A CONVENIENT METHOD FOR THE ESTIMATION OF ALBUMIN IN URINE.

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The determination of albumin in urine by weighing the precipitated albumin or by determining its amount by the Kjeldahl method, requires so much time that it is not adapted to the needs of the clinician. Several methods have been devised for the approximate determination of albumin, depending upon the measurement of the volume of a precipitate after centrifuging or allowing to stand. Upon trying these methods they were found to give results so unreliable as to be of little value.

As titration methods for albumin did not seem practicable, an endeavor was made to obtain the albumin in the form of a precipitate the volume of which would bear a more constant relation to the amount of albumin present. As it had been observed that acetone precipitated albumin in a flocculent form from aqueous solutions, it seemed probable that this precipitate would settle rapidly and compactly owing to the low specific gravity of the acetone. This was found to be the case with specimens of urine containing albumin, but aqueous solutions of serum albumin yielded a precipitate which did not settle readily, indicating that some other constituent of the urine affected the precipitate. Various constituents of normal urine were tried and it was found that if a small amount of monobasic sodium phosphate was added to the albumin solution, the precipitate would settle as rapidly as from urine. It was soon observed that in order to obtain satisfactory results, the urine must be distinctly acid, and for this purpose acetic acid was added to the acetone.

Method—Filter the urine if cloudy and measure 1 cc. from a pipette or burette into a 5 cc. graduated test tube having an internal diameter of 9 mm. Dissolve about 0.04 gm. of monobasic sodium phosphate in the urine and fill the test tube to the 4 cc. mark with a mixture of 98 volumes of acetone and 2 volumes of glacial acetic acid, both of U. S. P. quality. Close the test tube with a stopper, invert slowly six or seven times and then shake vigorously for thirty seconds. Allow the test tube to stand in a vertical position for exactly fifteen minutes; read off the volume of the precipitate and determine the percentage of albumin by reference to the following table:

Cubic Centimeters Precipitate	Percent Albumin	Cubic Centimeters Precipitate	Percent Albumin
0.20	0.09	0.75	0.91
0.25	0.13	0.80	1.01
0.30	0.17	0.85	1.10
0.35	0.22	0.90	1.19
0.40	0.29	0.95	1.29
0.45	0.37	1.00	1.38
0.50	0.45	1.05	1.48
0.55	0.54	1.10	1.59
0.60	0.64	1.15	1.72
0.65	0.73	1.20	1.86
0.70	0.82	1.25	2.05

If more than 1.25 cc. of precipitate is obtained, dilute the urine with an equal

volume of water and make a new test, using 1 cc. of the diluted urine, and multiplying the percentage found in the table by two.

In compiling this table, sixteen aqueous solutions of serum albumin varying in strength from 0.1% to 2.0% were prepared. These solutions were standardized in the following manner. The albumin was precipitated with potassium mercuric iodide, heated in a water bath, separated by filtration and determined by the Kjeldahl method using the factor 6.3. About forty determinations were made upon each of these solutions by the acetone precipitation method. A curve was plotted from the average results obtained, and from this the table was constructed. The use of normal urine instead of water in making up the albumin solutions caused no difference in the results; and in a number of pathological specimens gave results which agreed closely with those obtained gravimetrically. While it can not be expected that a method of this kind will give accurate results, yet if carried out with proper attention to details it will be found to give more accurate results than those obtained by other methods based upon the volume of the precipitate.

The results are not influenced by ordinary variations in temperature; nor by the changes in acidity or amount of phosphates caused by the varying composition of different urines.

Considerable variations in the diameter of the measuring tube or in the manner of mixing the liquids were found to affect the results.

The precipitate settles so rapidly that after fifteen minutes the volume changes very slowly. For this reason, it did not seem necessary to consider centrifugal separation as a means of shortening the method, although it is probable that good results might be obtained in that way.

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THE ASSAY OF SOME U. S. P. CHEMICALS.

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Assay processes for chemicals should be made as simple as possible and with the aid of as little apparatus as is consistent with good work. Comparison of past Pharmacopoeias shows remarkable advance in the number of assays directed, and the ninth revision now in progress will undoubtedly show the greatest advance; this is shown by the consideration given to chemicals for which no assay processes have ever been officially prescribed, as in the case of nitrates, chlorates, etc., owing to manipulative difficulties and the need of special apparatus.

ASSAY OF CHLORATES.

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A number of processes for the assay of this class of salts have been published which will be briefly outlined:

1. Decomposition of the chlorate by heat into the corresponding chloride