

etc., is much more gradually converted into nitric acid, and it may require many years for the conversion of the whole of it. The nitrogenous compounds of the soil itself are very slowly converted into nitric acid, but the soil yields a certain quantity every year.

When there is no vegetation and there is drainage from the land, or even when there is vegetation and an excess of drainage; nitric acid is lost by drainage.

In the case of permanent grass land, the soil is always covered with vegetation, there will be with it the maximum amount of nitric acid utilized by the crop and the minimum amount lost by drainage. Land without vegetation will be subject to the maximum loss of nitric acid by drainage.

The power of a growing crop to utilize the nitric acid in the soil is much diminished if there be a deficiency of available mineral constituents, and especially of potash and phosphoric acid, within the reach of the roots.

As the various crops grown upon a farm differ very much as to the period of the year of their most active growth, the length of time they may remain on the land and the character and the range of their roots, their capacity for taking up nitric acid from the soil is very varied.

The recognized exhausting character of grain crops is largely due to the limited season of their active growth, and the long period during which the land is bare, or there is little growth, and so subject to loss of nitric acid by drainage.

When salts of ammonium, or nitrates, are applied as manure, the chief, if not the only unexhausted residue of nitrogen left within the soil available for future crops, is that in the increased roots and other residues of the crops; and this is only slowly available.

When oilcakes or other foods are consumed by stock, the formation of nitric acid from the manure produced is slower, but continues longer than when salts of ammonium are used. When there is a liberal use of animal manures, an accumulation of nitrogenous and mineral matter takes place in the soil, and such accumulation is known under the term of "condition." Under such circumstances the fertility of the soil is maintained or it may even be considerably increased.

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The Farm.

DRAINING

(By the Editor.)

NOTE.—We have been requested, by a gentleman deeply interested in the farming of the Eastern Townships, to republish the series of articles on draining that appeared in the first volume of this periodical, 1890.

It is a remarkable fact, and one that is worthy of consideration, that in those counties in the East of England where we find the earliest attempts at thorough-draining, the practice of this remarkable art remained unimproved, and was executed in a purely empirical manner; while over the rest of the country, men of really scientific attainments were conducting the operations, and producing ten times the beneficial effect with no additional outlay.

I observe, in an article written some time ago, by a Canadian gentleman well skilled in agriculture, that a drainer was imported at a great expense from Britain, and a large subsidy paid to a brick-maker to embark in tile-making; and an idea crept into my brain, that it would have been as well if, before importing the man, the importers had settled in their own mind what he was to do. I have no doubt he thoroughly understood his business at home: the climate, the soil, and the rain-fall must, if he had gone to work here, have soon convinced him that his pre-conceived plans would need alteration.

I do not speak without having not only thought upon the subject deeply, but also followed out my thoughts in practice. I have drained several hundred acres of land on my own account, and inspected the drainage of several hundred acres more, besides having constantly watched the operations of Parkes, Morton, and other well known engineers employed to superintend the works under the Commissioners of the drainage-loans in England.

I began with bushes, next went to stones, then to horse-shoe tiles and soles, afterwards to pipes, and ended with the most perfect of all, pipes and collars. I have drained all sorts of land: light quicksands, heavy London clay, and loam on gravel.

All depths, too, I have worked at, from 20 inches, to 4 feet 6 inches, and occasionally as deep as 9 feet, for springs.

I know the cost pretty well, and I know how