The preceding data show very clearly that:

1st. The degree of deterioration varies with different lots.

2nd. The fat-free tincture made with 70 percent alcohol—two out of six samples—is apparently less subject to deterioration than that from the original drug.

3rd. The deterioration of tincture of digitalis is not so uniformly rapid as isolated experiments would indicate.

BIBLIOGRAPHY.

(1) Pittenger and Mulford, Jr., J. A. PH. A., March 1918, p. 236.
(2) Bourquelet, *Jour. de Pharm. et de chemie*, 1911, p. 149.
(3) Choay, *Jour. de pharm. et de chemie*, 1911, p. 343.
(4) Hale, *Hygienic Laboratory Bulletin* No. 74.
(5) Roth, *Hygienic Laboratory Bulletin* No. 102.
(6) Houghton and Hamilton, *Am. Jour. of Pharmacy*, Oct. 1909.
(7) Goodall, *Br. Med. Journal*, 1912, Vol. I, p. 887.

FROM THE RESEARCH LABORATORY OF PARKE DAVIS & CO.,
DETROIT, MICH.

ESTIMATIONS OF MINUTE QUANTITIES OF EPINEPHRIN IN ANESTHETIC HYPODERMIC TABLETS.

BY TORALD SOLLMANN.

The chemical assay of such tablets is apt to be unsatisfactory, partly because of the small quantities involved, but mainly because the color-reactions of epinephrin are not always reliable in the presence of other substances.

A biologic assay is much more rapid, and possesses very fair accuracy. The most suitable quantitative method for this purpose consists in the intracutaneous injection of a dilute solution into the skin of the human forearm. The quantity of epinephrin is judged by the extent, intensity and duration of the blanching, as compared with the effects of a known solution, injected at the same time. If the solution contains an anesthetic, the quantity of epinephrin may also be judged by the duration of the anesthesia. This is a useful check on the blanching.

The solution should be very dilute. In my experiments I employed a dilution of epinephrin of 1 : 800,000. This was easily distinguishable from a dilution of 1 : 1,600,000. Other skins may do better with somewhat different concentrations. The dilutions should be made with a boiled 1 percent solution of sodium chloride.

The method of injection is simple. One or 2 Cc. are drawn into a Luer syringe, having a very fine needle. The skin of the inner surface of the forearm is cleansed with a pledget of cotton moistened with alcohol. The point of the needle is thrust *into*, not under, the skin, holding the needle at a very slight angle. Enough of the solution (about 0.2 to 0.4 Cc.) is injected to raise a wheal of about 7 mm. diameter—the exact quantity or size of the wheals is not very important, if all are made nearly alike. Three injections are made of each solution, across the arm. The next solution is then injected in the same manner, about an inch distant. The sensation is tested with a bit of cotton, twisted to a point. A sketch is made of the area of blanching. The observations are repeated at intervals first of 5 minutes, later of 10, 20 and 30 minutes, until a fair comparison is secured. It is advisable to make one of the known solutions of the same strength as the sample to be tested, and another of one-half this strength.

The injections are practically painless, but the skin may remain slightly swollen and hardened for some days.

DEPARTMENT OF PHARMACOLOGY,
MEDICAL SCHOOL, WESTERN RESERVE UNIVERSITY,
CLEVELAND.