

LITERATURE CITED.

- (1) Small, J. K., "Flora of the Southeastern United States," 962 (1903).
 - (2) Gray, Asa, "Synoptic Flora of North America," 211 (1886).
 - (3) Pardo de Tavera, T. H., "Medicinal Plants of the Philippines," 175 (1901).
 - (4) Grisebach, A. H. R., "Flora of the British West Indies Islands," 470 (1864).
 - (5) Dymock, W., *Pharm. J.*, 7, 110 (1876).
 - (6) Schimper, A. F. W., "Plant Geography upon a Physiological Basis," 182, 388 (1903).
 - (7) Campbell, D. H., "Outline of Plant Geography," 216 (1926).
 - (8) Guppy, H. B., "Observations of a Naturalist in the Pacific between 1896 and 1899,"
- II. "Plant Dispersal," 20, 110, 572 (1906).
- (9) Dragendorff, G., "Die Heilpflanzen," 554 (1898).
 - (10) "The Indian Materia Medica," Ed. by Nadkarni, K. M., 471 (1927).
 - (11) Dragendorff, G., "Qualitative and Quantitative Plant Analysis," 8, 31, 38 (1883).
 - (12) Rosenthaler, L., "The Chemical Investigation of Plants," 31-35 (1930).
 - (13) *Ibid.*, 22-27.
 - (14) Power, F. B., and Rogerson, H., *Am. J. Pharm.*, 80, 253 (1908).
 - (15) Rosenthaler, L., *Loc. cit.*, 74.
 - (16) Lewkowitsch, J., "Chemical Technology and Analysis of Oils, Fats and Waxes,"
- I, 615 (1921).
- (17) Beilstein, F. K., "Handbuch der Organischen Chemie," Supplement, I, 729 (1928).
 - (18) Sandqvist, H., and Bengtsson, E., *Ber. Chem. Ges.*, 64, 2167 (1931).
 - (19) Schmidt, J., and Klein, G., "Handbuch der Pflanzenanalyse," II, Spezielle Analyse,
- 392 (1932).
- (20) Jamieson, G. S., "The Vegetable Fats and Oils," 294 (1932).
 - (21) Richter, M. M., "Lexikon der Kohlenstoff Verbindungen," IV, 4539 (1912).
 - (22) Mulliken, S. P., "The Identification of Pure Organic Compounds," I, 56 (1904).
 - (23) Abderhalden, E., "Biochemisches Handlexikon," I, 1022 (1911).
 - (24) Rosenthaler, L., *Loc. cit.*, 81.
 - (25) Schmidt, J., *Loc. cit.*, 390.
 - (26) *Ibid.*
 - (27) Willstatter, R., and Stoll, A., "Investigations on Chlorophyll," 131 (1928).

PREPARATION OF RESIN OF PODOPHYLLUM.*

BY A. H. UHL.¹

According to Lloyd (1), King was the first to have prepared the so-called resin of Podophyllum. The discovery was accidental. Its precipitation resulted when the hydroalcoholic extract was mixed with an infusion of the same drug (2). The earlier work on the "resin" threw no light on its chemical composition except in so far as the observation of its solubility in hot water caused Maisch to express the opinion that it was not a true resin (3). As the therapeutically important constituent of the drug, its preparation and its properties received special attention, more particularly when, in 1860, the resin of Podophyllum was made official in the United States Pharmacopœia.

EXPERIMENTAL.

The powdered dried roots and rhizomes of *Podophyllum peltatum* were extracted to exhaustion with 95 per cent alcohol in a Lloyd extractor. A portion of the alcohol was recovered leaving a syrupy, nearly black extract. On standing over night a greenish oily-looking material

* Presented before the Scientific Section, New York meeting, 1937.

¹ Director, University of Wisconsin, School of Pharmacy.

separated. To remove this material and obtain any additional material which might not have separated, the extract was washed several times with petroleum ether. This removed the oily substance.

The concentrated alcoholic extract was slowly poured into a 1 per cent hydrochloric acid solution which had been cooled to 10°. The precipitate thus obtained was washed three times by decantation, placed on a force filter and sucked dry, finally washed well with cold water. The product was allowed to dry at room temperature. It was noted that the dried product prepared in this manner did not agglutinate when allowed to stand in a warm room. Inasmuch as fatty material as well as the resin is precipitated when the concentrated alcoholic extract is poured into acidulated water, it seems desirable to remove the fat previous to the precipitation of the resin. The resin thus prepared answered all the requirements of the U. S. P. XI, and of the several batches prepared at various times, not once did coalescence or agglutination appear.

REFERENCES.

- (1) *Am. J. Pharm.*, 62, 378 (1890).
- (2) J. U. Lloyd (*Am. J. Pharm.*, 62, pages 242, 386, 605) has pointed out that the substance obtained by Hodgson (*Am. J. Pharm.*, 3, page 273) from the dried root by the use of hot water, cannot be the same substance that is now obtained by the extraction with alcohol. He gives King the credit for being the first to obtain and recognize the true resin in 1835. (See King's letter to Lloyd, above reference.) Power (*Proc. A. Ph. A.*, 25, 420 (1877)) decided from his own researches that the substance obtained by Hodgson could have been none other than the resin as we now know it. He considers the inactivity of Hodgson's product to be due to the observed effect of alkalis upon the resin in diminishing the activity. Abenthy (*Am. J. Pharm.*, 33, 299 (1861)) followed in detail the method of Hodgson, and showed that the product contained a certain amount of the active property of the drug.
- (3) *Am. J. Pharm.*, 46, 231 (1874).

PHARMACODYNAMICS OF THE CARDIOACTIVE PRINCIPLES OF URGINEA MARITIMA (SQUILL).*

BY DAVID ROBERT CLIMENKO, M.D., PH.D.

Squill (*Urginea maritima*) has played a peculiar rôle in the therapeutic armamentarium. The ancients regarded it as one of their most thoroughly understood drugs and accorded it a high place among their therapeutic agents. It was familiar to the Egyptian, the Arabian and the Greek schools of medicine, and descriptions of it are to be found in the Ebers papyrus, in the works of Epimenedes, Dioscorides, Hippocrates and Galen. The drug did not survive the classical period and fell into complete desuetude during the middle ages. But it is not the purpose of this study to discuss the history of the use of this drug, accounts of which may be found in the works of Joz (1), Chamberlin and Levy (2) and Scheer and Sigerist (3).

It is not difficult to account for the almost complete abandonment of this once highly respected drug. The crude substance contains an extremely variable concentration of therapeutically active principle together with a mass of highly irritating resinous substances. The presence of these irritants makes it almost impossible to administer a therapeutically effective dose without inducing nausea, diarrhoea and irritation of the upper respiratory tract. The isolation of the cardioactive principles from squill started with the pioneer work of Vogel (4) who, in 1812, described "scillitine" and Thomson (5) who described "scillitite" in 1831. It was

* From the Pharmacological Laboratory, Calco Chemical Company, Inc., Bound Brook, N. J.