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The Field.

Familiar Talks on Agricultural Principles.

VARIETIES OF SOIL.

The most careless observer cannot but have observed a great difference in the nature of soils. In one place after a shower, the dirt becomes very sticky and soon clogs the shoes, making it very unpleasant to walk about. In another place, a shower of rain sinks at once into the earth, and leaves only a look of moisture on the surface. Almost every one is familiar with the distinction between light and heavy soil,—or that between sand and clay. But there are peculiarities which do not strike casual observers, and these need to be understood in order to adapt a system of tillage to a particular soil. It is not however so easy as might be supposed, to classify soils in such a way as to comprehend all varieties, and make their characteristic features quite distinct and striking. They sometimes run into one another, so as to speak like the adjacent colours in the rainbow, and their qualities become mixed. As however the rainbow colours are easily distinguished at a short distance from the blending-point, so soils may be distinguished as one or other of the leading materials of which they are composed is found to preponderate. Soils vary in texture from coarse pebbly gravel or loose sand, to fine compact clay, and between these extremes there is ample scope for diversity. They not only differ in texture, but in some other characteristics, of which it is most important to take notice. Professor Johnston classifies soils according to their clayey or sandy proportions as follows:

1. *Pure Clay*; from which no sand can be extracted by washing.
2. *Strong Clay*, or brick clay; which contains from 5 to 25 per cent. of sand.
3. *Clay Loam*; which contains from 20 to 40 per cent. of sand.
4. *Loam*; which has from 40 to 70 per cent. of sand.
5. *Sandy Loam*; which has from 70 to 90 per cent. of sand.
6. *Light Sand*; which has less than 10 per cent. of clay.

This arrangement has some advantages, but it does not set forth all the varieties of soil in a way calculated to fix their distinctions in the popular mind, and perhaps for practical purposes, they cannot be more simply and comprehensively classed than under the following general heads:—SAND, GRAVEL, CLAY, CHALK, PEAT, ALLUVIAL, MARSH, and LOAM.

Sandy Soils have their origin in the disintegration or crumbling up of rocks, and they are white, grey, or black, according to the colour of the rocks whence

they were derived. The grains of sand consist chiefly of silica, and hence soils in which sand is the predominating ingredient, are called silicious.

Gravelly soils have also originated in the disintegration of rocks, but instead of the rocks having been crumbled into fine particles, they have been broken into small pieces, and these fragments have been tossed about and rubbed together by the action of water, until by mutual friction they have become smooth. Having been dispersed and carried about hither and thither by the action of tides and currents, gravel differs much in its qualities, being frequently mixed with various substances, organic remains, clay, loam, &c. There are rich gravels, and poor gravels, fertile gravels, and hungry gravels; their character being partly governed by the nature of the rocks of which they are composed, and partly by the substances mixed among them.

Clay soils consist very largely of alumina, one of the most abundant of the materials of which the earth's crust is composed, forming not less than one-fourth of its substance. In the formation of these soils, not only was mechanical agency exerted in the crumbling of rocks, but chemical combinations played an important part. Clay is a compound of silicic acid, alumina, and water. It also usually contains potash, soda, and lime. It forms a compact, fatty earth, soft to the touch, sticky in a moist state, and very hard when dry.

Chalky soils have been formed from rocks in which lime was abundant. There are very extensive chalk formations in the southeastern and eastern counties of England, the north of France, Germany, and the north of Europe. Calcareous soils, or those in which lime is a principal ingredient, are by no means uncommon.

Peaty soils consist of vegetable matter partially or wholly decayed. They are usually found in low, moist situations in which the mud washed by rains or streams has mixed with various vegetable substances, and through partial decomposition, a compact spongy mass has come to be formed.

Alluvial soils are formed by deposits of sand, loam, and gravel brought down by rivers. They are often very rich, being composed of a multitude of thin layers of mud, in which all sorts of fertilizing material is mixed. Sluggish rivers deposit these soils in the various valleys through which they flow, and near their junction with the sea. Fertile bottom lands have been formed in this way, and are capable of yielding immense crops, if properly managed.

Marshy soils are formed by the decay of animal and vegetable matter, but from their low situation they retain a large quantity of water. They are mines of fertility, but while full of moisture, their stores of wealth are useless.

Loamy soils contain a large proportion of decayed matter or *humus*. Woody fibre in a state of decay acquires a dark colour, and ultimately becomes mould. Loam contains a variety of ingredients, as

clay, sand, lime, in addition to humus. It is a loose, friable description of soil, easy of cultivation, and as to texture is the most desirable description of land for purposes of tillage.

Soils have the singular property of absorbing, retaining, and parting with the elements of fertility without materially altering their weight, bulk, or texture. They are fertile or barren, according as they abound, or are deficient in the organic and inorganic substances which enter into the composition of plants, and of which an account has been given in previous "Talks." From the fact that some of them have certain elements of fertility which are lacking in others, it is often promotive of improvement to mix one kind of soil with another. Thus clay improves a sandy soil, and sand improves a clay soil; muck or marshy earth improves loamy or sandy soil, and sand mixed with muck is beneficial. Special manures may also be applied in many cases to supply a lack of some article of plant food, which needs to be present to furnish the required nourishment to bring a profitable crop. A knowledge of the nature of soils is therefore very important. If I wish to raise a certain crop, it is very desirable for me to ascertain whether my land has the food in store upon which alone that crop can live and grow. By keeping land well manured with farm-yard dung, it is possible to provide a constant store of suitable food for all manner of crops. But by a judicious rotation, the same amount of manuring will go much farther, because one kind of plant will fatten where another will starve. It is not necessary that every farmer should be a skillful chemist in order to provide abundantly for the plants he grows. Attention to a few simple principles, will secure the result at which he aims without hard study or high scholarship.

How to Make a Concentrated Manure.

By a little attention, a manure may be produced which will possess an equal degree of fertilizing power with guano, or other expensive substances, and at a much cheaper rate.

Proceed as follows:—Construct your stables in such a manner that the urine from the stock, and particularly from horses, shall be all emptied into a large reservoir in the barn-yard. Into this excavation, put all the weeds, waste vegetable matters, &c., of your fields or kitchens, throwing over each layer, as it is packed in, a thin coating of the following composition, viz. sal-ammoniac, one part; and lime, two parts. This is to be sprinkled on each layer of weeds, &c., of six or eight inches in thickness; and upon this, or upon each of these layers, is placed a thin layer of earth. After the reservoir is filled, sprinkle over the top layer, from time to time, a thin layer of plaster (sulphate of lime.) This will prevent the evaporation of the ammonia formed in the mass. Next, into the reservoir so filled, let all the urine from the stock