

will also combine with the ammonia and prevent its escape. Gypsum is generally recommended for the purpose; that substance by its decomposition, entering into new companionship with both the ammonia and the carbonic acid gas, the resulting compounds being sulphate of ammonia and carbonate of lime. Gypsum is, however, very sparingly soluble, and it must be in solution in order that any such changes may take place, so that its efficacy in this respect is less than is usually supposed; nor is gypsum available only in very few cases, unless at very considerable cost; matters already existing on the farm are evidently to be preferred when the required purpose is attained by their use.

Before urine is applied to the land, it may be combined with various other fertilizers to increase its effects; but these should not be bulky, so as materially to add to the difficulty of applying it. The Flemings judiciously add rape cake, which, from its composition, is well suited for the purpose; that might be similarly applied in this country. All succulent vegetable matter, such as weeds from the garden and fields, may also be added to it before fermentation with the best effects.

The annual value of the urine of a cow is estimated by the Flemings at 2l., and this sum is, in fact, frequently paid in Flanders for it. A portion of the urine is, no doubt, at present conveyed to the fields in this country along with the solid manure; but it is not too much to suppose that, taking the whole of the United Kingdom into account, one half of the urine produced is allowed to go to waste. When we recollect the number of cattle contained in it is assumed at 8,000,000, without taking any of the other domestic animals into consideration, it will be seen what an immense loss is sustained by such waste. The urine of a cow annually contains little less than 10 cwt. of solid matters, equal in value, if not superior, to an equal weight of guano, which, at the present price of that article, would be worth 4l. 10s. Where the number of cattle kept on the farm amounts to 50, the salts contained in their urine are thus seen to be worth upwards of 200l. per annum—no inconsiderable sum. It is, of course, impossible to tell what proportion of this goes to waste, but, as before observed, it is probably too much to assume this at one-half.

Several methods have been adopted with a view of rendering the valuable ingredients of urine portable so that some portion of the vast quantities produced, in large towns might be saved. Thus the urate which is announced in the manure market is produced by the addition of one-seventh the weight of the urine of powdered gypsum, allowing the whole to stand for some days, when the liquid is poured off and the powder dried. This powder, it is said, contains the urea; but it is obvious that the salts in solution are entirely lost by this method of treatment. The Messrs. Turnbull of Glasgow, add diluted sulphuric acid to the urine as the ammonia is formed, after which the whole is evaporated to dryness, the resulting powder being sold as a manure, and a most efficacious one it would no doubt prove, if the process was so conducted as to retain the ammonia, the only volatile ingredient.

The application of urine is valuable to every kind of crop, especially when applied at an early stage of its growth; but it is to be observed that it is not equally advantageous when applied before the crop is put into the ground, the fertilizing matters in that case being dissipated before advantage can be taken of them. On the lighter class of soils it is of much greater value than on those of a clayey nature, being, in the latter case, subject to a greater degree of evaporation before being absorbed and rendered available. When applied to meadow and grass lands,

it not only causes an increased produce, but also tends to the destruction of the mosses which are so injurious in lands long in grass.

Notwithstanding the advantages resulting from the application of urine separately from the more solid animal manures—and they are confessedly very great—yet, in some cases, it is believed an undue importance has been attached to the course of management when the urine and other liquid matters might have been advantageously applied in conjunction with the soiled manures. In cases where the supply of litter is deficient in proportion to the number of animals which can be profitably maintained, and where the urine will, of course not be all absorbed, it may, and, in fact, must be, separately collected and applied; but on all the heavier class of soils, on which root crops are not extensively cultivated, it will rarely occur that an excess of moisture will be present, especially when due precautions have been taken to guard against the admission of rain water, which has already been seen to be extremely injurious. Indeed, in such soils one of the chief difficulties hitherto has been to cause the decomposition of the excess of straw produced in proportion to the number of animals which could be maintained; grain is the chief product of such farms, and when this is the case the entire of the urine will be absorbed by the litter which is consequently so abundant.

As improvements in husbandry advance, and the cultivation of root crops becomes more general, the proportion of liquid matters in the farm yard will, however, be on the increase, and in whatever manner this may be appropriated, a liquid manure tank is essentially necessary on every farm. Composts of various kinds will always be in process of collection on every well-kept farm, consisting of the scrapings of roads, scourings of ditches, &c., to which the contents of the tank will form a valuable addition. During the preparation of the land for green crops, quantities of weeds will have been collected, which, when formed in a heap in a convenient situation, and repeatedly turned, liquid manure from the tank being added at each turning, will thus form a compost little inferior to farm-yard dung.

Having now brought this department of our subject to a conclusion, a few general remarks may not be out of place before entering on the consideration of the portable manures. The question as to what extent the latter may be substituted for farm-yard manure has of late been much agitated among the farming community, although we do not conceive it can be fairly entertained for a moment. The dung of the farm yard is of home production, and could a sufficient supply of it be obtained, no good reason would exist for the use of any of the other manures at all, and the use of them in any case must be regulated by the extent to which the home supply is deficient. The portable manures are unquestionably of vast importance, and their introduction has formed a new era in the agricultural annals of the country; but in the eagerness to render them available to the fullest extent, it is to be feared that proper attention is not in the majority of cases paid to increasing the home supply, as being of comparatively less importance than before such auxiliaries were available. Without the aid of these auxiliaries, the extent of land which can be profitably cultivated is regulated by the supply of farm-yard manure which can be produced. They, have, however, enabled the farmer to bring into cultivation lands which otherwise he could not have done, and every addition to the cultivated produce of the farm also increases the sources of fertility for the production of future crops. The progress of improvements hitherto has not tended to lower the value of the dung of the farm yard, nor can