

to the *cheapest and best* modes of producing roots, and that result will only be brought about by a liberal use of some of the manures which the experience of others so highly recommends to our notice. The term Artificial Manure is generally understood to apply to all foreign substances not directly connected with the farm yard, that is—neither the product of vegetable growth, nor directly the residuum of the consumption of vegetable substances by animals. Thus Guano is primarily derived from the ocean, in the fish consumed by sea fowl, whose excrements having accumulated on islands and rocks furnish an almost inexhaustible supply of a manure so powerful and concentrated as to baffle all attempts at imitation; then the earth presents another class of manures, not the result of vegetable growth but the product of Geological events, as the limestone rocks, chalk, and marl beds, gypsum deposits, and sulphur, from which is derived sulphuric acid (oil of vitriol) now largely used to facilitate and economise the effect of bones. Again, there is another class to which the term 'Artificial' applies almost exclusively, they consist individually of different substances mixed in various proportions according to the special purposes to which they are intended to apply. Thus we have a variety specially compounded to promote the growth of turnips and other root crops in which phosphoric acid is largely employed; another variety, principally composed of nitrogen, is manufactured and sold to promote the growth and yield of cereals, and a third kind composed of salt, and gypsum. I have often used it, and can state from experience that it is peculiarly adapted for peas and other leguminous crops. To such manures the term Special is also applied. They are, or ought to be, compounded on the basis, which a chemical analysis of the ashes of plants furnish for providing their natural and peculiar food; success in the use of such manures will depend in great measure upon the attention which is paid by the farmer to the principles regulating the manufacture of the manure employed. The most profitable system is that which we ought to adopt, and in the case of Artificial Manures science has pointed out their true scope and object, and experience has already ascertained the advantage of employing them—first, in the cheapness of their application, and secondly, in the results. As a proof of the popularity of Guano in England, its sale in 1846 was 24,000 tons, and in 1853, 61,000! The English farmer is forced to calculate much closer than his more favored brother here, and we must believe that this great increase in the use of guano would never have taken place if its profitable application had not been an established fact! Its value is further demonstrated in the panic which has arisen in Britain from the prospect that the supply will in a few years be exhausted. The Royal Agricultural Society offered two years ago a premium of \$5000 to the inventor of a manure equal to guano; which could be sold at \$25 per ton, which is about one-half the price of guano. No one appeared to claim the prize till very lately. The *Times* of the 26th of January says:—"A new patent substitute for guano consisting of decom-

posed and concentrated sea weed, is about to be introduced by Mr. Longmaid with the view of claiming the prize offered by the Royal Agricultural Society, thus affording another instance of what science is likely to accomplish for us. The proud preeminence of Great Britain in the art of Agriculture has, no doubt, been obtained chiefly by cultivating green crops, in other words her turnip culture; it is within my recollection when the surplus fat stock of the County of Aberdeen, in Scotland, was not more than that produced by our County of Northumberland at present,—now Aberdeenshire ranks the highest county in Britain in the exportation of fat stock. How is this?—simply because the cultivation of root crops obtains in a similar ratio, the rotation followed entailing a fifth or sixth part of the arable acreage under green crops of some kind—without the aid of foreign or artificial manure this could not by any means be profitably accomplished, their use has therefore not only become general but almost absolute. The first great step in advance in the cultivation of turnips was the introduction of bones as a manure, the value of which as a fertilizer for this crop appears to have been totally unknown until about the end of last century when their use began in Yorkshire, Col. St. Ledger being the first person known to have used them, about the year 1780. In Scotland bones were not used at all until a very late period. As a manure for turnips their qualifications are abundantly evidenced in the results which follow their application, whilst their special capabilities are equally well established by the relations of their composition and the constituents of the turnip plant; their great certainty of action in a dry season has been observed by all who have ever had the opportunity afforded, and this quality alone would entitle them to the notice of the Canadian farmer, the great obstacle to root cultivation being the aridity of our climate; the influence of the manure upon the crop can be quickened by the form of preparation or the condition in which it is applied. The finer the bones are reduced the speedier their action, as has been fully established by many experiments, and this power of forcing the crop has been made available so as to hasten the period of hoeing ten days or more. As the turnip is a plant which in its earlier growth depends greatly on the manure and is at that period peculiarly liable to attacks of the bug, it follows that the more we have the manure under our control the more likely is our ultimate success, and an early feed of phosphate of lime, which bones can be made to supply, will push on vegetation to that state when it becomes capable of deriving assistance from atmospheric sources. I have been very successful more than once with dissolved bones, using for that purpose sulphuric acid, and although at considerable expence, still not in proportion to the benefit derived from its use. As an auxiliary to barn-yard manure used at the rate of 10 bushels, in dust, to the acre, where 20 wagon loads of dung have been previously well incorporated with the soil, a good crop of turnips, if not otherwise neglected, may be looked for with certainty. Canada is essentially a flesh consuming and consequently a bone producing