

of the average composition in our market, say containing 14.50 per cent. of ammonia—that is, fourteen and a half pounds in the hundred; now to fix this quantity of ammonia there will be required 73.04 pounds, say 73 pounds, of pure gypsum, because it will take 73.04 pounds of pure gypsum to furnish 33.08 pounds of sulphuric acid, the quantity necessary to fix or to convert into sulphate of ammonia $14\frac{1}{2}$ pounds of pure ammonia.

It will be seen from the above how important it is for the consumer to know the composition of his guano, in order to mix with it the requisite quantity of plaster to preserve its most valuable constituent, for without a proper material is used and in the proper quantity, loss is always liable to occur. I will add one practical caution here. Gypsum as it is frequently met with in commerce is not perfectly pure. This cannot be expected. It sometimes contains not more than fifty per cent. of pure gypsum; usually, however, the average is about 85 per cent., and therefore larger proportions than those I have mentioned must be used. I therefore advise in practice that an equal quantity of plaster and Peruvian guano be always mixed thoroughly together, as by this means there will be more certainty of having enough to fix all the volatile matter in the guano, the excess of gypsum, to say the least, being worth but little and doing no harm. Guano, when *immediately* applied to *some soils*, does not require any thing to fix it, that being done by the soils themselves; but the purchaser cannot know the soils that will do this, and therefore should always use plaster with his guano.

This mixture should be made as thorough as possible, as thereby the beneficial results will be much more certainly attained. With Patagonian guano a much less quantity of gypsum should be used than with Peruvian, as it contains much less of volatile matter to be fixed. With this variety practically about 20 pounds of gypsum to the 100 of guano will be all that is required. It is more valuable for its phosphates than for its ammonia; but I surely would not advise persons to buy it at its present price of from \$36 to \$38 per ton. The same amount of valuable matter can be obtained cheaper from other sources. I may here lay down a general practical rule, which is correct enough for all practical purposes, and that is: for each per cent., for every pound of ammonia in the hundred pounds of guano, six pounds of gypsum should be used.

All these facts and experiments show how necessary it is to have an inspection which shall exhibit the quantity of valuable matter in this article. It is necessary in order to protect the purchaser from loss; it is necessary in order to enable him to make experiments for future guidance as to the best quantity to be used; it is necessary in order to enable the purchaser to mix the proper quantity of other material to preserve its value when bought.