

trogen, one-half of the phosphoric acid, and one-third of the potash, over the manure derived from the ordinary dung from fairly managed farms. Of course, as we saw in the previous article, the age of the cattle, etc., producing the manure has something to do with its quality, but food and care in its preservation are the principal things regulating it.

*Sawdust*, as an absorbent of the urine, is excellent, but apt to produce a rather uncheckable degree of fermentation in the heap. Peat, or dry muck, is also good, and aids in retaining the soluble nitrogen and potash of the manure.

And now comes, to us especially, a very interesting part of the professor's evidence: on the value of *gypsum*, land-plaster (sulphate of lime), as a fixer of ammonia in the stable and mixen.

Somewhere about 1845, Philip Pusey, Member for Berkshire, England, and President of the Royal Society of Agriculture, in a review of the progress of farming, in the Magazine of that body, mentioned the then general opinion that land-plaster, or gypsum, scattered over the bedding of cattle and horses in the sheds and stables, would prevent the escape of the carbonate of ammonia. Mr. Pusey, a scientific as well as a practical farmer, entered into a disquisition on that point, too long for our space, but came to the conclusion that, although gypsum would indubitably act in the above manner where the matrix, if we may be allowed the word, was in liquid state, that where the question concerned the bedding of stock, a comparatively dry substance, its effect would be nugatory.

In 1888, Dr. Hoskins, then agricultural editor of the *Vermont Watchman*, in reply to a question from us, stated that he had no faith in the absorption of ammonia by a dry substance like ground sulphate of lime (gypsum).

In, or about 1897, Dr. Girdwood, professor of chemistry at McGill College, Montreal, in reply to the same question, told us that Mr. Pusey was right in his opinion that gypsum was useless for the purpose of fixing the carbonate of ammonia in stables. The best thing to scatter of the floor and bedding being what the French call "terreau," that is, mould, or dry bog-earth"; the action of which, we suppose, would be more mechanical than chemical.

Said Professor A. P. Sharp, of Baltimore, in the *Country Gentleman*, in 1895; "One of the popular bubbles, that I think worth pricking, is

the belief that plaster is decomposed by ammonia. (Plaster, we need hardly say, is a compound of lime and sulphuric acid). For this reason, farmers are advised to use it on their manure-pile to fix the ammonia, by setting free the lime and uniting with the sulphuric acid. Such absurd statements are published and repeated in scientific lectures. Every schoolboy ought to know that lime and sulphuric acid are too strong friends to be separated by such a fickle, short-lived gas as ammonia.

"I will say that I am not ignorant of the fact that from a solution of sulphate of lime (which is slightly soluble in water), by the addition of a solution of carbonate of ammonia, owing to the insoluble nature of carbonate of lime, a mutual change takes place; carbonate of lime sinks and sulphate of ammonia remains in solution (precisely Mr. Pusey's idea published just 50 years ago!). But this is not the condition when plaster is spread over a manure-pile with escaping ammonia"; or as we may add, over the floor and bedding of a stable.

Again, in "Answers to correspondents," in the *Country Gentleman*, of 1897, we find the following: "Can land plaster be economically used as an absorbent in cow-stables? R. F. P.—Answer: We do not think it can. You could better afford to draw common earth, or, preferably, sods or leaf-mould, into the barn, when the weather is dry at midsummer, and store it for use in winter than to buy land plaster."

On the other hand, Professor Macfarlane, the Government analyst at Ottawa, holds that ammonia in stables is fixed by the use of plaster. We have, unfortunately, mislaid the reference, but that is the gist of his statement, and our memory is still pretty trustworthy.

Lastly, in defense of our position, we beg to quote Professor Shutt's words at page 15 of the pamphlet containing his evidence before the Agricultural Committee of the House. We condense it as much as possible, as it is rather long for these pages.

Three tons of horse and cow manure were mixed, in equal proportions, and allowed to ferment alone; and an equal weight of the mixture, with 50 lbs. of gypsum to the ton, were also submitted to the same treatment. The two lots were put into separate bins on July 15th, 1897, and were allowed to rest undisturbed till the 15th November. They were both moistened from time to