

XVII.—*On the Combination of Arsenious Acid and Albumen, with
Remarks on Liebig's Theory.*

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My time has been so much occupied, the last year, that I have had no opportunity of investigating, thoroughly, the compound of arsenious acid and albumen. I have latterly, however, paid considerable attention to this subject, owing to the following statement appearing in the Transactions of the Chemical Society :* “If water so readily extracts arsenious acid both from the compounds formed in the laboratory, and from those which nature has prepared, surely we may conclude that its retention is simply mechanical, and affords no ground for the theory which that eminent chemist, Liebig, has raised upon it.”

* Chem. Soc. Qu. J. III, 16.

Liebig writes: "Arsenious acid enters into a very firm combination with membranes and gelatinous tissues; the arsenious acid combining with these, gives to them the power of resisting decay and putrefaction."

I cannot believe that so renowned a philosopher could have published such statements, unless he was convinced of their correctness from experiments and analysis. I now enter upon my researches.

QUALITATIVE ANALYSIS.

I took 0.107 grm. of dissolved arsenious acid and 12.67 grms. of the glairy albumen of eggs. They were intimately triturated together for about twenty minutes, coagulated by heat, and evaporated to dryness in a water-bath. The white residue, affused with distilled water and filtered, yielded a filtrate which gave *no deposit* of arsenic on copper by Reinsch's test, nor any stains on porcelain by Marsh's apparatus. When the residue on the filter was heated with pure sulphuric acid, and then submitted to the preceding experiments, arsenical indications were immediately obtained, proving that a combination of arsenious acid and albumen had occurred.

QUANTITATIVE ANALYSIS.

61.07 grms. of albumen were mixed as above with 0.603 grm. of dissolved arsenious acid, I washed the mixture, after evaporation to dryness, with distilled water, until not a trace of arsenious acid dissolved out.

The filtrate was introduced into a bottle provided with a glass stopper, some hydrochloric acid added, and a stream of sulphide of hydrogen passed through the menstruum. The flask was then closed, and allowed to rest for some hours; after this, pure carbonic acid was transmitted through its contents with the view of expelling all the free sulphide of hydrogen: the sulphide of arsenic was then collected on a tarred filter, dried at 100° C., and weighed.

Weight of tersulphide of arsenic	.	.	0.270
Equal to, of arsenious acid	.	.	0.217

The above results, therefore, prove incontestably that the albumen had combined with 0.386 grm. of arsenious acid. This compound is not poisonous. I heard from Professor Gregory that he performed some experiments in Dublin in 1837, which satisfied him that Liebig was right; and Sir Robert Kane has stated that the "com-

pound of albumen with the acids is generally somewhat soluble ; with metallic oxides insoluble.”*

When the white of egg is used as the antidote to metallic poisons, it acts no doubt mechanically as well as chemically—a large portion being enveloped and protecting the mucus membrane of the stomach, while a small portion *enters into combination*.

The analytical results cited are to my mind so convincing, that to descant further upon the matter would be superfluous ; and I may close this notice with the following able remarks of a medical man, with which I entirely coincide.

“There is in my opinion no doubt that the metallic poisons are capable of uniting with animal matters ; and this I apprehend is perfectly well known to all toxicologists, and is the universally received explanation of their antiseptic properties.”
