NOTES UPON WATER ANALYSES BY THE AMMONIA METHOD WITH SOME NEW APPARATUS.*

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Wanklyn's ammonia method of water analysis, in spite of its imperfections, is still the process most widely used in this country. It is the simplest and most practicable of all combustion methods, wet or dry, that have been applied to water analysis, and although it shares with all processes of this class used in sanitary work, the doubt as to interpretation of its results, its general use among chemists indicates its superior adaptability to such work.

The process as now used is essentially the original one, but experience has shown that the interpretation of results must be guided by familiarity with the method and by a knowledge of the class to which the water in question belongs. Also, there is now a marked tendency to prescribe more closely than Wanklyn has done the minute details of the process.

The variability of natural water with respect to the indications which they yield under Wanklyn's process, as to time of distillation, concentration of reagents and rate of attack of oxidable matter, have necessitated the adoption of standard methods as the nearest approach to a means by which the results obtained from different waters, and by different observers, could be made in any sense comparable.

I have shown in a previous paper (*This Journal, Vol. 8, No. 9*) the points in which such prescription of detail should be insisted upon and have suggested a standard method for general use. The previous work of Mallet, Smart, and others, had suggested many similar points of detail requiring attention.

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upon the methods of water analysis adopts many of these different suggestions. With regard to the quantity of water to be used the quantity is left optional, as to 500 or 100 c.c., in this report. In common with many other chemists I should have been glad to see a recommendation as to the exclusive use of the 100 c.c. method and of 10 c.c. nesslerizing tubes as representing a neater and more accurate method of conducting the analysis. The use of the smaller quantity of water is no exception to the general preference in chemical analysis for small samples where accuracy is not impaired by their use. In the present case there are to be offered the advantages of less cumbrous apparatus, a hastening of the process and an increase in accuracy by the use of the smaller tubes with their greater depth for a given volume of the liquid submitted to the colorimetric test.

Another detail upon which I have insisted, as necessary in order to render results obtained by the Wanklyn process comparable, as nearly as possible, for waters of all classes, is the matter of carrying the distillation to a very small residual volume in the retort, so that the greatest strength of the permanganate and alkali and the strongest attack upon oxidable matter shall be concentrated upon the organic matter which has longest resisted that attack; in other words the carrying of the distillation to a point near dryness. This again is much more easily done in a small than in a large retort, for obvious reasons. Further, the accurate measurement of all liquids put into the retort permits a control of the distillation by measurement of the 10 c.c. portions which are taken off as distillates during the operation, or of the 85 c.c. portion taken off in the preliminary process of cleansing the retort as already described. (*loc. cit.*) The degree of condensation may thus be judged of and the volume of the residual liquid in the retort at the close of the operation may be known within 2–3 c.c. at most. In practice I leave less than 5 c.c. of liquid in the retort at the close, yet accidents from running dry or spurting are almost unknown.

The objection that modification of the old method will prevent comparison of the results with those previously obtained, is an objection that, in some sense, meets every attempt at improvement of an analytical process and cannot be regarded as insuperable.