



MR. MADISON'S ADDRESS. Concluded from our last.

It has been asked, how it happens that Egypt and Sicily, which have for ages been exporting their agricultural produce without a return of any equivalent produce, have not lost their productive capacity. One answer has been, that they have lost no small degree of it. If the fact be otherwise with regard to Egypt, it might be accounted for by the fertilizing inundations of the Nile. With regard to Sicily, there may be something in the system of husbandry, or some particular local circumstances, which counteract the continued asportation of the fruits of the soil. But it is far more probable, that the Island is less productive than it once was. It is certainly less of a granary for other countries now, than it was when it received that title from the ancient Romans. And its population being diminished, the internal consumption must also be diminished. If a single farm is rendered less productive by a continued removal of its crops, without any adequate returns, no reason occurs why it should not happen to a number of farms multiplied to the extent of a whole country.

And that individual farms do lose their fertility, in proportion as crops are taken from them, and returns of manure neglected, is a fact not likely to be questioned. If it were, Virginia, unfortunately, is but too capable of furnishing the proofs. Her prevailing crops have been very exhausting, and the use of manures has been particularly neglected.

Tobacco and Indian corn, which for a long time on the east side of the Blue Mountains were the articles almost exclusively cultivated, and which continue to be cultivated, the former extensively, the latter universally, are known to be great impoverishers of the soil. Wheat, which has for a number of years, formed a large portion of the general crop, is also an exhausting crop. So are rye and oats, which enter occasionally into our farming system.

With so many consumers of the fertility of the earth, and so little attention to the means of repairing their ravages, no one can be surprised at the impoverished face of the country; whilst every one ought to be desirous of aiding in the work of reformation.

The first and main step towards it, is to make the thieves restore as much as possible of the stolen fertility. On this, with other improvements which may be made in our husbandry, we must depend for the rescue of our farms from their present degraded condition.

Of tobacco, not a great deal more than one half of the entire plant is carried to market. The residue is an item on the list of manures; and it is known to be in its quality a very rich one. The crop of tobacco, however, though of great value, covers but a small proportion of our cultivated ground; and its offal can of course, contribute but inconsiderably to the general stock of manure. It is probable also, that what it does contribute, has been more carefully used as a manure, than any other article furnished by our crops.

The article which constitutes our principal manure, is wheat straw. It is of much importance, therefore, to decide aright on the mode of using it. There are three modes. 1. Carrying it from the farm yard, after having passed through, or being trodden and enriched by cattle. In that mode, the greater part of it must be used, if used at all; the straw going through that process, being a necessary part of the food allotted to the cattle. To derive the full advantage from it, it ought to be hauled out before the substance has been wasted by rain, by the sun, and by the wind; and to be buried in the earth as soon as possible. 2. Spreading the straw on the surface of the ground. Many respectable farmers are attached to this mode, as protecting the soil from the sun; and by keeping it moist, favoring the vegetation underneath, whether spontaneous or artificial; whilst the straw itself is gradually decomposed into a manure. The objection to this mode, is the loss by evaporation, before this last effect is obtained. 3. Turning the straw at once under the surface of the earth. This would seem to be the best mode of managing manures generally; least of their substance being then lost. When the grain is trodden out from the straw, it is left in a state easily admitting this operation. Some difficulty may attend it, when the grain is threshed from the straw, by the flail, or by the machines now in use, neither of which break the straw sufficiently to pieces.

It may be remarked with regard to this article of manure. 1. That its weight is barely more than that of the grain. 2. That the grain is the part which makes the greatest draft on the fertility of the earth. 3. That the grain is for the most part not consumed within the farm. It is found, on trial, that a stalk of wheat, as generally cut, including the chaff, and the grains borne by the stalk, are pretty nearly of equal weight. The case is probably the same with rye, and not very different with oats. The proportion of fertilizing matter in the straw, to that in the grain, has not, as far as I know, been brought to any satisfactory test. It is doubtless much less in the straw, with alone, in

the case of wheat, is with us returnable in any form to the earth. This consideration, whilst it urges us to make the most of the article as a manure, warns us of its insufficiency.

The stubble, and the roots of the small grains, not being taken from the earth, may be regarded as relapsing into a fertility equal to that of which they deprived the earth. This remark is applicable to all cultivated plants, the roots of which are not an esculent part.

An eminent citizen and celebrated agriculturalist of this State, has among other instructive lessons, called the public attention, to the value of the corn stalk as a manure. I am persuaded that he has not overrated it. And it is a subject of agreeable reflection, that an article which is so extensively cultivated as that of Indian corn, and which is so particularly exhausting, should be the one so capable of repairing the injury it does. The corn stalk as a fodder is of great value. Not only the leaves, but the husk inclosing the ear, and the cob inclosed by it, are all more or less valuable food when duly preserved and dealt out to cattle. There is no better fodder than the leaves or blades for horses and oxen; nor any so much approved for sheep. The husk or shuck is a highly nourishing food for neat cattle. And the pickings of the stalk, even at a late season, and after much exposure to the weather, support them better than any of the straws. From the saccharine matter in the stalk, which is long retained about the joints, it cannot be doubted that if cut early, or before exposure to the weather, into parts small enough for mastication, it would well repay as a food for cattle, the labor required for it.

The great value of the cornstalk, in all its parts, as a fodder, was brought into full proof, by the use made of it, during the late general failure of crops. It is to be hoped that the lesson will not be suffered to pass into oblivion.

But it is as a resource for re-fertilizing the soil, that the cornstalk finds the proper place here; and as such it merits particular notice, whether it be passed through animals; or be prepared by fermentation in the farm yard; or be merely spread on the surface of the earth, the mode in which its effects must be least considerable. The same qualities which render every part of it nutritious to animals, render it nutritious to the earth; and it is accompanied with the peculiar advantages. 1. That the grain itself is mostly every where, and altogether in places distant from navigation, consumed within the farms producing it. 2. That as the grain is in greater proportion to the space on which it grows, than most other grains, so the rest of the plant is in greater proportion to the grain, than the rest of any other grain plant. The straw and chaff of the smaller grains, as already remarked, is in weight, but about one half of the grain. The cornstalk, with all its appurtenances, is of not less than three times, and if taken early from the field, probably of not less than four or five times the weight of the grain belonging to it. 3. The fertilizing matter contained in the cornstalk is greater in proportion to its weight, than that contained in the straw and offal of other grains, is to the weight of the straw and offal.

Would it be hazardous too much to say, that where a level surface, or the mode of cultivating a hilly one, prevents the rains from carrying off the soil, a restoration of an entire crop of Indian corn, in the form of manure, to the space producing it (there being no other intervening crop not so restored) would replace the fertility consumed by the crop; & maintain a perpetual productiveness? Reason the case of forest and fallow fields, where the spontaneous crop falls back of itself to the earth, and the Chinese example, where the cultivated crop is restored to the earth, all pronounce that such would be the effect. And yet the fact stares us in the face, that our most impoverished fields, even the most level of them, owe their condition more to the crops of Indian corn, than to any other crops.

The cotton plant, which is so extensive a crop, in the more southern, and the south western states, is but little cultivated in Virginia, and scarcely at all in this part of it. I am not able to say how far it is comparatively an exhausting crop. But it would seem to be more capable than any crop not wholly consumed within the farm, of preserving its fertility. The only part of the plant, carried away, is the cotton fibre, or woolly part, which bears an inconsiderable proportion to the other parts in weight, and as may be inferred, in fertilizing matter also. The seed alone, passing by the ball and the haulm, is of three times its weight, and contains the chief part of the oil in the plant. In the countries where cotton makes the principal part of the crop, the superfluous seed must deserve great attention as a manure. Where the fields are level or cultivated in horizontal drills, it might go far towards supporting a continued cropping, without a diminished fertility.

The sum of these remarks on cultivating poor land, and neglecting the means of keeping or making land rich, is, that if every thing grown on a soil is carried from it, it must become unproductive;

that if every thing grown on it, be directly or indirectly restored to it, it would not cease to be productive; and, consequently, that according to the degree in which the one or the other practice takes place, a farm must be impoverished, or be permanently productive and profitable. Every acre made by an improved management to produce as much as two acres, is in effect the addition of a new acre; with the great advantage of contracting the space to be cultivated, and of shortening the distance of transportation between the fields, and the barn or the farm yard. One of the Roman writers\* on husbandry, enforces the obligation to an improving management by a story of one Paradius who had two daughters and a vineyard; when the elder was married, he gave her a third part of the vineyard; notwithstanding which, he obtained from two-thirds, the same crop as from the whole; when his other daughter was married, he portioned her with the half of what remained; and still the produce of his vineyard was undiminished. The story short as it is, contains a volume of instruction.

The plaster or gypsum, though not a manure within the farm itself, has been too long neglected, as a fertilizing resource. It is now beginning to take a high and just rank as such. The proofs of its efficacy are as incontestable, as the causes of it are obscure. The experiments of a very distinguished chemist led him to the opinion that its substance enters into the substance of the plant. Without doubting the fact, it does not sufficiently account for the addition made to the size and weight of the plant, which greatly exceeds the quantity of the plaster. It must therefore have some further mode of operating. Whether it be by neutralizing some noxious ingredient in the earth, one of the modes by which lime is supposed to operate; or by attracting and conveying to the plant, food from the earth, the air, or water; or by exciting the plant to a more active use of its feeding powers, whatever they be; or by its accretion and assimilation to the particular parts of plants on which these powers depend; thereby augmenting and strengthening those particular parts, and enabling the feeding powers to give proportional augmentation to every other part; whether by any one or more of these processes, or by some other or others distinct from them all, the growth of plants be promoted by this mineral, remains it would seem to be yet explained. In the mean time, a more extensive use of it, promises much advantage to our agriculture. I take it however, that this advantage cannot be permanent without making the increased product of the soil, a source of manure to the soil. That the effect of the plaster will be continued indefinitely, and a constant removal of the whole crop from the soil, supports belief. It can scarcely fail to exhaust at length, the productive powers of the earth. The period of time necessary for the purpose, may be an uncertain; but that, as in the case of the other mineral manures, lime and more, such must sooner or later be the result, cannot well be so. The effect of plowing the earth by tillage, as practised by Till, is stated to have been unimpaired crops of wheat, without manure, for more than twenty years; which was regarded as a demonstration that tillage, was a complete substitute for manure. Erroring the statement to be free from error, the inference is certainly not warranted by the fact. We know that some of our soils not naturally richer than the highly manured soils on which Till probably commenced his tillage, will bear a succession of crops for an equal period; and we know as well, that their fertility will not hold out for ever. How long plaster, whatever be its mode of operation, will hold out, may not yet have been fully tried. But to make it permanently successful, it will be wise to take for granted, that it must be made a source of future manure, as well as of immediate productiveness. If the crop as augmented by the plaster be given back to the soil, the soil may be benefited more than it would be, by the return of a crop not augmented by the plaster. And in this way fertility may be accelerated. The restoration of a crop increased by ordinary cultivation, to the soil on which it grew, would, I presume, fertilize it more than the restoration of a smaller crop spontaneously produced; although in both cases, the whole taken from the soil would return to it.

IV. Among the means of aiding the productiveness of the soil, which have not received merited attention, is irrigation. In scarcely any country does this resource abound more than in the United States; nor is there any, where there is so little sensibility to its value. The inconsiderable use made of it is chiefly by emigrants, particularly Germans, or the immediate descendants of them. I have understood that the market of Baltimore has been much benefited in dry seasons by the irrigation introduced by exiles from St. Domingo. For a distinguished proof of the importance of the practice, I may refer to the fact which has been stated, that in the neighborhood of Barcelona in Spain, where a part of the land is under irrigation, and a part is not susceptible of it. Both being otherwise of equal fertility, the

part irrigated is of double price in the market. It is to be noted indeed that the climate is a dry one, and that the article cultivated is Lucerne. But this is a plant, which though much aided in its growth by moisture, is at the same time remarkable for the length of a tap root, and fitted by that as well as by the absorbent quality of its leaves, to flourish in a thirsty soil, & warm climate. Our particular district of country, abounding in springs, small streams, and suitable declivities, admits greatly of irrigation; and being generally of a thirsty nature, the more strongly invites the use of it. I cannot but consider it as an error in our husbandry, that oxen are too little used in place of horses. Every fair comparison of the expence of the two animals, favors a preference of the ox. But the circumstance particularly recommending him, is that he can be supported when at work, by grass & hay; whilst the horse requires grain and much of it; and the grain generally given him, Indian corn, the crop which requires most labor, and greatly exhausts the land. From the best estimate I have been enabled to form, more than one half of the corn crop is consumed by horses; including the unground ones; and not less than one half, by other than pleasure horses. By getting free from this consumption, one half the labor, and of the wear of the land, would be saved, or rather more than one half; for on most farms, one half of the crop of corn grows on not more than two fifths, and sometimes a smaller proportion, of the cultivated fields; and the more fertile fields would of course be retained for cultivation. Every one can figure to himself, the ease and convenience of a revolution which would so much reduce the extent of his cornfields; and substitute for the labor bestowed on them, the more easy task of providing pasturage and hay. But will not the ox himself when kept at labor require grain food as well as the horse? Certainly much less, if any. Judging from my own observation, I should say, that a plenty of good grass, or good hay, will suffice without grain, where the labor is neither constant or severe. But I feel entire confidence in saying, that a double set of oxen alternately at work, and therefore half the time at rest, might be kept in good plight without other food than a plenty of good grass or good hay. And as this double set would double the supply of beef, tallow and leather, a set-off is found in that consideration for a double consumption of that kind of food. The objections generally made to the ox, are—1. That he is less tractable than the horse. 2. That he does not bear heat as well. 3. That he does not answer for the single plough used in our corn fields. 4. That he is slower in his movements. 5. That he is less fit for carrying the produce of the farm to market.

\* Columella. † Sir H. Davy.

The first objection is certainly founded in mistake. Of the two animals, the ox is the more docile. In all countries where the ox is the ordinary draught animal his docility is proverbial. His intractability, where it exists, has arisen from an occasional use of him only with long and irregular intervals; during which the habit of discipline being broken, a new one is to be formed. The 2d objection has as little foundation. The constitution of the ox accommodates itself, as readily as that of the horse to different climates. Not only in ancient Greece and Italy, but throughout Asia, as presented to us in ancient history, the ox and the plough are associated. At this day, in the warm parts of India and China, the ox, not the horse, is in the draught service. In every part of India, the ox always appears, even in the train of her armies. And in the hottest parts of the West Indies, the ox is employed in hauling the weighty produce to the sea ports. The mistake here, as in the former case, has arisen, from the effect of an occasional employment only, with no other than green food. The fermentation of this in the animal heated by the weather, and fretted by the discipline, will readily account for his sinking under his exertions; when green food even, much less dry, with a sober habit of labor, would have no such tendency.

The 3d objection also is not a solid one. The ox can by a proper harness, be used singly as well as the horse, between the rows of Indian corn; and equally so used for other purposes. Experience may be safely appealed to on this point. In the 4th place, it is alleged that he is slower in his movements. This is true, but in a less degree, than is often taken for granted. Oxen that are well chosen for their form, are not worked after the age of about 8 years, (the age at which they are best fitted for beef,) are not worked too many together, and are suitably matched, may be kept to nearly as quick a step as the horse. May I not say a step quicker than that of many of the horses we see at work, who, on account of their age, or the leanness occasioned by the costliness of the food they require, lose this advantage, where they might have once had it? The last objection has most weight.—The ox is not as well adapted as the horse to the road service, especially for long trips. In common roads, which are often soft, and sometimes suddenly become so,

the form of his foot, and the shortness of his leg, are disadvantages; and on roads frozen, or turnpiked, the roughness of the surface in the former case, and its hardness in both cases, are inconvenient to his cloven hoof. But where the distance to market is not great, where the varying state of the roads and of the weather, can be consulted; and where the road service is in less proportion to the farm service, the objection is almost derived of its weight. In cases where it most applies, its weight is diminished by the consideration, that a much greater proportion of service on the farm may be done by oxen, than is now commonly done; and that the expence of shoeing them, is little different from that of keeping horses shod. It is observable, that when oxen are worked on the farm, over rough frozen ground, they suffer so much from the want of shoes, however well fed they may be, that it is a proper subject for calculation, whether true economy does not require for them, that accommodation, even on the farm, as well as for the horses. A more important calculation is, whether, in many situations, the general saving by substituting the ox for the horse, would not balance the expence of hiring a carriage of the produce to market. In the same scale with the hire, is to be put the value of the grass and hay consumed by the oxen; and in the other scale, the value of the corn amounting to one half of the crop, and of the grass and hay consumed by the horses. Where the market is not distant, the value of the corn saved, would certainly pay for the carriage of the market portion of the crop, and balance moreover any difference between the value of the grass and hay consumed by oxen, and the value of the oxen when slaughtered for beef. In all these calculations, it is doubtless proper, not to lose sight of the rule, that farmers ought to avoid paying others for doing, what they can do for themselves. But the rule has its exceptions; & the error, if it be committed, will not lie in departing from the rule, but in not selecting aright the cases which call for the departure. It may be remarked, that the rule ought to be more or less general, as there may or may not be at hand, a market by which every produce of labor is convertible into money. In the old countries, this is much more the case, than in new; and in new, much more the case near towns, than at a distance from them. In this as in most other parts of our country, a change of circumstances is taking place, which renders every thing raised on a farm more convertible into money than formerly; and as the change proceeds, it will be more and more a point for consideration, how far the labor in doing what might be bought, could earn more in any other way, than the amount of the purchase. Still it will always be prudent, for reasons which every experienced farmer will understand, to lean to the side of doing, rather than hiring or buying, what may be wanted.

The male seems to be, in point of economy, between the ox and the horse; preferable to the latter, inferior to the former; but so well adapted to particular services, that he may find a proper place on many farms. He is liable to the objection which weighs most against the ox—He is less fitted than the horse for road service. V. A more manifest error in the husbandry of the older settlements, is that of keeping too many neat cattle on their farms. As a farm should not be cultivated farther than it can be continued in good heart; the stock of cattle should not be in greater number than the resources of food will keep in good plight. If a poor farm be unprofitable, so are poor cattle. It is particularly the case with the milk cows. When the whole of the food given them is necessary to support a lean existence, no part can be spared for the milk pail. The same food given to the proper number, will not only keep them in a thrifty state, but enable them to supply the dairy. Even the manure from several poor cattle is worth less than that from a single fat one. The remark holds equally good with respect to the hide.

The misjudged practice in question, is another effect of inattention to the change of circumstances through which our country has passed. Originally the forest abounded in rich herbage which fed and fattened, without expence, all the cattle that could be brought through the winter into the spring. It was natural at that time to keep as large a stock as could be preserved through the winter. For a long time past, the forest is scarcely any where a resource for more than two or three months; and in many places, no resource at all. A greater difficulty is often felt in finding summer, than winter subsistence. And yet where no inclosed pasturage is provided to take the place of the extinct one in the forest, the habit, founded in reasons which have entirely ceased, is but too generally retained. The same number of cattle is aimed at, as if the forest was as ready to receive and fatten them now as formerly. The size and appearance of our neat cattle, compared with those for which nature or good husbandry has provided sufficient food, are proofs that their food is not in proportion to their number; and that where the food cannot be increased, the number ought to be reduced.

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