

nitrogen of the atmosphere. Nevertheless, the fertilizer manufacturers still seem to be under the necessity of supplying this element in considerable quantity in their goods, and of charging for it. In the case of the mixed fertilizers, this extra charge varies from \$8 to \$14 per ton, which the farmer must pay if he purchases, and which he can readily save in his own stables, or produce upon his own farm.

Nearly the whole of the nitrogen in the fodder fed to farm stock is to be found in the excreta of the animals, and one half of it is contained in the urine. It is further well known that 95 per cent of the potash contained in the food of cattle and sheep may be recovered by carefully saving the liquid manure only. It has, however, been ascertained that stable yard manure experiences considerable loss of its fertilizing constituents, but more especially of nitrogen, when left to itself in the dung heap. According to the experiments of Wolff this loss amounts to 55 per cent of the nitrogen contained in fresh manure from horned cattle. The later experiments of Heiden and Holdelleiss place it at 23.4 per cent. These results were obtained when ordinary reasonable care is taken of the manure, but give no data for estimating the loss which occurs when, as is very frequently the case in Canada, the manure is treated with the grossest neglect. It is safe to assume that, generally, 50 per cent of the nitrogen contained in the barn-yard manure of this country returns unutilized to the atmosphere, or is otherwise lost by careless treatment. Supposing that an average quantity of 36,000 lbs. is produced in fresh condition annually by each animal, and that it contains 0.4 per cent of nitrogen, it follows that a loss of 72 pounds of nitrogen, worth \$8.64, takes place for each head of cattle. This loss can be prevented by daily strewing the stables with 2 lbs. of ground plaster for each animal, which at once prevents any smell of ammonia from arising in the stable. The quantity prescribed means 700 lbs. or a cost of about \$2.50 annually for each 1,000 lbs. live weight, but, by adopting this plan, the farmer would to a great extent be relieved from the necessity of purchasing the nitrogen of artificial fertilizers.

In a pamphlet published by Vieweg in 1859 entitled "Ein Pfund Stickstoff kaun einen Groschen," which may be freely translated "a pound of nitrogen for a penny," Dr. Meyer-Altenberg maintained that ground gypsum is the very best preservative of barn-yard manure when applied in the stable, because it secures "certainty and completeness of effect, ease of execution, and the lowest possible cost." He further described the effect of its application on the domain of Beberbeck in Hesse, and other impoverished farms, showing that it is possible to bring such into a fertile condition, without the purchase of manure or fertilizers or feeding stuffs, excepting a little straw for bedding and oats for the horses.

TREATMENT OF STABLE-YARD MANURE.

Dr. Meyer-Altenberg, in the little work above mentioned, takes care to point out that the use of gypsum, without subsequent careful treatment of the dungheaps, does not give the desired effect, and he dwells on the importance of having the manure thoroughly trodden down, and made as compact as possible. This is also shown in Dr. J. König's prize essay 'How can the farmer preserve and increase the stock of nitrogen on his property?' (Berlin, 1887.) In a special chapter of this work the author discusses 'The evolution of free nitrogen during the fermentation and storage of stable manure,' describes the experiments which were made from 1860 to 1885 regarding its treatment and gives finally the results of the discussion from which the following sentences may be translated with advantage:—

1. In the decomposition of nitrogenous substances of every nature a loss, more or less considerable, of free nitrogen takes place.
2. This loss is the greater the more the atmosphere has access to the decomposing mass.
3. Too much moisture is just as hurtful as too little. Stable manure requires such a degree of humidity as permits its components to lie close to each other.
4. The addition of substances which fix ammonia (such as gypsum, kainite and kieserite) prevent or reduce the loss of nitrogen. These substances are, however, of little