

shows a yield of from 13 to 14 per cent, and exceptional instances occur in which 18 per cent is obtained, a much larger yield than ever was obtained in Europe.

It seems from these facts that the sugar producing region of the West is to be California, that land of wonderful resources and unprecedented development, though the beginnings are comparatively small, there is little doubt that they will prove the foundation of a gigantic interest. The struggles of the pioneers in this field have been severe, but those who have held out will be ultimately rewarded.—*Scientific Am.*

### The Agricultural and Commercial Value of Artificial Manures.

Professor Voelcker lately delivered a lecture to the members of the Derbyshire Agricultural Society on the subject.

Dr. Hitchman introduced the lecturer, saying:—Like almost all men possessing great knowledge, Dr. Voelcker is most cautious in induction and modest in statement, and is ever ready to receive with courtesy and thankfulness any facts which may be communicated to him by practical and observant men. Facts from such a source are always most acceptable, provided they are facts, for it is a sad fact that there are many things alleged to be facts, and given in all good faith by the communicant as facts, which are nothing less than illusions, mistakes, part-truths, or entire blunders, and which, taking the place of facts, act as barriers to progress, prevent or retard discoveries, act, indeed, like sand-shoals in the ocean of truth, until their true nature has been revealed, and the alleged fact is found to be a phantom—what Lord Bacon would have named an idol, called into existence by false perception or erroneous induction. To observe accurately is a valuable quality, and one by the acquisition of which the most humble of us may contribute something to that great storehouse of knowledge from which things new and old are being daily called forth by scientific minds for the benefit and instruction of mankind. I have watched with interest and admiration the career of Dr. Voelcker for more than 20 years; and I confess that his industry, honesty, caution, practical sagacity, and inductive skill have excited my reverence and esteem. He has never been fond of indulging in "sensational" theories, has not emulated the brilliancy, the scientific romance, of some other great chemists, has never longed to "o'erstep the modesty of nature;" but with child-like docility he has sat at her feet, and with inexhaustible patience awaited her teachings, and then placed them in calm, clear language before his own auditors and readers; and if he had not dazzled us with the splendour of his genius, neither has he led us into quagmires by its delusive coruscations. I am, unfortunately, old enough to remember the hopes which were excited in

the minds of ardent agriculturists by the earlier writings of Laebling and his imitators. Enthusiasts began to think that agricultural chemistry was an Aladdin's lamp, to conjure up corn crops from a deal board; and even soberer men expected that any number of crops might be successfully raised from any plot of ground by substituting a few pounds of potash for the crops removed. Persons talked in such a manner of manuring a large field with a mere hatful of salts as to call forth the satirical remark that, when that took place, they might bring back the produce in the waistcoat pocket. Those days have passed; and practical chemists like Dr. Voelcker know that there is a wide difference between chemical compounds subjected to the influence of soils, of wind, of light, of moisture, cold and warmth, in variable and varying quantities, in the external air, and to the added influence of the special vital qualities of the growing plant, and the same compound obediently complying with the wishes of the chemist in the scales and retorts of his laboratory. Dr. Voelcker has conferred great benefits on the cultivators of arable soil, by his valuable analyses, by his description of fertilising earths, by his exposure of the frauds of dishonest manufacturers of cattle food and manures, and by the information he has imparted on the manures best adapted for special soils and seeds; and he has now, under the auspices of that wise friend of the farmer—the right hon. Lord Vernon—come among us, to tell us something of artificial manures and the agencies best adapted for the fertilisation and cultivation of our grass lands.

Dr. Voelcker said. The subject of artificial manures was of annually increasing importance, for where five or ten years ago men spent their tens of pounds in the purchase of artificial manures they now spend their hundreds, and those who spent their hundreds now spend their thousands. To see how important the question was becoming they need only look at the many manufacturing of artificial manures which were springing up everywhere, and at the keen competition which existed between rival dealers; indeed, the dealer in artificial manure had become one of the greatest bores in the market. They could not go into a market without being pestered by some agent for an artificial manure manufacturer, who praised his wares often to the detriment of those of his rivals. There were now makers who produced from 30,000 to 40,000 tons per annum; others 20,000 and 10,000, and some 1,000 or 500. Very large sums were invested in the manufacture, and it was unnecessary to say that large sums were paid annually for these manures by agriculturists who must, in the present day, if they would successfully cultivate their land, spend a good deal of money for the purchase of these manures: for the present state of agriculture necessitated the application to the soil of more fertilizing agents than could be conven-

iently obtained from farmyard manure. Seeing that so large an amount was spent on these manures, it was of the greatest importance to the farmer that he should lay out his money to the greatest advantage, and how could he do that unless he possessed some knowledge of the fertilising constituents which enter into the composition of the manures offered for sale? The time was long past when the fertilizing powers of certain materials were ascribed to a certain unknown force, and they now knew pretty well on what substance the value—both economical or money value, and the fertilizing or practical value—of the manures depended. It was not by any process of cooking or of turning over that they could obtain good manures; they could only secure them by incorporating the right materials. There was a time when a mistaken notion prevailed that farmyard manure should be turned three times, and that it got better every time. Now there was, as was generally the case, a little truth mixed up with the error involved in that idea. To turn manure helped to make it rotten, and rotten manure was better than fresh, bulk for bulk; but by its standing exposed it was apt to lose a great deal of its fertilizing properties, and the more economical plan was to cart the dung to the field as soon as possible, and then they avoided the risk of losing a portion of its valuable properties by evaporation or by drainage. They knew well that the value of animal manure depended very much upon what they put into the animal's belly, and that it would be very different if they used plenty of oilcake, or other rich food, than if they gave their stock an insufficient amount of poor food. So with artificial manures. Their value depended on the materials put into them. They might concoct a manure of the sewage matter of London, or Birmingham, or Derby, by sifting out its solid parts, but its fertilizing value would be very little, and it would largely consist of soil, clay, or sand, with some organic matter of no great value. They must not expect to get much fertilizing matter from town sewage, unless they incorporated with it a good deal of Peruvian guano, or good bone dust, or nitrate of soda. The fertilizing value of manures depend mainly on the nitrogenous matters, phosphates, and salts of potash they contained. Nitrogenous matter was derived from animals, and existed largely in blood, flesh, skin, hair, and other refuse animal matters. As a rule ammoniacal salts produced bulk, and phosphates produced quality, and his aim would be to get both.

(To be Continued)

### Harvest wages in Scotland:

It appears that this harvest wages have ruled very high at Perth, Scotland.

Cutters were paid \$1 10 per day, with meal and milk—while binders received, one dollar per day with vituals found. But even at this high rate they are not as well off as in Canada, where all harvest hands have received \$1.25 with all board and lodging found.