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## THE MANUFACTURE AND APPLICATION OF ARTIFICIAL MANURES.—BY MR. SMETHAM.

(Continued from page 139.)

All the valuable constituents of guano are in a form readily available, but the condition is sometimes unsuited for sowing and the quality, moreover, varies considerably. Several large firms, have, therefore, undertaken the manufacture of dissolved guano, *i. e.*, guano treated with sulphuric acid, and send it out at a guaranteed strength. This is a decided gain to the farmer—who is thus protected against the fraudulent impostures of some dealers who, keeping to the letter of the law, sell inferior articles at high prices as pure Peruvian Guano. The credit of first introducing this form of manure into England is due to Messrs. Ohlendorff & Co., of London.

There is also in the market a class of so-called phosphatic guanos, in which the phosphoric acid exists as dibasic instead of tribasic phosphate of lime. To convert these into soluble phosphate only half the quantity of sulphuric acid is required, as to convert the ordinary tribasic phosphates, and consequently products of high quality are produced, which find their way into the market as phospho-guano, biphosphated guano, &c.

In conclusion I must express my indebtedness to my friend Mr. H. H. R. Shepherd for the kind assistance which he has given to me while compiling this paper.

Mr. King drew attention to the fraudulent manuring mixtures that are palmed off on the public. He had lately bought some manure as superphosphate of lime. Shortly afterwards the agent came to say the wrong manure had been delivered. Being a little suspicious, he had some of the lumps gathered off the field (it had been sown) and analysed, when it was found the manure was worth about £4 per ton. He had contracted for a quality at £12. He told the company from whom the manure was bought that they could take it off the ground if possible, but he was certainly not going to pay for it; he then had some good manure applied, and all he could say was that from the two he had an excellent crop of oats. Now he ventured to say that if he had mentioned that he was going to have the manure analysed he would never have heard anything as to the wrong delivery. Mr. King further stated that to show how valuable the assistance of the analyst was to a farmer, that on another occasion he thought potash would be capital stuff to put on a particular field, so he put some down and some time afterwards found on submitting some of the soil to Mr. Smetham for analysis, that there was enough potash on

that ground, in 6 in. depth, to grow crops for over three hundred years. He thought the information imparted by papers like the present was extremely valuable, and that if there were some government standard for regulating the sale of manures a great deal of good would be done. He thought that unless farmers were careful to make progress that not only would America and Canada be supplying us with general agricultural produce, but we should be getting beef from the River Plate, especially as refrigerating appliances were becoming so perfect. It seemed extraordinary that while in England we have about one sheep per head of the population, in Australia they have thirty-five times as many per head; altogether we have 23 millions and they have 70 millions. It seemed to him that the value of land must largely go down unless Mr. Smetham or his chemical friends could give us some assistance in obtaining better results than have yet been obtained.

Mr. CHANTRELL said the subject of manures had been frequently brought before the Society, and especially in connection with the treatment of sewage and disposal of town refuse. A number of limited companies had been formed to carry out various ingenious schemes, duly patented, all of which he believed had ended in failure. In his own case he had brought two before this Society, in which the deodorising powers of charcoal was the main feature. As an old and successful patentee of apparatus for the revivification of animal charcoal for the use of sugar refiners, it was only natural that he should have great faith in charcoal.

Peat Charcoal was the feature of one company and Carbonised Street Sweepings Charcoal that of the other, and it is of this latter he would say a few words.

The wonderful properties of charcoal have been long known and admitted amongst sanitarians, but the difficulty has always been the procuring of it, at a very cheap rate.

In his studies as a microscopist years ago, he had been led into an investigation of garden soil (amongst other substances) in studying the lowest forms of life, believing that he should find in the substance, called by the agricultural chemists "humus," find similar organisms to those found in vegetable decompositions, and he was right in this conclusion: he found the familiar amœba and numerous other organisms. It was these facts convinced him that garden soil would, when carbonised, produce a good charcoal.

It was then that the idea suggested itself that street sweepings (town refuse), if carbonised, would make the cheapest of all charcoals. After a number of experiments, he satisfied himself that this would prove the universal charcoal desired. A patent was taken out by him, and a company formed, arrangements were made with the Corporation of Salford for the use of a building belonging to them at their Ordsall Lane Manure Depot, in which to erect the carbonising furnaces and carry on the manufacture of charcoal manure, the corporation supplying the company with the street sweepings for carbonisation, and the excreta from the pails on very reasonable terms. The process was a very simple one, the street sweepings were passed into the self-feeding revolving retorts which conveyed the contents