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AGRICULTURAL CHEMISTRY.

[The following are extracts from a Lecture recently delivered at Glasgow by Professor Johnson.]

He had said it must contain the same substance of which common salt, gypsum, &c., were representatives; and if they had all these, the manure would make any soil fertile, with the exception of those in in which some noxious ingredient existed, and which must be got rid of by the operation of a different process. Did farm yard manure, then, contain all these things? This, they must remember, was the great staple by which the corn crops of the country were raised; and many farmers believed that if they had this kind of manure it was unnecessary that they should have anything else. Now, if they allowed all, or the greater part of its liquid properties to run off, or be washed out by the rains of heaven, then they might lay down load upon load without producing the desired effect. It therefore did not contain all that was required. Undoubtedly the crops contained these ingredients but, then, to be useful, they must be given back in the same proportions in which they were taken off; and this he he had stated, could not be the case. Did bone then contain all these things? He need scarcely detain them by stating that this manure had now been introduced over the greater part of the kingdom, and had been productive of the greatest blessings. They had fertized tracts of country, which formerly were all but inaccessible; and from their portability—from the small amount of labour necessary to convey them from place to place—they had produced crops where formerly the reaper had never been. Bones, then, contain out of 100 parts the following substance:—cartilage or grissle, which became glue, 33 3 per cent; phosphat of lime 57.4 prcent: phosphate of magnesia, 2 0; carbonate of lime 3.9; soda with a little common salt; 3 4. Now were these ingredients all which the plant wanted? Let them remember the saline particles necessary, and they would find that there were a number of things requsite which were not supplied by bones; and they might readily see that by repeatedly applying bones they would not be able to keep the land constantly fertile; nor did they always produce those splendid crops of turnips which they had formerly given. They must therefore take a rotation of bones or introduce something else along with it. There was one method of using bones, in conjunction with another substance which had been productive of extraordinary success in raising crops of turnips. The process was this. It was to dissolve the bones in sulphuric acid, or common oil vitrol when it became a kind of paste, and was allowed to stand so many days till all the particles of bone disappeared, and it became a pulp—a thick kind of glue. It was then mixed with earth, and became so dry that it could be put on the soil as dry manure, either as top dressing or along with the seed. He doubted however, whether the same good crops would always attend this kind of manure which had been produced at the outset. Let them look at the cartillage of bones and see whether and how it acted as manure. If they allowed this cartillage to ferment or decay, it gave off ammonia, and entering into the plant produced the nitrogen so necessary to its existence. It was therefore, undoubtedly, a manure of great value. (Hear.) He would now come to another manure, which though recently introduced, had already become of the greatest consequence in this country—which had already conferred great benefit on agriculture, and wh ch, as he would detail to them, contained a great many of those substances so essentially necessary to the existence and growth of the plant—he meant the new manure called Guano—(Hear, hear and applause.) In connection with this subject he might state that he was not aware of any circumstances which indicated more clearly the connection which exist betwen the great interests of the country—maritime, commercial, and agricultural, than the facts which were drawn from the importation of bones from every part of the world during the last 20 years, and more recently the large importations which had taken place in guano—a trade which gave a fair return to the merchant for risk and enterprise, which afterwards benefitted the farmer by increasing his crops, and through the farmer benefitted the country at large.

In this point of view there was hardly anything more striking than the facts connected with the importation of guano, and particularly with the guano from the coats of Africa. They all knew that it was a common saying in connexion with agriculture, that the man who made two blades of grass to grow where only one grew before, was a great benefactor to his country; but he would ask, was not the man, or class of men, who enabled them to grow thousands of quarters of grain by means of fertilizers which they did not formerly possess equally a benefactor or benefactors to their kind? (applause) And while they have thus by their industry and enterpise and by fair and honorable tryffice, obtained the means of elevating their status in society, they are also the instruments of producing a greater amount of food for the people. But while he held this opinion, he was, at the same time, desirous that they should not make too much money at the expense of the farmer or of the public—(a laugh)—while he freely granted them a fair profit, he did not wish them to have too much; for he wished to see guano as cheap as possible to the farmer and corn as cheap as possible to the people. He would bring before them the principle on which the value of guano depended; and, with this view, he would explain the points upon which certain kinds of guano differed from each other, and how far the agricultural value of each might be ascertained. The word guano was an old term; and one which had been imported into this country from South America. It was now, and had been long given by the Peruvians to the dung of sea fowl, which, from the remotest era, had been gathered on certain islands on their coast, and was still represented by the deposits collected on the rocky promontories of South America. They were all aware that many of the islands upon the Scottish coast were frequented by innumerable clusters of sea fowl; but ther droppings did not remain there. The frequent rains which fell in our variable climate was the obstacle to the accumulation of this kind of manure, for by this means their valuable particles were soon washed away and disappeared. But for 500 or 600 miles on the coast of Peru and Bolivia scarcely any rain fell, and the droppings of millions on millions of these sea fowls had been allowed to accumulate there in deposits of 70, 70, and 80 feet deep, wherever the birds had pemanently settled. The value of this substance was well understood by the ancient Peruvians, and so highly was it estimated, that the various islands along the coast, such as Chincha and others, were each alocated to a separate track of country, the inhabitants of which drew the guano to grow their crops from a certain island, and no district of country was allowed to obtain the manure from any part but that specially allotted to it. Persons were regularly appointed to look after the birds, and it was an offence punished with loss of life for any person of kill one of them—so satisfied were the Peruvian rulers of the necessity and importance of preserving and husbanding this means of raising their corn. At the present day, this substance was not only employed upon the coast, but it was caried on the backs of mules to vast dstances along the ridge of the Cordilleras, for the purpose of fertilising the inland soils. After the conquest of Peru by the Spaniards, the birds were destroyed in great numbers; and while the writers of that day complained that the quantity of the guano was much diminished they looked forward with painful forebodings to the time when the usual means of fertilising the country would no longer exist—for it followed that if the birds were decreased in numbers their deposits, must be less in a corresponding degree. The kinds most valued there were the recent deposits, particularly those which contained a larger amount than was found in the brown guano sometimes brought to this country. Millions of these birds still frequented the islands of Chincha, into some of the hollows of which their deposits lay to a great depth, but in other cases it was not thicker than 15 inches. Notwithstanding however, the immense extent of droppings still continued, the quantity was said to have greatly diminished from its extent in former times. No rain fell, as he had stated, in localities—the strength of the manure was therefore well preserved, and the smell of the fresh guano was so strong that it could he perceived on ship board at the distance of 15 miles from the islands. The meeting would therefore understand that the recent guano was the most valuable, and this was the kind which the Peruvians themselves were most desirous to obtain. Though the guano, as he had observed, might well be supposed to exist on our own coast it was not found there, from reasons which he had already mentioned. Still a reasonable hope was entertaned that it might be found on other coasts, which were similar to Peru, viz.—were no rain fell; but it was not less than two years ago that deposits had been found in other parts of the world—desposits, from the effects of which he argued the most beneficial effects to the agriculture of this country.

He was enabled, by the courtesy of the Messrs Downie, of this city, to exhibit a map, representing a portion of the coast of Africa where guano of a very valuable kind had just been found; and in connexion with this subject might state, that the enterprise of these gentlemen was a credit to themselves and to the city of Glasgow and though he did not hope that they should obtain an exorbitant profit, still they were justly entitled to a fair and remunerating return. This was just one of the cases to which he had alluded, mutual dependence of commerce and agriculture; for while the enterprise of these gentlemen would be profitable to themselves, it could not fail, at the same time to be beneficial to the farmer, and to the public generally. (Hear, hear.) [The Professor then explained, from the map on the wall, the position of the African guano islands.] They would observe the bay of Angia Pequena, and the islands which it contained. To these islands the penguines resorted in immense numbers, and there guano had accumulated for ages, and was found in large quantities.

To the north they would observe another island in Elizabeth bay. This was Ichaboe, where large deposits were also found, and it might be of more interest in their eyes, on account of being the place from which guano had been recently imported into Glasgow. In that island the deposite, he believed, was 70 feet in thickness, but he was not aware of the extent of ground which it covered. On this coast little or no rain fell, and hence the reason why it might be compared to Peru. The winds, however beat strongly along this coast, and those parts, therefore which were most exposed to the sea breeze would be more acted upon than others, and the deposite might thus lose a portion of its value. They would see, for instance, from the form of the bay of Agra Pequena, that the tidal wave must set in upon it with great strength. Ichaboe was also much exposed to the action of the winds, but the exterior was of course more exposed than the interior of the island; and, therefore, on the exposed sides of the island they would have a larger portion of water mixing with the deposits.—Following out this view, Mr. Downie accounted for the good quality of the guano which he had imported by stating that it had been lifted from the inner part of the island, where the deposit was well sheltered from the sea. It was of vast consequence to the country that the deposits of guano on this coast should prove to be of the most extensive kind, and he would fain hope there was reason to believe that it would be found over 300 miles in extent. It was of great consequence, he had said, that guano should be found in large quantities on the coast of Africa, for the voyage to it was comparatively short, and they might thus entertain the expectation that in the course of a year or two the price would be reasonably reduced and thus a greater extent of soil brought under its beneficial operation. (Hear hear:) From the coast of South America, however the price of carriage, on account of its distance, must be high, and this of course would always fall to be paid, however abundant the article might be on these shores or however extensively it might be imported into this country. This was the reason why he had expressed the hope that the quantity of deposits on the African coasts might prove to be extensive; and at the same time, he hoped that the proper means would be taken to secure its advantages to the farmerrs of England and Scotland.

TRANSPLANTING.—Most plants may be removed at any season, provided they are taken up with a ball of earth round their roots, and replanted immediately. The best time, however, is early in autumn, soon after they are out of flower, or when the leaves begin to fall; though spring planting, that is about February, will do nearly as well, and for most halfhardy plants, is perhaps better than autumn. Transplanting should be performed, when the soil is sufficiently dry not to clog the spade, and a cloudy sky at the time is preferable always to a bright sun. Deep planting, especially with respect to trees and shrubs, is always to be avoided; the heart or collar of the plant, that is the point where the stem and the root join, should be on a level with the surface or the ground. When a tree or sprout is transplanted, all straggling or decayed roots should be pruned off, and the remainder carefully spread out, nearly horizontally, before the soil is thrown upon them. Annuals should be transplanted when very young, especially those which have tap or spindle-shaped roots, as the Eschscholzia; as soon as they have opend their third pair of leaves, they are quite old enough. When plants are removedafter they have begun to grow, they will usally require to be shaded and watered, till the roots re-established themselves. A flower-pot turned upside down over them is sufficient shade for small plants; and for larger ones any other means may be used which will protect them from the midday sun.—*Mott's Flora Odorata.*

THE ECONOMY OF AGRICULTURE. Liberality constitutes the economy of agriculture, and perhaps it is solitary humane occupation, to which the adage, 'the more we give the more we shall receive,' can be justly applied. Liberality to the earth in manuring and culture, is the fountain of its bounty to us. Liberality to the laborers and working animals is the fountain of their profit. Liberality to domestic brutes is the fountain of manure. The good work of a strong team causes a product beyond the bad work of a weak one after deducting the additional expense of feeding it; and it saves moreover half the labor of the driver, sunk in following a bad one. Liberality in warm houses, produces health, strength and comfort; preserves the lives of a multitude of domestic animals; causes all animals to thrive on less food; and secures from damage all kinds of crops. And liberality in the utensils of husbandary, saves labor to a vast extent, by providing the proper tools for doing the work both well and expeditiously.

Foresight is another item in the economy of agriculture. It consists in preparing work for all weather, and doing all work in proper weather and at proper times. The climate of the United States makes the first easy, and the second is less difficult than in most countries. Ruinous violations of this important rule are yet frequent, from temper and impatience.—Nothing is more common than a persistence in ploughing, making hay, cutting wheat, and other works, when a small delay might havo escaped a great loss, and the labour employed to destroy,