

weight. This sample of *Digitalis lutea* shows potency, when assayed by the frog method, equal to but no greater than *Digitalis purpurea*, of which a considerable number of samples tested showed from 100 to 170% of the U. S. P. activity requirements.

An effort was made to determine the possibility of purchasing *Digitalis lutea* in the New York crude drug market. We inquired of most of the leading crude drug houses and found that they were unable to furnish this variety. However, we considered it desirable to find a means of distinguishing *Digitalis lutea* from *Digitalis purpurea*, and it is apparent that the U. S. P. assay is of no value in this respect.

In order to observe pharmacognostic differences under the microscope a portion of the *Digitalis lutea* sample, as received from the University of Minnesota, and a portion of the official variety of *Digitalis* were reduced to a No. 60 powder and examined under the microscope. Only on careful examination and comparison were we able to observe the differences mentioned below. The U. S. P. IX and U. S. P. X descriptions of *Digitalis* do not eliminate *Digitalis lutea*.

*Digitalis lutea.*

*Multicellular, uniseriate, non-glandular hairs.*

Less numerous than in *Digitalis purpurea*. The cells of the hairs appear to be more often collapsed. The apex of the hair is more blunt than that of *Digitalis purpurea*.

*Digitalis purpurea.*

Appear to be more numerous in this species. The walls of the hair cells are comparatively much thicker and the apex is more acute. Due to the thicker cell walls, the space between the cells is much greater than that observed in *Digitalis lutea*.

*Stomata.*

In this variety the two guard cells are more elongated and form an elliptical outline. Neighboring cells are much larger. The walls are thicker, very angular and very irregular.

The two cells composing the breathing pore of the leaf form almost a circle in outline. The surrounding or neighboring cells have thin walls and are smooth and wavy, also much smaller than those found in *Digitalis lutea*.

*Conclusions.*—Our work has shown that *Digitalis lutea* is not superior in activity to *Digitalis purpurea*. When tested by the U. S. P. IX frog method the physiological activity of the former was found to be similar to that usually possessed by good samples of *Digitalis purpurea*, but lower than that occasionally found for the latter. It was found almost impossible to obtain any *Digitalis lutea* in the New York drug market. The U. S. P. X assay and description of *Digitalis* do not eliminate *Digitalis lutea*, but the *lutea* may be distinguished from the official variety by careful comparison under the microscope.

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## THE EPHEDRINE CONTENT OF EPHEDRA VULGARIS, VAR. HELVETICA.

BY R. E. SCHOETZOW AND G. H. NEEDHAM.

Upon assaying three lots of *Ephedra vulgaris*, var. *helvetica* by the method recommended by Chen,<sup>1</sup> the U. S. P. IX method for Belladonna Root, using methyl

<sup>1</sup> K. K. Chen, JOUR. A. PH. A., 14, 189 (1925).

red as indicator and the  $N/10$   $H_2SO_4$  factor of 0.016513 given by him for ephedrine, we found 0.403%, 0.632% and 0.863% alkaloids calculated as ephedrine. It may be mentioned that during the assays all precautions were taken against decomposition of the alkaloids by heat, etc., by not allowing the temperature at any time to be above 60° C. The botanical characteristics of these three lots of Ma Huang were found to be identical with the description given by Chen.<sup>1</sup>

The amount of ephedrine found is much greater than that reported by Chen<sup>1</sup> of 0.018 to 0.091% and much more comparable with the Masucci & Suto<sup>2</sup> findings of 0.305% and 0.515%.

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## THE EFFECT OF BENZOIC AND CINNAMIC ACIDS ON THE RATE OF DEVELOPMENT OF RANCIDITY IN LARD.\*

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Reference books are not in complete agreement in their statements as to which constituents of benzoin are effective in retarding the development of rancidity in lard. The British Pharmaceutical Codex (1) states that "the benzoic acid present in the benzoin acts as an antiseptic and prevents the lard from becoming rancid." The "National Standard Dispensatory" (2) ascribes the protective action to the benzoic acid and odorous principles. According to Ruddiman (3), "lard dissolves benzoic and cinnamic acids and volatile oil, all of which act as antiseptics, retarding rancidity."

In the present study, a search of the literature was made to find out what foundation there was for the statements quoted above, and experiments were carried out to determine the effect of benzoic and cinnamic acids on the rate of development of rancidity in lard.

### HISTORICAL REVIEW.

The use of benzoin in ointments originated in France. The original paper on this subject by Deschamps was published in the *Journal de Pharmacie et Chimie* in 1843, and an abstract of the work appeared in the *American Journal of Pharmacy* (4). The way in which the discovery was made can best be understood by a brief quotation translated (4) from Deschamps' own words, as follows: "Struck with the very slight alteration which poplar ointment undergoes, I thought its preservation was owing to the resinous matter which the grease drew from the poplar buds; hence it occurred to me that the portion of benzoin soluble in grease, would likewise prevent its alteration, and an agreeably aromatized ointment be obtained." Deschamps reported that poplar buds were more effective than benzoin, but their use was not recommended except for colored ointments because they imparted an orange color to the ointment. These results were verified in 1863

<sup>1</sup> K. K. Chen, *JOUR. A. PH. A.*, 14, 189 (1925).

<sup>2</sup> *JOUR. A. PH. A.*, 15, 748 (1926).

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