

vary from 17.9 per cent below strength in sample No. 78291 to 15.8 per cent above strength in sample No. 79725. It seems difficult to account for such a condition except through carelessness in manufacture. Had they been titrated with standard solutions, such an error would easily have been detected. When the poisonous nature of this solution is considered and the necessity of placing in the hands of medical practitioners a properly made up product is taken into account, the whole situation appears to be quite serious.

#### *Discussion on General Collection of Liquor Arsenicalis.*

This subject was given attention in Bulletin No. 175 of this series, published February, 1909. At that time it was suggested that a variation of 0.020 per cent of arsenic be allowed. The assay prescribed by the pharmacopœia would demand an accuracy of 0.002 per cent according to 1898 edition. In the 1916 edition U.S.P. limits of variation run from 0.975 per cent to 1.025 per cent. The B.P. 1914 states that 25 mls of Liquor Arsenicalis should discharge the colour of 50.4 mls of deci-normal iodine. A 1 per cent solution of pure arsenious acid should (using 25 mls) react completely with 50.53 mls of deci-normal iodine. Any samples showing a greater variation than this may rightly be termed adulterated.

It has been claimed that Fowler's solution falls off in strength from a one per cent arsenious acid solution on standing. Statements of this nature occur in such texts as Lucas' Practical Pharmacy, p. 166. It is recognized here that oxidation of the arsenious acid to arsenic acid, or an equivalent valence change, may take place in partly filled or exposed solutions containing excess carbonate, after a lapse of time. The rate at which this reaction will take place depends on the care used in handling the stock solution. The etching of glass by alkaline solutions of carbonates should not be confused with deposits of arsenic in any form. These etchings are the result of slow action between the alkali and the glass, and may be contaminated sufficiently with arsenic to give a test after superficial washing. When properly sealed a Fowler's solution will keep for years, and during that time will show only slight losses in arsenious acid content. Over a period of from three to four months this loss is not such as may readily be detected by titration. The responsibility in every case should remain with the manufacturer and vendor. They should titrate their solutions with standard iodine and assure themselves of their correct strength by this means, rather than by the incorrect method of trusting only to the proper weighing and complete dissolving of definite amounts of arsenious acid. In this way, impurities in the arsenious acid used, cease to become factors in the accuracy of the final product as far as ordinary commercial and pharmacopœial work is concerned. If impurities were to be considered in more minute detail, a review of the literature would show that the following may be present in small amounts:  $\text{Si O}_2$ ,  $\text{Sb}_2\text{O}_3$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{Ni O}$ ,  $\text{Co O}$ ,  $\text{Ca O}$ ,  $\text{SO}_2$ ,  $\text{Cu}$ ,  $\text{Pb}$ ,  $\text{Zn}$ ,  $\text{As}_2\text{S}_3$ ,  $\text{Sb}$ ,  $\text{Cd}$ ,  $\text{Bi}$ , and  $\text{S}$ . For a discussion covering the importance and elimination of these very slight impurities, and dealing in particular with the possible presence of antimonous oxide reference is made to an article by R. M. Chapin (J. Ind. and Eng. Chemistry vol. 10, No. 7, p. 522, 1918) on "The Preparation and Testing of Pure Arsenious Oxide."