

Coarse sands and gravel, where found in a state of nature, are usually the most defective in organic substances of any description except indeed, that from their situation or climate they may abound in moisture, but under such circumstances they generally receive the wash from more elevated lands, bringing down with it no inconsiderable of the finer particles of earth mixed with many seeds, and much decomposed organic matter, by which means they are capable of growing plants from such deposit of seeds as may flourish in a situation congenial to their nature, to the exclusion probably of many others incapable of vegetation under the same circumstances.

Now of lands which have been under culture and become *exhausted*, we must consider what is implied in that term "that they cannot be made remunerative by culture;" but we believe there are, there can be, but few spots (in this country at least) which can by any means be *laid dry*, which will not become productive.

All plants must necessarily take something, as their food, from the constituent parts of the soil, beside what they receive from the atmosphere, which undoubtedly furnishes a large proportion.

We need scarcely argue that if we take a ton or a ton and a half of hay from the meadow, or an equal or greater quantity of straw* from the arable land, over and above the weight of the grain itself, say 25 bushels of wheat equal to 1500 lbs., or barley or oats in their several proportions, that we are not robbing the land of something, which something must be returned to the soil in some form or other, before it can be again *equally* productive.

Professor Thaeer says of wheat, that for every 100 parts of nourishment necessary for that plant, contained in the soil, 40 is carried off by the crop. This may be hypothetical as to exact quantity, but as a general principle it is undeniable that a large proportion of the amount removed in the crop is furnished by the soil.

That land which is unproductive for one crop, will raise one of a different description, is owing to the varied proportions of the different ingredients entering into the formation of different plants,—thus evidencing the necessity for a rotation of crops, and indicating the positive need of restoratives in the form of manures to meet the deficiency; so the bar-

ren soil on the coast of Peru, which does not contain a single particle of organic matter, consisting only of clay and sand without the slightest appearance of vegetation, is made (by the application of guano) to raise the finest crops of Indian corn, plainly showing that such manure contains within itself all the ingredients of which the soil is deficient, for the sustenance of that prolific and valuable cereal. If then, land which will not grow so much as woods, can thus be made remunerative, we ought to hear less about *worn out and exhausted* soils; it is ignorance, or bad management, or both, which is the farmer's bane, leaving out of the question (of course) unfavourable seasons, over which he can have no control.

Many facts the observant farmer has arrived at by experience, without the aid of science, by which he has been enabled to correct some errors, and avoid some fatal mistakes; but if he would make the best use of all his appliances, it will be necessary that he should become acquainted with the constituent parts of each plant and the proportion of the different ingredients entering into their formation, and also the capability of his land to furnish such ingredients, irrespective of the manure intended to be applied, he will then be able to arrive at the description of manure most beneficial, and the amount needed for the crop.

Manure may be defined to be any substance necessary for the food of a plant, of which the soil on which such plant is grown is naturally deficient; or, any matter necessary to enter into combination with substances already contained in the soil, rendering them better fitted to enter into the organization of the plant.

The light sandy, or coarse gravelly soils, are usually denominated hungry soils, not returning a produce at all equal to the amount of manure laid upon them. And this is easily accounted for, by the consideration of their total unsuitness (naturally) for the production of grain, especially in a climate where the heat during the summer is intense, the amount of rain which falls comparatively small, and from their texture so pervious to the sun's rays, that all their moisture is quickly lost by evaporation, and the plant withers at its source. Now to supply such a soil with a large proportion of nearly undecomposed barn-yard manure is an error, in more ways than one; first, it renders the soil still less compact than before, and consequently more liable to the operation of the sun and hot winds of a sul-

try season. Again, long strawy undecomposed matter is "in fact" no manure at all, it neither converts other elements of the soil into nutrition matter, nor is its presence needed, since it could only furnish an additional amount of one ingredient, "silica," for the formation of the straw, of which material the soil is already in excess.

A superabundance of any one element in the soil, however good in itself, will not promote the intention of the agriculturist; it is the just combination of the various ingredients which ensures success. There may be in the soil an excess of the richest material, which will prove equally fatal to successful production, as a vast deficiency of the same matter; true, the plant may be strong, vigorous, beautiful, full of sap, and apparently promising well; but what is the result? an abundance of straw, bearing a head which rarely arrives at maturity.

It is stated by one writer, that the best and most productive soil is that in which "the decomposable vegetable or animal matter does not exceed one-fourth of the weight of the earthy constituents;" and we should be disposed to rate this as a high estimate, and that such an amount is unnecessary for most crops, supposing access to be had to one or other of the fertilizing substances now in use as manures.

We find it impossible to close this subject without exceeding our ordinary limits, and shall therefore defer it until our next number, contenting ourselves for the present by stating our belief—

That sterility or barrenness can result only from the absence of certain materials, which may (in most instances) be supplied, or from the excess of other component parts, which can be either modified or removed:

That an abundance of material is already in existence for the supply of vegetable life to any extent, and that no continued creative energy is employed in such productions:

That these materials are within the reach of every agriculturist, and that science is leading the way to their attainment:

That a knowledge of the due and proper admixture and proportion of such materials, for the various crops, is necessary to successful cultivation of the soil.

Wheat harvest has commenced; there are some few excellent crops, but we fear they are the exception and not the rule, and we doubt whether the result generally will not be much below an average crop. Barley, which was not up until after the cold rains ceased, is looking well. Oats will be a fair crop, but there are but few really good fields of Spring wheat. We know of none at all equal to a field belonging to M. Cruso, Esq., on land reputed worn out this twenty-five years past.

* The weight of straw compared with bushels of grain varies from 100 to 200 lbs. per bushel.