

THE GLEANER

AND NORTHUMBERLAND, KENT, GLOUCESTER AND RESTIGOUCHE
COMMERCIAL AND AGRICULTURAL JOURNAL.

OLD SERIES]

Nec araneorum sane textus ideo melior, quia ex se fila pignunt, nec noster vilior quia ex alienis libamus ut apes.

[COMPRISED 13 VOLUMES.]

NEW SERIES VOL. IV.]

MIRAMICHI, SATURDAY MORNING, DECEMBER 27, 1845.

[NUMBER 12.]

Agricultural Journal.

From the London Farmer's Magazine.

ESSAY

ON THE MANUFACTURE OF MANURES, AND THE APPLICATION OF THE SAME TO THE DIFFERENT VARIETIES OF SOIL. BY ASAHEL FOOT.

Fermentation of Manures.

That manure should never be suffered to undergo fermentation any where else than in the soil, or in well-protected compost-beds, may be argued from the facts, 1st. That even an incipient fermentation cannot take place without the evolution and escape of some portion of its volatile products, such as carbonic acid and ammonia, to the latter of which all nutritive manures are indebted for their principal efficacy; 2. That, during fermentation (in the open air) it is constantly exposed to further loss by infiltration and drainage; and, 3. That the finer grains do not require this process to be undergone in the barn-yard, since, coming as they mostly do, and as perhaps they always should, after hard crops, they find the manure employed for the previous crop in just the requisite state of decomposition; a clear gain of the entire advantage secured in the previous harvest.

It may be objected to this view of the subject, that fermented manure is in particular cases indispensable for forcing vegetation—that is, for hastening the growth and maturity of certain plants. Let this be admitted; still the admission does not establish the necessity of that waste against which we are protesting. Let the manure to be fermented be carefully collected in compost-heaps, and we are satisfied.

Applying Manures to the Surface.

Whether putrescent manures should ever be applied to the surface of the soil, is a question on which the opinions of distinguished agriculturists are far from being unanimous. The right decision of the question depends, in our view, upon the following circumstances: 1. The condition of the manure to be applied; 2. The character of the soil for which it is intended; 3. The nature of the crop to be benefited by it; and, 4. The time of the year when the manure is to be carried out.

1. If the manure to be applied has been composted, or if the process of fermentation has already spent its force upon it, there can be no serious objection to its being spread upon the surface; since the gaseous exhalations having already escaped, it is chiefly secured from the ravages of the atmosphere, and from infiltration there is nothing to fear as that is the very process best adapted to bring the decomposed particles in contact with the mouths of the plants which are to feed upon it.

2. If the soil for which the manure is intended be very porous to a considerable depth, the nearer the surface it can be deposited, without too much exposure to the atmosphere, the better, it being evident that the nutritive juices will soon descend beyond the reach of the plants, if it be in the first place buried too deep.

3. If the crop to be benefited consists of any of the finer grains or grasses, the application of the manure to the surface (harrowed in, in the case of grain), will have a greater present effect than any other mode of application as the roots, that is, the mouths of the plants, lying close to the surface, will have the readier access to their food. That natural meadow-land can thus be made to yield greater burden of grass than by any other means scarcely admits of a doubt.

4. If the manure to be applied is summer made manure which must be carted out in the fall, this mode of application will have another argument in its favour. By being spread at this season of the year, after the heats of summer are past, the fermentation and evaporation will be but slight, and the rains and snows which may be expected to fall upon it in succeeding months will either wash it into the soil, or so imbed it among the roots

of the growing crop, as quite effectually to shield it from the wasting action of the atmosphere the succeeding season.

One thought more upon this subject. With the relations of plants to the atmosphere as a source of nutriment, we are as yet much less acquainted than with those which they sustain to the soil; and agricultural science, in its onward progress, may yet develop the fact, that manures applied to the surface, by exerting a direct and powerful agency upon the leaves of plants, and thus promoting an increased absorption of the nutritive particles of the atmosphere, may prove more beneficial, especially in the case of grasses and the finer grains, notwithstanding the losses they sustain from evaporation, than they would if buried beneath any portion of the soil.

Green Crops for Manure.

Green crops, ploughed under for the purpose of enriching the soil, have been regarded from very ancient times as valuable aids in agriculture, and are still recommended in no small degree by the highest agricultural authorities. It is indeed unquestionable, that a crop of clover, for instance, turned under the soil, will afford a sufficient quantity of nutriment for a crop of wheat or rye, and also leave the soil (if not cross-ploughed) in a condition highly favourable to the growth of such a crop. The great question is, whether it would not be more advantageous to the farmer, first to give his cattle the benefit of the clover, and then turn under the remaining vegetable together with the animal matter distributed over the soil, and thus secure two valuable objects instead of one. That such was the opinion of the late Judge Buel, (a more judicious adviser than whom has never contributed to the improvement of American farming), will appear from the following extract from his *Cultivator*, vol. 2, p. 13:—"Vegetable matter, when thus covered by the soil in its green and succulent state, readily undergoes decomposition, and forms a very enriching substance. The practice, however, is chiefly suited to warmer countries, where vegetation is very rapid; and even there it argues a somewhat low state of the art, and is not the best way of producing decomposing matter. When we are able to raise green food of any kind, it is better that we apply it in the first place to the feeding of animals, for then it not only yields manure, but performs another and not less useful purpose."

It is a consideration, notwithstanding, of some weight, that in case of feeding off the green crop, the nutritive substances lose somewhat by exposure, and are much less evenly distributed over the soil for the use of the cultivated crop. "When, however," continues the Judge, "the practice is for any reason adopted, the period at which the plants should be ploughed down is just when they are coming in flower, for they then contain the greatest quantity of readily soluble matter, and have the least exhausted the nutritive substance of the soil."

In the concluding clause of the extract last quoted, green crops are spoken of as "exhausting the nutritive substance of the soil." We take occasion from this hint, to raise an interesting inquiry. If the green crop, while growing above ground, exhausts the soil—and this must be admitted—how can it, by being turned under, enrich the soil? Can it give to the soil any thing which it has not first taken away from it? Science answers in the affirmative. By the aid of her light it has been discovered that plants derive a greater or less proportion of their constituent principles from the atmosphere. These principles, by the process of turning under green crops, become a constituent portion of the soil. This, then, is one of the secrets of their utility. It is not, however, the only one. The physical condition of the soil is also improved by their means; its lightness, warmth, and power of absorption are increased, so that still further draughts are made upon the atmosphere, and thus the soil is permanently benefited.

Whether the crop "should be ploughed down just when coming in flower," or not till after maturity, is yet a question of

debate. Says Dr. Dana, p. 214. "Powerful as are the effects of green crops ploughed in, it is the experience of some practical men, that one crop allowed to perfect itself and die where it grew, and then turned in dry, is superior to three turned in green. Green plants ferment—dry plants decay. A large portion escapes in fermentation as gas, and more volatile products are formed than during decay."

The testimony of Chaptal hangs quite upon the other end of the beam. "It is well known to the farmer," he remarks, "that ploughing in a green crop, of any kind whatever, prepares the soil for producing well without any other manure; since, by this process, all that the soil has yielded is returned to it, with some additions resulting from the decomposed principles of air and water, which are contained in the plants."

"In order fully to understand this doctrine, which appears to me of great importance to agriculture, it is necessary to consider the successive changes which take place in annual plants during their growth; first, they produce green leaves, which, by coming in contact with the air, receive from it the principles of which I have spoken; subsequently the stalks increase in size and number, and are covered with numerous leaves, which absorb from the atmosphere a degree of nourishment suited to the increased wants of the plants. This state continues till after the period of flowering, when a change worthy of note takes place; the roots dry up, the stalks wither and change their colour; and when fructification is at length completed, both roots and stalks have become mere skeletons, which answer but little purpose either for nourishing animals or manuring earth."

But whether turned in green or dry, the ploughing should not be so deep as wholly to exclude the action of the sun and air (for acids will then be formed in the soil); neither should cross-ploughing ever succeed, as this would defeat the object intended, by feeding the atmosphere instead of the soil, upon the virtues of the crop.

Manufactured Manures.

Certain manufactured substances, as bone-dust, urate, podrette, &c., might here receive a passing notice; but as they are not likely, at present, to secure much patronage among us, and certainly should not be employed, expensive as they are until we have learned to save the *helf* of our home-made manures which are now suffered to be lost for want of a little attention, it is not deemed important to enter on any discussion of their merits, especially as these, together with the proper modes of applying them, are fully set forth in all our agricultural journals. We proceed, therefore, to our second division, viz;

Stimulative Manures.

The value of this class of manures depends, not so much on any direct impartation of food to plants, as on their agency in exciting their organs to greater activity, in appropriating to their benefit the influences of the atmosphere, in combating their insect enemies, and in dissolving the salts, neutralizing the acids, and improving the texture of the soil—as lime, marl, gypsum, ashes, saltpetre, common salt, charcoal, soot, sand, clay, &c.

Lime.

Lime has been long and extensively employed in Europe as a fertilizer of the soil, and with such success as to induce an English writer of note (Morton on Soils) to assert, that "the majority of soils cannot be cultivated to advantage till they are dressed with lime; and whether considered as an alternative as a stimulant, or as a manure, it will be found to be the basis of good husbandry, and of more use than all other manures put together. Wherever lime has been properly applied, it has been constantly found to prove as much superior to dung, as dung is to the rakings of the roads, or the produce of a peat mire." And, says M. Puvis, a distinguished French author, "In limed earth, weeds and insects disappear. The

earth, if too light, acquires stiffness, and is lightened if too clayey. In the same soils, with the same manure and the same tillage, by the addition to the ploughed layer of only one-thousandth part of lime, the products, whether volatile or fixed, are increased in a wonderful manner; the soil of the lowest quality reaches the product of the second—the second rises one half or more—and that of the best soil increases a fourth." Yet, strange as it may seem, there exists even among the English agriculturists the greatest diversity of opinion in regard to the propriety and mode of its application on different soils, and the admission is heard on every hand that extensive tracts of British soil have been rendered infertile by its use.

Were we to hazard an opinion on a subject regarding which not only learned farmers but learned doctors disagree, we should say that the truth in the case was something like the following. Vegetable matter becomes the food of plants only in a state of decomposition; of this process lime is a powerful promoter; when, therefore, lime is incorporated with a soil containing much undecomposed vegetable matter, it rapidly prepares this matter for the use of plants; the immediate consequence is, a great increase of vegetable products. But just in proportion to the crop produced, is the greatness of the draught upon the soil. Persisting, therefore, in the application alone of this mere excitant, stimulating his soil to an unnatural activity, without supplying those nutritive substances which alone can sustain its strength, the farmer finds ere long, to his cost, that he has "over-driven his beast," that he has tasked his soil beyond its capabilities, and is fast reducing it to a state of exhaustion. During the early period of his experiments while reaping his unwonted harvests, he could not sufficiently extol—now that he has closed the series, and looks upon his jaded lands, he cannot enough decry the use of lime. Such is, we apprehend, the origin, to a great extent, of that diversity of opinion which exists in regard to the utility of lime. Were its application always judicious, and accompanied, when necessary, with an adequate supply of nutritive matters, the probability is that no such disagreement would exist. Without, however, attempting to reconcile the multifarious and conflicting theories in relation to the use of this substance, we will proceed to notice some of the most obvious modes of its action, and leave the intelligent farmer to deduce from his own experiments (for here experiments are quite indispensable) the practice adapted to his particular soil. We observe, then,

1. Lime acts as a specific food for certain plants; that is, it enters as a natural element into the composition of their substance, so that without its presence they cannot be grown to perfection. For the production, therefore, of these plants (as potatoes and wheat, for instance), the existence of lime in the soil is absolutely necessary. Whether any given portion of the soil is destitute of this earth or not—and upon that question depends entirely the propriety of its application as a nutritive substance—can only be determined by analysis.

2. Lime acts with great efficiency in hastening the decay of animal and vegetable matters. This is the secret of its efficacy when applied to old, matted turfs, to all peaty soils, and to such loads, of whatever description, as abound in undecomposed vegetable matter. To vegetable matter in a soluble state, and to animal matters in general, being easy of decomposition, it is not deemed proper to apply this substance, its tendency being, according to Chaptal, to form insoluble compounds with almost all animal and vegetable substances that are soft and thus to destroy their fermentative properties. Loudon also maintains, that "lime should never be applied with animal manures, unless they be too rich [?], or for the purpose of preventing noxious effluvia; and that it is injurious when mixed with any common dung, and tends to render the extractive matter insoluble."

3. Lime has the property of neutral-