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Goâmon-biphosphaté.—We again call attention to the offer of the Department of of Agriculture, Quebec, to soll superphosphate, delivered free on board at Quebec, for $26 a ton. This superphosphate has cost the Goverment over $30 a ton, and is sold at the low rate mentioned, in order to enable farmers to experiment upon this new fertilizer.

First steps in Farming—Young Man's Department.

A few years previous to 1840, a general feeling seemed to exist among the more advanced farmers in Britain, that half-inch bones were not quick in coming into action. In certain seasons of great drought, the turnip crop, for which they were principally used, derived but little benefit from their application. Guano was as yet unknown, except in its own home, Peru, and the refuse of the rape-oil manufacture, with perhaps a few tons of wool-waste and scum from the sugar-refineries, were the only supplementary manures available.

But, in 1840, a meeting of the British Association was held, at which Liebig propounded a new theory for the chemical treatment of bones, whereby they were rendered more rapidly soluble, and consequently were ready for the crop without loss of time. What he did was simply this: he showed that (v. p. 167, vol. 3 of the Journal) carbonic acid slowly and quietly took from the tri-calcic phosphate some of its lime, and thus increased the solubility of the bone; "why not, then," asked the great chemist, "use at once some strong acid, the sulphuric for instance, and dissolve the bones before they are deposited in the soil; the chemical change would be completed in an hour, and the phosphate of lime will be soluble in water. Nay, more; not only will time be gained, but a more thoroughly soluble condition of the tri-calcic phosphate will be brought about;" as thus:

Composition of tri-calcic phosphate.	Re-agent employed.	Products of decomposition.
Phosphoric acid } Lime }	Water } Water }	Monocalcic phosphate and Sulphate of lime, which is land plaster, or gypsum.
Lime } Lime }	Sulphuric acid	

On comparing this diagram with the immediately preceding one (p. 168, vol. 3. of the Journal), you will see that a new form of phosphate of lime is obtained, quite different from the bi-calcic which was produced in the soil by water and carbonic acid. And a great gain this was, for the bi-calcic is slowly soluble, and the mono-calcic is rapidly soluble, in water. And hence arose the term "superphosphate of lime;" for the phosphoric acid which, in bones, had been combined with three equivalents of lime, had been concentrated upon one equivalent of lime, and this one equivalent had been over-, or super-charged with phosphoric acid. You must bear in mind, please, that it is the phosphoric acid which is wanted in the manure, not the lime; as in ammoniacal manures, it is the nitrogen, and not the hydrogen, which is for the service of plants. Some of our English landlords are pretty sharp, when their own interests are concerned, but on this occasion, Liebig's words seem to have fallen in vain on their ears. Not so, however, with the ears of Mr Thomas Proctor, of Bristol; they were erect at once; he hastened home, set to work at once, and had the honour of starting the first manufactory of superphosphate that ever existed, from which hundreds of thousand of tons have set out on their fertilising errand, and from which the family of the original proprietor has reaped a rich harvest of reputation and wealth.

In those days, superphosphate of lime, or "sulphated bones," as it was sometimes called, sold for £7. 10. sterling a ton; now, it can be bought for £3.! And the reason for this fall in price is simple enough. At first bones were the only available source of phosphate of lime. Chemists, particularly Daubeny, I remember well, knew that in foreign parts, in Estremadura and elsewhere, there were deposits of phosphatic rock; but, unfortunately, there were no railroads in those days, and the Estremadura roads were only travelled by pack-mules, which poor beasts were clearly incapable of transporting any decent quantity of rock to the sea-board. But in 1842, Mr J. B. Lawes, then of Deptford, but now of that national glory, Rothamsted farm, commenced experiments on the phosphatic nodules of the green sand formation in Suffolk and Cambridgeshire. These nodules, commonly called *coprolites*, were originally supposed to be, as the Greek derivation shows, the *kopros* or dung of extinct animals. Whatever they may be, their composition was satisfactory, and a factory was mounted on a large scale for their utilisation, the product of which was, and is, known as *mineral* superphosphate.

Afterwards, the universal world was searched for phosphates; bone-ash, the residue of bones used for fuel to try out "the fat of the South American cattle, was largely imported; and our own *apatite*, as rich in phosphoric acid as any of the mineral phosphates, but too utterly refractory for use without previous treatment with sulphuric acid, is likely to become very popular in Europe.

I must repeat here, what I have often said before: any one who uses Canadian apatite, crushed to never so fine a powder, without making it into superphosphate, is throwing away time, trouble, and money. All the experiments made