

no doubt an improved practice that is much needed and of great importance. But even here caution becomes necessary, lest by allowing dung too freely to ferment, without the requisite amount of moisture being present, a large amount of its manuring power be dissipated in the form of *volatile* products, instead of only *soluble* matter. Horse dung when kept dry and in large heaps, is peculiarly liable to ferment to such a degree as to render it a light, dry, and almost useless mass. The best plan, for general purposes, is to mix together the manure of the different kinds of animals kept on the farm; admitting as much air and moisture as experience shows to be necessary in accordance with atmospheric temperature, for sustaining the requisite amount of fermentation. The cold of our winters is usually too excessive to allow of rapid chemical changes taking place in manure, either in the yard or in the heap; but great waste often occurs during a thaw, or heavy rains, when much of the soluble salts is wasted in the way before described.

In proof of this waste the following experiment made by Professor Voelcker, chemist of the Royal Agricultural Society of England, will be deemed conclusive. He took several cart loads of dung from the stables of the cows, mixed them thoroughly, and analysed a portion, that he might be able to understand whatever changes might subsequently take place. The mass was then divided into several equal parts, each of which was treated differently from the others, and after some months analysed again. The result was, that the portion kept under shelter had lost scarcely anything, but that which was exposed to rain, &c., had lost two-thirds of its most valuable ingredients, potash, ammonia, and phosphoric acid. And that this immense loss was due to the washing of the rain, and not to evaporation, was proved by frequent examinations of the air immediately around those parts most likely to give off ammonia, the only one of the three ingredients named which is at all volatile; and also by the analysis of liquid which flowed from the heaps.

Farmyard manure exerts a double action in the soil; that is, it produces *both a mechanical and a chemical change*. Under the former agency we find it giving stability to light sandy

soils, and making them more absorbent of moisture,—rendering tenacious clay soils more open and friable in their nature, and thereby admitting the freer passage of the rain and atmospheric air, as well as promoting the decomposition of these soils, and thereby rendering them more fertile. For dung to act mechanically in rendering the soil more open, and to overcome its tenacious character, it should be applied in what is termed its green state, that is not too much rotten. Ploughing deeply tenacious clays, incorporating with the soil a quantity of rough manure, tends to open their pores, so as more readily to admit air, and light, and heat, ameliorating agents of the greatest value. On soils, however, naturally light and porous, dung should be thoroughly decomposed before it is applied.

Farmyard manure exercises another group of influences of the greatest moment in the economy of vegetation in relation to the soil, which comes within what is designated *chemical action*. Here we have powers quite distinct from the former, that is the *mechanical*, which relates principally to the weight and tenacity of the soil, while the chemical powers supply the necessary ingredients for the growth and maturity of the cultivated crops. It is, therefore, in their combined action that the most desirable results become manifest. It is, however, worthy of inquiry, whether or not the use of fresh dung for stiff land, and rotten dung for porous land, is supported and confirmed by the chemical character of dung? When fresh dung is used upon stiff land, we find that the decay which then takes place acts upon the land, and renders the dormant ingredients of the soil active, and thereby converts matter which could not nourish a plant into valuable food for vegetation. It also imparts to the soil a beneficial warmth, which is favorable to germination and vegetable growth. In addition to this, the absorbent powers of the soil seize and return the products of this fermentation of the dung, and secure them until required by the growing plant. In the case of a sandy land, the circumstances, as well as the powers of the soil, are totally different. The porous character of the soil is decidedly unfavorable to the power of retaining manure; and consequently we cannot look upon such soils as safe guardians