, the production of this indispensable commodity would be greatly increased. A good Spanish sheep, of a large growth, yields four times as much fine wool as the best Russian will afford by the most careful working.

For the transplantation of foreign races into Russia, the English and the Spanish breed, which have already been naturalized in Sweden and Germany, will be found to be the fittest. The genuine Spanish and English wool is only of use in making fine stuffs; from their unctuous quality they cannot well be employed in weaving stockings and stuffs, and as the climate of Sweden and Germany comes nearest to that of most parts of Russia, these races already innured to the northern skies, would hold out and thrive the better here. Besides, the price of these animals in those countries, is far lower than they bear in their proper native country. The principles on which such a transplantation should be effected, are delivered in a very instructive manner by the œconomical society of St. Petersburg, and, by the writings of that useful body, are brought into circulation throughout the empire. In the remoter governments, where the introduction of foreign kinds of sheep would be attended with too many difficulties, the native species might be improved by greater attention and care. The miserable state of sheep-breeding in Russia, is owing, in some measure, to the severity of the climate and the bad pasture grounds. But in far the greater number of districts, it is the neglect of proper management that lessens the value of these animals and their products.

I am, Sir, yours, &c.

C. L. C.

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## ON THE COMPARATIVE AGRICULTURE OF SPAIN.

*To the Editor of the Agricultural Magazine.*

SIR,

I shall not enter into a minute examination of the methods described in the last number, it will be enough for my purpose to observe: 1. The superior attention which the Spanish Arabians paid to the various soils of the several kinds of manure. 2. The degree of labour they bestowed on their lands. And, 3. The pains they took to make use of the experience of other nations.

The great attention paid by a people to distinguish between the different soils, and to compose the numerous manures which suit them, shews the necessity there is to profit by all its internal resources. It is really curious to observe, what pains the Moors were at to classify the various soils, as they related to the purposes of agriculture. Every distinction that can occur to a person used to country employments is sought for by them, and some of these would seem almost ridiculous to many agriculturists; I mean the taste and smell of the earths. Without justifying some of their observations, I will, however, not hesitate to affirm, that some of their distinctions or classes are not to be despised, particularly in the southern climates. Those who have travelled in these countries must have observed, that after the first autumnal rains, the earth, which the intense heat of the long summer has parched, emits a peculiar smell, but this is very different in various places. With respect to the taste, although this quality is seldom attended to, it is more than probable it is not the same in all kinds of earth, and that it varies according to the different soils. Messrs. Olaten and Povelsen, sent by the king of Denmark to Ireland, relate, that at the mountain of Draap-Helid, they found a species of earth whose taste was acid. The naturalist, Sparman, to whom we are indebted for his observations on the Cape of Good Hope, remarks also, that there is a kind of earth that the inhabitants call *acid earth*, which occupies a pretty large space, and although it is in some degree fertile, it is by no means suited to all kinds of crops.

The great attention which the Spanish Moors paid to the quality of each kind of manure, the mixtures they adopted and varied according to the state of the soil, and the kind of crops, prove their astonishing industry and perseverance in rural occupations.

The degree of labour they bestowed on their agricultural pursuits is very remarkable. They gave the earth four ploughings before they sowed their corn, and the detail of their numerous methods, make it evident, that they spared no pains to accomplish their purpose. We may infer from this, that labour was very cheap, for otherwise, no farmer, or even proprietor, could sustain such an expence. It is natural to conclude from hence, that the population of the country was very great, that the peasants were in industrious habits, and that they were forced to render the earth as productive as possible for the supply of the inhabitants. One circumstance which supports this idea is, the attention they paid to all substances capable of being converted into food, and to those principally which were found to increase the quantity. A long list might be given of these articles of which the Euro-

peans in our time never have an idea of the utility. This is the case in China and Japan, where the population is immense, almost all the people attend exclusively to agriculture, and where labour is very cheap. It is only in temperate or warm climates, where food is the only absolute necessary, where all the lands is so completely cultivated, where the forests furnish aliment for man, that these habits can be formed\*. It is in those climates that famine is most frequent, that men learn to form into aliment every article capable of being so converted: Such I imagine was the state of the kingdom of Spain when the Moors inhabited it, and history confirms the supposition.

If the quantity of labour at the time we have been speaking of was greater than now bestowed by the modern Spaniards, the Arabians also had more facility in adopting and appropriating the improvements of other nations. To the Roman mode of tillage which they possessed completely, they added various means of the eastern nations,

In the art of grafting, they had methods which they called the Roman, the Grecian, and the Persian, which was performed on the roots, and which, in some circumstances, seemed to have been advantageously applied; there is another very curious method, the detail of which may be seen in the seventh article of the eighth chapter of Ebn-el-Awam. Having borrowed from the east the culture of many kinds of fruit trees, they had much more enlightened ideas of the sexual system, and the amelioration of their produce, than the European nations, who, cultivating only those trees which have hermaphrodite flowers, had not the same means of improvement. The whole of the thirteenth chapter of Ebn-el-Awam, is devoted to this subject.

I shall leave, for those who propose to cultivate the most interesting parts of the works of this author, and of Kutfami, the choice of the numerous subjects they treat of. Oriental superstition will account for some wonders they relate, the love of the marvelous others; but there will always remain a sufficient number of consequence enough, from their obvious utility, for the experiments of cultivators, at least those in the south of Europe: I shall only speak of one method, the simplicity and elegance of which struck me forcibly.

Every cultivator knows, that the wounds of trees, whether arising from accident or from imperfect grafting, should be covered over, either by a preparation of clay, or some other adhesive substance. The defects of the first method are well known, and no other glutenous materials that have been substituted, can be applied in a cold state, and they might become

\* The forests in the south of Spain are almost entirely composed of a species of oak, bearing sweet acorns resembling nuts.

extremely hurtful in the hands of an unskilful artizan. The Moors used for such purposes the gummy sap of the fig tree, and it is almost certain, by the latest discoveries, the gummy sap of this tree, as well as of the eupherbium, contains an elastic gum which may be used for this purpose cold. Every one may judge of the simplicity and superiority of this method. I will venture to propose to our cultivators the trial of the sap of the Tithimale, moderately thick, as a substitute, as on account of our northern climate, fig trees are not common.

I think we may conclude, that the superiority of the agriculture of Spain, in the time of the Moors, was owing to the great number of their labouring people, the degree of their industry, and the knowledge they had of the experience and practice by which they were enriched. Of these they were not the inventors, but the subjugation of so many countries to the Mahometan yoke, circulated among them all, the improvements which had been confirmed before to particular districts. In the twelfth century, the same religious opinions, the same language, and consequently the same habits existing from the India sea to the Atlantic ocean, joined, as in one family, many different nations, whose pilgrimages brought them together every year. It is in these numerous and extensive fraternities, that the arts and sciences make most progress. If in one part of these vast societies a new and brilliant view of any subject is obtained, it is quickly diffused over the others. Emulation springs, and the sphere of human thoughts and actions is enlarged. In these immense communities, which have no other cement than their language and their religion, the human mind takes its most extended flights. Such was the state of the Greeks, such was also that of the Arabians, and such is the origin of the present state of Europe. This subject would be worthy the pen of a philosopher, with a view to the ascendancy of the popes, who, by their tenacious preservation of the Latin language of the pilgrimages to Rome for so many centuries, have united the states of Europe in one common bond of science and humanity. But, Sir, I am wandering from the immediate subject of your work, therefore I shall only make my acknowledgements to you for your polite attention to my last communication, and signify the respect with which I am, Sir,

AMIGO DEL PAIS.

Nov. 30, 1804.

*For the Agricultural Magazine.*

OF THE VEGETABLE PRODUCTIONS IN HUDSON'S BAY, AND AS FAR NORTH AS CHURCHILL RIVER, PARTICULARLY THE MOST USEFUL, SUCH AS THE BERRY-BEARING BUSHES, &c. GOOSEBERRY, CRANBERRY, HEATHBERRY, DEWATER BERRY, BLACK CURRANTS, JUNIPER BERRY, PARTRIDGE BERRY, STRAWBERRY, EYE BERRY, BLUE BERRY, AND A SMALL SPECIES OF HIPS.

THE gooseberries thrive best in stony and rocky ground, which lies open and much exposed to the sun; but in those situations, few of the bushes grow to any height, and spread along the ground like vines. The fruit is always most plentiful and the finest on the under side of the branches, probably owing to the reflected heat from the stones and gravel, and from being sheltered from all cold winds and fog by the leaves. I never saw more than one species of gooseberry in any part of Hudson's Bay, which is the red one. When green, they make excellent pies or tarts, and when ripe are very pleasant eating, though by no means so large as those produced in England.

Cranberries grow in great abundance near Churchill, and are not confined to any particular situation, for they are as common on open bleak plains and high rocks as among the woods. When carefully gathered in the fall, in dry weather, and as carefully packed in casks with moist sugar, they will keep for years, and are annually sent to England in considerable quantities as presents, where they are much esteemed. When the ships have remained in the Bay so late that the cranberries are ripe, some of the captains have carried them home in water with great success.

The heathberries are in some years so plentiful near Churchill, that it is impossible to walk in many places without treading on thousands and millions of them. They grow close to the ground, and are a favourite repast of many birds that migrate to those parts in summer, particularly the grey goose; on which account the Indians distinguish them by the name of *nishca-minnick*, or the grey gooseberry. The juice of this berry makes an exceeding pleasant beverage, and the fruit itself would be more pleasing, were it not for the number of small seeds it contains.

Bethago-tominick, as it is called by the Indians, or the dewater-berry of Mr. Dragge. I have seen this berry as far north as Marble Island, and that in great abundance. It flourishes best, and is most productive, in swampy boggy ground covered with moss, and is seldom found among grass. The plant itself is not very unlike that of a strawberry, but

the leaves are larger; but out of the centre of the plant shoots a single stalk, sometimes to the height of six or seven inches, and each plant only produces one berry: which at some distance resembles a strawberry, but on examination they have not that conical form, and many of them are only composed of three or four lobes, while others consist of near twenty. The flavour of this berry is far from unpleasing, and it is eaten by our people in considerable quantities during the season, which is August, and like all other fruits in those parts, is supposed to be wholesome and a great anti-scorbutic.

Currants, both red and black, are common about Churchill river, but the latter are far more plentiful than the former, and are very large and fine. The bushes on which those currants grow frequently exceed three feet in height, and generally thrive best in those parts that are moist but not swampy. Small vallies between the rocks, at some distance from the woods, are very favourable to them; and I have frequently observed, that the fruit produced in those situations is larger and finer than that which is found in the woods. Those berries have a very great effect on some people if eaten in any considerable quantities, by acting as a very powerful purgative, and in some as an emetic at the same time; but if mixed with cranberries, they never have that effect.

Juniper berries are frequently found near the new settlement at Churchill river, but by no means in such plenty as in the more southern and interior parts of the country. The bush they grow on is so similar to the creeping pine, that one half the Company's servants residing in Hudson's Bay do not know one from the other. Like the gooseberry bushes in those parts, the fruit is always most plentiful on the under side of the branches. They are not much esteemed either by the Indians or English, so that the few that are made use of are generally infused in brandy, by way of making a cordial which is far from unpleasent.

Strawberries of a considerable size and excellent flavour are found as far north as Churchill river, and what is most remarkable, they are frequently known to be more plentiful in such places as have formerly been set on fire. This is not peculiar to the strawberries, but it is well known, that in the interior parts of the country, as well as at Albany and Moore Forts, that after the ground, or more properly the underwood and moss, have been set on fire, that raspberry bushes and hips have shot up in great numbers on spots where nothing of the kind had ever been seen before. This is a phenomenon which is not easily accounted for, but it is more than probable, that nature wanted some assistance, and the moss being all burnt away, not only admits the sun to act with more power, but the heat of the fire must in some measure loosen the texture of the soil, so as to admit the plants to shoot up, after having

been deep rooted for many years, without being able to force their way to the surface.

Besides the berries already mentioned, there are three others found as far north as Churchill, viz. what the Indians call the eye berry, and the other two are termed the blue berry and partridge berry by the English.

The eye berry grows much in the same manner as the strawberry, and though smaller, is infinitely superior in flavour. This berry is found in various situations, but near Churchill River they are most plentiful, in little small hollows among the rocks, which are situated some distance from the woods, but they are never known to grow in swampy ground, and I never saw them as plentiful in any part of Hudson's Bay as about Churchill River.

The blue berry is about the size of the hurtle berry, and grows on bushes, which rise to eighteen inches or two feet, but, in general, are much lower. They are seldom ripe till September, at which time the leaves turn to a beautiful red, and the fruit, though small, have as fine a bloom as any plumb, and are much esteemed for the pleasantness of their flavour.

The partridge berry is nearly as large as the cranberry imported from Newfoundland, although of a beautiful transparent red, yet has a disagreeable taste. These berries are seldom taken either by the Indians or the English, and many of the latter call them poison berries, but several birds are fond of them. They grow close to the ground, like the cranberry, and the plant that produces them is not very unlike small sage, either in shape or colour, but has none of its virtues.

I had nearly forgotten another species of berry, which is found on the dry ridges at Churchill, in considerable numbers. In size and colour they much resemble the red currant, and grow on bushes, so much like the creeping willow, that people, of little observation, scarcely know the difference, particularly as all the fruit is on the under side of the branches, and entirely hid by the leaves. I never knew this berry eaten but by a frolicsome Indian girl, and as it had no ill effect, it is a proof it is not unwholesome, though exceedingly unpleasant to the palate, and not much less so to the smell.

Hips, of a small size, though but few in number, are also found on the banks of Churchill River, at some distance from the sea. But in the interior parts of the country, they are frequently found in such vast quantities, that, at a distance, they make the spots they grow upon appear perfectly red. In the interior parts of Hudson's Bay, they are as large as any I ever remember to have seen, and, when ripe, have a most delightful bloom, but, at that season, there is scarcely one in ten, which has not a worm in it, and they frequently act as a strong purgative.

H. K.

*For the Agricultural Magazine.*

SPECULATIONS ON THE PERCEPTIVE POWER OF VEGETABLES, READ BEFORE THE LITERARY AND PHILOSOPHICAL SOCIETY OF MANCHESTER.

**I**N all our inquiries into truth, whether natural or mortal, it is necessary to take into previous consideration, the kind of evidence which the subject admits of, and the degree of it, which is sufficient to afford satisfaction to the mind. Demonstrative evidence is absolute, and without gradation; but probable evidence ascends, by regular steps, from the lowest presumption to the highest moral certainty. A single presumption is, indeed, of little weight, but a series of such imperfect proofs may produce the fullest conviction. The strength of belief, however, may often be greater than is proportionate to the force and number of these proofs, either individually or collectively considered. For, as uncertainty is always painful to the understanding, very slight evidence, if the subject be capable of no other, sometimes amounts to credibility. This every philosopher experienced in his researches into nature, and the observation may serve as an apology for the following *jeu d'esprit*; in which I shall attempt to shew, by the several analogies of organization, life, instinct, spontaneity and self-motion, that plants, like animals, are endued with the powers both of perception and enjoyment.

I. Vegetables bear so near a similitude to animals in their structure, that botanists have derived from anatomy and philosophy, almost all the terms employed in the description of them. A tree or shrub, they inform us, consists of a cuticle, cutis and cellular membrane, of vessels variously disposed, and adapted to the transmission of different fluids; and of a ligneous, or bony substance, covering and defending a pith or marrow. Such organization evidently belongs not to an inanimate matter; and when we observe, in vegetables, that it is connected with, or instrumental to the powers of growth, of self preservation, of motion, and of seminal increase, we cannot hesitate to ascribe to them a living principle. And by admitting this attribute, we advance a step in the analogy we are pursuing. For the idea of life naturally implies some degree of perceptivity: and wherever perception resides, a greater or less capacity for enjoyment seems to be its necessary adjunct. Indefinite and low, therefore, as this capacity may be, in each single herb or tree, yet, when we consider the amazing extent of the vegetable kingdom, "from the cedar of Lebanon to the hyssop upon the wall," the aggregate of happiness produced from it, will be found to exceed our most enlarged conceptions. It is prejudice only, which restrains or suppresses the delight-

ful emotions, resulting from the belief of such a diffusion of good. And because the formers of systems have invented arrangements and divisions of the work of God, to aid the mind in the pursuits of science, we implicitly admit as reality, what is merely artificial, and adopt distinctions, without proof of any essential difference. *Lapides crescunt; vegetabilia crescunt et vivunt; animalia crescunt vivunt et sentiunt.* This climax, of Linnæus, is conformable to the doctrines of Aristotle, Pliny, Jungius, and others. But none of these great men have adduced sufficient evidence to support the negative characteristics, if I may so express myself, on which the three kingdoms of nature are here established. That a gradation subsists in the scale of beings, is clearly manifest, but the higher advances we make in physical knowledge, the nearer will the degrees be seen to approach each other. And it is no very extravagant conjecture to suppose, that in future periods, perceptivity may be discovered to extend even beyond the limits now assigned to vegetable life. Corallines, madrepores and sponges, were formerly considered as fossil bodies, but the experiments of Count Marfigli evinced that they are endued with life, and led him to class them with the maritime plants. And the observations of Ellis, Jussieu, and Peyssonel, have since raised them to the rank of animals. The detections of error in long established opinions concerning one branch of natural knowledge, justifies the suspicion of its existence in others, which are nearly allied to it, and it will appear from the prosecution of our enquiry into the instincts, spontaneity, and self-moving power of vegetables, that the suspicion is not without foundation.

II. Instinct is a propensity or movement, to seek what is agreeable to the particular nature actuated by it without deliberation, and to avoid what is incongruous or hurtful. It is a practical power which requires no previous knowledge or experience, and which pursues a present or future good, without any definitive ideas or foresight, and often with very faint degrees of consciousness. The calf, when it first comes into the world, applies to the teats of the cow, utterly ignorant of the taste or nutritious quality of the milk, and consequently with no views either to sensual gratification or support. And the duckling which has been hatched under a hen at a distance from water, discovers a constant restlessness and impatience, and is observed to practice all the motions of swimming, though a stranger to its future designation, and to the element to which its oily feathers and web-like feet are formed. Instincts analogous to these, operate with equal energy on the vegetable tribe. A seed contains a *gem* or plant in miniature, and a *radicle*, or little root, intended by nature to supply it with nourishment. If the seed be sown in an inverted position, still

each part pursues its proper direction. The pumula turns upward, and the radicle strikes downward into the ground. A hop plant turning round a pole, follows the course of the sun from south to west, and soon dies when forced in a contrary direction. But remove the obstacle, and the plant will quickly return to its ordinary position. The branches of a honey-suckle shoot out longitudinally till they become unable to bear their own weight, and then strengthen themselves by forming into a spiral. When they meet with other living branches of the same kind, they coalesce for mutual support, and one turns spiral to the right, and the other to the left; thus seeking by instinctive impulse, some body on which to climb, and increasing the probability of finding one by the diversity of their course: for if the auxiliary branch be dead, the other uniformly winds itself round from the right to the left.

These examples of the instinctive economy of vegetables have been purposely taken from subjects familiar to our daily observation. But the plants of warmer climates, were we sufficiently acquainted with them, would probably furnish better illustrations of this acknowledged power of animality; and I shall briefly relate the history of a curious exotic, which has been delivered to us from good authority, and confirmed by the observations of several European botanists.

The *Dionæa Muscipula* is a native of North Carolina. Its leaves are numerous, inclining to bend downwards, and placed in a circular order. They are jointed and succulent. The upper joint consists of two lobes, each of which is a semi-oval in its form, and with a margin furnished with stiff hairs, which embrace each other when they close from any irritation. The surfaces of these lobes are covered with small red glands, which probably secrete some sweet liquor tempting to the taste, but fatal to the lives of insects. For the moment the poor animal alights upon these parts, the two lobes rise up, grasp it forcibly, lock the rows of spines together, and squeeze it to death. And lest the struggles for life disengage the insect thus entangled, three small spines are fixed among the glands near the middle of each lobe, which effectually put an end to all its efforts. Nor do the lobes open again while the dead animal continues there. The dissolution of its substance, therefore, is supposed by naturalists to constitute the nourishment of the plant. But as the discriminative power of instinct is always limited, and proceeds with a blind uniformity when but into exertion, the plant closes its leaves as forcibly if stimulated by a straw or pin, as by the body of an insect. Nor does it expand them again till the extraneous substance is withdrawn.

III. If the facts and observations which have been adduced, furnish any presumptive proof of the instinctive power of vegetables, it will necessarily follow, that they must be endued

with some degree of *spontaneity*. For the impulse to discriminate and to prefer, is an actual exertion of that principle, however obscure the consciousness or the feeling may be with which it is accompanied; and such volition presupposes an innate perception both of what is consonant, and of what is injurious to the constitution of the individual, or species directed by it. But it is the design of this little essay, rather to investigate nature, than to appeal to metaphysical considerations. I shall proceed, therefore, to point out a few of these phenomena in the vegetable kingdom, which indicate spontaneity.

Several years ago, whilst engaged in a course of experiments to ascertain the influence of fixed air on vegetation, the following fact repeatedly occurred to me. A sprig of mint suspended by the root, with the head downwards, in the middle glass vessel of Dr. Nooth's machine, continued to thrive vigorously, without any other papulum than what was supplied by the stream of mephitic gas to which it was exposed. In twenty-four hours the stem formed into a curve, the head became erect, and gradually ascended towards the mouth of the vessel; thus producing, by successive efforts, a new and unusual configuration of its parts. Such exertions in this sprig of mint to rectify its inverted position, and to remove from a foreign, to its natural aliment, seems to evince volition, to avoid what was evil, and to recover what had been experienced to be good. If a plant in a garden pot be placed in a room which has no light, except from a hole in the wall, it will shoot towards the hole, pass through it into the open air, and vegetate upwards in its proper direction. Lord Kaimes relates, that "amongst the ruins of New Abby, formerly a monastery in Galloway, there grow on the top of a wall a plane tree twenty feet high. Straightened for nourishment in that barren situation, it several years ago directed roots down the side of the wall, till they reached the ground ten feet below, and now the nourishment it afforded to these roots during the time of descending is amply repaid; having every year since that time made vigorous shoots. From the top of the wall to the surface of the earth, these roots have not thrown out a simple fibre, but are now united into a simple hard root."

The regular movements by which the sun-flower presents its splendid disk to the sun, have been known to naturalists, and celebrated by poets, both of ancient and modern times. Ovid founds upon it a beautiful story; and Thomson describes it as an attachment of love to the celestial luminary.

But one the lofty flower of the sun  
Sad when he sets; shuts up her yellow leaves,  
Drooping all night; and when he warm returns,  
Points her enamoured bosom to his ray.

Summer, line 216.

IV. Nature has wisely proportioned the powers of motion to

the diversified necessities of the beings endued with them. Corallines and Scapens are fixed to a spot, because all their wants may be there supplied. The oyster, during the efflux of the tide, opens to admit the water, lying with the hollow shell downwards; but when the ebb commences, it turns on the other side: but thus providing by an inconsiderable movement for the reception of its proper nutriment, and afterwards discharging when it is superfluous.

Mr. Miller, in his late account of the island of Sumatra, mentions a species of coral which the inhabitants have mistaken for a plant, and denominated *leilan-lout*, or sea-grass. It is found in shallow places, where it appears like a straight stick, but when touched, withdraws itself into the sand. Now if self moving faculties like these indicate animality, can such a distinction be denied to vegetables possessed of them in an equal or superior degree. The water lily, be the pond deep or shallow where it grows, pushes up its flower stems till they reach the open air, that the *farina secundano* may perform without injury its proper office. About seven in the morning, the stalk erects itself, and the flowers rise above the surface of the water. In this state they continue till four in the afternoon, when the stalk becomes relaxed, and the flowers sink and close. The motions of the sensitive plant have been long noticed with admiration, and exhibiting the most obvious signs of perceptivity, and if we admit such motions as criteria of like power in other beings, to attribute them in this instance to mere mechanism, actuated solely by external impulse, is to deviate from the strongest rule of philosophy, which directs us not to multiply causes when the effects appear to be the same. Neither will the laws of electricity better solve the phenomena of this animated vegetable. For its leaves are equally affected by the compact of electric and non-electric bodies; shew no change in their sensibility, whether the atmosphere be dry or moist, and instantly close when the vapour of volatile alkali, or the fumes of burning sulphur are applied to them. The powers of chemical stimuli to produce contractions in the fibres of this plant, may, perhaps, lead some philosophers to refer them to the *vis insita*, or irresistibility which they assign to certain parts of organized matter, perfectly distinct from, and independent of any sentient energy. But the hypothesis is evidently solecism, and refutes itself, for the presence of irresistibility can only be proved by the experience of irritations, and the idea of irritation involves in it the idea of feeling.

But there is a species of the order of Decandria, which constantly and uniformly exerts a self-moving power, uninfluenced either by chemical stimuli, or by any external impulse whatever. This curious shrub, which was unknown to Linnæus,

is a native of the East Indies, but has been cultivated in several botanical gardens here. I had an opportunity of examining it in the collection of the late Dr. Brown. It is trifolious, grows to the height of four feet, and produces in autumn yellow flowers. The lateral leaves are smaller than those at the extremity of the stalk, and all day long they are continually moving either upwards, downwards, or in the segment of a circle; the last motion is performed by the twisting of the foot stalks, and while one leaf is rising, its associate is generally descending; the motion downwards is quicker and more irregular than the motion upwards, which is steady and uniform. These movements are observable during the space of twenty-four hours in the leaves of a branch lopped off from the shrub, and kept in water, if from any obstacle the motion be retarded, upon the removal of that obstacle, it is resumed with a greater degree of velocity. I cannot better comment on this wonderful degree of vegetable animation, than in the words of Cicero. *In animum est omne quod pulsu agitur externo; quod autem est animal ad motu scietur interiore et suo.*

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ON THE KIND OF CATTLE BEST ADAPTED TO FATTEN,  
IN ANSWER TO A NOVICE.

*To the Editor of the Agricultural Magazine.*

SIR,

**I**N your last number, *A Novice* has requested information on a great variety of subjects — Carbon, the criteria of the most profitable grazing cattle, condiments, composts, the best modes of using dung, comparative experiments in agriculture; smut in wheat, the most advantageous quantities of seed corn; the utility and best mode of changing this seed, the culture of winter tares to be succeeded by turnips; the comparative advantage of housing and stacking corn, and the best mode of thatching, or covering, the stacks, are all huddled into this very inquisitive letter.

If your correspondent had introduced into this long list a few additional enquiries, he would have embraced the greatest part of the important art of rural economy—an art upon which a physician has lately written some ponderous volumes, which will cost upwards of four pounds\*. It is not my intention, however, to censure *A Novice* for the multiplicity of his enquiries, for they are important. All I wish to insinuate is, that he has introduced too many in *one* letter. He cannot reasonably expect to see answers to the whole of them in your next and the succeeding number, and perhaps those which are not answered in two or three months, will be forgotten,

\* Of this work (the author of which has, I hope, brought his scientific arguments to the test in the field of practice) I have received some very favourable accounts, and I shall be glad to see them corroborated in your critical catalogue.

Judging by the past, however, it seems probable that he will obviate this objection by reiterating them in a different dress.

His observations on cattle, and descriptions of those he had purchased, are laughable. He was certainly unfortunate in buying those which had the distinguishing marks of slow feeders: but this shows the pertinence of his signature; and under this impression, I shall proceed to communicate my sentiments on the criteria of those cattle which attain early maturity, and to offer such remarks as seem connected with some other parts of his enquiries.

From experience in feeding cattle, I am of opinion, that *when the object is to convert a given quantity of food into the most money within six to twelve months*, size is not "the principal matter to attend to." When I say this, however, I do not mean to disparage larger cattle, for I am satisfied that animals of that description will often enable the feeder to raise a larger profit than any other kind whatever, proper attention being paid to local circumstances; to the quantity and quality of the food, and the demand of the markets. But in order to obtain this object, either from large, middling sized, or small cattle, experience has proved that it is of great consequence to purchase those which "handle well." Hence the practice of those graziers mentioned by *A Novice*.

It seems unnecessary to describe to this correspondent, a well formed animal, for I think the greatest novice that can attend cattle markets, may easily distinguish a handsome from an ugly, or even an indifferent shape. It appears necessary, however, to state, that a good form, small bones, thin hide, small horns, and prominent eyes, are, *generally*, indications of a profitable feeding animal. This opinion is so well founded, that many experienced graziers frequently purchase largely by attending to appearances *only*. On these criterias, however, I think too much stress is often laid. That they are, *generally*, the concomitants of an aptitude to fatten, I will not dispute, but it is certain that, in some cases, well formed, small boned, and fine horned cattle, are not thin skinned, and that others, with thin hides, handle too hard and stiff; and I would advise your friend to pay more regard to the feel or touch of the hide, than to fine form or small bones; for, except in cases of internal disease, I have always found that those cattle which were covered by *soft and silky* skins, whether thin or thick, fattened readily, and attained the greatest weight in proportion to their dimensions. Whether this superiority of the "good handlers" arises from an accompanying superiority of internal structure, or from their skins being more easily stretched to contain a great quantity of fat, I shall not attempt to determine. It is enough for me to state the fact, that soft skinned cattle increase their bulk in the *greatest proportion*,

leaving it to more able and accurate investigators to assign the cause.

My experience has been chiefly in short horned cattle, and to these I confine the above remarks. From the few trials I have made however in West highland Kyloos, I am inclined to think that they will also apply to that valuable breed.

In the mid-land and western counties of England, most of the cattle are of the long horned, or Lancashire, breed; and I have been informed that they (especially the variety selected by the celebrated Bakewell) are profitable feeders. Their hides, however, are very thick, which certainly militates against the arguments of those who maintain the universal superiority of thin skinned cattle.

It seems the general opinion, that condiments would increase pinguefaction, and consequently the weight of cattle and sheep. Salt has been given to both with considerable success; but loaded as it is with a heavy duty, doubts are entertained whether the increase of weight would defray the additional expence. Perhaps accurate trials are wanting to determine this point. But if the opinions I have advanced be well founded, *A Novice* will see good reasons for the superior profit of his neighbours, without supposing the use of condiments. On the most profitable breeds of sheep, he, in common with your other readers, may reasonably expect ample information from the correspondence of Mr. Bartley and *Pastorius*. Without making any observations on the *conjecture* of the latter gentleman, relative to the introduction of Spanish sheep into this district, I beg leave to inform him, that if I were convinced that they, with their "throatiness, heron nogs, (I shall be obliged to him if he will inform me what he means by the latter expression) dromedary backs," and all the other "*deformities*" he mentions, would raise considerably more money, profit, (including fleece and carcase) than any other breed, I would not be deterred from giving them the preference, by the "keen ridicule" of any body of breeders whatever. Whether the Spanish really deserve to be preferred to the new Leicester sheep, is a question I am not discussing. But if I should, at some future period, deem it necessary to estimate their comparative merits, I will, doubtless, be influenced, in a considerable degree, by the issue of the controversy between him and Mr. Bartley, which I consider as highly interesting to many of our sheep breeders. I shall, therefore, pay great attention to the arguments, but more to the *facts*, on each side.

I hope, Mr. Editor, when you consider the share I have had in discussing the comparative merits of horses and oxen, in the pages of your Magazine, you will excuse my digressing a little, to express my admiration of the energetic and animated manner

in which *Pastorius* has asserted the superiority of the former animals in the labours of the field. My scale, Sir, was confined indeed, when compared to his. I did not venture beyond the abodes of the living, but he has undauntedly offered the *ashes* of the great conqueror, Hannibal, together with his “dreadful fire-brands,” to the side of “all the oxen of all the great and little emperors from Japan and China to the western shores of Europe,” and then boldly challenged the whole, *ashes, fire-brands, and all*. This is very heroic! What had raised your correspondent to so high a pitch? Had he just traced his descent from one of those valourous Scotchmen who conquered at Bannock Burn against a vastly superior army, *with the ashes of the great Edward at its head*? I assure you, Sir, I am very glad of such an assistant, or rather of such a leader. Let the advocates of oxen now remain in the back ground, or he will drive them before him like chaff before the wind!

Having endeavoured to instruct *A Novice* (as far as my knowledge will reach) in the choice of cattle, and having pointed out to him an excellent source of information as to sheep, I shall now offer a few observations on a mode, which he has adverted to, of raising green crops for their support, viz. the cultivation of winter tares to be succeeded by turnips.

If two green crops, one of tares and another of turnips, can be attained in Northumberland, within the same year, your correspondent need not despair of obtaining them, in the more favourable climate, and on the richer soil of Yorkshire. A few years ago, in the beginning of September, I sowed a few acres of middling turnip land with winter tares mixed with rye, (two Winchester bushels of the former, and half a bushel of the latter, per acre.) The land was clean, having produced a great crop of oats, after being three years in grass. The winter and spring were favourable, and in June following, I cut a great crop of tares and rye, which I carried to the fold yards for my horses. The rye prevented the tares from lodging so much as they otherwise would have done. The land was twice ploughed, well harrowed and hand picked, and sown with common turnip seed on the 4th of July, after receiving about twenty cart loads of good dung per acre. Rain succeeded the sowing, and the crop of turnips was very productive. The barley after them, and the succeeding crops of clover and rye grass, were as good as those in any other part of the field upon similar soil, equally manured, &c. The tares greatly increased my stock of dung. In October, 1803, I sowed four acres of similar soil, which had produced a crop of spring wheat after turnips, with winter tares, at the rate of two Winchester bushels per acre. A good deal of the wheat had been shaken out by high winds, and therefore I did not sow any rye. The weather in the spring being exceedingly unfavourable, the time of sowing too late, and the wheat too thick, the crop of

tares was but indifferent. The land was perfectly clean, managed in the same manner as that in the above experiment, and sown with common turnip seed on the 29th and 30th of June last. The crop of turnip is scarcely so good as that upon contiguous land, of similar quality, managed in the common mode. This, however, I impute to the wheat having been much too thick among the tares. From these trials, I have no doubt of the cultivation of winter tares and turnips being advantageous management. The soil, however, ought to be fresh, clean, easily pulverized, and well manured. To carry it to a great extent, would, I think, be injurious in the northern provinces. In the southern counties, where the tares can be sown in August, and where the spring is earlier and less severe, I think it might be advantageously practised to a very considerable extent. It is, unquestionably favourable, to what I have always considered as a most important matter to the cultivators of the soil—to a great increase of manure. Let *A Novice*, therefore, try it with precision. Here I am led to another of his enquiries: the extent of comparative experiments in agriculture. Such experiments, sir, conducted with judgment and accuracy, are highly important to the husbandman and the community; nay, I scruple not to assert, that when they are properly made, they are more instructive than any other mode of acquiring agricultural knowledge. On the other hand when they are not made with judgment, and the utmost accuracy, they are more mischievous in their consequences, than any theories, however wild and extravagant. I am of opinion, that in order to be as accurate as possible, the land on which comparative experiments are made, should, throughout, be perfectly equal, in the nature and condition of the soil, exposure, and management, for many years previous to the trial; that the various operations of ploughing, harrowing, sowing, hoeing, &c. should be performed on the same day under precisely similar circumstances; that the manure should be so thoroughly mixed as to be an homogeneous mass, and applied, in each mode of husbandry, in, precisely, equal quantities per acre; and that the seed, in each mode of culture, should be similar in condition and variety, and applied in equal quantities. Now, if I am right, it follows that we should be guided in our practice by the results of experiments made upon a small scale: by those upon from half an acre to two acres, in preference to those upon eight to ten acres of ground. For it is obvious that, upon the large scale, the different operations could rarely, if ever, be performed, without such variations of soil, weather, or other circumstances, as would destroy the accuracy of an experiment. Every attentive husbandman knows how necessary it is, in such cases, to advert to minutiae, and how great a difference is frequently produced in the crop by a very small variation of soil, or of the circumstances under which it is cultivated. I never saw eight contiguous acres in which I

could not (without chemical analysis) show difference in the nature or condition of the soil. Indeed I have always found a great difficulty in discovering the fourth or fifth part of that quantity, *in every respect*, fit for the purposes of experiment. Besides, it is necessary to cut, carry, thrash, and measure, or weigh, the *whole* produce, under circumstances precisely alike, for when only a *small proportion* of the crop is tried, *as an average*, the experimenter will often be led to erroneous conclusions; and to weigh every turnip, upon eight or ten acres of land, would be exceedingly troublesome and difficult.

I am, sir, yours, &c.

Nov. 28, 1804. AGRICOLA NORTHUMBRIENSIS.

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ON THE COURSE OF CROPS, LIME, &c.

*To the Editor of the Agricultural Magazine.*

SIR,

Nov. 30, 1804.

WHEN I held the plough, about thirty or forty years ago, upon my father's land, he, and all the farmers in the neighbourhood, took three crops to a fallowing, viz. wheat, oats, pease, or wheat, barley, oats, or pease; turnips were rarely cultivated, except a few acres for the cows, the calves, and the pot; and even the management of these small quantities was deemed exceedingly expensive and troublesome. For the *faugh* was not only neglected when it should have received the second or third furrow, but much of the dung was taken from it to enrich the turnip land; and besides, we were under the necessity of hiring gardeners, at a great expence, to hoe them; no other people being considered as fit for that operation. The tillage fields had been in that state, and the grass land in grass, from generation to generation; and I assure you, I have many a time grudged the great quantities of dung taken past our wheat to our turnip fallows; for, though lime was plentiful in the neighbourhood, we did not apply any, having discovered that we derived no advantage whatever from liming our lands. This will, perhaps, not be credited by our juvenile farmers, who contend that they are highly benefited by the application of lime. But, Sir, it is not only in this, but almost every other respect, that I have observed a great alteration in the modes of management, *on returning from a mercantile life, to the cultivation of the soil*. In that part of the country in which I reside, the farmers generally stand pretty high in the scale of cultivators. And as most of our old long-since modes are exploded, I frequently find myself at a loss how to proceed. Were I to follow the practice of our ancestors, perhaps I would not only be unable to support that increased

load of expences which farmers are now doomed to bear, but also to be ridiculed and laughed at by my neighbours. I therefore pursue their methods as well as I can. I have all my life been rather curious and anxious to trace effects to their causes, when in the line of my business. But when I begin to reason with some of the most eminent of my neighbours, and then become a little inquisitive, I frequently receive my short and unsatisfactory answers: such as, "*d—n it*, no matter what is the cause, we find the effect advantageous, and that is enough for us farmers; if you want more, go to your philosophers in the town." I have not been so fortunate, however, as to meet with any of these philosophers who appear to have sufficient knowledge in practical husbandry. And as I observed in some of your numbers, a few months ago, that you have philosophical and practical correspondents, I shall be glad if you will permit me to request information from some of them on one or two points. The attention which has been paid to the enquiries of one of your correspondents (*A Novice*) who seems, in some respects, not much better acquainted with modern husbandry than I am, has induced me to trouble you on this occasion; and I will say, with him, that when I see any thing new and important in the rural economy of this quarter, I shall have much pleasure in communicating it to the editor of that useful work—the *Agricultural Magazine*. Our modern farmers maintain, that they reap a much greater profit by taking a green and a white crop alternately, than by pursuing the old mode of taking two or three white crops in succession; contending that clover, or some species of grass seeds, should be sown every three, four, or five years; and that the land so sown, should be continued one, two, or three years in grass, before it be again broken up. Many of them also assert, that by this change of species, or even that of cultivating a white crop, after a white crop of a different kind, the advantageous effects arise from committing to the soil within a number of years, various kinds of seeds suited to the various kinds of vegetable food which the earth contains. Now I have been told by some men of a philosophical turn of mind, that all vegetables are supported by the same kind of food; and if this opinion be well founded, the reasons advanced by these modern farmers for their more abundant crops, do not seem satisfactory. I shall therefore be greatly obliged to some of your intelligent correspondents, if they will communicate their sentiments on the advantages of a change of species, together with their opinions as to the causes of those advantages.

There is another subject upon which two of my neighbours have lately been engaged in a pretty warm controversy, and though its discussion may be deemed, by some of your readers,

more curious than useful, yet perhaps others may consider it of some importance. The dispute is this—one of these farmers occupies land which is mostly banky or hilly; the other reflected on his judgment for lately taking a new lease of it, at too great an advance of rent; objecting to the expence of cultivating it in consequence of these rising grounds or hills. The occupier contended, that the additional quantity of land he gained by these rising grounds, overbalanced the extra expence in their cultivation. It was, however, denied that he possessed any more land than that included in the landlord's survey and plan. He then stated, that he had particularly remarked that the surveyor had laid his chain upon few, if any, of these hills, and that, if the interior parts of his fields were mostly rising, or hilly grounds, he actually possessed a much greater number of acres; a greater surface than the plan and survey contained; beating out a semi-ball of lead in support of his argument. This silenced, if it did not convince his opponent. The latter, however, gave the argument a new turn; thus—supposing, says he, that by means of these hills you actually have a greater *superficies* than your landlord has estimated upon, yet it will not produce more stalks or stems of corn, &c. than if the surface within the dikes had all been flat, and equal to the hills in point of quality; for corn, &c. grows upright; that is, not perpendicular to the surface of the ground, but perpendicular to the horizon. The occupier of the ground said, that it would be equally rational to contend that twenty would contain as many stems as twenty-five acres. His antagonist persevered, and to illustrate the matter, stated that a hill side would not produce more trees than its base; viz. that the slope A, in the annexed figure, would raise no more than its base B.



The combatants remained of their original opinions; and as an elucidation of the matter in dispute may be useful to those who may have occasion to estimate the value of hilly grounds; perhaps some of your ingenious correspondents may think it worth discussion in the Agricultural Magazine. For my own part, I think it deserves their attention; and I hope most of your readers would be gratified by an ample investigation of this rather intricate subject.

Yours, &c.

AGRICOLA CURIOSUS.

ON THE ADVANTAGES OF AVOIDING THE USE OF  
STRAW IN THATCHING.

*To the Editor of the Agricultural Magazine.*

SIR,

A FEW months ago, one of your correspondents complimented you for not inserting in your periodical work, any matter not strictly agricultural. But as I conceive that a publication which contains many papers on practical agriculture, (written by experienced men) besides others on the various regulations which tend either to promote or obstruct the extension of that most important art, is greatly superior to one which is *confined* to the former subject, and as yours has not been thus confined, I beg leave to observe that your correspondent has not only given an improper character of your work, but that, in my opinion, his ideas respecting the most useful kind of agricultural magazines, are ill founded. Surely, sir, your friend must admit that many regulations and customs prevail in this country which obstruct the extension of our agriculture, and prevent the practice of the most judicious modes of management. Will he contend, then, that investigations of these subjects, and the best modes of reform, are not particularly proper for the pages of your miscellany? I think, on cool reflection, he will not. Now if they ought to be discussed, permit me to ask him whether any other men are so well qualified to point out their injurious effects, as those who frequently observe them in the course of *practice*.

In this country, freedom of discussion is happily permitted. We enjoy the inestimable blessings of a free and vigorous constitution of government; and an active and enlightened legislature. Many members of that legislature are, much to their credit and their country's advantage, extensively engaged in the practice of husbandry. I believe that numbers of the two houses of parliament, men who correspond with them, and others who have many opportunities of personally conveying to them, their ideas on agriculture and the improvement of the country, compose a very considerable proportion of your readers. I believe, also, that the spirit of agricultural improvement never existed either in our legislature, or the country, in so great a degree, as at present. These are favourable times, therefore, for practical men not only to publish their opinions on the different modes of culture, &c. but also on all those regulations and customs which obstruct the most advantageous management, the extension of tillage, the improvement of our disgraceful wastes, &c. and as your meritorious undertaking seems to embrace all those important objects, I would, were I disposed to flatter you, compliment you on the judicious *extent* of your plan, in which I hope you will persevere with patriotic ardour.

In ancient Italy, in ancient Greece and many other parts of

the Turkish empire, the advantages of a fruitful soil and favorable sky, were vastly increased by the industry of the inhabitants in the collection of manures. In some parts of these countries, less favoured by nature, that industry converted comparative sterility into a state of productiveness which supported an amazing population and power. View them now, under the want of that industry, and they will exhibit, even where they are naturally fertile, an appearance of barrenness much greater than we observe in the cold and sterile regions of Caithness and Sutherland. Even in several of our most populous and productive districts, we may discover that the soil is naturally poor or indifferent in quality, and that their present fruitfulness, is owing, in a great degree, to the application of great quantities of manure. Of all the manures we apply, dung is the most enriching, and as its effects are so highly propitious, should we not collect, with the greatest care, all the vegetable matter which will promote its increase? and when collected, should we not apply it to the soil in preference to every other purpose? It has been correctly observed by one of your correspondents, that dung increases somewhat like money at compound interest. Another agricultor has observed that about one-tenth to one-twelfth, of our straw is annually consumed in thatching houses; now, sir, if these remarks are well founded, what would have been our present increase of manure, if an act of parliament had been passed an hundred years ago to prohibit the use of straw in such thatching? Can any practice be more barbarous than that of applying the article on which we principally depend for raising our most fertilizing manure, in covering our houses? An apology for such gross mismanagement might easily be made, if we could not obtain covers of tiles, slates and heath, but as these covers are in readiness, and as their use would increase beyond calculation, our quantity of manure, besides benefiting the revenue of the country, I must beg your permission to recommend, through the medium of your useful and widely circulated work, the passing of an act to prohibit the use of straw in thatching houses. While I earnestly request the publication of this paper, I assure you, I do not intend to confine my communications to reform in those regulations which greatly impede the progress of the most important of all arts.—No, sir, I shall, with great pleasure, transmit some papers on *practical husbandry*, which I hope you will deem worth a place in your valuable pages.

There are many other customs and regulations on which I am inclined to offer some pretty copious remarks. Some of them, however, are already in a course of discussion by other correspondents; and I sincerely hope they will pursue them with zeal and ability.

Yours, &c.  
A PRACTICAL FARMER.

## ON THE PRODUCE OF THE HARVEST.

*To the Editor of the Agricultural Magazine.*

SIR,

AGRICOLA Northumbriensis deserves the thanks of your numerous correspondents, for the communicating of the state of the several crops of grain throughout the northern districts, which he mentions of the year past. Such information is the only likely means of ascertaining whether or not there is an actual deficiency, how great or extensive it may be, and whether sufficiently alarming as to authorize and justify the present high prices. To aid, as far as lies in my power, such an enquiry, I here offer to your readers the general opinion entertained in this county, respecting the produce of its crops: actual certainty on the subject cannot be had till the corn is nearly all threshed; but the forwardness in threshing, which the present high price has much encouraged, will enable us to form a more accurate *guess* than is usually to be made at so early a season. First then as to the wheat. Five coombs are esteemed rather above an average crop through the county *communibus annis*. It is feared that *three* coombs will this year approach nearer to the truth: a deficiency of *two fifths* therefore appears from this statement. In the eastern part of this county I am informed that the mildew has not been so injurious, whether from the nature of the soil (a rich deep loam) or that the influence of the blast did not reach so far eastward: a general defect in the last or yield, is however notorious; and even in this neighbourhood, wherever an inclosure from some unknown cause has escaped the mildew, and the quality of the grain is good, it is remarked that it does not yield so largely by the acre as many of those fields which suffered considerably by the blight. It is fortunate that some wheats have been more prolific: it would have been lamentable indeed, had all shared the fate of a neighbour of mine, who has just concluded threshing seven acres, which promised when in the grass, as well as he could wish, and on measuring, actually found no more than *eight-and-twenty bushels!*

Of the barley crop, for the same reasons as above given, I cannot speak but from general opinion. This, however, decidedly declares against the existence of an average quantity of this grain. Two good reasons are assigned: one is, that early sowing being nine years in ten in favour of the barley crop, the best and most active husbandmen we can boast, pursued this plan last spring. The season proved cold, wet, and unkindly, and consequently a thin unproductive plant, convinced them of their unfortunate error, condemning them besides to the mortification of seeing far superior crops grown by

some slover or other, whose land was sown very late, probably in not half so good condition as their own, and who owed his success principally, if not altogether, to downright bad farming. The other reason is the same which A. Northumbriensis notices in his estimate. A much smaller proportion of ground was under barley this year than happens in other seasons. The very low price at which it was sold the preceding year, deterred numbers from sowing so much as was usually practised, and in lieu of barley, they sowed peas, oats, tares, all of which had raised much more money by the acre than barley. Hence, therefore, from this county at least, the supply of barley to the London and Northern markets must fall very short even if no other reason than the one last mentioned operated; but if we add to this, what I really believe to be the case, from all the information I can collect, that the average of *what was grown* will not exceed three quarters and a half per acre (which is a deficiency of perhaps one quarter and a half per acre, in the usual average of this county), and that the adjoining counties of Suffolk and Cambridge have fared the same. We must conclude that the present price is not only accounted for very satisfactorily, but that without supplies from foreign countries, the same, if not higher prices, must be maintained throughout the year.

The price of grain at Lynn market yesterday, December 11th, 1804.

Wheat	from 76s. to 100s.	per quarter.
Barley	from 39s. to 42s.	per quarter.
White Peas	22s. to 25s.	per quarter.
Grey ditto	34s. to 40s.	per quarter.
Rye	30s.	per quarter.

The pea crop of both kinds, as well as beans (which are rarely grown but on rich fen land) is good, scarcely known more abundant, though short in the straw.

I am, Sir, yours, &c.

AGRICOLA NORFOLCIENSIS.

Fakenham, Dec. 13th, 1804.

P. S. I have the satisfaction to say, that having tried the Northumberland husbandry in my turnip crop of this year, I find by actual experiments, that the drilled crop exceeds the broad cast nearly two tons per acre.

## CRITICAL CATALOGUE.

PRACTICAL AGRICULTURE, *or a Complete System of Modern Husbandry, with the Method of Planting and the Management of Live Stock.*  
By R. W. DIXON, M. D. 2 Vols. 4to. £.4 4s. 0d. Phillips.

AMONG the striking features by which the late century will be rendered memorable in the history of mankind, the most pleasing is the unparalleled progress of the arts and sciences; in which they have been aided, as well by the public spirit of individuals, as by the various national establishments in different parts of Europe. In so truly noble an emulation, our own country can with confidence claim a distinguished place; and, among its foremost pretensions, may justly advance that of having rescued Agriculture from the degradation to which it had been hitherto uniformly doomed, by being considered as exclusively the province of the mechanical operator; and of having elevated this most ancient and valuable art into an object of liberal and enlightened study and scientific research.

This, indeed, upon cool and mature reflexion, will appear a wonderful epoch in the annals both of science and of man. The union of the two characters,—the man of enlarged and comprehensive mind, of deep and accurate thinking, with the husbandman, the mere tiller of the ground, (the former considered, in every civilized age, as the highest in the scale of society; the latter, perhaps, as the lowest)—was a novelty worthy of adding to the lustre even of the eighteenth century. It was not, like cotemporary revolutions, the wild and unjust abasement of all that was most dignified, but the merited exaltation of what was most humble; it was not the degradation of the man of liberal attainments into the coarseness of the rustic, but the approximation of the rustic towards the refinement of the man of liberal attainments; it was, in a word, the precise contrast of the change from what poetry tells of the Arcadian swains of the golden age, to the comparatively brutal ignorance and insensibility of the shepherds of modern times.

The most careless observer must know how great is the influence of the personal manners and dispositions of a monarch, on the condition and habits of the people under his authority; and, in applying this principle to our days, must be convinced of our happiness in possessing, in his present majesty, a sovereign, who, while in his domestic character he exhibits a bright pattern of the virtues on which our dearest happiness depends, holds out equally, even in his customary relaxations, the example of employments so congenial to our national character, and so conducive both to individual comfort and to public prosperity, as agricultural pursuits.

This is indeed a subject that comes home to British bosoms: and it is not surprising that conduct thus worthy of imitation has been very generally imitated by many of our principal nobility and gentry; and that, aided by the establishment of a public board, it has succeeded in giving to the study of this interesting art, the pre-

valence (while its own vast importance must insure it from the transitory duration) of a *fashion*.

The zeal and perseverance with which noblemen and gentlemen have engaged in this subject, and the liberal and enlarged scale on which their experimental enquiries have been conducted, form no inconsiderable addition to the numerous other testimonias of the public spirit of individuals among us. But—(and, in the development of an art which has been so lately raised into a science it could not have been otherwise)—it cannot be denied, that in the universal extension of these laudable attempts, much inconvenience and embarrassment has, from various causes, unavoidably arisen. Unfortunately, it did not always happen that the gentlemen who were the most earnest in their well-meant endeavours at improvement possessed themselves, or were assisted by, all the solid *practical* experience which the professional farmer alone can be master of, and which, in every art, (perhaps more so in Agriculture than in any other) must occasionally be called in, to correct the exuberances of theoretical speculation; and from this it arose that the most unlearned farmer might at times detect, in their ingenious dissertations, some (to him) apparent absurdities, which could give him a sentiment of disgust, not to be removed by any arguments, however plausible. The writers too, as in every new branch of science, were eager to form *entire theories*: and, on the ground of having made a few valuable discoveries, would think themselves entitled to establish principles on every point of the great subject of their partial investigations. Hence, from each individual author something valuable might be extracted, but which it was impossible to combine with all that was found best in the works of the others, or to unite the whole of these collected parts together into one general course of practice. The publications, likewise, were usually expensive, and at last grew intolerably numerous. “Book referred to book; to seek was not always to find, and to find was not always to be informed;” and the merely professional farmer, thus deterred by at least their costliness and multiplicity, either was obliged to confine himself to a very few, which of themselves probably could afford him but little information, of considerable novelty or advantage; or rejected the new inquiries altogether, and determined to “keep in the safe track of his fathers before him.”

To select, therefore, from the almost innumerable details and experiments to which the spirit of improvement has given birth, all that was really beneficial, and in doing this to detect the various resources of misapprehension which, in the different statements, are continually presenting such contradictory results; and to blend with the scattered parts thus brought together, just so much of the old and most approved methods as would supply the deficiencies, and amalgamate with the former into an uniform and consistent whole, was an undertaking which the state of the agricultural art began every day more imperiously to demand. In too many instances the professional farmer actually congratulated himself that he had not been seduced into the maze of visionary improvement, where even the man of real taste and science was lost and bewildered amidst the jarring and irreconcilable details of experimenters,

The nineteenth century could not open more auspiciously than with the performance of such a task, if indeed its performance were possible; but of this, all who turned their thoughts to the subject despaired: and our own curiosity, much more than our hope, was excited by the announcement lately of a work, under the title of "A complete System of Practical Agriculture, including the newest Improvements; by Dr. R. W. Dickson, of Hendon."

Before we proceed to our analysis and remarks on the work itself, we shall introduce Dr. Dickson's own reasons for embarking in this laborious undertaking, and his ingenuous opinion as to the causes that have hitherto retarded the progress of agriculture as a science, as well as those which have operated against its extension and improvement.

"Agriculture, though it has probably made a greater progress in this than most other countries, is still far from having attained that degree of perfection which might have been expected, and of which it is capable:—much remains to be effected in almost every branch. If the state of the art be examined with attention, it will be found that though in particular districts and situations its principles and operations may have been well understood, and the lands of course have been conducted under an improved state of cultivation; yet, that on the whole, but a very small portion of the cultivated part of the island has even at this advanced period been brought under a judicious and well-conducted system of husbandry. Immense tracts of land of the more rich and fertile kinds may still be met with in different parts of the kingdom that are managed in very imperfect and disadvantageous methods of farming. It has been stated by an able writer that Great Britain contains sixty-seven millions of acres; seven millions of which are taken up by houses, roads, rivers, lakes, &c. consequently incapable of cultivation; and that of the remaining sixty millions, only five millions are employed in raising grain, and twenty-five millions in pasturage, while thirty millions are either completely in a state of waste, or cultivated "under a very defective system of husbandry."

"But it is not merely in regard to the cultivation of the soil that the advancement of the art has been so slow and confined; in other departments or branches its progress has been equally limited. In the management of meadow and pasture-lands, and the improvement of the breeds of different kinds of domestic animals, except in particular instances, there appears to have been a greater degree of neglect or inattention, though it must be allowed that regard is as necessary to be had to these as to that of arable cultivation; the connection between them being so intimate, that however well a farmer may be acquainted with arable practice, unless he at the same time possesses the proper knowledge of improving and keeping his grass lands in order, and of breeding, rearing, and feeding animals, he must manage to very considerable disadvantage. Without this knowledge it is impossible for him to distinguish the different breeds of animals, or know that which is the most suitable and best adapted to the nature, situation, and circumstances of his farm, or to feed them in the most proper and advantageous methods.

“ In the instrumental part of husbandry, though much has been lately done, much is still to be accomplished before that degree of economy, convenience, and utility is attained that the subject is capable of admitting, and which the nature of the art requires. It must however be allowed that valuable additions of this kind are daily introducing themselves.

“ The causes that have produced this slowness in the progress of an art which undoubtedly claims the greatest regard and encouragement are not only numerous but extremely different in their nature. On a near investigation of the subject, it will probably be found that agriculture has however been less retarded by the incapacity or inattention of those who have been engaged in the practical part of the profession, than by the different regulations and restrictions with which it has been fettered, and which have been suffered to continue after the circumstances that gave them birth have been either entirely changed or undergone very material alterations. It is not, however, on this account to be concluded, that the advancement of husbandry, as a science, has not been impeded by the influence of other causes; it has obviously been much restrained at all times, and especially in the more early periods of its cultivation, by the want of a clear and explicit knowledge of its principles, and of greater precision and correctness in the language made use of in their explanation. It has been observed by an able writer that while a want of due precision and discrimination is suffered to exist in the definitions and descriptions of those substances which constitute the basis of agricultural knowledge, it is utterly impossible that it can be carried to any degree of perfection as a science. It is from this ambiguity and incorrectness in the language of the art, that the cultivators of land in one part of the country are frequently incapable of profiting to any extent by the accounts that are given of what has been done by the exertions of those in another. This is sufficiently shown in what has been done in respect to the nature of soils; agriculturists in general having given such descriptions and definitions of them as coincided with the notions that they had formed concerning their nature in their own particular districts or situations, rather than such as marked their particular properties and compositions. Knowledge of this kind, however just or accurate it may be in regard to the soil of the places from which such descriptions are drawn, must, he contends, be very imperfect in respect to others, and of course be incapable of any general application or utility. For it must be obvious to every one who is in the least degree conversant with the business of cultivation, that soils do not only differ very materially in the nature of their principal ingredients, but also in the proportions or quantities in which these enter into such compositions as are denominated soils. Thus the mere assertion of a soil being clayey, loamy, gravelly, &c. conveys little information, as it does not make us in the least acquainted with either the properties or proportions of the substances from which they are thus denominated. Besides, it is known to every farmer that there is the greatest difference in the nature of clays and other substances which constitute the basis of soils as they exist in the state of earth or

mould; the clayey soil of one tract of country being extremely fertile and productive, while that of another possesses the highest degree of sterility and barrenness. There are likewise very considerable differences in the loamy and gravelly soils of different districts, which are by no means distinguished by such unqualified terms. For this reason it probably is that experience in farming has had a less general effect in improving the science of agriculture than may have been supposed; and it is perhaps from the same cause that the principal improvements in the profession have been confined to particular situations and districts, from which they have extended themselves by very slow and gradual means.

“The difficulty of determining the connection of effects and their causes, and the length of time that is requisite to fully ascertain any particular fact or circumstance in farming are also causes that have considerably impeded the scientific progress of agriculture. After much labour, time and expense have been employed in order to elucidate and ascertain particular facts of this kind, it not unfrequently happens that the experimenters are incapable of accomplishing their objects, or draw such conclusions as can be safely depended upon; so various and so involved are the circumstances that influence the results of experimental attempts in this science. In this way, however, it is remarked, a sort of experience is begotten and transmitted in the art which is difficult to be rejected; but which, if adopted, must often inevitably lead to error and disappointment in the practice of the farmer. Besides, this, as well as other sciences, has been greatly embarrassed and retarded by details of imaginary experiments and discoveries, which are very apt to impose upon the minds of those who are not very well informed concerning rural affairs.

“There is likewise, it is added, in the business of agriculture, much confusion introduced, by the difficulty which even the best judges frequently find in making their decisions, where a number of circumstances and causes are combined, concerning those which are essential and necessary to particular operations and processes, from such as are merely accidental and of little import. The want of correctness too, in regard to the absolute expense incurred in accomplishing various operations in respect to any particular object of husbandry, and the difficulty, in many instances, of preserving the products of different trials distinct, have had a tendency to impede the advancement of the art: as from such inaccuracy the farmer is frequently incapable of ascertaining, with any degree of exactness, either the sum which he has expended or the value of the produce which he has obtained; consequently he cannot be in a situation to estimate the advantage of such operations or processes, from which the profession remains where it was before the commencement of his attempts. The want of accuracy and precision, in matters of this kind, has also led to the introduction of an extremely pernicious system of proceeding in different instances, which is that of making conclusions by a sort of guess-work. Nothing can, however, be more fallacious, than this mode of deciding; because a person, under such circumstances, is almost certain to be influenced by some preconceived opinion re-

specting the particular object of his decision. Facts collected and ascertained in this way, as they can but seldom have any solid basis, must of course greatly retard the progress of agriculture. The conclusions that are drawn by means of experiment are even frequently liable to objection, and hence the improvement of the profession is not so much promoted by this method as many persons may suppose. In making such experiments as are to elucidate and explain the facts in this science which are doubtful or not well understood, much knowledge, care and circumspection, is constantly necessary on the part of the experimenter, to guard against every thing that may, in the least degree, influence the result: for if this point be not carefully attended to, very different conclusions may be drawn from the same experiment. The farmer, from his not having been accustomed to that accuracy and precision which is requisite in this mode of inquiry, is often but indifferently prepared to avoid errors, which may be produced by a variety of unsuspected causes, which considerably influence the results of his trials. On this account, the inductions that are drawn from the experimental attempts of even real farmers, can seldom be so fully depended on, as may, at first sight, be supposed: where due care and attention are bestowed, this is, however, the best and most certain means of increasing our knowledge, and extending the bounds of the art.

“The want of a better and more complete knowledge of the different branches of science which are intimately connected with that of agriculture, among practical farmers, has not been less prejudicial to the improvement of husbandry, by the incorrectness and inattention which it may have caused in the ascertaining of particular facts and circumstances in the profession itself, than by the prejudice and attachment which it has engendered to particular customs, practices, and methods of management. The minds of those who ought to have been the most capable of enlarging the bounds of agricultural knowledge, have frequently, by this means, been fettered, and kept from taking any new or particular views of the various objects and operations of husbandry. And this is, perhaps, one of the causes, of farmers having proceeded so much in the same track since the commencement of the art.

“That agriculture is capable of being advanced to a considerable state of improvement, by a more correct and general application of such principles and reasonings as are borrowed from other sciences with which it is connected, is extremely probable, from the success and progress that has been made by the little that has been already done in this way, as well as from what may have been observed to take place, in consequence of such application in other arts.

“After this cursory view of the principal causes, which appear to have impeded the advancement of agriculture as a science, we may proceed to those that operate against its extension and improvement as a practical art. Impediments of this kind are, however, so exceedingly numerous and complicated, that it is not in-

thended to enter into any full or elaborate discussions respecting them; but merely to bring them to the notice of the agricultor.

“It is easy to perceive that a variety of obstructions must have been thrown in the way of agricultural improvement, by those slow and imperceptible changes that are continually taking place in the situation and circumstances of a country, by which laws, regulations, and restrictions, that were once proper and useful, become, in the course of time, highly detrimental and improper. From this cause it is, that the early regulations that were made in respect to the management of lands in this island, are so badly adapted for promoting the advantages of husbandry at the present period. This is fully exemplified in the case of commons. The ground, in such instances, does not merely lay in the state of waste, being debarred and deprived of undergoing any cultivation, although frequently very capable of admitting of it, but it is detrimental by preventing improvements in the adjoining lands from being carried on in the most complete manner and with the fullest effect, as well as by being exposed to injuries of the most baneful kind, by the cutting away and removal of its surface, the sinking of pits, the stagnation of water, as well as a thousand other practices, while the nation derives not the smallest advantage from it in return for such a system of deterioration.

“But it is not only in this point of view that commons are prejudicial or useless; they are a kind of property, that has much effect in injuring the morals of the poorer classes of inhabitants, who claim rights on them, by engendering quarrels and disputes, and relaxing those habits of industry, economy, and exertion, which are essential to the labourer in husbandry, by holding out to him a fallacious means of subsistence.

“There is also a kind of *commonable* property, which, in some counties, appears, from the late excellent surveys that have been made, to be nearly one half of their whole arable territory; in which each individual knows indeed the limits of the lands that he possesses, but is under the necessity of submitting to certain regulations and restrictions that custom has established, however absurd or disadvantageous they may be in the cultivation and management of them. This circumstance, instead of exciting the farmer to industry and improvement, tends, very materially, to lessen his exertions and introduce slovenly modes of practice, highly prejudicial to the interests of agriculture. Lands conducted under such a system of management, cannot probably be made to produce one half the quantity of grain or other substances, which they might be made to do under improved methods of cultivation. That great inconvenience and much disadvantage, in a natural as well as individual point of view, arises from the possession of lands clogged with such customs, cannot be doubted; but, perhaps, the greatest mischief is the restraint which is thus imposed on the art of husbandry.

“The tenures of land, in many instances, are not less injurious to the advancement of agriculture than the circumstance of grounds being waste or in a commonable state. A large part of the land of

this country is held under lords-of-manors, by a kind of copy-hold or customary tenure which subjects the tenants to the payments of fines on the decease of the lords or tenants, and on the alienation of the property, as well as certain annual rents, and in some places even to the performance of various disagreeable services; from which it is impossible that the holders of lands under such restricted conditions, especially where the lords are entitled to fines proportioned to the improved value of such property, can be disposed to the expenditure of money, or the using of much exertion in order to bring such lands into an improved state of husbandry. It has been justly observed, that 'one great obstacle to improvement arises from a laudable anxiety in the customary tenants to have their little patrimony descend to their children. These small properties, loaded with fines, heriots, and boondays, joined to the necessary expence of bringing up and educating a numerous family, can only be handed down from father to son by the utmost thrift, hard labour, and penurious living: and every little saving being hoarded up for the payment of the *evenful fine*, leaves nothing for the expence of travelling to see improved modes of culture; to gain a knowledge of the management and profits of different breeds of stock; and to be convinced by ocular proofs that their own situations are capable of producing similar advantages; and even should they be half inclined to adopt the new practice, prudence whispers, that should the experiment fail, it would require the saving of many years to make good the deficiency.'

"Such lands too, as are held under corporations, whether they be civil or religious, as they do not afford the occupiers of them that kind of interest and security, which becomes the stimulus of exertion and improvement, are of course detrimental to the progress of the profession. In lands of this tenure, no exchanges for the purpose of mutual accommodation and advantage can be entered into; no improvements, in the way of cutting canals or laying out roads, can be safely made, without the intervention of the legislature. But what is still more hurtful, leases of very short periods can only be granted; from which circumstance such lands must constantly remain under very imperfect systems of management.

"The possession of lands under deeds of entail, may likewise be considered as prejudicial in the same way; as, in such cases, no inducement is held out for the expenditure of money, and the consequent improvement of such property.

"But obstacles of a more general and powerful nature are found in the various indefinite claims that are made on lands. The payment of tythes in kind, from its operating directly as a tax, on the capital and productive labour of the farmer and land-proprietor, as well as from its being vexatious in the mode of its collection, is a measure that impedes the improvement of the art of husbandry in a very serious degree. In the cultivation of arable farms, especially if the land be in such a condition as to require the expenditure of large sums of money in the purchase of manure, and considerable labour and exertion in other respects, in order to bring it into the state of producing abundant crops, its effects are

experienced in the most injurious and oppressive manner. The efforts of the husbandman, in this case, have been 'compared to those of a labourer, who should make considerable exertions during the hours of relaxation throughout the day, in order that he might obtain a bit of something hot for supper; and when he was just preparing to enjoy his hard-earned morsel, he had it taken away from him by a neighbour, who stood by idle all day, and now came, by means of a legal authority he had obtained, as a reward for some exertions of his predecessors, when the state of society rendered such a mode of remuneration the easiest of any that could then be devised, to seize that which the poor man gained by the sweat of his brow. Though the poor man is forced to give up his morsel in this case, it is impossible for him to yield it without reluctance, or ever after to view his neighbour with a favourable eye. It provokes an invidious parallel to be drawn between the two parties, which estranges them the more from each other. The consequence is, that although, in this particular circumstance, the one gains just as much as the other loses; yet it tends very little on the whole to the emolument of the receiver; because the looser says within himself, since I cannot enjoy my own morsel myself, I can at least prevent my neighbour from getting it, for nobody can compel me to earn it but if I please. So down he sits in indolence; and neither of them enjoys the blessing that might have resulted from industry.'

“The spirited cultivator may be inclined to improve his lands, as is frequently the case, even where the profit he is to derive from such improvement cannot be considerable; but under such circumstances, he must constantly be prevented from proceeding by the operation of this injudicious regulation: where a tenth or more of the produce arising from the exertions of the improver are to be taken away, it is obvious that small returns will not answer; especially in a business where there is much risk from season and other causes. By this means the community is consequently deprived of the various advantages resulting from increased industry, and augmentation of produce. By the same system also, much good land, exclusive of commons and wastes, is constrained to remain in the unprofitable state of grass, which might otherwise, by a trifling expenditure of money, and no very extraordinary degree of exertion, be rendered greatly more productive under proper arable management. And it is likewise highly injurious in many instances, by subjecting the farmer to a disgusting dependence on the tythe-owner.

“It is evident that the effects of this measure must be equally detrimental to the interests of the proprietors of lands as to those of actual farmers; for whatever tends to lessen the exertion and industry of the latter, must necessarily diminish the incomes of the former, and in a proportion much greater than is commonly supposed. But they are injured in another way besides that of rent; for as a tenth of the produce of lands is thus taken away in kind, a deficiency of manure to that extent must be the consequence, the disadvantages of which are now generally well understood. The effect which the abolition of tythes in Scotland has had in promoting

agricultural improvements, also affords a strong and satisfactory proof of their operating powerfully against the advancement of husbandry; for it cannot be attributed to any other circumstance that improvements have been carried on so much more extensively in that part of the island than in this.

“But it is not merely in stopping the progress of agricultural improvements that the payment of tythes in kind is prejudicial, its effects are injurious in many other points of view which it is unnecessary to consider at present. It is therefore a matter of the utmost importance that such an alteration or modification should be effected as might render the claims of the proprietors secure, without producing those mischievous consequences which proceed from it in its present form.

“The present method of providing for the poor, notwithstanding the judgment and deliberation with which it was adopted, is unquestionably detrimental to the advancement of agriculture, as well as greatly prejudicial to morals and industry, from its falling disproportionately heavy on land-holders of every description, nearly three fourths of the whole amount of the immense sum being raised by that class of society. The proprietors of land, are, however, in some measure enabled to throw this burthen from themselves by stipulating with their tenants for the payment of all parochial taxes, so that in fact the farmer becomes the principal sufferer, especially in cases where any augmentation of the assessment is required, which is frequently the case from the operation of either local or general circumstances; such as the failure of manufactures, or the carrying on of wars. By these means the capital of the farmer is diverted from its proper application, that of being employed in the cultivation and improvement of land, by which the progress of husbandry is not merely impeded, but the community sustains an incalculable loss.

“There are still other obstacles which retard the improvement of the art besides those that have been noticed; but they are in general less prejudicial in their tendency, or more limited in their operations. Of this kind are the game, the corn, and the salt laws; all of which in their present forms throw great impediment in the way of agriculture. And the want of proper and convenient markets in many situations, for the disposal of different kinds of produce, and of easy and expeditious modes of conveying them to such places, as well as a variety of local customs and regulations, are not less injurious in their effects, though much less attended to.

“These are some of the principal difficulties and impediments that have been so long suffered to retard the progress of cultivation, and which must continue to put an insuperable bar to its improvement, in many respects, until they are moved.

“But the advancement of agriculture has not been solely obstructed by causes of this nature; there are many others which the proprietors of land have the means of obviating. The want of proper and judicious leases has at all times operated unfavourably for the improvement of husbandry, and is an evil very generally complained of by farmers, a circumstance which is not in the least to

be wondered at, as it can hardly be supposed that improvements will be carried on to any extent where there is a want of permanent security for the enjoyment of those advantages that may be derived from them.

“It has been justly remarked by Mr. Donaldson, that ‘that man would certainly be justly subjected to the reproach of being rash and inconsiderate in his conduct, who should expend money and labour on the improvement of any farm, where his certainty of continuance does not entitle him to look forward with a confident assurance to the period when his exertions are to be rewarded. It is a well known fact, that the hope of reward sweetens labour; take that away, and the spur to labour ceases. It is that alone that calls forth industry, and is the spring of all exertion. What object then can a farmer have to hazard his capital, and devote the most vigorous and active part of his life to the improvement of a farm which he holds on no more certain tenure than the will; or, in other words, than the whim or caprice of his landlord? In every such situation, the prudent farmer must be restrained from any spirited expenditure, however much he may be satisfied that the improvements, which might thereby be effected, would, under other circumstance, prove beneficial to the public, the landlord, and himself. Have not instances occurred, where tenants so circumstanced have been obliged repeatedly to agree to pay advances of rent rather than remove; while, from the uncertainty of the tenure on which they held their farms, they were debarred from making those exertions which an advance of rent demanded, and which almost uniformly takes place in such cases when leases are granted?’

“From an examination of the excellent surveys that have lately been made of the agricultural state of the kingdom, under the direction of the Board, it appears that by far the greatest part of the land in many counties is held by tenants merely at the will of their landlords: who, of course, may deprive them of their farms, on proper notice given, whenever they please; and in cases where leases are granted, they do not extend further than from five to nine years, except in a very few instances indeed, in which they may be protracted to the period of nineteen or even twenty-one. And even such leases as those are for the most part clogged with such restrictive clauses and conditions as put a stop to improvement, and confine the cultivator in methods of management that are frequently far from being the most advantageous.

“In the first case, indeed, the farmer is kept in such a state of dependence, as is not only highly degrading, but must effectually damp and repress his exertion and industry. And the tenants under short leases are not in situations much more desirable, as they cannot with safety or propriety enter into any extensive beneficial methods of augmenting the produce of their farms, lest the advantages should be reaped by others. Even a lease of twenty-one years, in many situations, and under different circumstances, is not sufficient to allow the farmer to undertake improvements of considerable magnitude, as he can neither conduct them in the most economical way, nor reap the full advantage of them. Be-

fides, where money to any great amount is expended in the beginning of such a term, the farmer is often, in order to indemnify himself, where he has not a prospect of remaining, induced to run out and exhaust the land at the latter end of his lease; which is a practice of the most prejudicial tendency to the proprietors of such farms, and the community as well as the interests of agriculture.

“ It is evident, therefore, that the farmers of land should, in all cases, have such a security for the possession of it, as will enable them to introduce the most improved modes of management, and excite them to adopt the best means of improvement. The length of lease that may be most suitable and best adapted for these important purposes is not easily ascertained; it ought probably to vary according to the particular circumstances, and the nature of the improvements that are to be carried into execution. In such leases, many clauses must of course be requisite; but they should be such as are plain and simple, and such as may not too greatly destroy the independence of the farmer, but leave him much at liberty to follow his own plans of cultivation; while they afford effectual security to the proprietors, by cautiously guarding against the introduction of such systems of husbandry as would be injurious or improper.

“ There are many other causes of this kind that operate unfavourably for the extension of agricultural improvements; but as they are either confined to particular circumstances, or only possess a local influence, it is not necessary to consider them with a view to the present object.

“ From what has been observed, it is evident that different circumstances must be attended to, in order to bring the state of agriculture to that degree of perfection which its utility demands. It will not only be necessary that the principles of the art be rendered more clear and easily accessible to the cultivator, but that the various processes and practices be brought into a more obvious and intimate connection with them, and more full and complete explanations of the nature and constituent properties of the different substances or bodies that enter into and form the basis of the profession, afforded; as well as the different clogs and impediments, which have been interposed at different times, in the way of regulation, obviated and removed. The author has endeavoured, as much as possible, to furnish the farmer with a more correct knowledge of the quality and methods of operation of those materials or substances with which he is to accomplish his various purposes, as well as the changes which they undergo by an intimate combination with each other; and the modes in which they may be applied and made use of with the greatest chance of success and advantage.

“ The former of these have been objects of much consideration in the present work. It has also been his wish to extend the bounds of his information in respect to the means of cultivating the different plants which constitute the food of man, or which serve for the purpose of feeding cattle and other domestic animals. In this intention, the various improvements that have been effected in

the nature of tillage, and the interposition of different sorts of green crops with those of the grain kind, as well as in the implements and machinery by which they may be performed with the greatest economy and convenience, have been brought to his notice in as clear and concise a manner as the nature of the subjects admitted.

“And as the various products of the earth can only afford a trifling advantage to the cultivator, unless he be perfectly acquainted with the means of applying them as the food of animals, the methods of management that appear the most beneficial in the breeding, rearing, feeding, and fattening different sorts of live stock, have, it is hoped, been more fully explained, and placed in more clear and distinct points of view.

“In regard to the latter, or the removal of those obstacles which have been thrown in the way of agriculture, under the idea of regulating its operations, however necessary it may be to the complete improvement of the art, it can only be effected by the interposition of the legislature and the proprietors of land.”

This great work is divided into sections: the first treats of the implements of husbandry, and in this the merits and uses of ploughs, wheel-ploughs, drill-machines, hoes, scarifiers and scufflers, drags, harrows, rollers, thrashing and winnowing machines, chaff-cutters, rakes, and wheel-carriages of every description, are discussed at great length, and with much interesting and useful originality of method. Section 2, is on the subject of farm-houses and offices; and here we find farm-houses, barns, granaries, stables, cow and feeding houses, dairies, the out-offices, and numerous other buildings, considered, with regard to their construction, form, arrangement and disposition, and improvement, in a manner required by a point of such essential importance to the comfort and convenience, as well as the prosperity, of every farm. Section 3, is on the too much neglected subject of farm cottages, and the condition of cottagers in general. Section 4, is of inclosing land, and contains some judicious remarks on the great general national question of inclosures, fences, walls, hedges, &c. naturally find a place for discussion in this section. Section 5, treats of the construction of roads, and examines, both mechanically and geometrically, the questions of the forms and the directions of roads, and the forms of wheels: there is much curious novelty in the examination as here conducted. Section 6, is on the important subject of soils, including that of subsoils; and discusses the different chemical properties of the clayey, loamy, chalky, sandy, gravelly, and peaty soils, as well as the general nature of vegetable earth. Section 7, is a truly admirable and agricultural dissertation on the various kinds of manures, and their decomposition from animal, vegetable, fossil, saline, and other different substances, and on the means of augmenting and preserving manures; the whole of which is concluded by general directions for their application, and is summed up with so much perspicuity, and displays so perfect a knowledge of the subject, that we cannot do our readers a greater favour, than to give it in the author's own words:—

“In the application of manure to land, several circumstances are

necessary to be considered, such as the state or condition of the substances which are to be made use of, the nature of the soils on which they are to be laid, the kind of crop that is to be promoted by them, and the season in which they are put into or upon the ground.

“As we have already seen that changes are continually taking place from the moment the materials of the dung heap are thrown together, to the period in which they are reduced into a black carbonic earthy matter; and that in most of the different stages through which they pass in this process of decomposition, such substances are formed as are capable of contributing to the nutrition and support of vegetable crops; it seems probable, that in cases where manures are to be turned into the ground, and such crops cultivated as require a supply of nourishment for a considerable length of time, they should be employed in their long or more imperfectly reduced states, as by the heat which is evolved in the commencement of their dissolution, the process of early vegetation may be greatly promoted, and their gradual decomposition and decay afterwards, under the ground, afford a more durable and regular supply of nutrient materials, and thereby contribute more effectually to the growth of the crops; but that where they are to be buried in, or applied to, the surface of the soil, and intended merely for the benefit and support of such crops as are of short duration, or quickly arrive at their full growth, they may be more advantageously made use of after they have been more fully and completely reduced, as in this state the manure is, in the case of grass lands, not only capable of being spread out in a more regular and uniform manner, by which it becomes more evenly as well as more generally carried down to the roots of the plants by rains, but it is in the most suitable condition for allowing the young plants the means of springing up with facility, and at the same time, whether used under or upon the soil, of affording the crops that abundant supply of nourishment which is necessary to their speedy growth and great luxuriance, and by these means to contribute the most perfectly to the promotion of their increase.

“Besides the above advantages of long, or imperfectly, decayed manures, they have others that depend on the soil into which they are turned, and the nature of the crops that are sown or planted with them. Where they are employed in such stiff, clayey, or loamy grounds, as have a great tendency to become dry and hard, and thereby incapable of admitting the tender fibrous roots of grains or other plants to spread or extend themselves, and draw in more abundant supplies of nourishment, they may be useful by keeping the earth around them in a more open and porous state, from the slowness of their decomposition, and the gradual and continued manner in which the different elastic matters are set loose and united with the soil. Hence, when barley, or such kinds of grain as require a rather light and open state of soil, and those bulbous or knobby rooted plants, such as potatoes, that require much room to shoot and extend themselves, are cultivated on such stiff soils, they are generally found to be the most productive where such long or imperfectly reduced manures have been made use of in the preparation of the land.

“ And as in the slow and gradual decomposition of the materials which are made use of for manures, when slightly deposited beneath the soil, there is much less waste of heat and those elastic matters which contribute so greatly to the support of vegetation, than where they are made to undergo the various processes of dissolution in large masses, as in dung heaps, they may probably sometimes on that account be most advantageously employed in this state.

“ On this principle too the ploughing down of fresh vegetable crops, in many cases, in their most succulent states, may be a more economical as well as more beneficial practice; especially in such light and dry kinds of soil as will more readily admit of their gradual putrefaction and decay, than to cut and take them off for the purpose of being by other means converted into manure. It seems likewise probable, on the same grounds, that for the production of crops of bulbous-rooted vegetables on the more stiff and tenacious soils, the matters made use of as manures may be employed with the greatest advantage, when put into the earth before they have undergone any great degree of decay by means of putrefaction, as in this way there is no waste, the whole being ultimately converted and applied, though more slowly, to the support of the crops.

“ As to the season in which manures may be put into the soil, or spread out upon its surface, with the greatest benefit and advantage, though in practice it must, in some measure, depend on the state of the land and the convenience of the farmer, it should, in cases where they are buried in the ground, be as nearly as possible to the periods in which the seeds or the roots, which they are designed to support, are sown or placed in the earth; and in the latter case, or where they are to be laid upon the surface of the land, it ought probably to be just before the crops of grass, or other vegetables, begin naturally to spring or shoot forth.

“ By the practice of depositing and blending the manure with the soil, nearly at the time the crops are put in, there is scarcely any waste of the fertilizing properties of such substances, which, as they gradually proceed in their decomposition and decay under the ground, must otherwise be the case, the roots of the plants not being in their most proper states for taking them up and converting them to their support. Besides, in the stiff, loamy, or clayey soils, they have a tendency, as has been remarked above, to produce a degree of lightness and friability that is suited to the early process of vegetation. And it is observed by an able writer, that ‘ the atmospheric air, which is buried along with the manure, in the interstices of the earth, and which for many weeks, or even months, renders the soil loose and easily impressed by the foot on walking on it gradually evolves, by its union with carbon, a genial heat, very friendly to vegetation in this climate, as well as the immediate production of much fluid carbonic acid, and probably of a fluid mixture of nitrogen with hydrogen, which are believed to supply much nutriment to plants\*.

“ And by the application of such manures as are employed in the way of top-dressings in the beginning of the spring, they are laid on in the most favourable period for affording their nutritious principles, and for their being drank up by the roots of plants, conse-

quently become useful at the time they are most wanted for the promotion of the crops, and the great waste which must otherwise be caused, either by the excessive falls of rain and floods in the winter season, washing down much of the valuable properties into the adjoining rivers and ditches, or the evaporation of their more volatile or elastic matters by means of the summer heats, is most effectually guarded against and prevented.

“The practice common in some places of applying manure to grass lands in the latter end of summer or beginning of autumn, after the first crop of hay has been taken from the ground and the after-grass has begun to make shoots, is not by any means so favourable as that of early spring, as in the latter case the generation of those materials that contribute to the support of vegetation is greatly promoted by the constantly increasing heat of the vernal and summer months; while in the former it is constantly checked and retarded by the increasing coldness of the autumn and winter seasons. Besides, the manure, by being spread out upon the surface of the land, under such circumstances, must be the cause of great loss, by contaminating the after-grass, and rendering it incapable of being eaten off by cattle or other kinds of live stock.

“Where, however, a second crop of hay is to be taken, it may sometimes be put on at such times with advantage to such crop, especially if the weather be not too hot, and the manure in a perfectly fine and reduced state.

“Doctor Fenwick, in his very ingenious reflections on manures, has very well observed, that it is scarcely possible to suggest a worse mode of using manures on grass lands, than that which is almost universally practised in the neighbourhood in which he resides; and it is the same in many other parts of the country, as is evident from the reports that have been lately published under the authority of the Board of Agriculture: ‘When a severe frost has bound up the land in a state of impenetrable cohesion, the farmers,’ says he, ‘wheel on their dung, perhaps even when snow has covered it. While the frost lasts the land can derive no advantage from the manure, and when a thaw supervenes it is evident that the wash from the melting snow, or from the rains which generally fall in such weather, must deprive the mass of every part that is soluble. The ground, in the mean time, retains the frost for many days, and is therefore incapable of absorbing the wet which falls upon its surface; and even when the influence of the milder air has reached it, it can imbibe but little, being in general previously filled with water, and the quantity which flows over it being too great for soil under any circumstances to drink up.’

“In favour of this destructive and wasteful practice, however much it may have been defended on the ground of the farmer’s leisure or inconvenience, and the little injury done to the turf or sward of the land, the same writer thinks there can be only one reason alleged, which is, that manure, when spread early in the winter, may protect the roots of grasses from the severity of frosts. This, too, is probably a mistaken notion, as it is known to every one, that the common grasses are seldom injured by the severest frosts: and other kinds of grasses may probably not suffer less in-

jury from the application of manure at such a season, than from the severity of frosts.

“ On all these accounts, therefore, farmers should contrive, as much as possible, to apply the manures, intended as top-dressings to grass lands, as early in the spring as it can be conveniently done, which may be easily managed on those that are dry, and on such as are inclined to be wet and poachy, it may probably be greatly facilitated by having small light carts constructed for the purpose, and placed on broad cylinders as wheels. We are fully convinced, from the trials which we have made in applying manures to grass lands at such periods, that the trouble of the farmer will not only be rewarded by much larger crops of hay, but also by a considerable increase in the quantity of the after-grass; and, besides, his crops in both instances will be more forward than in the ordinary methods of putting them on, either in the autumn or the winter months, which in many cases is a circumstance of great importance.

“ In the application of manures to lands under tillage, as well as those in the state of grass, there are a few other circumstances that require the attention of cultivators; such as the depth they may be deposited in the soil, the modes of putting them upon the ground, and the most economical methods of employing them.

“ As we have already seen that the putrefaction and decay of animal and vegetable matters, whether above or beneath the ground, is greatly promoted by the free admission of air and a suitable degree of moisture to them, it is evident that they should not be buried so deep in the earth, as that they may be prevented from readily receiving the aid of such causes in forwarding their decomposition; nor, as the process is known to be much retarded by the substances being rendered too dry, should they be placed so near the surface, or be so thinly covered, as to permit the action of the sun and winds, before the crops have risen to such heights as to prevent it from dissipating and carrying away their nutritious properties. The introduction of the manure to a middling depth, as three or four inches, would, therefore, on these accounts, as well as from its contributing more expeditiously and more fully to the vegetation of the crops that may be put in with it, seem, in general, to be the most advantageous practice; but on the lighter and more friable soils, it may be adviseable to plough it into a greater depth than in such as are heavy and tenacious. In every case, however, whether the manure made use of be in a long or a more reduced state, it should be perfectly covered or ploughed into the earth. The practice of burying manures deep in the soil, has been defended by some on the ground of its being the nature of elastic matters to rise or force themselves towards the surface; but when they are placed to a considerable depth in the earth, as the process of decomposition is thereby stopped, or suffered to proceed in but a very slow and feeble manner, little or nothing escapes for the support of vegetation, or it is furnished in so very slow and sparing a way, as to be of scarcely any service to the immediate crops. Thus in the cultivation of such crops as are placed in rows or drills, where the manure is put into a great depth and covered

pretty thickly with earth, on digging them up at the end of many months it may frequently be observed nearly in the same state it was when first put into the ground. And the same thing is often noticed by gardeners, where imperfectly reduced or long dung is placed in deep trenches and covered to a considerable thickness with mould.

“In order that manures may produce their effects in the most perfect manner, they should be spread over the surfaces of the grounds as evenly as possible, whether they be intended to be turned into the soil or left upon its surface as top-dressings. This may be greatly facilitated by placing the manures out at first in very small heaps, as by such a practice it may be spread over the ground with much greater ease and exactness; and on grass lands much less injury will be done by the bottoms of the heaps.

“On tillage lands, manures should always be turned in, or otherwise covered, as soon as possible after they are spread out; for if this be neglected, much loss may be sustained, especially in hot seasons, by the quick evaporation that takes place in such cases. The best practice is, therefore, not to carry more out from the dunghill at a time, than can be conveniently spread upon and ploughed into the earth in a short time afterwards. In spreading manures employed as top-dressings on grass lands, much advantage will be gained by breaking and reducing the clods or lumps into as fine a state as possible, as by such means they are not only applied more perfectly, but washed by the rains much more readily to the roots of the grasses. The springing of the young grasses is also less retarded where the manures are rendered fine and powdery, than where they are left in a cloddy state.

“In the use of manures, it seems not improbable, but that some degree of saving may occasionally be made, as has been already recommended, by applying them on lands under tillage, as well as others, nearly at the time the seeds and roots are put into the ground, or when the grasses begin to shoot; as from the whole of the manure being in this way made to contribute directly to the support of the crops, a less quantity may be sufficient for the purpose: how far they may be safely diminished on this principle, can only be shewn by actual experiments and accurate deductions made from them; but there are sufficient grounds, from what has been observed, for supposing that it may be considerably more than can be easily apprehended by those who have not adverted much to this circumstance.

“Another economical mode of employing manure, is by placing it in the drills or hollows, formed for the reception of different crops which are cultivated in rows, as peas, beans, cabbages, potatoes, &c. by this method, that part of the ground which is intended to bear the crop is only manured, the intervals or spaces between the rows not receiving any, from which, where the business of putting the manure into the drills is properly performed, a great saving must of course be made. According to the conclusions of a later writer, the saving of manure in this way is so great, as to constitute one of the chief advantages of the drill system of cultivation. His calculation is, that by ‘drills being made two feet asunder, and each drill six inches wide at the bot-

tom, there will be just one fourth part of the ground covered with manure; for as six inches multiplied by four gives two feet, which will be the distance from drill to drill, and as four multiplied by four makes sixteen, it follows, that if the whole of the land had been covered with manure, sixteen loads would have been required for what is as fully and beneficially performed by four, that is by one quarter of the quantity used by the old method of dressing, supposing in of the same thickness and quality.' Besides, from the manure being in this method kept closely together, and the seeds or plants placed immediately upon it, they must, he suspects, receive the advantage of the dressing in a more full and complete manner.

"As it appears probable that in the decay of different materials in the soil, all the nutritious matters as they are formed, immediately become useful for the purpose of vegetation, without any waste being sustained, as must always be more or less the case where they are deposited together in heaps, it may be an economical practice, as has been already observed, in cases where the crops to be benefited by them require a regular and lasting, but not large supply of nourishment, or where the ground is required to be kept in an open and rather light state, for a considerable length of time, to employ such manures in their less decomposed states, as by the ploughing down of green succulent vegetable crops, and the turning in of long strawy substances.

"By adopting such means, the more perfectly formed manures of the farm may be reserved for such crops of luxuriant vegetables as demand more speedy and abundant supplies of nutrient matters.

"In respect to the advantage of using one sort of manure in preference to another, it may be observed, that as animal matters are found in general to undergo more speedily the process of putrefaction or decomposition, than those of the vegetable kind, and as in most instances they afford those mucilaginous and elastic principles that contribute so largely to the support of vegetable life in greater proportions; such manures as are either wholly or in a great measure composed of them, must be the most beneficially employed, where quick and abundant supplies of nourishment are required, as in the growth of all the more gross and luxuriant crops, whether of grain, plants, or grasses; and that as those vegetable substances which contain saccharine, farinaceous, oily, saline, or mucilaginous principles in the largest quantities, are ascertained, from experience, to proceed the most readily into the state of dissolution or decay, and consequently to afford more fully and more expeditiously the nutrient food of new plants, where manures are principally formed from them, they should be preferred to such as have been made from the harder and more ligneous vegetable substances, that contain such properties in scarcely any, or much smaller degrees, for all the purposes of agriculture.

And lastly, such substances as are found to contain those elementary materials, of which vegetables are principally constituted in their more soluble or loosely combined states, as car-

bonaceous matter in the black earths or moulds, and oxygen, azote, and hydrogen, in burnt clay, raddle, manganese, and calamy substances which have hitherto been little employed, as well as in water and air, should be made use of in preference to those which possess them in slight proportions or scarcely at all.

“The most convenient and advantageous modes of applying particular kinds of manures, have been so fully considered in the preceding parts of the section, that nothing further seems necessary to be added here in respect to them.”

Section 8, treats of draining of land, in the different kinds of soil; it details some valuable practical methods of draining wet boggy lands. In Section 9, the subject of paring and burning is practically and chemically examined, as to its effects on different soils and in different intentions. Section 10, treats of fallowing; and much chemical knowledge is displayed in investigating the effects of this practice, by producing a degree of mellowness and pulverisation in the soil. Section 11, is on the great and primary subject of the cultivation of arable land, and occupies above five hundred pages, nearly one half of the work. In this section the whole process of cultivation is traced, from the clearing the ground down to the last stage to which refinement has brought this most useful and meritorious of the arts. It is impossible to give any adequate idea of the contents of this section by a sketch only; it may, however, just be observed, that the striking modern discovery of the importance of proper courses of crops is here most amply considered; and many new and interesting statements on this head are given, as well as on the convertible system of husbandry. Section 12, is on the cultivation of grass land; and is precisely with respect to this sort of land, what the preceding section is in relation to arable; beginning with the removal of obstructions to the scythe, and comprehending, among others, heads of manuring, watered meadows, warping, mowing, &c. and after-grass, pastures, drinking-ponds, cow keeping, draining, grazing, soiling, and stall-feeding, house-lamb suckling, planting (both fruit and timber), and woods. Section 13, concludes the work, and is on the important subject of live stock, but does not admit of such a slight sketch as could alone be given here, to supply any possible idea of its value.

The general conduct of this extensive work is truly admirable. The style is uncommonly clear and precise; and while, by its simplicity, it is perfectly adapted to the capacity of every intelligent professional farmer, even its literary merit alone would be sufficient to recommend it to the notice of gentlemen of superior intellectual acquirements. No subject is started without being fully developed and discussed, and satisfactorily dismissed. The references to former publications, without being so numerous as to appear pedantic or ostentatious, are such as may be both useful and acceptable; there is no succession of multiplied quotations; but in each page it may be seen, that the author has skilfully extracted the substance of every thing valuable which had been stated by preceding writers on the point in question, blending together the results, with the addition of much judicious and original remarks;

while his own practical knowledge has enabled him, with great sagacity, to reject whatever is injurious in the fanciful and extravagant notions to which unrestrained theory has given rise, and to admit only so much of these as may supply probable and well-founded hints for future speculators. It is in this point that the solidity of his judgment has been displayed with great advantage; but a very peculiar and a striking benefit is derived to his work from the author's intimate acquaintance with the modern discoveries in chemistry, and the penetration with which he applies its principles to the operations of nature in the different processes of vegetation, at the same time, in so familiar and happy a method, as to render this hitherto difficult and abstruse subject universally intelligible.

We understand that Dr. Dickson has spent ten years in bringing his first avowed publication,

“The gather'd treasure of a thousand volumes,”

to perfection, and that it has been several years in the press. In return, his pains will, without doubt, be amply compensated in seeing it become (as it assuredly must) the companion of every professional, as well as every experimental farmer—to the former of whom it will save the expence of purchasing a complete library on his art; and to the latter, the perpetual trouble of consulting that which he may at present possess. For our own part, we can with the greatest satisfaction recommend this valuable production, as likely to prove of incalculable utility to the agricultural interests of the British empire, and as forming an æra in the history of agriculture.

This work, which will certainly be henceforward the standard book on agricultural subjects, has its practical utility greatly augmented by the addition of nearly a hundred large engravings, many of them coloured from nature; and may be pronounced, from this circumstance, as well as from the vast quantity of printed matter which is contained in its two bulky volumes, the cheapest publication which has yet appeared in any department of art or science. It is dedicated, by permission, to the Right Honourable Lord Carrington, the late active President of the Board of Agriculture; and it cannot be doubted that it must also obtain the notice and patronage of the first practical farmer in his own dominions, as well as of the first farmer among his subjects.

*Further extracts from, and remarks on, this valuable work shall be given in our succeeding Numbers.*

# HISTORY.

## AGRICULTURE.

### PROCEEDINGS OF AGRICULTURAL SOCIETIES.

#### *Bath and West of England Society.*

AT the annual meeting of this Society, holden at their rooms, Hething-house, Bath, December the 11th, 1804:

BENJ. HOBHOUSE, Esq. M. P. F. R. S. Vice-President, in the Chair.

Many lots of neat cattle and swine, both fat and breeding stock, being exhibited for the premiums, appropriate committees were appointed for the purpose of inspection, and returning to the Chairman reports on the respective and relative claims to merit. Suitable committees were also chosen for inspection of agricultural implements of machinery, and of wool and cloth, the specimens of which latter were much more numerous than the exhibitions on any former occasion, and decidedly indicative of progress and rapid improvement.

After these arrangements, the further business of the Anniversary commenced with the preparatory election of Officers and of Gentlemen to fill up the vacancies in the permanent Committee of Honorary Members, &c. when his Grace the Duke of Bedford was unanimously re-chosen President of this Society; Sir John Coxe Hippisley, Bart. M. P. elected to the office of Vice-President; J. W. Smith, Esq. the Rev. B. Wood, E. Ludlow, B. Butter, J. Jeanes, J. Heaven, and T. Poole, Esqrs. to be Members of the Committee on Agriculture and Planting; F. Naish, G. Austin, W. Stoddart, and R. Haynes, Esqrs. of the Committee of Manufactures and Commerce; Dr. Archer, Dr. Gibbes, L. Tugwell, J. Norman, and J. W. Smith, Esqrs. of the Committee of Mechanics and Useful Arts; and Dr. Archer, Dr. Gibbes, the Rev. Mr. Townsend, P. Okenden, Esq. the Rev. T. Falconner, and the Rev. B. Wood, on the Committee of Correspondence and Inquiry.

The following Gentlemen were elected Honorary Members:—Dr. Currie, Humphry Davy, Esq. Chemical Professor of the Royal Institution, and Teyoninhokera'wen, a Chief of the Mohawk nation, near the falls of Niagara, who having been introduced to the fittings of the Anniversary, by his intimate friend, R. Barclay, Esq. rose and delivered a most appropriate address on the occasion, in reply to which, the Chairman was pleased to return him the politest expressions of personal thanks.

John Billingsley, Esq. C. Gordon Grey, Esq. Dr. Cogan, Mr. Lewin Tugwell, and Mr. William Matthew, the Committee of Superintendance, delivered a general report of their transactions during the past year, received the thanks of the society for their services, and were re-appointed for the ensuing year.

The following premiums and bounties were adjudged, viz.  
To Arthur Young, Esq. F.R.S. for the best Essay on the Nature, Properties, and Application of Manure, the subject of the Bedfordean premium for the present year—*The Gold Medal.*  
To the Right Honourable Lord Somerville, under premium

13, Class 4, p. 45, for the greatest number (i. e. in proportion to the size of his farm) and most profitable sort of sheep, premium	£. 5.	21 0
N. B.—The sort consisted of various crosses of Merino rams with British ewes		
To R. Jolloff, Esq. of Lower Ashton, near Bristol, premium 5, Class 4, p. 33, for pasturing Sheep on Wheat, on the Wheat plant, premium	5 5	
N. B.—This experiment having proved to be of a discouraging nature, the premium was ordered to be discontinued.		
To Dr. Parry, premium 7, class 5, p. 50, for the best piece of a navy blue Broad-Cloth, from Lamb's Wool of British growth, i. e. Merino and British Crosses, premium	8 8	
To B. Gray, jun. Esq. of Henstridge, Somerset, for rearing Pigs, in a comparative way between the large lop-eared sort, the Leicester, and the Chinese	5 5	
N. B.—The superiority appeared to have been much in favour of the Chinese.		
To John Billingsley, Esq. premium 12, class 1, p. 30, for work performed by oxen	5 5	
N. B.—This experiment was considered to have been an additional instance, remarkably striking, of the superiority of ox labour in the business of the farm.		
To Mr. Bartley, the secretary, premium 6, class 5, p. 50, for the finest and most valuable fleece of wool from a British ram	5 5	
N. B.—The weight of the unwashed fleece at shear-time was 10½ lb. and the competition with a Ram of the un-mixed Merino.		
To Francis Nairn, Esq. of Tiverton, near Bath, premium 4, class 5, p. 49, for manufacturing a piece of navy-blue Broad Cloth, from Wool of British growth	5 5	
To J. G. Everett, Esq. of Heytesbury, Wilts, premium 2, class 5, p. 48, for the greatest number of fine woolled shearling Rams	10 10	
To a Female Friendly Society, established at Horningsham, near Warminster, Wilts, about 10 years since, with singular advantage, for the purpose of relieving Women in Child-birth and Sickness, a bounty	5 5	
To Mr. James, for a plough, possessing a share of merit	3 3	
N. B.—The first <i>Bedfordean Gold Medal</i> , offered by the Committee for the best Design for a <i>Reverse</i> to the said Medal, had been by them unanimously adjudged to Miss Catharine Fanshawe.		
To the following Labourers and Servants in Husbandry.		
To Richard Vining, of Bratton, Somerset, for having brought up 9 out of 10 children born, without parochial assistance	3 3	
To James Green, of Tollard Royal, Somerset, 8 out of 13 children	3 3	
To Hannah Vincent, of Wanstrow, Somerset, 8, being all her children	3 3	
To William Leader, 7, being all	3 3	
To Robert Hunt, of Dawlish, Dorset, for 57 years faithful servitude and good behaviour	3 3	
To Anthony Cook, of Grittleton, Wilts, 56 years ditto	3 3	
To Wm. Yerman, of Timsbury, Wilts, 49 years ditto	3 3	

To Rd. Hanny, of Hermitage, Dorset, 51 years ditto	-	3	3
To Susannah Oakley, of Kemerston, Gloucestershire, for 21 years faithful servitude and good behaviour	-	3	3
To Ann Gay, of Grittleton, Wilts, 24 years ditto		3	3
To Eliz. Holbrow, of Broughton, Wilts, 24 years ditto		3	3
To Eliz. Smith, of Beaton, Somerset, 24 years ditto	-	3	3

A letter from the Duke of Bedford, President of the Society, having been read, in which his Grace expresses his regret, that he found it impossible to be present at the anniversary. The Chairman was directed to return a suitable acknowledgment.

Lord Somerville's very interesting report, containing a particular statement of work, performed by oxen on his Lordship's farm in the year 1803, having been presented and read, the Chairman was unanimously requested to convey the Thanks of the Society to Lord Somerville, for this valuable communication; and to express his sincere regret, on account of his Lordship's inability to be present at the anniversary.

Dr. Parry read to the Society a Memoir containing the result of thirteen years experience on his Flock of Sheep, which are a mixed breed between the Merino and Ryeland. This subject he comprehended under the nine following Propositions:

1. The Wool of the South Cross of this breed is fully equal in fineness to that of the male parent stock in England.

2. By breeding from select crosses bred Rams and Ewes of this stock, Sheep may be obtained, the fleece of which are superior in fineness both to those of the cross-bred parents, and, of course, to those of the original progenitors of the pure blood in England.

3. From mixed Rams of this breed, Sheep may be obtained, having Wool at least equal in fineness to the best which can be procured from Spain.

4. Wool from Sheep of a proper modification of Merino and Ryeland, will make cloth equal to that from the Spanish Wool imported into this country.

5. The proportion of fine Wool in the fleeces of this cross-breed is equal, if not superior, to that of the best Spanish piles.

6. This Wool probably goes farther in the manufacture, than an equal weight of imported Spanish, of the same degree of cleanness.

7. The Lambs' Wool of this cross-breed will make finer cloth than the best of that of the pure Merino breed.

8. Should long Wool of this degree of fineness be wanted for Shawls, or any manufactures, which cannot be perfected with our common coarse long Wools, this may probably be effected by allowing the fleece to remain on the animal unshorn for two years.

9. There can be no doubt, that this cross, which is already much improved in carcase, comparatively with the Merino, originally imported, will, in a short time, be fully equal in that respect, to the best of the native breeds of short-woolled Sheep in England.

Dr. Parry having established these propositions by various exhibitions of wool, cloths, and stock; the particular thanks of the society were unanimously voted to him, for his unremitting and successful exertions, in promoting an object so important to the interests of this country. The Doctor was called in, and received the thanks from the Chair. The chairman was requested to transmit to him a copy of the vote of thanks, and to communicate to the public the account of the proceedings through the channel of the periodical papers.

The recommendation of the committee, in adjudication of the Bedfordian gold medal to the author of the essay distinguished by the letters R. D. P. C. was adopted, and on opening the cover inclosing the

real signature of the author, it was found to have been Arthur Young, Esq. F. R. S. The chairman was therefore requested to address Mr. Young, with information of his having been declared to be the successful candidate, and that the gold medal had been assigned to him.

Resolved, *nem. con.* That the cordial thanks of the society be voted to the original Bedfordean Committee for its assiduous attention, and exemplary merit, in accomplishing the purposes for which it was appointed. That the following gentlemen be added to the permanent Bedfordean Committee; *i. e.* W. Northey, Esq. M. P. Dr. Cogan, J. Wiltshire, Esq. Mr. W. Matthews, and Mr. Lewin Tugwell, and that the proposals for a new premium for the gold medal be recommended to the immediate consideration of such committee.

The following new premiums were adopted, *viz.*

- No. 1. For raising crops of Swedish turnips.
2. For ascertaining the cause of, and pointing out a preventative for, the blight in wheat.
3. For rewarding female friendly societies.
4. For women ploughing.
5. For folding the greatest number and most profitable sort of sheep.
6. For breeding and keeping generally the greatest number and most profitable sort of sheep.

The secretary's current accounts were examined, approved, and signed; and the funds of the society having been stated, were found to have increased.

The following subscribers were found to have been gained to the list of members during this year, being many more than have been lost by death, resignation, &c.

The Right Hon. Lord Cawdor, Right Hon. Lord Henniker, Right Hon. Charles Ogle, S. Sitwell, Esq. M. P. the Rev. T. Sweet, Rev. B. Wood, Rev. Mr. Hawkins, Rev. Francis Minchull, Rev. Mr. Fanshawe, Rev. Mr. Townsend, J. B. Cholwich, Esq. Henry Williams, Esq. Jeremiah James, Esq. Henry Bosanquet, Esq. Robert Clare, Esq. T. Grimston Estcourt, Esq. S. Ames Severne, Esq. Richard Wyatt, Esq. William Beard, Esq. Edward Langford, Esq. Joseph Counsel, Esq. Fletcher Partis, Esq. John Cheffrye, Esq. John Houlton, Esq. Peter Baillie, Esq. James Norman, Esq. Dr. Bradshaw, Dr. C. Parry, Mr. Joseph Storrs Fry, Joseph Bradney, Esq. John Wymbore Smith, Esq. Philip J. Miles, Esq. Mr. Richard Reynolds, John Benson, Esq. Mr. Nehemiah Bartley, jun. and Mr. Thomas Bartley, Engineer and Land Surveyor.

The thanks of the society were voted to all unsuccessful exhibitors of live stock, of agricultural implements, &c. and to several others.

#### *Norfolk Agricultural Society.*

The next meeting of the committee of this Society will be held at the Crown Inn, in Fakenham, on Wednesday, the second of January, at eleven o'clock in the morning, on which day all claims upon the society, for premiums adjudged at the last general meeting, will be paid, and all notices will be received from the claimants of premiums to be adjudged at the ensuing general meeting, in the Mart Week, at Lynn.

The members of the society are requested to observe, that by the fifth rule, no premiums nor regulations can be proposed at a general meeting, but such as have been approved of by the committee, previous to the general meeting.

Members of the Committee. The President, and Vice-Presidents. Mr. B. Rackham, Brandiston; Mr. D. Reeve, Beetley; Mr. J. Reeve, Wighton; Mr. S. Bircham, Reephram; Mr. J. Repton, Oxnead; Mr. W. Salter, Whinberg; Mr. G. Smith, Creak; Mr. T. Purdy, Egmere; Mr. A. Beck, Maffingham; Mr. T. Bagge, jun. Lynn; Mr. J. Lloyd, Pentney; Mr. T. Dewing, Castleacre; Mr. H. Blyth, Birnham; Mr.

W. M. Hill, Waterden: Mr. St. John Priest, Secretary. Scarning,  
Nov. 26, 1804.

*Smithfield Cattle Show, Saturday, December 14.*

The number of amateurs who flocked this day to see the prize cattle was greater than on any former occasion; and from about eleven till two o'clock, Mr. Wootton's yard and premises, where the cattle stood, was so thronged, that it was often several minutes before the persons present could move along, in their eagerness to view and handle the different cattle exhibited. Among the company present, we noticed, his grace the Duke of Bedford, Lord Somerville, Lord Galway, Lord William Russell, Lord Aylesbury, Sir Joseph Banks, Sir R. Layton, Sir William Curtis, George Byng, Esq. M. P. Robert Byng, Esq. Charles Gordon Grey, Esq. Henry Hugh Hoare, Esq. John Higgins, Esq. John P. Paul, Esq. Rofs Mahon, Esq. — Child, Esq. Rev. Mr. Morris, Colonel Murray, Messrs. Bennet, Edmunds, S. Davis, Exter, Letchmore, Astley, Crooke, S. Chandler, Giblet, King, Præd, Pickford, Perry, Lawrence, Garrard, Collinge, Bellamy, Farcy, J. Rogers, J. Duckitt, Webber, Westcar, Reynolds, Weller, Eyre, S. Stone, Honeybourn, N. Stubbings, three William Smiths, Pester, &c. &c.

The first remarkable thing which struck us was, that, although there were in former years so many candidates for the prizes for fat pigs, no one had sent to this show any pig within the time limited, and with the requisite registers of food, weight, &c. and of course no prize is awarded for pigs. A dark thin haired pig of the Essex breed, belonging to Charles Western, Esq. which was shewn, had some merit. And an excellent black thin haired pig of the Hertfordshire breed, between eleven and twelve months old, fed on beans and pease, was shewn.

In the first or lower stable, was a yellow-red cow, of the Holderness, or short horned Yorkshire breed, very fat. Beyond this stable door stood two beautiful small black polled heifers, belonging to Alderman Curtis; they attracted a good deal of attention, and so much resembled the Scotch or Galloway breed of cattle, that the Earl of Galloway, who examined them, seemed to consider them as of the genuine breed of his country; but Sir William Curtis, who came soon after, stated, that they were by a Devon bull, out of cows of the China breed.

We next came at a black ox, of the North Wales breed, four years old, which had been fed on grass and hay, by Mr. Gilbert, of Leicestershire, for which he is adjudged ten guineas, in Class V.; this animal having gained the greatest comparative weight of flesh in a given time of feeding.

A yellow spotted cow, very fat, of the short horned breed, eight years old, having had five calves, which had been bred and fed on grass, hay, and turnips, by Mr. Pickford, the second prize of ten guineas in Class IV.

The next object of attention was a most beautiful dark red cow, of the Kent breed, eight years old, which had borne five calves, bred by Mr. Monk, of Romney Marsh, and which had been fed by the Duke of Bedford, on oil cake, turnips, and hay. This gained the first prize of fifteen guineas in Class IV.

The next was a small brindled ox, of the Scotch breed, five years old, bred by the Dukes of Gordon, and fed on grass, hay and turnips, by the Duke of Bedford. This gained the second prize of ten guineas, in Class III.

A red ox, of the Scotch breed, four years old, bred by Mr. Rout-

ledge, and fed with grafs, hay, and turnips, by Mr. King, gained the firft prize of fifteen guineas in Clafs III.

A large light red ox, of the Hereford breed, fix years old, bred by Mr. Tully, near Hereford, and fed on grafs, hay, and turnips, by Mr. Westcar, gained the fecond prize of fifteen guineas in Clafs II.

A dark dun ox, of the Glamorgan and French beed, fix years old, bred by the Duke of Bedford, and fed by him on grafs, hay, and turnips, gained the firft prize of twenty-five guineas in Clafs II.

We next came to the pen of fheep: three new Leicefters, two years old, bred by Mr. Thomas Westcar, of Woolafton, Oxfordfhire, and fed on grafs by his brother, the famous grazier, John Westcar, to whom the prize in Clafs VII. of ten guineas is awarded.

The next pen contained three new Leicefter fheep, one year old, bred and fed by Mr. Plasket, of Oxfordfhire, on grafs and hay. They gained the prize of ten guineas in Clafs VI.

Three South-down fheep, two years old, fed on grafs, hay, and turnips, the property of the duke of Bedford, bred and fed on his Marlden Farm, gained the prize of ten guineas in Clafs IX.

Three South-down fheep, one year old, fed on grafs, hay, and turnips, belonging to the Duke of Bedford, from his Marlden Farm, gained the prize of ten guineas in Clafs VIII.

After paffing feveral other pens of fheep, we came to a large, spotted, light-red ox, very fat and fine, of the Hereford breed, feven years old, bred by Mr. Tully, near Hereford, and fed on oil cake, by Mr. John Westcar—this gained the principal prize, or twenty-five guineas, in Clafs I.

The next was a large red ox, of the Devon breed, fix years old, fed on oil cake, which had been bred and fed by the Duke of Bedford. This gained the fecond prize, of fifteen guineas, in Clafs I.

The laft beaft on that fide of the yard, was a handsome ox, of the Tytherton breed (two parts French, and one Scotch), only three years old, which fell lame on the road, and did not arrive in time to be a candidate for the prizes: it was bred and fed by Thomas Croke, of Tytherton.

Much difcuffion took place at this fhew, between different groupes or parties of gentlemen on agricultural fubjects. Mr. Bellamy iffued his notice of a work published, on remedies for fcowering and other difeafes of cattle. Mr. Lawrence iffued his propofals for a work on the nature and management of cattle in general. Mr. Smith, late of Bath, Adelphi, fhewed his maps and fections of the frata of England.

After infpecting the cattle, there was a meeting of the Committee of the Smithfield Society, at the Crown and Anchor, his Grace the Duke of Bedford in the chair; Thomas Buckler, Efq. the Rev. Thomas Plasket, and feveral other gentlemen, were admitted members of the Society, and fome other bufinefs was tranfacted; after which, about thirty fat down to an excellent dinner. His Grace the Duke of Bedford, Lord Somerville, Henry Hugh Hoare, Efq. John Howell, Efq. Charles Gordon Grey, Efq. Mr. Pickford, Mr. Præd, Mr. Stone, Mr. Afley, and Mr. Young, were of the party.

*Monday, December 17.*—On Saturday, about twelve o'clock, his Royal Highnefs the Duke of Clarence, his Grace the Duke of Bedford, Lord Sheffield, the Prefident of the Board of Agriculture; Lord Pelham, Sir William Scott, and feveral other noblemen and perfons of diftinction, went to Mr. Wootton's yard, and minutely examined the prize cattle and fheep, among which Mr. Westcar's and the Duke of Bedford's large oxen, which gained the two firft prizes, attracted much of their attention; fo did the beautiful cow of the Kent or Suffex

breed, belonging to the Duke of Bedford, and the two small black heifers belonging to Alderman Curtis.

His Royal Highness and the other noblemen entered into the most familiar conversation with Mr. Westcar, and several other breeders and farmers, who were in the yard, and staid till past two o'clock.

Since our former account, a very large and fat ox, of the Hereford and Yorkshire breed, which was bred and fed by Mr. Ratcliffe, of Bucks, has been brought into the yard, and occupies the place of Mr. Crooke's Tytherton ox, which with its fellow, is sold to Mr. Philip Reynolds, butcher, in the Borough. Some few alterations had taken place in the arrangement of the cattle and sheep, but not of sufficient importance to deserve mention. The yard was much crowded during the greater part of the day with genteel company. Among those present we noticed, besides the above, Tatten Sykes, Esq. — Gy-dalla, Esq. Charles Gordon Grey, Esq. John P. Paul, Esq. — Letchmore, Esq. Messrs. Astley, Pickford, Honeybourn, Jennings, Cooper, Perry, Bell, Bellamy, J. Duckitt, W. Smith, J. Circuit, W. Young, W. Clay, Ody, Robinfon, Collinge, Oakley, Clayton, &c.

Several ladies yesterday attended at Mr. Wootton's to see the cattle, in the absence of the crowd, which there is on other days. Alderman Flower accompanied two ladies, Captain Frost two ladies, and several other gentlemen brought their parties of ladies, who were much pleased with the sight of so many extraordinary animals; the Earl of Aylesbury also called at the yard.

Last night, Alderman Curtis sent the small Indian cow, from which his two black heifers were bred, and two others of her progeny, in order that the curious in breeds of cattle may this day have an opportunity of seeing them together. Two other Indian cattle were also expected from Sir William Curtis.

A beautiful cow and bull, of a mixed breed, between an East Indian bull, and a Devon cow, belonging to Mr. White Parsons, of Wiltshire, who sent them up for the inspection of the public; but owing to a mistake, they did not arrive there in time. They were examined by several breeders and amateurs, who continued to come till great part of the stock were taken away. In the afternoon, several ladies also took this opportunity of seeing the cattle. Prince Pontiskei, from Russia, and an Hanoverian nobleman, were present also; Colonel Letchmore, Dr. Nelson, Messrs. Westcar, King, Crooke, Wells, Grace, Young, Scarborough, &c.

Mr. Slater, an artist, attended and took a portrait of Mr. King's four year old Highland Scotch prize ox, in Class III.

Mr. Giblet, of Bond-street, bought Mr. Westcar's prize ox, in Class I.; his twin ox and cow, and his three prize new Leicester sheep. The same spirited butcher bought the Duke of Bedford's prize ox in Class III.; his six prize South Down sheep; and Mr. King's prize ox, in Class III.

Mr. Chapman, of Fleet-Market, bought Mr. Westcar's first prize ox in Class I.

Mr. Browning, of Leather-lane, bought Mr. Westcar's red cow.

Mr. Cotteril, of Liquorpond-street, bought Mr. Westcar's fat pig.

Mr. Hull, of Newgate market, bought Mr. Smith's eleven month black pig.

Mr. Pickford's fat prize cow, and Mr. Plaſket's three prize new Leicester sheep, are to be killed by Mr. King, of Newgate-market, for the owners.

The following gentlemen, who are farmers and graziers, viz. Mr. Porter, of Yeovil, Somersetshire, Mr. Hill, of Cotchbatch, near Luterworth, Mr. Bosworth, of Holmby, near Northampton, and the

two following butchers, viz. Mr. Miller, near the Marsh Turnpike, Lambeth, Mr. Brushfield, near Rumbold, Essex, were the five judges appointed to examine the cattle, and certificates accompanying each animal. It was three o'clock yesterday, before they had finished at the yard, when they retired to make up their report, and to prepare the labels to be affixed this morning at the head of the stall, containing each of the successful animals, for the inspection of the public.

*Tuesday, Dec. 18.*—Yesterday being the principal market-day, previous to Christmas, Mr. Wootton's yard, in Smithfield, was thronged with company, for several hours, to a degree which deterred many persons from attempting to get in to view the cattle. Among the crowd, it was with difficulty that we distinguished, Prince Esterhazy, his Grace the Duke of Bedford, Lord Somerville, Lord Sackville, Lord William Russell, Sir Thomas Carr, Thomas Anson, Esq. Robert Byng, Esq. J. P. Paul, Esq. Charles Gordon Grey, Esq. Money Hill, Esq. William Northey, Esq. — Moseley, Esq. Henry Holland, Esq. Neil Malcolm, Esq. Messrs. Westcar, Perry, Buckley, Crooke, Fleet, Frost, Parkinson, Ratcliffe, Pester, Reynolds, Jennings, Grace, Tay, Whybro, Hudson, Knowles, Garrard, Farey, Wilton, Collinge, Jellico, J. Garner, S. Davis, Oakley, King, Tooke, W. Smith, J. Smith, Payne, J. Bovill, B. Bovill, Capt. Perry, Berge Williamson, Barker, &c. &c.

Sir William Curtis's bailiff, Mr. Whybro, was present, and explained the seeming mystery, respecting the two black heifers, which had so much puzzled the breeders on the preceding days, by stating that they were by a Suffolk, instead of a Devon bull, as he had stated by mistake; the two yearlings shown yesterday were by a Devon bull, out of the same small Indian cow, which has been fifteen years in Sir William Curtis's possession. A very large and tall Hereford ox of Mr. Westcar's, which had been brought in since Saturday, was much admired. Mr. Robinson shewed the carcasses of the three Lincolnshire sheep, which had been exhibited on Friday and Saturday.

Yesterday the gentlemen of the Smithfield Club, after inspecting the cattle, held a meeting at the Crown and Anchor tavern, when Mr. Ayres, Mr. Wilkins, and several other breeders and graziers, were admitted members; and the same prizes, as in the present show, were determined on for the next year, except Class V. and it was resolved that the rules and regulations of the Society be printed and distributed to the members at the Woburn Sheep Shearing in June next.

About five o'clock, more than 100 gentlemen sat down to an excellent dinner, at the Crown and Anchor, his Grace the Duke of Bedford in the chair—Money Hill, Esq. vice-president. As soon as the cloth was withdrawn, "The King," was drank; after which, his Grace gave "Prosperity to the Smithfield Society," "Good Grazing," "The Plough," "The Fleece," "Breeding in all its branches."

His Grace of Bedford then addressed the company, calling their attention to the original objects of this Society, which were, to excite the industry of the breeders and graziers, for improving the breeds of cattle, and increasing the supply of the markets; that, happily, the idle prejudices which had existed, respecting the objects and views of this Society, had disappeared; and, it could not be doubted, but the public must applaud the exertions which had produced such cattle as had been this year exhibited, and which were in January last, in the Straw Yard, or in use in the Dairy or the Plough; wasteful or long feeding could not possibly here be urged. His Grace proceeded, in a very animated speech, to state, that the object of the Society had last year been to discourage useless experiments, founded on the important truth, that the interests of the breeder, grazier, and the public, were

the same and inseparable. His Grace then proceeded to read the adjudication of the prizes by Messrs. Pester, Hill, Bosworth, Miller, and Bousfield, the five judges who had examined the cattle.

To Mr. John Westcar, the first prize in Class I. 25 guineas, for his Hereford ox, 6 years old, fed on oil cake.

To the Duke of Bedford, the second prize in Class I. 15 guineas for his Devon ox, 6 years old, fed on oil-cake.

To the Duke of Bedford, the first prize in Class II. 25 guineas for his Glamorgan and French ox, 6 years old, fed on grass, hay, and turnips.

To Mr. Westcar, the second prize in Class II. 15 guineas for his Hereford ox, 6 years old, fed on grass, hay, and turnips.

To Mr. King, the first prize in Class III. 15 guineas for his Highland Scotch ox, 4 years old, fed on grass, hay, and turnips.

To the Duke of Bedford, the second prize in Class III. 10 guineas for his Scotch ox, 5 years old, fed on grass, hay, and turnips.

To the Duke of Bedford, the first prize in Class IV. 15 guineas for his Kent cow, 8 years old, and which had borne five calves, fed on oil-cake, turnips, and hay.

To Mr. Pickford, the second prize in Class IV. 10 guineas for his short horned cow, 8 years old, and having had five calves, fed on grass, hay, and turnips.

His Grace then proceeded to Class V. and observed, that it appeared by the certificates, that Mr. Gilbert's North Wales bullock, weighing 60 stone in April, and 110 in December, had gained 50 stone; that the Duke of Bedford's ox, weighing 182 stone in April, and 252 in December, had gained 70 stone; that Mr. Westcar's Hereford ox, weighing 189 stone in May, and 240 stone 4lb. in December, had gained 59 stone 4lb. by which it would appear that Mr. Gilbert was entitled to the prize; but a doubt having arisen on the weight of Mr. Gilbert's ox, the Committee had written to him, and on his answer would depend the final adjudication of this prize, among the parties above-mentioned.

To the Rev. Thomas Plasket, for three new Leicestershire wethers, which were yeaned in the month of May, 1803, and weaned from the ewe in September following, having had nothing more than natural grass and hay through the winter, and were removed in the month of May, 1804, into a field containing three acres of second year's clover hay (into which were put twenty-two sheep of the same age) where they continued till the month of October, 1804, since which time, they have been upon natural grass, with turnips for the last month only: for these, the prize of ten guineas, in Class VI. was adjudged.

To Mr. John Westcar, for three new Leicester wethers, 2 years old, fed on grass, the prize of 10 guineas, in Class VII.

When speaking of Class VIII. his Grace observed, that he had ever held it wrong to accept a premium where no competitor appeared; and, as no one but himself had sent in South Down wethers of one year old, highly as he felt himself flattered by the approbation the judges had bestowed on the yearling wethers from his Marlden Farm, he should let this premium revert to the funds of the society.

Proceeding to Class IX. His Grace stated, that the judges had assigned to the Duke of Bedford ten guineas for his three South Down sheep, two years old, fed on grass, hay, and turnips. His Grace then stated, that no material good having resulted from the prize offered in the Vth Class, it would be discontinued in future; all the others would be continued for the year ensuing. His Grace apologised for again stating, that the views of this society were, as

they ought to be, directed to no other end than the encouragement of the best breed of cattle, and to lay the information they could acquire on this essential subject freely before the public; he concluded by giving as a toast: "Increasing success to the efforts of the Smithfield Society." His Grace then called the attention of the company to a subscription which had been proposed at a former Bath Meeting, for rewarding Mr. Bellamy for his discoveries of remedies for scouring and other disorders of cattle, which were now fully explained in a Treatise which he had in the room ready for delivery.

Lord Somerville then rose and proposed the health of "The Duke of Bedford," which was drank with three times three, and the loudest applause.

His Grace thanked the company in a neat and short speech, and proposed "The Memory of Mr. Bakewell."

Mr. Ransom shewd specimens, and distributed his proposals, for a new invented cast iron plough-share, which, owing to one of the surfaces being hardened in the casting, obviates the necessity of continual resource to the Blacksmith to sharpen them.

Mr. Smith, of Buckingham-street, shewed his map of the Strata of England, which is preparing for Sir Joseph Banks, in whose library it will soon be exhibited for the information of the curious.

The proposals for Lord Somerville's shew in February next were distributed, as were also the plan of a general Canal Company. Sir Thomas Carr proposed a bet for shewing some twin heifers which he has got; and shortly after Mr. Money Hill proposed a bet of one hundred guineas, which was accepted by Sir Thomas Carr, for shewing five South Down sheep, fed on grass, hay, and turnips, at Lord Somerville's next shew.

Mr. Garrard issued his proposals for a characteristic view of the Duke of Bedford's sheep-shearing at Woburn, with portraits of all the well-known Agriculturists, his subscribers.

The toasts proceeded with—"Mr. Coke, of Norfolk;" "Lord Winchelsea;" "The union of husbandry and commerce;" "Lord Egremont;" "Sir Charles Davers;" "Mr. Pacey;" "Emulation and competition among breeders and graziers;" "Mr. Overman, of Burnham;" "Lord Somerville, with three times three."

His Grace remarked, that the present shew had been honoured by the presence of some foreigners of distinction, whom the Emperor of Russia, in his enlightened policy, had sent over to this country to purchase some of the best breed of animals in this country, and concluded by proposing the health of "His Imperial Majesty the Emperor of Russia."

Sir Joseph Banks's health was drank with much applause. Room will not permit us to mention more of the interesting proceedings of this meeting, or to mention particularly the many noble and well known persons who were present.

#### MISCELLANEOUS INTELLIGENCE.

The Bedfordean Medal adjudged by the Bath Society to Mr. Arthur Young, is of gold, about two inches and an half in diameter, value twenty guineas; the die for which was cut by Milton: It bears a most capital likeness of that great Patron of Agriculture, and useful Arts, the late Duke, from Nolliken's Bust, under which are the words, "Francis, Duke of Bedford, President, 1802." The reverse contains, within a wreath of ears of corn, the figure of Britannia receiving the offerings of agricultural industry, an ox and a sheep, which are presented by two emblematical figures; these are

after a fine design, by Miss Fanshawe, under it are the words, "Bath and West of England Society, given 1804." Round the edge of the medal are engraved these words; "Adjudged to Arthur Young, Esq. F. R. S. for an Essay on the nature and properties of Manures, at the annual meeting, 1804."

The present Duke of Bedford having, soon after the death of his illustrious brother, presented the Bath Society with an excellent bust in marble of the late Duke of Bedford, executed by Nollikins, which now graces their meeting-room: the Members of that Society entered into a subscription, and appointed a standing committee, consisting of fifteen of their members, called the Bedfordean Committee; whose duty it is to propose annually some object of agricultural enquiry, on which essays are to be received, and the best of such essays is to be rewarded with a gold medal, as above, in token of the esteem the Society entertains for the memory of the illustrious character whose name it bears.

The grand artificial Aqueduct, constructing over the Vale of Pontefract, in Denbighshire, to perfect the Junction Canal, from Chester, along the river Dee, it is thought, will be completed by Midsummer next. It is one of the most extraordinary efforts of human art. It consists of nineteen pair of conical pillars, fifty-two feet asunder, the centre of which are one hundred and twenty-six feet in height; each pair of pillars support a kind of elliptical bridge of cast iron, the whole forming an horizontal base, on the summit, on which masonry sheets of cast iron are rivetted and cemented together, so as to form an aqueduct for the canal barges to pass each other, viz. about twenty feet in width, and six feet in height; a moiety of this aqueduct is already perfected; it is proposed by the Engineer to erect an iron platform and railing on the South side, for the towing path for the horses; but, as this must be attended with a prodigious additional expence, and would, in some measure, weaken the general work, there is reason to hope, that some plan may be devised for rendering such towing-path altogether unnecessary. It strikes a common observer, that the barges may be towed with windlasses; or, considering the extreme depth for the multiplying powers of gravitation at each end, they may be slid along so smooth a surface of water, by the simple mechanism with which the operations of a common meat-jack are every day performed.

#### *Ploughing Match.*

The competition for premiums allowed by the Highland Society to the ploughmen in the Upper Ward of Lanarkshire, took place on the farm of Lampitts, near Carnwath, on the 21st ult. under the direction of Mr. Bertrem, of Kersewell, and Mr. Mosman, of Auchtyfardal, Members of the Society; when most of the gentlemen and farmers of the neighbourhood, with a vast concourse of people, attended; twenty-three ploughs started, and the judges of the work to be performed, after inspecting minutely the lots ploughed, adjudged the first prize (the Society's Medal and Two Guineas) to Thomas Crawford, servant to J. Denham, Kirkton of Dunzyre; the second prize (the Society's Medal and One Guinea and a Half) to W. Weir, son of R. Weir, Rawhills, of Lasmahago; the third (One Guinea and a Half) to Henry Scot, son of G. Scott, tenant, Auchenglen, Lanark; the fourth (One Guinea) to David Sanderson, servant to William Brown, Mains of Dunzyre. Each unsuccessful candidate got Half-a-Crown; for, although the field was both rugged and steep, yet the whole was performed in such a masterly style, that the judges declared they had much difficulty in ascertaining their respective preferences.—(*Edinburgh Journal.*)

**EARLY WHEAT.**—The following account of the early, commonly here called the Virginia wheat, having been obtained from the state of Virginia, where it first appeared.

In the year 1787, a Mr. Ifabele, of the county of Caroline, purchased a quantity of mixed wheat of a merchant, and having sown it accidentally, observed when his wheat was in flower, a single ear almost ripe; he conceived it might be a different species. To determine this, he carefully preserved the produce from his solitary ear, which soon multiplied to such a degree as to constitute a larger portion of the wheat sown in Virginia. Its use continues to be very extensive, and its reputation holds good.

It is found less liable than other wheat, to be destroyed by the rust or smut; which may be owing partly to the lowness and nakedness of the straw, which more freely allows the action of the sun and air, and partly to its filling and ripening in a cooler season, for it comes forward two weeks at least sooner than other wheat. Being ripe before the cockle has arrived to a vegetative state it is never assailed by that enemy.

If vegetables extract much of their food from the atmosphere, as the experiments of Dr. Priestly seem clearly to prove, and if more of this food is obtained when the air is condensed with a degree of moisture, than when it is highly in a state of rarefaction, it results that this wheat cannot impoverish the soil so much as the other species. Because it comes to maturity before the heats of summer have driven down vegetables to pasture themselves almost exclusively on the store of food absolved by the earth.

It is found that clover, and where there is no clover, weeds, succeeding this wheat, surpass the growth of clover and weeds, succeeding other kinds so greatly, that the superior luxuriance is distinguishable, almost as far as they can be seen, and though this should be attributed to the removal of the forward wheat earlier than the other, yet it must have a preservative influence upon the fertility of the soil. It is found also, that before this wheat is cut the growth of clover sown upon it is greater than among other wheat, and it also comes up better, which may perhaps be ascribed to the lowness of the wheat.

The quantity of straw in proportion to the grain is about one-third less than that of other wheat. It is generally cut with a scythe. The grain both before and after the wheat is cut is less liable to injury from rain than other wheat, because the straw dries faster and is got in sooner. The shortness of the straw also prevents its lodging.

The ear is about one-third shorter than that of common wheat, though the product per acre is not less; and this wheat is almost invariably the best filled and the heaviest. The grain is harder than other wheat—it produces flour as well, both as to quantity and quality, as the large white wheat.

This species of wheat seems to be particularly adapted to those parts of Connecticut where wheat generally blasts, as upon Connecticut and some other rivers. The best time for sowing it here will probably be found to be about the beginning of October.

Application is intended to be made to Parliament for an Act for dividing, allotting, and inclosing the whole-year lands, open and common fields, half-year or shack lands, lammas meadows, warrens, heaths, commons, commonable lands, and waste grounds, within the parish of Brandon, in the county of Suffolk.—And a Petition will be presented to the Honourable House of Commons, for leave to bring in a Bill for the purposes above-mentioned, during the next Session of Parliament.

AVERAGE PRICES OF CORN, by the quarter of eight Winchester bushels; and of OATMEAL, per boll, of 140 pounds Avoirdupoise:

From the Returns received in the Week, ended DECEMBER 22, 1804.

INLAND COUNTIES.

COUNTIES.	Wheat.		Rye.		Barley.		Oats.		Beans.		Peas.		Oatmeal	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Middlesex	99	0	58	0	48	0	33	2	51	9	54	5	25	0
Surrey	108	8	50	0	46	8	32	6	48	0	52	0		
Hertford	85	2	40	6	46	0	27	6	35	6	44	3		
Bedford	84	0	60	9	39	6	29	2	45	10	46	9		
Huntingdon	82	1			43	0	24	0	39	11	44	9		
Northampton	76	4	48	0	41	4	25	4	45	0	48	0		
Rutland	80	0			44	0	25	0	47	0			59	7
Leicester	79	9			43	1	26	11	40	6	48	6	40	11
Nottingham	91	2	53	6	46	4	28	6	44	6	47	0		
Derby	85	3			46	8	31	8	51	0	52	0	40	10
Stafford	87	1			46	5	30	1	55	2	74	8	44	0
Salop	77	0	57	2	44	6	25	8	48	0	47	4	66	3
Hereford	79	5	48	0	49	4	27	3	49	4	47	11	60	1
Worcester	83	11	46	0	47	10	31	0	52	4	55	4		
Warwick	85	1			46	11	28	0	54	3	64	0	48	9
Wilts	83	4			46	0	29	8	60	4	51	0		
Berks	102	6			43	4	29	1	52	1	53	4		
Oxford	83	3			41	5	26	11	46	7	49	5		
Bucks	86	0			43	2	28	10	44	8	47	0		
Brecon	81	6	48	0	44	0	26	8			48	0	46	1
Montgomery	81	9			41	7	23	11			44	0	50	10
Radnor	86	10			45	5	28	7						

Maritime Counties.

Essex	107	4	51	0	45	6	32	9	48	6	48	0		
Kent	99	8	45	0	47	6	34	4	50	0	53	0		
Suffex	102	8			48	9	36	4			53	4		
Suffolk	101	7	62	0	46	0	26	7	44	2	50	5	59	7
Cambridge	89	10	59	0	43	6	21	5	41	10				
Norfolk	96	0	50	10	43	3	26	0	47	8	43	10		
Lincoln	87	9	50	6	41	10	24	7	44	11				
York	78	2	54	1	40	5	27	2	47	3	64	10	50	8
Durham	81	4			42	8	26	5			40	0		
Northumberland	83	1	52	11	43	9	26	7					20	0
Cumberland	74	0	47	4	38	5	26	3					20	1
Westmorland	80	11	52	0	35	4	26	6					19	10
Lancaster	79	4			46	8	31	3	49	9			23	7
Chester	77	7			46	8	28	11	56	0			25	6
Flint														
Denbigh	89	9			42	5	24	9	60	0	48	0	48	3
Anglesea	60	0			40	0	22	0						
Carnarvon	76	0			41	4	24	0					54	1
Merioneth	92	0	52	0	42	4	23	4			48	0	41	4
Cardigan	76	7			37	8	20	0						
Pembroke	70	7			43	2	20	11						
Carmarthen	86	3			43	4	21	8						
Glamorgan	92	11			52	0	25	1						
Gloucester	82	5			46	4	27	4	55	6	53	8		
Somerfet	89	2			49	7	28	6	62	6	52	0		
Monmouth	89	7			49	11	26	0						
Devon	95	5			45	2	26	0	52	0				
Cornwall	83	10			41	5	25	0						
Dorset	95	10			49	7	33	6	60	8	50	0		
Hants	97	2			47	8	31	0	52	2	56	0		

TO OUR READERS AND CORRESPONDENTS.

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**T**HE title, preface, index, and list of errata to this volume, will be given additionally with our next number.

Our readers, will easily perceive that the copper-plate stitched in our present number, belongs to the preceding one, which, by accident, our engraver was unable to accomplish last month. We shall endeavour to embellish our number for January with a print of Sir William Curtis's famous heifer.

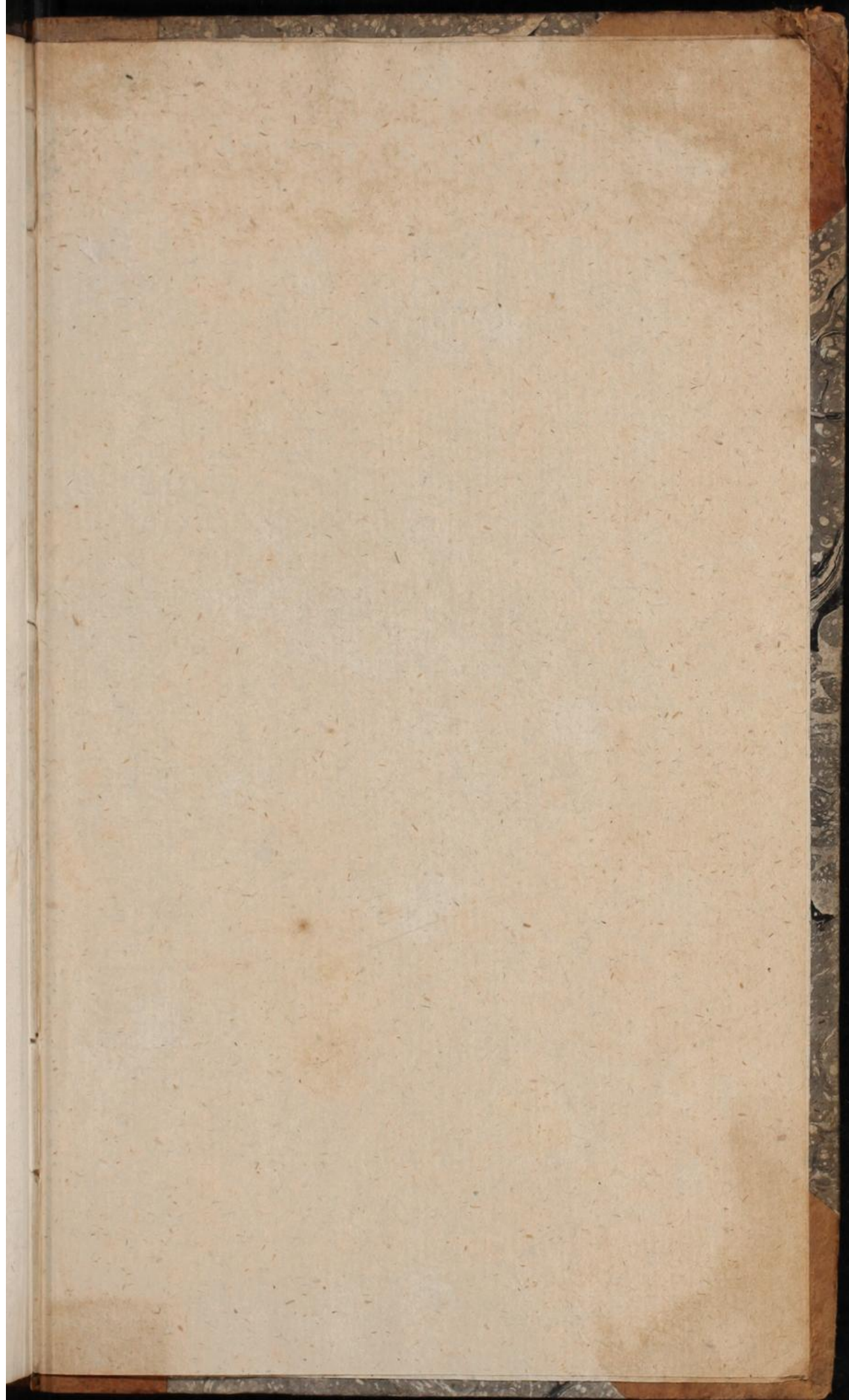
We doubt not but our extract from Dr. Dickson's work on the size of cattle, will be acceptable to many of our friends. We shall occasionally make extracts from this great work. We consider ourselves entitled to this liberty as the Doctor has made the same use of the Agricultural Magazine, as well as copying many of the copper-plates.

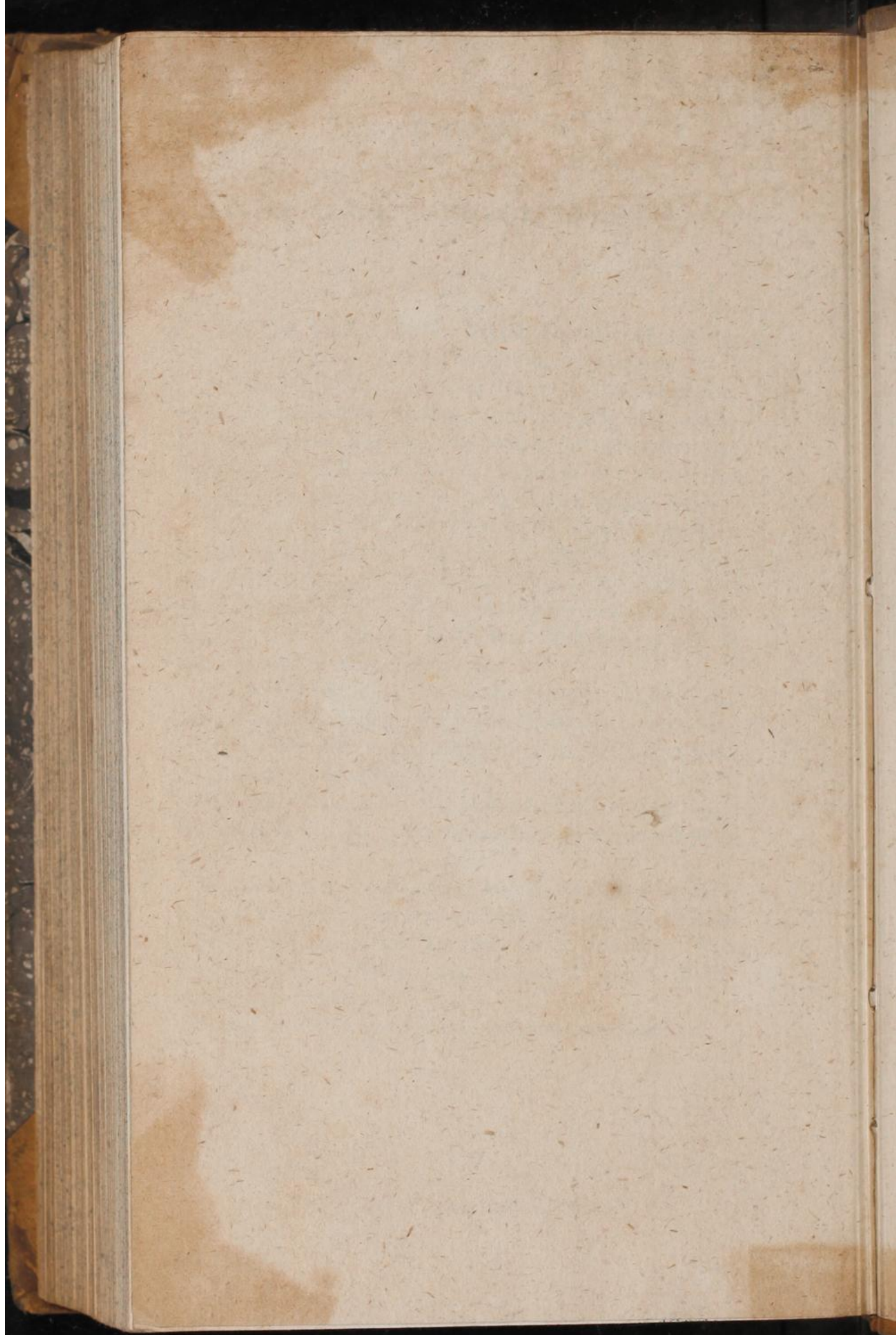
It is with much regret we inform Agricola Norfolciensis, that the packet containing the articles he alludes to never came to hand. We wish to be informed when it was put into the post-office, and where?

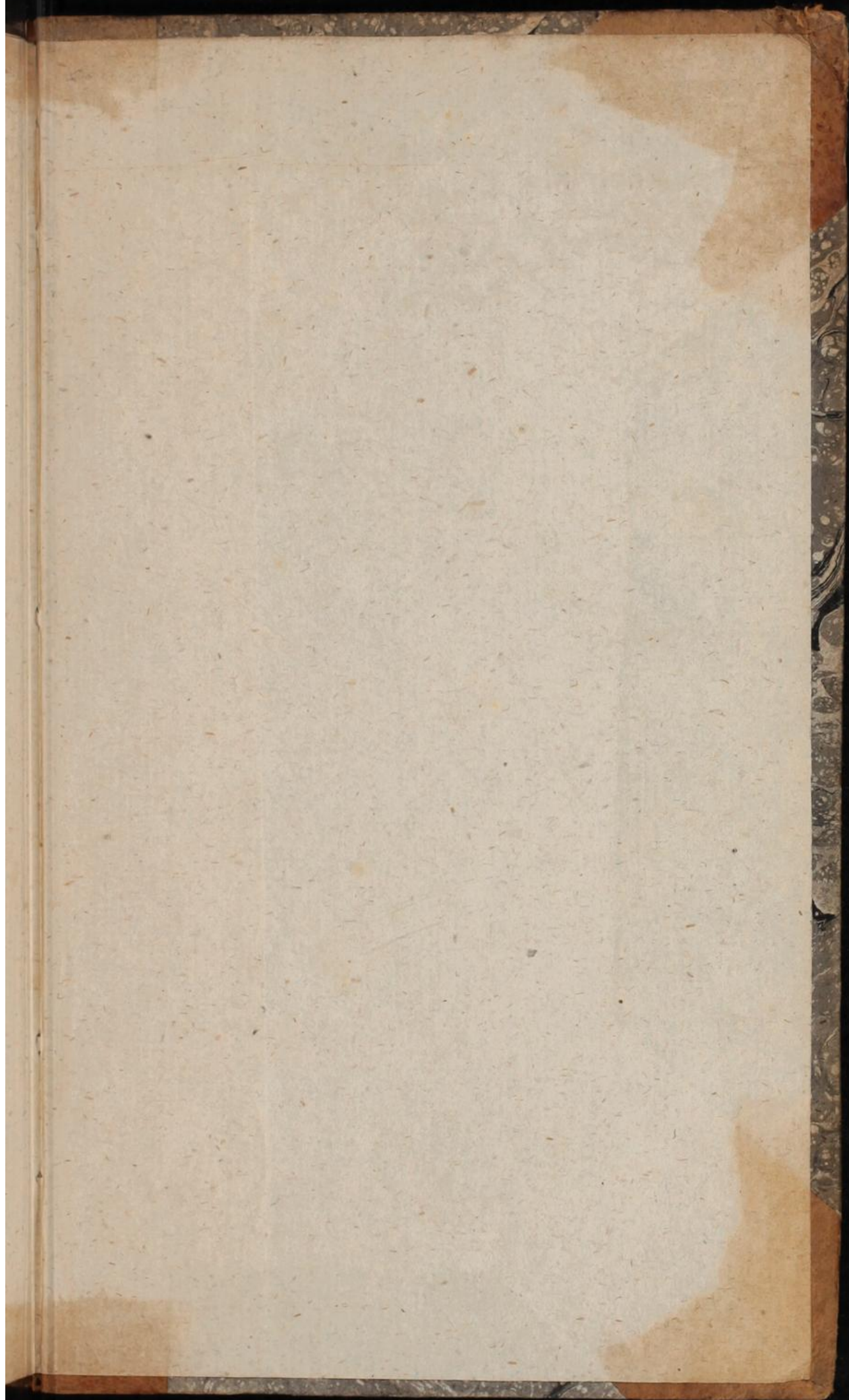
Our history department this month, we believe, contains a very correct account of the annual shew of cattle at Smithfield.

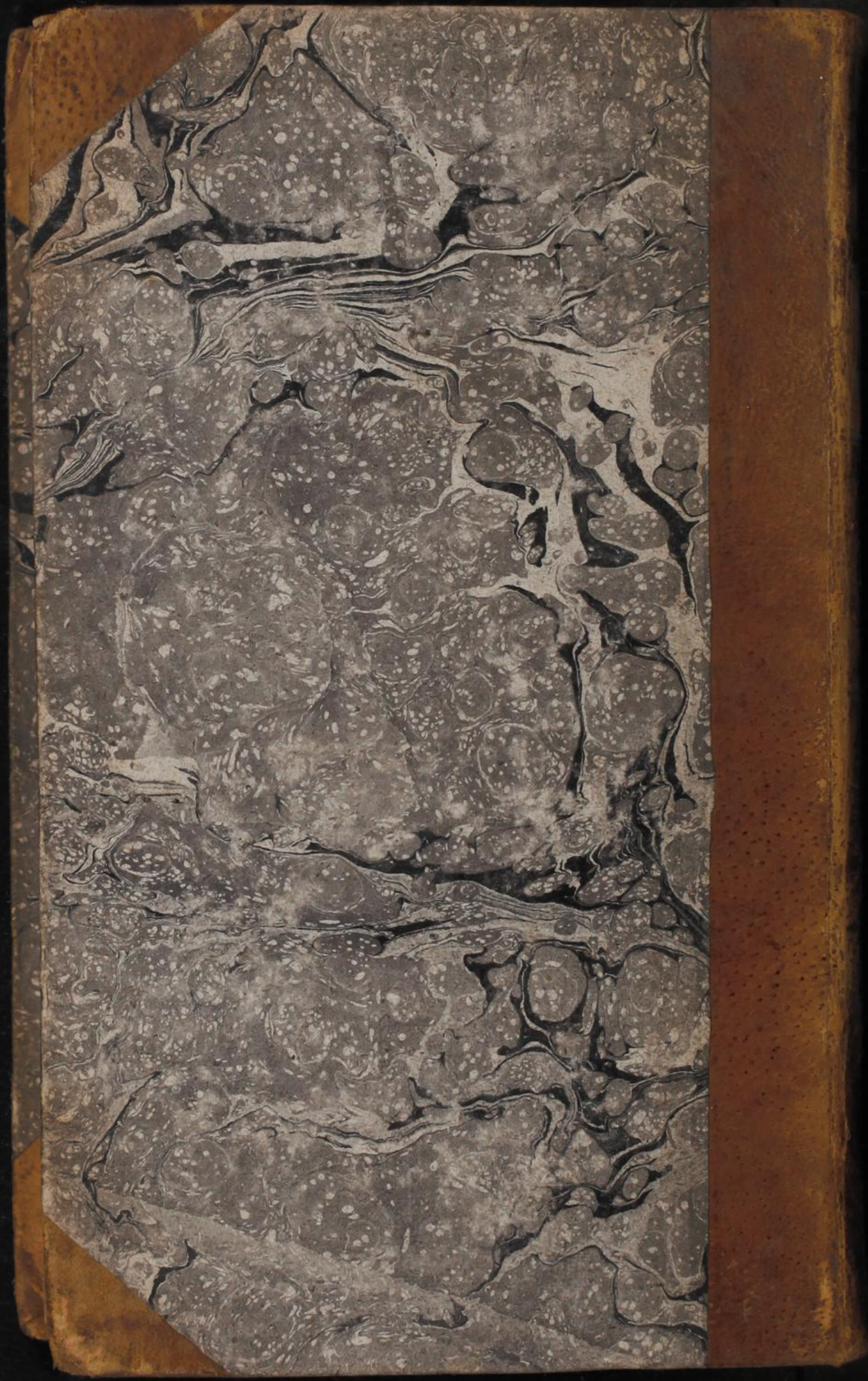
We are sorry that indisposition has prevented the gentleman who was engaged to furnish us with the marketing tables from fulfilling his engagements for these last two months. We have, however, his assurance that we shall no longer be disappointed on that subject.

Several letters are come to hand and under consideration.







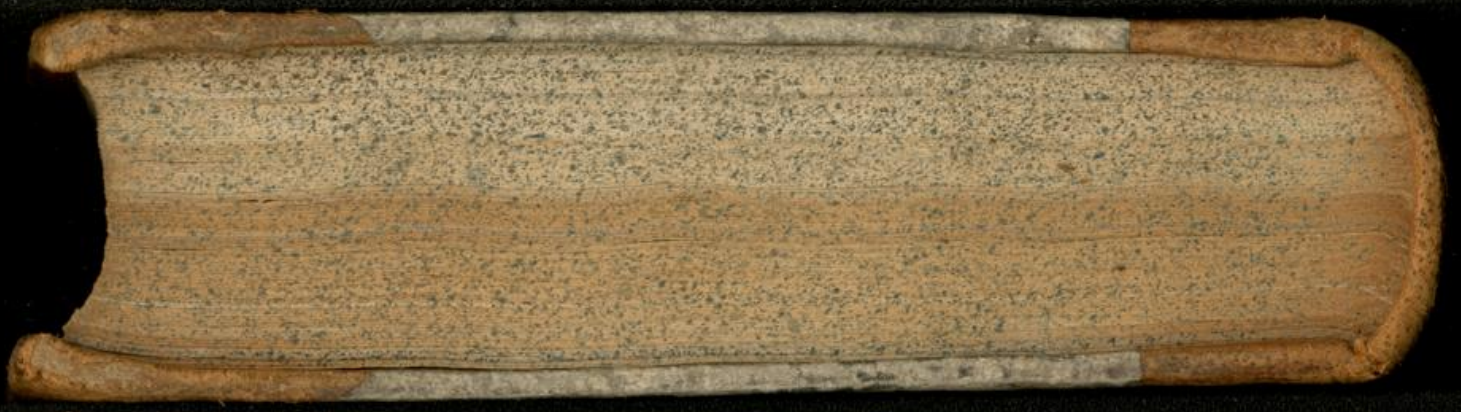




851.







Inches 1 2 3 4 5 6 7 8  
Centimetres 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

# Farbkarte #13

B.I.G.

Blue	Cyan	Green	Yellow	Red	Magenta	White	3/Color	Black
								
								

