physicians order much of this material because of a lack of confidence in their ability to write prescriptions for wanted drugs in equally acceptable forms. Hospital formularies would help some hospitals to cut down on unusually high drug charges to patients if the use of such publications could be inaugurated. Improvement in inadequate formularies now in use in some other institutions, with aid to the hospital interne as a guiding principle, should provide some of us with additional opportunities for service.

A FURTHER STUDY OF TINCTURE OF CANTHARIDES.*

BY L. M. OHMART[1] AND E. T. MORGAN.

At the 1936 meeting of this ASSOCIATION, the senior author submitted a paper entitled "A Preliminary Study of Tincture of Cantharides" (1) to the Section on Practical Pharmacy and Dispensing. The paper reviewed the changes which have been made in the official formula for this preparation in the attempt to devise a method of preparation and a menstruum which would yield a satisfactory tincture.

The investigations of Squibb (2), Scoville (3, 4, 5, 6), Nitardy (7, 8, 9) and Eberhardt (10) were briefly reviewed. As a result of these investigations, notably those of Scoville, the menstruum for the present official tincture contains 10% by volume of glacial acetic acid. Numerous criticisms of the present official preparation have been voiced, chiefly on account of its strong acetous odor. Because of these criticisms, the senior author undertook to devise a method which would yield a preparation free from these objections. The earlier paper reported the results obtained from thirteen experimental tinctures. It was found, as earlier investigators had reported, that alcohol was unsuitable as a menstruum; that mixtures of alcohol and glacial acetic acid gave better results; that a menstruum containing 10% of the acid was better than those of lower concentration. It was further found that mixtures of hydrochloric acid and alcohol were superior to mixtures of glacial acetic acid and alcohol in the extraction of cantharidin. The official process of maceration was found to be superior to the official process of percolation as a method of extraction for cantharides. To confirm the results previously obtained, and to establish the minimal concentration of hydrochloric acid in alcohol as a menstruum for tincture of cantharides, the present study was undertaken.

EXPERIMENTAL.

Two lots of cantharides were procured and were assayed by the U. S. P. method. Drug A, a fine powder, yielded 0.803% of cantharidin. Drug B, a fine powder, yielded 1.029% of cantharidin. Fourteen tinctures were prepared from Drug A and were assayed according to Scoville's (4) modification of the method of Self and Greenish (11). The methods of preparation, menstruum used and assay results are shown in Table I.

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TABLE I.

Method.	Menstruum.	Cantharidin Content. Maximum 0.0803 Gm.	Percentage of Extraction.
1 Percolation	Alcohol + 0.25% HCl*	0.0623 Gm.	77.5%
2 Percolation	Alcohol + 0.50% HCl	0.0613 Gm.	76.3%
3 Percolation	Alcohol + 0.75% HCl	0.0695 Gm.	87.0%
4 Percolation	Alcohol + 1.00% HCl	0.0711 Gm.	88.5%
5 Percolation	Alcohol + 1.50% HCl	0.0648 Gm.	80.7%
6 Percolation	Alcohol + 2.00% HCl	0.0628 Gm.	78.2%
7 Percolation	Alcohol + 2.50% HCl	0.0617 Gm.	76.8%
8 Maceration	Alcohol + 0.25% HCl	0.0641 Gm.	79.8%
9 Maceration	Alcohol + 0.50% HCl	0.0587 Gm.	73.1%
10 Maceration	Alcohol + 0.75% HCl	0.0728 Gm.	89.9%
11 Maceration	Alcohol + 1.00% HCl	0.0713 Gm.	88.6%
12 Maceration	Alcohol + 1.50% HCl	0.0541 Gm.	67.3%
13 Maceration	Alcohol + 2.00% HCl	0.0486 Gm.	60.4%
14 Maceration	Alcohol + 2.50% HCl	0.0593 Gm.	73.8%

* Percentages are of the absolute acid.

While a menstruum of hydrochloric acid and alcohol is equal to or superior to one of glacial acetic acid and alcohol in its power to extract cantharides, there are two objections to its use. It extracts a considerable quantity of material which is deposited on standing and bottles in which tinctures made with this menstruum are stored soon acquire a coating which is unsightly.

Further investigation was undertaken in the hope of discovering a menstruum which would provide a tincture free from these objections while efficiently extracting the cantharidin. A menstruum of lactic acid and alcohol was chosen for these experiments. Ten tinctures were prepared from Drug B and were assayed by the method before stated. The methods of preparation, menstruum used and assay results are shown in Table II.

TABLE II.

Method.	Menstruum.	Cantharidin Content. Maximum, 0.1029 Gm.	Percentage of Extraction.
1 Percolation	Alcohol + 1% $CH_3 \cdot CHOH \cdot COOH$*	0.0939 Gm.	91.3%
2 Percolation	Alcohol + 2% $CH_3 \cdot CHOH \cdot COOH$	0.0867 Gm.	84.3%
3 Percolation	Alcohol + 3% $CH_3 \cdot CHOH \cdot COOH$	0.0987 Gm.	95.9%
4 Percolation	Alcohol + 4% $CH_3 \cdot CHOH \cdot COOH$	0.0925 Gm.	90.0%
5 Percolation	Alcohol + 5% $CH_3 \cdot CHOH \cdot COOH$	0.0936 Gm.	91.0%
6 Maceration	Alcohol + 1% $CH_3 \cdot CHOH \cdot COOH$	0.0794 Gm.	77.2%
7 Maceration	Alcohol + 2% $CH_3 \cdot CHOH \cdot COOH$	0.0920 Gm.	89.4%
8 Maceration	Alcohol + 3% $CH_3 \cdot CHOH \cdot COOH$	0.0899 Gm.	87.4%
9 Maceration	Alcohol + 4% $CH_3 \cdot CHOH \cdot COOH$	0.0885 Cm.	86.1%
10 Maceration	Alcohol + 5% $CH_3 \cdot CHOH \cdot COOH$	0.0850 Gm.	82.6%

* Percentages are of the absolute acid.

The tinctures obtained in the foregoing experiments were brilliant liquids of a brownish green color. No deposition had occurred after two months and their brilliancy was unimpaired. No foreign odor was perceptible. In all of the experiments reported in this paper, in which the process of percolation was employed, the drug was mixed with five times its weight of purified sand and the percolation was allowed to proceed at a very slow rate. Subject to these modifications, the process of percolation was found to be superior, in most cases, to the process of maceration in extracting cantharides.

SUMMARY AND CONCLUSIONS.

1. A paper on this subject, presented by the senior author in 1936, is briefly reviewed.

2. Experiments were conducted in an attempt to confirm the results previously reported and to determine the optimum concentration of hydrochloric acid in a menstruum for tincture of cantharidin.

3. The optimum concentration of hydrochloric acid was found to be approximately 1% of the absolute acid.

4. Certain objectionable features of tinctures in which hydrochloric acid had been used led to further investigation.

5. A menstruum of lactic acid and alcohol was found to be fully as efficient as one of hydrochloric acid and alcohol and the tinctures so prepared were not objectionable in odor or appearance.

6. The optimum concentration of lactic acid was found to be approximately 3% of the absolute acid.

7. A modified process of percolation was found to be superior to the process of maceration in extracting cantharides.

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THE VALUE OF VARIOUS PROMOTIONAL METHODS FOR PRESCRIPTION PHARMACIES.*

BY M. A. CHEHAK.[1]

In a discussion of promotional methods for prescription pharmacies, it is first necessary to reminisce and visualize the tremendous change that has taken place in Pharmacy as a whole within the last twenty years. Considering that Pharmacy is one of the oldest professions, it is only within the last few years that the pharmacist has made any concerted effort to prove his service in the interest of public health to the public. The layman is aware of the division of professional pharmacy and commercial pharmacy, but it seems that the pharmacist has been a little lax in his professional promotional efforts.

I am sure if we, as professional pharmacists, will take the physician's viewpoint as to what he considers ethical promotional methods, the problem will not seem so difficult. In directing our promotional work the physician's viewpoint has always been uppermost in our minds.

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