A RAPID AND EASY METHOD OF ESTIMATING UREA IN URINE.

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This apparatus was designed for the use of physicians rather than chemists. The process is a modification of the well known hypobromite process, by which the urea is decomposed, with the formation of CO_2, H_2O and free nitrogen. The first two of these remain in solution, while the nitrogen escapes and is measured.

The hypobromite solution is usually prepared by dissolving 25 c.c. of bromine and 100 grms. of sodium hydroxide in 250 c.c. of water. To avoid this tedious and disagreeable preparation I prepare the solution as needed by mixing, in the apparatus, a 20% solution of potassium bromide and sodium hypochlorite (Labaraque's solution), in the proportion of one of the former to about three of the latter.

The result of this mixture is a solution of sodium hypobromite and potassium chloride, answering in every way the requirements of the process.

The two solutions keep well, while the hypobromite solution does not.

The apparatus consists of two parts: First—A graduated pipette delivering 1 c.c. Second—A graduated tube about 1 cm. in diameter and 30 cm. long, closed at one end, and graduated from this closed end throughout its entire length. The graduation is made as follows: A standard solution of urea is prepared containing 10 grains to the fluid ounce. With an ordinary gas tube it was found that 1 c.c. of this solution gave 8.2 c.c. of nitrogen.

This is about the average urea strength of normal urine. Each 8.2 c.c. on the new tube are then divided into ten principal divisions, and each of these into four smaller divisions.

Each of the principal divisions then represents grains per fluid ounce, when 1 c.c. of the urine is taken.

By a similar method the graduation may be made to represent grams per litre.

The process is conducted as follows:

Holding the ureometer in the left hand pour in enough of the 20 per cent. solution of potassium bromide to fill it to the fifth division; then add hypochlorite solution to the eighteenth or twentieth mark. The tube is now inclined and water added to about the twenty-fifth division. With the small pipette 1 c.c. of urine is now added, allowing it to run down the side of the tube so that it shall mix with the water floating upon the heavier solution below. The open end of the ureometer is now firmly closed with the thumb, and its contents thoroughly mixed by inverting it a few times. When the effervescence ceases, which usually takes about two or three minutes, invert and read off the height of the liquid in the tube.

The thumb is now removed under water, the tube depressed to bring the liquid in the tube to a level with the water in the outer vessel, and a second reading taken. The difference between the two readings gives at once the number of grains of urea in each fluid ounce, or grammes per litre, according to the construction of the scale.

This number multiplied by the number of ounces passed in twenty-four hours, in the one case, or litres in the other, gives the amount of urea passed in twenty-four hours, which should be about 500 grains, or 30 to 33 grms. The instrument may be had of Eimer & Amend.

NOTE.—Experiments made to determine whether the apparatus could be used to determine total nitrogen, after decomposition in the Kjeldahl flask with sulphuric acid, gave good results.

Experiments with ammonium chloride showed that but one-third of the nitrogen was set free from this salt, while the sulphate seems to yield all of its nitrogen.