MANURES AND THEIR MODES OF APPLICATION.

1884 BY PETER HENDERSON.

THE subject of Manures is one of the greatest importance to every operator in the soil, whether farmer, market gardener, florist, or such as cultivate only for their own use, for under few conditions can crops be long grown without the use of fertilizers. Although I have already given general instructions about fertilizers in all my works on gardening, yet I find, from the number of inquiries received from even such as have my works, that the matter has not been there treated sufficiently in detail to meet the wants of the varied conditions under which the necessity for the use of fertilizers arises.

The comparative value of manures must be regulated by the cost; for example, if rotted Stable Manure, whether from horses or cows, can be delivered on the ground at $3 per ton, it is about as valuable, for fertilizing purposes, as Peruvian Guano at $65 per ton, or pure Bone Dust at $40 per ton, and is better than either of these, or any other concentrated fertilizer, from the fact of its mechanical action on the land, that is, its assistance, from its light, porous nature, in aerating and pulverizing the soil; Guano, Bone Dust, or other commercial fertilizers, acting only as such, without in any way assisting to make better what may be called the physical condition of the soil.

All experienced cultivators know that the first year that land is broken up from sod, if proper culture has been given, by thorough plowing and harrowing, (provided the land is drained artificially or naturally, so as to be free from water, and relieve it from sourness,") the land is in better condition for any crop, than land that has been continuously cropped without a rest. The market gardeners in the vicinity of New York are now so well convinced of this that, when twenty acres are under cultivation, at least five acres are continually kept in grain, clover, and grass, to be broken up successively, every second

or third year, so as to get the land in the condition that nothing else but rotted, pulverized sod will accomplish. This is done in cases where land is as valuable as $500 per acre; experience having proved that, with one-quarter of the land " resting under grass," more profit can be got than if the whole were under culture.

When the rotation, by placing a portion of the land under grass, cannot be done, then it is absolutely necessary to use Stable Manure, at least to some extent, if the best results are desired, for continuous cropping of the soil. Where concentrated fertilizers only are used, they will not continue to give satisfactory results after the grass roots, or other organic matter, have passed from the soil, all of which will usually be entirely gone by the third or fourth year after breaking up. I have long held the opinion, that the idea of lands having been permanently exhausted by tobacco or other crops is a fallacy. What gives rise to this belief, I think, is the fact that, when lands are first broken up from the forest or meadow lands, for three or four years the organic matter in the soil, (the roots of grasses, leaves, etc.,) not only serves to feed. the crops, but it keeps the soil in a better state of pulverization, or what might be called aerated condition, than when, in the course of cropping for a few years, it has passed away. Stable Manure best supplies this want; but on farm lands away from towns, it is not often that enough can be obtained to have any appreciable effect on the soil, and hence artificial fertilizers are resorted to, which often fail, not from any fault in themselves, but from the fact that, exerting little mechanical influence on the land, it becomes compacted or sodden, the air cannot get to the roots, and hence failure or partial failure of crop.

Thus, we see, that to have the best results from commercial fertilizers, it is of great importance to have the land " rested " by a crop of grain or grass every three or four years.

The best known fertilizers of commerce are Peruvian Guano and Bone Dust, though there are numbers of others, such as Fish Guano, Dry Blood Fertilizer, Blood and Bone Fertilizer, with the various brands of super-phosphates, all of more or less

value for fertilizing purposes. It is useless to go over the list, and we will confine ourselves to the relative merits of pure Peruvian Guano and pure Bone Dust. Guano, at $65 per ton, we consider relatively equal in value to Bone Dust at $.}o per ton, for in the lower-priced article we find we have to increase the quantity to produce the same results. Whatever kind of concentrated fertilizer is used, we find it well repays the labor to prepare it in the following manner before it is used on the land:

To every bushel of Guano or Bone Dust add three bushels of either leaf mould, (from the woods,) well-pulverized dry muck, sweepings from a paved street, Stable Manure so rotted as to be like pulverized muck, or, if neither of these can be obtained, any loamy soil will do; but in every case the material to mix the fertilizers with must be fairly dry and never in a condition of mud; the meaning of the operation being, that the material used is to act as a temporary absorbent for the fertilizer. The compost must be thoroughly mixed, and if Guano is used, it being sometimes lumpy, it must be broken up to dust before being mixed with the absorbent.

The main object of this operation is for the better separation and division of the fertilizer, so that, when applied to the soil, it can be more readily distributed. My experiments have repeatedly shown that this method of using concentrated fertilizers materially increases their value, probably twenty per cent. The mixing should be done a few months previous to spring, and it should, after being mixed, be packed away in barrels, and kept in some dry shed or cellar until wanted for use. Thus mixed, it is particularly beneficial on lawns or other grass lands. The quantity of concentrated fertilizer to be used is often perplexing to beginners. I give the following as the best rules I know, all derived from my own practice in growing fruits, flowers, and vegetables:

Taking Guano as a basis, I would recommend for all vegetable or fruit crops, if earliness and good quality are desired, the use of not less than 1,200 pounds per acre, (an acre contains 4,840 square yards, and cultivators for private use can easily estimate

from this the quantity they require for any area,) mixed with two tons of either of the materials before recommended. If Bone Dust is used, about one ton per acre should be applied, mixed with three tons of soil or the other materials named.

For market garden vegetable crops, in the vicinity of New York, this quantity of Guano or Bone Dust is harrowed in after twenty-five or thirty tons of Stable Manure have first been plowed in; so that the actual cost of manuring each acre is not less than $100, and often $150.

When fertilizers are used alone, without being mixed with the absorbent, they should be sown on the soil after plowing or digging, about thick enough to just color the surface, or about as thick as sand or sawdust is sown on a floor, and then thoroughly harrowed in if plowed, or, if dug, chopped in with a rake. This quantity is used broadcast by sowing on the ground after plowing, and deeply and thoroughly harrowing in, or, if in small gar-dens, forked in lightly with the prongs of a garden fork or long-toothed steel rake. When applied in hills or drills, from 200 to 300 pounds should be used to the acre, according to the distance of these apart, mixing with soil, etc., as already directed.

When well-rotted Stable Manure is procurable at a cost not to exceed $3 per ton, delivered on the ground, whether from horses or cows, it is preferable to any concentrated fertilizer. Rotted Stable Manure, to produce full crops, should be spread on the ground not less than three inches thick, (our market gardeners use from 50 to 75 tons of well-rotted Stable Manure per acre, when no concentrated fertilizer is used,) and should be thoroughly mixed with the soil by plowing or spading. The refuse hops from breweries form an excellent fertilizer, at least one-half more valuable, bulk for bulk, than Stable Manure. Other excellent fertilizers are obtained from the scrapings or shavings from horn or whalebone manufactories. The best way to make these quickly available is to compost them with hot manure, in the proportion of one ton of refuse horn or whalebone with fifteen tons of manure. The heated manure extracts the oil, which is intermingled with the whole.

The manure from the chicken or pigeon house is very valuable, and when composted as directed for Bone Dust and Guano, has at least one-third their value. Castor Oil Pomace is also valuable in about the same proportion.

Poudrette is the name given to a commercial fertilizer, the composition of which is night soil and dried swamp muck or charcoal dust as an absorbent. It is sold at about $12 to $15 per ton, and at that price may be equal in value, if too much of the absorbing material is not used, to Bone Dust at $40 per ton.

In my early experience as a market gardener, I used large quantities of Night Soil for vegetable crops with the very best results. It was mixed with Stable Manure at the rate of about one ton of Night Soil to fifteen tons of Stable Manure, and put on the land, so mixed, at the rate of 25 tons per acre. In the absence of Stable Manure, dry soil, charcoal dust, sawdust, or any material that will absorb it, will do. Thus mixed, if equal quantities of each have been used, ten tons may be used per acre, if plowed in; if sowed on top, to be harrowed in, say five tons.

Salt has little or no value as a fertilizer, except as a medium of absorbing moisture; for experience shows that soils impregnated by a saline atmosphere are no more fertile than those inland, out of the reach of such an atmosphere.

Muck is the name given to a deposit usually largely composed of vegetable matter, found in swamps or in hollows in forest lands. Of itself it has usually but little fertilizing property, but from its porous nature, when dry, it is one of the best materials to use to mix with other manures as an absorbent. It can be used to great advantage if dug out in winter and piled up in narrow ridges, so that it can be partly dried and " sweetened" in summer. Thus dry, if mixed with Stable Manure, or, better yet, thrown in layers three or four inches thick in the cattle or hog yard, where it can be trodden down and amalgamated with the manure, the value of the manure thus treated will be

nearly doubled.

In reply to questions that I receive by the hundred each season, asking whether or not it is worth while to use the so-called special fertilizers, claimed to be suited to the wants of particular plants, such as the " Potato Fertilizer," "Cabbage Fertilizer," " Strawberry Fertilizer," " Rose Fertilizer," etc., I can only give this general answer, that while these manures may suit the plants they are claimed to be "special" for, I have no doubt that either one would suit equally well for the others; or, if all were mixed together, the mixture would be found to answer the purpose for each kind of crop, just as well as if kept separate and applied to the crop it was named for. These hair-splitting distinctions are not recognized to be of any value by one practical farmer or gardener in every hundred; for a little experience soon shows that pure Bone Dust or well-rotted Stable Manure answers for all crops alike, no matter what they are. These special fertilizers for special crops are gradually increasing in number, so that some dealers now offer fifty kinds, different brands being offered for plants belonging to the same family. There is an ignorant assumption in this, and any cultivator of ordinary intelligence cannot fail to see that the motive in so doing is to strike as broad a swath as possible, so that a larger number of customers maybe reached.

One of my neighbors called the other day, and informed me that his Lettuce crop, in his green-house, was failing, and asked me what I thought of the Lettuce Fertilizer that was offered in a circular that contained some fifty other "specials." An inquiry developed the fact that he had been keeping his Lettuce crop at a night temperature of 65° in January, so that there was just about as much chance of the Special Lettuce Fertilizer helping the crop as there would be of giving health to a man by feeding him beefsteak in the last stages of consumption.

I merely mention this incident to show how, and in what manner, the sellers of these special fertilizers obtain customers.