

the delicacy of the test rendering this possible without impairing the reaction. Eight drops of urine, however concentrated that fluid may be, can hardly contain enough of these reducing bodies to effect any change in the test. Another feature of this method is the perfect clearness of the reagent during the progress of its application. The employment of tartaric acid endows the test with its peculiar sensitiveness and serves as well to keep in solution the earthy phosphates of the urine as that fluid is added so that the phosphatic cloud, which is so annoying a feature of other copper tests, does not ever appear.

I have adapted this test so that with some variation in procedure it may be used for the quantitative estimation of sugar. The method pursued is in imitation of the ammoniated cupric tests (Pavy-Purdy). The process is as follows—measure off one drachm of the cupric oxide solution (Reagent No. 1), and add to it three drops of tartaric acid solution (Reagent No. 2), and one drachm of liquor ammonia U.S.P. These are thoroughly mixed together and poured into a small glass flask or beaker, and enough distilled water is added to raise the total volume to one ounce. The presence of the ammonia entirely changes the reaction which characterized the employment of the test for qualitative purposes as already described. The cuprous oxide formed by the reducing power of the sugar is held in solution by the ammonia, and does not at any time appear as a reddish precipitate. The blue protoxide of copper which gives the color to the test solution is, however, still reduced by the sugar of the urine, the resulting suboxide being dissolved by the ammonia as quickly as it is formed, the solution remaining clear, the complete disappearance of the blue color marking the completion of the test. The test carefully measured and mixed as indicated possesses the fixed sugar value of one tenth of a grain of grape sugar—that is, it is reduced and decolorized by exactly one-tenth grain of sugar. The flask containing the reagents is placed over a spirit or bunsen flame, and when it is smartly boiling the urine is added slowly, a single drop at a time from a burette or graduated minim pipette. Care must be exercised not to add the urine too fast, an interval of four or five seconds being allowed to elapse between the first few drops, and when the blue color begins perceptibly to fade, the addition should proceed still more slowly until an interval of