NOVEMBER 1884

these circumstances, I shall introduce here the composition of two sandy soils analysed by Dr Vooloker.

	No. 1	No. 2
Organic matter and water of combination.	5.36	4 82
Oxide of iron and atumina	578	12.16
Carbonate of lime	25	15
Potash, soda, magnesia.	49	46
Phosphoric acid	none.	faint trace
Sulphurie acid	trace.	trace.
Chlorine	trace.	trace
Insoluble silicious matter (chiefly fine		
quartz sand with but little elay)	83.12	82.41

100.00 100.00

Both soils abound in quartz sand and are deficient in elay and lime. Number 1 contains positively no phosphoric acid, and less clay then number 2.

On land of this description, grain, roots, or grass cannot be grown without frequent dressings of manure, for in these soils all the more important mineral constituents which are required for sustaining a healthy and luxuriant vegetation are by the growth of white straw crops. Upon land rich in avail-

Now, it is clear, from observation, that these sandy soils are, generally speaking, liable to burn, if highly concentrated manures are applied to them. Hence, we gather that liquid manure should be amply diluted with water. It is, under ordinary oircumstances, the soil that furnishes to plants a considerable proportion of the mineral matters which are left behind on reducing them to ashes. As a rule, the manure, in addition to nitrogenised substances and other organic constituents, is required to supply those mineral matters which, like phosphoric acid and potash, are usually but sparingly distributed through the soil; for, as Dr Voeleker very sensibly says: the more common fertilising materials, such as lime, magnesia, sulphurio acid, silica, and even potash, are found in such abundance, that we need not care to replace them in the measure in which they are carried off the land in the different crops of a rotation.

There are a few soils where we can grow paying crops of roots, grain or clover, without restoring in the shape of manure the more valuable minerals, such as phosphoric acid; but where it is yet necessary to replace the nitrogenised foods of plants, which, it appears, is diminished in a high degree



MESSRS. HOWARD'S SHEAF-BINDING REAFER.

either absent, or are very deficient. Thus, No. 1. contains able mineral matters, purely ni rogenous or ammoniacal ma-no appreciable quantity of phosphoric acid, and No. 2. mere nure may be used with far more safety than upon soils defi-traces of it. Again, it will be noticed that lime, which in cient in available mineral food. The injurious effects of an smaller or larger quantities is contained in every kind of agricultural produce, occurs very sparingly in these soils, and that the percentage of potash and soda, in both, is far from what it ought to be to meet the wants of growing plants. Sulphurie acid is wanting. In short, both are poor soils that want frequent doses of manure to retain them in anything like a productive state.

Hence, we deduce the general rule: a liquid which is very poor in these fertilising constituents, when applied to land which contains already potash, lime, phosphoric acid, and other mineral substances required by plants, though possibly deficient in quantities, may not make any perceptible impression, simply because it does not materially increase the original store of the available substances in the soil; whilst the same liquid, when put upon land that contains no phosphoric aud whatever, and a much smaller proportion of lime, potash, &c, than is contained in the liquid manure, will produce a striking effect, inasmuch as the fertilizing constituents in the manure materially increase the store of plantfood in the soil.

excess of ready-formed ammonia or of nitrogenous matters ready to furnish ammonia on decomposition, show themselves nowhere more plainly than upon poor sandy soils. Daily experience in England warned me to use such stuffs very sparingly, though frequently, on such land. Hence, as I said before, on these soils, the liquid manure, always containing a considerable proportion of nitrogenous organic matters. as well as ready-formed ammonia, should be diluted with at least three or four times its bulk of water. There are many sandy soils, as we saw above, in which lime, &c., occur in very small quantities; and if such land be manured with a too concentrated description of liquid manure, the danger is that there will not be a sufficient quantity of available mineral food in the soil and the manure to counterbalance the injurious effects which an overdose of highly nitrogenous food is well known to produce.

Again, liquid manure is particularly well adapted for porous soils, because it penetrates them, when properly diluted, deeply and uniformly : a great advantage, since the porons nature of sand allows the roots of plants to penetrate