of temperature, loses its volatile atom of base, (the water,) and is consequently transformed into a phosphate of two atoms of fixed base, or a pyrophosphate. Triphosphate of lime, under the same conditions, remains unaltered. According to this, the hydrochloric acid solution of the natural, as well as of the heated powder of the "exterior layer," if treated with ammonia, produces a precipitate which is, in both cases, soluble in acetic acid. This is also the case with the natural powder of the "body of the rock," whilst its heated powder, if treated in the same manner, remains insoluble in acetic acid, as pyrophosphates do. But pyrophosphates can only be produced in this way by common phosphates, ergo: the "body of the rock" is composed of common phosphate of lime, the "exterior layer" of triphosphate of lime.

2. Common phosphate of lime, when brought in contact with ammonia, is converted into triphosphate of lime, whilst phosphate of ammonia is found in solution. This fact may explain the relation which exists between the "exterior layer" and the "body of the rock." The latter, we have seen, is composed of common phosphate of lime and some organic matter; on its surface, where it was exposed to rain and to the influence of the atmospheric ingredients, (especially ammonia,) its organic matter became slowly decomposed and ammonia evolved from it. The ammonia thus produced by the organic matter of the rock, as well as that portion conveyed to it by the atmosphere, necessarily came in close contact with the common phosphate of lime on the surface of the rock, and consequently transformed it, according to the above, into the triphosphate of lime, of which the "exterior layer" is composed, whilst the resulting phosphate of ammonia, on the other side, was washed away by the rain.

It was found upon experiment that, on account of the peculiar state of the aggregation of the particles of the rock, liquid ammonia had to remain for a long time in contact with it before appreciable quantities of phosphate of ammonia could be found in solution.

3. If extracts of both parts of the rock in water were treated with an excess of alcohol, that of the "body of the rock" produced a voluminous white precipitate of sulphate of lime, whilst that of the "exterior layer" remained clear, though it produced instantly a precipitate with chloride of barium, after having been acidulated with hydrochloric acid. This is a proof that in the "exterior layer" the sulphuric acid is present in the form of sulphate of soda, whilst the "body of the rock" contains it as sulphate of lime.

Both triphosphate of lime and common phosphate of lime, are equally insoluble in water, and have, in this respect, no advantage over each other as fertilizers; the former is the constituent part of all the natural phosphates heretofore known as guanos, bones, apatite, and the various other mineral phosphorites; the other, on the