"The Composition and Assay of Diacetyl-Morphine Chloride and Heroin Chloride," by R. T. Harris and A. M. Clover; "The Analysis of Cigarettes, Cigars and Tobacco, and the Use of Lloyd's Reagent in the Determination of Nicotine," by Azor Thurston; "The Structural Variation of Allspice," by Dr. William Mansfield; "Cannabis Sativa, Is the Medicinal Value Found Only in the Indian-Grown Drug?" by H. G. Hamilton; "The Pharmacognosy of the Medicinal Rhamnus Barks," by Prof. E. N. Gathercoal; "Notes on the Estimation of Morphine and on Lloyd's Reagent," by H. M. Gordin and J. Kaplan; "Notes on a Glycerin "Substitute," by Joseph Feil; "Notes on a New Alkaloid found in Nux Vomica," by Hugo H. Schaefer.

The hour being late it was voted that the remaining papers be considered as read by title and that they be referred for publication.

On motion of Mr. Kirschgessner it was voted to dispense with the formal installation of officers, and that they be considered as installed in office.

Voted to adjourn.

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## THE DETERMINATION OF GLYCERIN IN TABLETS AND CONFECTIONS.

LEROY FORMAN.

At the present time the use of glycerin tablets and confections is very great. Upon consulting a number of journals, as well as chemical literature, we find no work of any kind reported upon this class of preparations, which are sold largely through the drug trade.

It is a well recognized fact that glycerin taken in this form has a very soothing effect for irritations of the throat and bronchial tubes.

This investigation was entered upon because there is no available literature on this class of tablets, and, secondly, it was considered as necessary for tablets sold as "Glycerin tablets," to contain an appreciable amount of glycerin, as it is for any medicated tablet to contain an appreciable amount of the chief active constituent for which it is named.

Samples of six different popular brands of such tablets, were purchased in drug stores, two of these samples being plain glycerin tablets, one, honey and glycerin, and three, menthol and glycerin.

The official method of the A. O. A. C. was tried for the estimation of glycerin, but in evaporating the solution, obtained by dissolving the tablets in water, to such a small volume as the A. O. A. C. directs, some glycerin was probably lost, due to the very slow evaporation after the solution had obtained a syrupy consistency, which results when the volume is about 25-30 cc. But if milk of lime is added at this time, the resulting mixture can be evaporated to a stiff paste, which can then be carried through the regular A. O. A. C. procedure. The complete method used is as follows:

Enough tablets were taken to weigh about 5 grammes, these were dissolved in water, evaporated to syrupy consistency, 15 cc. of milk of lime added and the

mixture evaporated to a thick paste, stirring frequently to prevent it from drying hard on sides of dish. This mass was then rubbed in smooth paste with 5 cc. of water, 45 cc. absolute alcohol was added, heated to incipient boiling, and heavy particles allowed to settle. The supernatant liquid was then transferred to filter, and dish and filter washed with 95% alcohol until filtrate measured 150 cc. This was evaporated on a water bath at 85° to a syrupy consistency. This residue was taken up with 10 cc. absolute alcohol, transferred to 50 cc. graduated cylinder and the dish washed with two 5 cc. portions of absolute alcohol and transferred to the cylinder; then 30 cc. of anhydrous ether were added in 10 cc. portions and shaken thoroughly after each addition.

This was allowed to stand until perfectly clear, then decanted through a dry filter, and the cylinder and filter washed with 25 cc. of alcohol-ether mixture in above proportions. This was then evaporated to 5 cc., 20 cc. of water added and evaporated to 5 cc., 10 cc. water added and again evaporated to 5 cc. This was transferred to a 50 cc. volumetric flask, the beaker washed with hot water, then freshly precipitated silver carbonate (0.1 gm. silver sulphate, plus excess sodium carbonate), was added. The mixture shaken frequently during ten minutes, then 0.5 cc. basic lead acetate was added and again shaken frequently during ten minutes and made up to mark.

Twenty-five cc. of the filtrate was placed in a 250 cc. flask, 1 cc. concentrated sulphuric acid added, to precipitate excess of lead, then 30-40 cc. strong bichromate solution (7.5 gm. potassium bichromate and 15 cc. concentrated sulphuric acid per 100 cc.), and 24 cc. concentrated sulphuric acid, and the mixture placed in boiling water bath for 25 minutes. Make up to mark, cool, take aliquot of 20 cc., dilute with 50-70 cc. water and titrate excess of bichromate with ferrous ammonium sulphate solution (30 gm. per liter and 50 cc. sulphuric acid).

Standardize ferrous ammonium sulphate solution against a 1-20 dilution of bichromate solution, then calculate glycerin, by finding excess of bichromate in oxidized glycerin solution. The number of cubic centimetres of strong bichromate added, minus excess found after oxidization, multiplied by 0.01 gm. equals weight of glycerin in the 25 cc. purified solution used. This multiplied by two gives total weight of glycerin. Then percentage is then calculated as usual. The following table shows results of the examination:

| Kind of Tablet | Wt. each Tablet | % Glycerin | Wt. Glycerin per Tablet |
|---|---|---|---|
| 1. Plain Glycerin | 5.46 gm. | 3.13 | 0.1708 gm. |
| 2. Menthol and Glycerin | 1.50 gm. | 1.00 | 0.015 gm. |
| 3. Menthol and Glycerin | 1.44 gm. | 1.09 | 0.0156 gm. |
| 4. Menthol and Glycerin | 1.48 gm. | 0.98 | 0.0146 gm. |
| 5. Plain Glycerin | 2.33 gm. | 13.60 | 0.3168 gm. |
| 6. Honey and Glycerin | 3.29 gm. | 12.07 | 0.397 gm. |

The above results indicate that of the six samples examined, but two (numbers 5 and 6) are really entitled to the use of the word "Glycerin" in an unqualified form in the title.