

discussion which sprang up some years since, in reference to which of the constituents of bones we are to attribute their value. Sprengel asserted that it was to their phosphates only, and this opinion was favored by Liebig. Others again gave all the credit to the ammonia formed from their animal matter. It would, in my opinion, be a waste of time to give the views of the contestants.

Both sides certainly knew, that all soils which are deficient in phosphoric acid, are rendered more fertile when it is supplied; and it would be certainly difficult to find a field long in cultivation whose productiveness would not be increased by the use of ammonia, provided one or more of the essential elements be not deficient or altogether absent.

It seems strange that such a question could have been raised by distinguished men in the present day, when there is certainly no room to doubt for one moment the efficacy of both phosphoric acid and ammonia as constituents of manure.

Much difference of opinion has prevailed from the first use of bones, as to the best mode of applying them. In Germany it was for a long time the practice to burn them. Whether this was owing to ignorance or the want of bone-crushing mills, we do not know. I believe, however, that this practice has ceased, and that crushed bones are now used in both Germany and in France.

Stoeckhardt, in his *Agricultural Chemistry*, laments that, owing to the want of appreciation of bones in Germany, they are largely exported to England for manure.

In England they are crushed or ground fine, when they are to be drilled in with turnips seed; but a rather coarser kind is used when sown broadcast.

In this country they are also crushed, but the kind suited for drilling in is not often used, owing to its additional cost.

There are three modes of applying crushed bones to the soil:

1. In the dry state, as purchased.
2. Dissolved in sulphuric acid.
3. Causing an incipient decay, or, more correctly, putrefaction of their animal matter.

If the object is the permanent improvement of the soil, without caring so much about a maximum growth of the first crop, the crushed bones may be applied in the dry state, without any previous preparation. This is the least expensive mode, (1.)

When they are applied for the benefit of only one or two crops, without looking to the permanent improvement of the soil, the phosphate of lime may be made soluble by means of sulphuric acid, or oil of vitriol. (2.)