

sieving and subsequent pounding of the selected lumps; and, secondly, to sow it in a manner which will secure its distribution throughout those parts of the soil *where* the grain is sown; to effect this purpose, it on grain crops should always be sown with a drill. It is apparent that Peruvian guano, on account of its containing nitrogen not alone in the most concentrated state, but also in a form (that of the volatile ammonia) which renders it extremely volatile, is more liable to loss than any other of the manures commonly used; and that, therefore, our particular attention should be directed to the ways and means by which its full effect may be secured. To this end, a variety of substances has been proposed for admixture with the guano, and among them especially plaster of Paris. I do not know from what source this recommendation was derived; but the fact is that this substance is extensively used by farmers with the certain belief that its action on the guano is always most beneficial in preventing any escape of ammonia from the same. This is, however, altogether a mistake, and the more necessary to correct, as such a belief may induce the farmer to neglect the taking of other measures which really serve the purpose.

Plaster of Paris, as we know, can only act in the manner above ascribed to it, when a sufficient quantity of water is present to bring its chemical affinities into action; in this case, plaster of Paris exchanges its constituents with those of the volatile carbonate of ammonia, arising from Peruvian Guano, and the result is the formation of sulphate of ammonia, a salt which really contains the volatile element in a fixed combination. In the dry state, on the contrary, plaster of Paris will exercise no influence whatever in fixing ammoniacal compounds, my own practical observation showing that the quantities of ammonia which escape from dry guano amount to the same before and after its admixture with plaster of Paris—and this is exactly the state of things in a dry mixture of plaster of Paris and Peruvian Guano. If it should be advisable to use plaster of Paris along with Peruvian Guano, and this is, indeed, *very* often the case, we have to expect from such an admixture no other material action but that to meet certain deficiencies in the soil which Peruvian guano *alone* cannot supply. Another substance which has been proposed is common sulphuric acid. This substance, however efficient it may be in binding and retaining the ammonia, is not alone costly and inconvenient to handle, but will act, besides, injuriously on the mechanical condition of the guano. It bakes it, forms it into lumps of smaller or larger size, and thus renders it unfit for being properly sown. There is, in fact, but one substance which, if properly mixed with this guano, will in every respect answer the purpose in question, and this substance is soil itself. It has already been remarked that water which has been saturated with ammoniacal salts, if suffered to filter through soil,