The potash, which in No. 3 forms an important feature in the cost, I am inclined to think may be omitted without much loss to the crop of roots, and if the same amount were expended in sulphate of ammonia = 200 lbs. = 50 lbs. ammonia, I am sure the mangel, at any rate would be the better for it.

As I am writing, a letter is put into my hand from Mr. Labatt, the Secretary-treasurer of the St. Lawrence Sugar-refinery, in which he offers to sell "old char," the *animal charcoal* used in refining sugar after it has done its work in their establishment, for $18.00 per gross ton = $16.00 per 2,000 lbs. This form of phosphate of lime contains, on an average, about 70 °/₀ of phosphate = 32 °/₀ of phosphoric acid, with 10 °/₀ of carbonate of lime, and about 12 °/₀ of charcoal. Now, 300 lbs. of this "old char," added to 125 lbs. of sulphate of ammonia, would only cost $6.46, and applied to an acre of land would, I believe, cause it to yield a far larger crop of mangels or swedes than any of the advertised mixtures or compounds.

If brown sulphuric acid could be had here for 2 cents a pound, I should be inclined to use the following mixture for swedes and turnips:

| | |
|---|---|
| 200 lbs. old char | $1.40 |
| 140 lbs. sulphuric acid | 2.80 |
| | $4.40 |

adding water = twice the *bulk* of acid to the old char, and mixing in the acid by degrees, stirring briskly with a long-handled tool all the time. This, with a half-dressing of dung ought to bring a good crop: mangels, as my readers know, must have nitrogen. This old char and acid will be when finished in a state of very thick gruel, and must be dried up with something or other to make it fit for sowing. Finely sifted earth would do, but I should prefer bone-dust for the purpose.

The theoretical quantity of sulphuric acid required to dissolve a mineral phosphate of lime and its results are, according to Way, chemist to the R. A. Soc. of England in its early days, as follows; the example is from the coprolites of the Suffolk *Crag*:

| | |
|---|---|
| Water (of combination) | 10 |
| Sand, clay, and oxide of iron | 21 |
| Carbonate of lime | 10 |
| Phosphate of lime | 56 |
| Fluoride of calcium, &c. | 3 |
| | 100 |

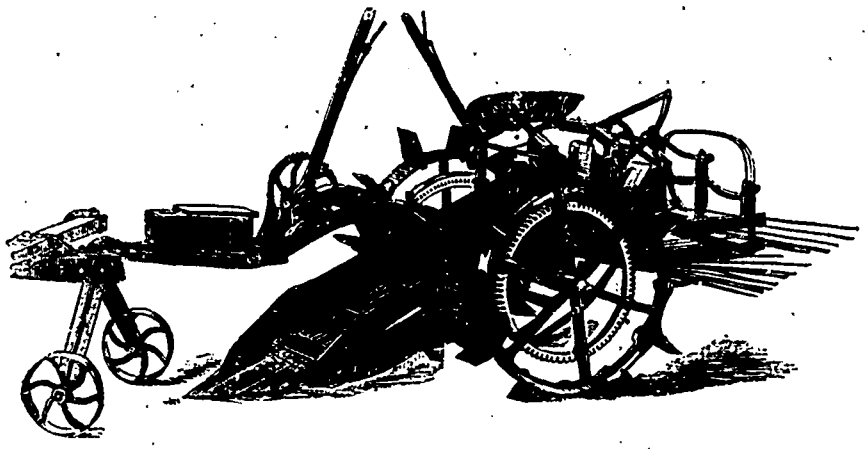
To convert this entirely into bi-phosphate we should require:

| | |
|---|---|
| Sulphuric acid (oil of vitriol) to neutralise the carbonate | 10 lbs. |
| Sulphuric acid (oil of vitriol) for the phosphate | 31 " |
| | 41 " |

The composition of the product when dried would be, in a hundred parts, something like this:

| | |
|---|---|
| Moisture | 10 |
| Sulphate of lime—plaster | 49 |
| Bi-phosphate of lime | 25 |
| Sand, &c. | 16 |
| | 100 |

This 25 °/₀ of bi-phosphate is equivalent to about 18 °/₀ soluble phosphoric acid, a quality rarely to be met with, though 33 °/₀, and even 35 °/₀, of soluble phosphate of lime is always to be had, and Messrs. Downes, of Liverpool, England, advertise 37 °/₀—see next paragraphs.



HOOVER POTATO DIGGER.

SUPERPHOSPHATE OF LIME.—Influenced by large export demand, and, to a lesser extent, by the consumptive demand, the market buoyant, and would be more so, but manufacturers evince great firmness. For prices, terms, and conditions of sale of the D'N'S brand, the reader is referred to the scale on the annexed page. In proportion to the current price of 26 to 28 per cent. soluble the 35 to 37 per cent. strength is the cheaper, irrespective of the advantage in railway carriage, to the consumer; three tons contain an amount of soluble, equal to four tons of the lower strength, so that the receiver would benefit to the extent of carriage on one ton by ordering the 35 to 37 per cent. soluble.

There is one point in connection with the purchase of superphosphate not generally known, that is deserving of the consideration of intending buyers. Superphosphates made from coprolites containing iron have a pronounced tendency to what is technically termed "go back" *i. e.*, the raw phosphate, after having been rendered soluble by acid, may to some extent again become insoluble, and therefore of diminished value to the crop to which it is applied. Thus, as *the value of superphosphate is determined by the amount of soluble phosphate it contains*, a quality testing 26 per cent. sol. at the time of manufacture might, owing to the presence of iron, deteriorate within a very brief period to a marked extent—for instance, 26 per cent. super. delivered within, say, 100 miles from the works, costs about £3 per ton, equivalent