

led to improvement of this preparation by addition of glycerol. We observe the steady improvement of the final stage; the curve moves to higher and higher degrees of sliding ability.

#### GENERAL SURVEY.

The experiments herein described show that the apparatus used, gives in an excellent manner information on certain mechanical properties of Creams, Emulsions, lubricating materials, etc. No doubt this may be of some importance in

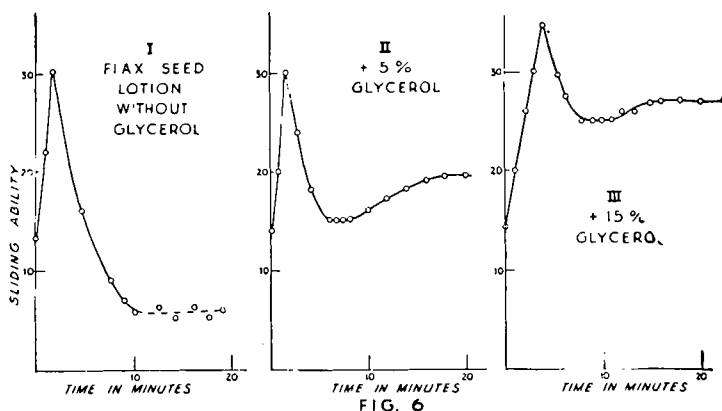


FIG. 6

technology, especially as to cosmetics. By means of it, it will be possible to get information within a few minutes concerning important mechanical properties of creams (*e. g.*, for massage purposes), objectively and reinforced by figures. Of course, besides the mechanical qualities, the specific, pharmacological and physiological effects upon the skin are of no less importance to the question of quality and adaptability of a cosmetic cream.

#### SUMMARY.

A method is described making it possible to characterize, objectively and numerically, the "sliding ability" of skin creams, lubricating and anti-friction materials, etc., and their very manifold and characteristic changes which take place upon continuous trituration.

A few examples of interest cosmetically are represented by curves.

### DRUG EXTRACTION. IX. THE EFFICIENCY OF REPERCOLATION FOR BELLADONNA ROOT AND NUX VOMICA.\*<sup>1</sup>

BY WILLIAM J. HUSA<sup>2</sup> AND C. L. HUYCK.

Although the process of repercolation has been known for many years there is practically no information in the literature giving definite data as to the efficiency of the U. S. P. X process of repercolation. The pioneer work of Squibb was con-

\* Scientific Section, A. P. H. A., Portland meeting, 1935.

<sup>1</sup> This investigation was aided by a grant from the AMERICAN PHARMACEUTICAL ASSOCIATION Research Fund.

<sup>2</sup> Head Professor of Pharmacy, University of Florida.

cerned with the now obsolete method of saving the weak percolates from one batch of drug and placing them in storage until the next time the fluidextract was to be prepared which might be a matter of months or years. The expense of storage, the idle investment in menstrua and the possibility of deterioration during storage are the chief factors responsible for the unpopularity of this method.

The work of Diehl, which was carried out during the same period as that of Squibb, dealt with a repercolation process for half-strength fluidextracts. There was some agitation at that time for use of 50 per cent fluidextracts based on the claim that such fluidextracts could be made by the retail druggist, while the adoption of 100 per cent fluidextracts would throw the preparation of fluidextracts into the hands of the large manufacturers. However, the 50 per cent fluidextracts were not adopted and hence the work of Diehl has little application to present-day repercolation.

In later studies by Army and Oxley (1) the repercolation process did not appear to give favorable results. This was judged from the fact the repercolation of gentian did not in most cases give a product that contained as much total extractive as did simple percolation with evaporation of the weak percolates. Scoville (2) stated that on the basis of his experience repercolation could be used with excellent results with drugs which percolated easily such as capsicum and resinous drugs in general.

As an advantage of the repercolation process, it has been stated (3) that a weak solution of the extractive of a drug is usually a better solvent for the active constituents than the original menstruum.

In order to throw some light on the exact efficiency of the U. S. P. X repercolation process, experiments have been conducted with belladonna root and nuxvomica.

#### EXPERIMENTAL PART.

*Fluidextract of Belladonna Root.*—Using belladonna root in No. 40 powder (assaying 0.43% alkaloids) a 1000-cc. portion of fluidextract was prepared, following the U. S. P. X directions for making fluidextracts by Type Process C (repercolation). The assays showed that 1000 cc. of finished fluidextract contained 4.6 Gm. of alkaloids and 87.7 Gm. of total extractive. These results show that repercolation was successful for belladonna root. In fact the quantity of alkaloids based on the assay of the powdered drug should have been only 4.3 Gm. This difference is probably not entirely an experimental error since in previous work it has been found (4) that extraction with the official menstruum gives slightly higher results in alkaloids than can be obtained in the official assay using ether-chloroform mixture.

In order to check up on the quantity of alkaloids in the separate reserve portions these were assayed with results as shown in Table I.

TABLE I.—ASSAY RESULTS ON RESERVE PORTIONS OF FLUIDEXTRACT OF BELLADONNA ROOT

	Gm. Alkaloids.	Gm. Total Extractive.
200 cc. reserve portion	1.2	15.9
300 cc. reserve portion	2.1	30.5
500 cc. reserve portion	1.3	43.8
Total	4.6	90.2

Some of the experimental details of this experiment are as follows: The 500-Gm. portion of the drug was moistened with 300 cc. of menstruum; the time of percolation was 18 hours for the

reserve portion and 8, 10, 7 $\frac{1}{2}$ , 7 $\frac{1}{2}$  and 7 $\frac{1}{2}$ , respectively, for the successive weak percolates. The 300-Gm. portion of drug was moistened with 180 cc. of weak percolate and the reserve portion was collected in 25 $\frac{1}{2}$  hours, the time of percolation for the successive weak percolates being 5, 7, 7 and 6 hours, respectively. The 200-Gm. portion of drug was moistened with 120 cc. of weak percolate and the reserve portion was collected in 35 hours.

*Repercolation of Nux Vomica.*—Using nux vomica in No. 40 powder (assaying 2.3% alkaloids) a 1000-cc. portion of fluidextract was prepared. The U. S. P. X repercolation process was used with menstrua as follows: Menstruum I: acetic acid 100 cc., water 150 cc., alcohol 750 cc.; Menstruum II: alcohol 3 volumes, water 1 volume. Five-tenths of the acetic acid were used for the 500 Gm. portion of drug, and three-tenths and two-tenths for the 300-Gm. and 200-Gm. portions, respectively. The acid for the two latter portions was added to the first portion of weak percolate used as menstruum in each case. To keep the alcohol content the same, a volume of water equal to that of the acetic acid used for the last two portions was left out of Menstruum II. The rates of flow were as follows: 500-Gm. portion, 2 to 3 cc. per minute; 300-Gm. portion, 2 cc. per minute; 200-Gm. portion 1 to 2 cc. per minute.

The assays showed that 1000 cc. of finished fluidextract contained 21.9 Gm. of alkaloids and 128.8 Gm. of total extractive. Assays on the reserve portions are shown in Table II.

TABLE II.—ASSAY RESULTS ON RESERVE PORTIONS OF FLUIDEXTRACT OF NUX VOMICA.

	Gm. Alkaloids.	Gm. Total Extractive.
200 cc. reserve portion	4.9	28.3
300 cc. reserve portion	9.2	49.7
500 cc. reserve portion	7.9	50.2
Total	22.0	128.2

Repercolation was fairly successful for nux vomica as 1000 cc. of fluidextract contained 22.0 Gm. of the 23.0 Gm. of alkaloids shown to be present by assay of the drug.

#### SUMMARY.

Because of the lack of definite data in the literature as to the exact efficiency of the U. S. P. X repercolation process, experiments were carried out with two alkaloidal drugs. Repercolation was successful for fluidextract of belladonna root and fairly successful for fluidextract of nux vomica.

#### REFERENCES.

- (1) Arny and Oxley, *Proc. A. Ph. A.*, 58, 1104 (1910).
- (2) Scoville, discussion of paper by Arny and Oxley, reference (1).
- (3) Bennett and Cocking, "The Science and Practice of Pharmacy," Vol. I (1933), page 134.
- (4) Husa and Magid, *Jour. A. Ph. A.*, 23, 891 (1934).

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The service of pharmacy should be impressed on the public; omissions or misapplied credits are perhaps not intentional but result because the historians or biographers are not informed or do not appreciate the importance of the services rendered. Referring to Huxley—"He dared to utter that which he felt was true, and the strongest desire of his soul was that he might never compromise with error for the sake of mental ease, or accept belief simply because it was pleasant."