

passing mention as a curiosity, and no note to supply the deficiency was attached by the editor; so little was it then known to the most intelligent cultivators, and so speedily had the knowledge of its value spread in the interval. This single fact would alone show that we had reached a new era in the history of farming.

In 1840, before the farming public had become accustomed to these imported manures, Professor Liebig suggested that the fertilizing power of bone manure would be increased by the application of sulphuric acid, and the consequent production of superphosphate of lime. There have been periods in our history when a book like that of Liebig would never have travelled further than the libraries of our men of science; but in 1840 we had in our dealers in manures a commercial class keenly alive to the possible profits of a philosophical suggestion. A carboy of sulphuric acid was easily poured over a few bushels of ground bones, and soon Suffolk drills, charged with superphosphate and guano, were sent to teach farmers that if they wished to grow great root-crops there was something to be added to the invaluable "muck."

One of the first to experiment upon the new manure, and then to manufacture it on a large scale, was Mr. J. B. Lawes, a Hertfordshire squire and scientific chemist. He was followed by Mr. Purser, of London, who began, in 1843, with a single carboy of sulphuric acid, price 10s., and has since frequently purchased ten thousand carboys at one time. At Southampton, a few years later, Messrs. Dixon and Cardus made an excellent speculation by a contract with the Government of Buenos Ayres for the exclusive right of exporting the charred flesh and ashes of joints of meat burned for want of other fuel on the treeless Pampas, to boil down the tallow. This animal refuse, the accumulation of a quarter of a century, when treated with sulphuric acid, is converted into valuable superphosphate. But although every quarter of the globe, even battlefields, were ransacked for bones, the supply was insufficient, and some new resource was required in order to keep down the price.

The chemists having so far done their part, the next contribution to the progress of agriculture came from the geologists. Professor Henslow, whose great acquirements as a botanist had not prevented his attending to other branches of science, had noticed in 1842 some nodules at Felix Stowe, on the coast of Suffolk. In 1843, haunted with the idea that they were something of importance, he returned to Felix Stowe, collected a quantity of them, and placed them in the hands of a Mr. Potter for analysis. The analysis showed them to be fossils, commonly called coprolites, on the supposition that they consisted of animal excrement, and containing from 50 to 55 per cent. of phosphate of lime. From this discovery Professor Henslow might have realized a considerable fortune. The quarry of coprolites was to be had at a common rent, and there were manure manufacturers prepared to pay for the information, but he "did not consider such a course consistent with his position as a man of science and a clergyman," and after keeping silence on the subject for some months at the request of Mr. Potter, "who wished to have the chance of availing himself of the discovery," he gave the results of his investigation to Mr. J. B. Lawes, who made the superphosphate obtained from coprolites the subject of a patent, which he was not able to maintain. Subsequently, beds of coprolites were discovered in Cambridgeshire, Hampshire, and Dorsetshire, and further investigations in Norway placed Mr. Lawes in the exclusive possession of great beds of another fossil called *apatite*, rich in phosphates—of which he imports whole cargoes for his manufactory at Bow, near London. The superphosphate of lime, however, produced from fossils being much less soluble than that from fresh bones, can only be usually applied when mixed in moderate proportions with the latter.

One other important addition to the portable manures was discovered about seven years ago by Mr. Odams in the blood and garbage of the London slaughter-