and 3 mm. in thickness. From the general resemblance of this root to that of Brazilian Jalap and to that of Mexican Scammony, I would hazard the guess that it is from some plant closely allied to them and consequently from the morning glory family, the *Convolvulaceae*.

W. L. Scoville, who is working out the chemistry of the drug, has informed me that in so far as he can tell from the limited amount of work he has been enabled to give to it, it does not differ materially from the resin of Mexican Scammony except in its yellow color. Under the microscope the root structure differs from the Brazilian Jalap in having no rosette crystals or crystal fibers, in having a superabundance of starch, the grains being of a more uniform size of from 0.013 mm.–0.018 mm., the vessels being chiefly of the pitted type, wood fibers are plentiful and there is some bast fiber. In Brazilian Jalap, oil with refractive inclusions, perhaps oleoresin, was scarce and where present was arranged in masses, rather than in drops, in longitudinal lines, mostly in connection with the medullary ray cells; but most of the cells of the samples I had for examination were empty, while on the other hand in the *Resina Drastica* samples the cells were well filled with the products of metabolism and as in the case of the starch there was a superabundance of large drops of oil with its inclusions throughout the cortex. Wood fibers in this drug measure for the most part from 0.704 mm. to 0.892 mm. in length, about 0.02 to 0.03 mm. wide, the lumen being about $1/8$ the width of the cell.

MEXICAN SCAMMONY.

This drug is derived from the large tuberous roots of *Ipomoea Orizabensis* (Pell) Ledenois and is also known as Male or Orizaba Jalap. It resembles very closely the drug described above as *Resina Drastica*, but is somewhat lighter in color, extremes being as light on one hand as the Brazilian Jalap and as dark on the other as *Resina Drastica;* it is as fibrous as the latter but the strands usually are finer, sometimes longer, more numerous, and arranged more regularly in concentric circles or zones. Under the microscope it differs in no tangible way from the *Resina Drastica*. The resin obtained from this is black; whether or not the difference in the colors of the resins of this and of the *Resina Dratica* can be correlated with specific difference in the plants producing them can not now be determined.

DEPARTMENT OF BOTANY,
PARKE, DAVIS & CO.,
DETROIT, MICH.

PIPTOSTEGIA ROOT, PIPTOSTEGIA PISONIS MART., SO-CALLED "BRAZILIAN JALAP."*

BY CLARE OLIN EWING AND JOSEPH F. CLEVENGER.

An importation recently offered for entry as "Jalap" proved, upon investigation, to be the root of *Piptostegia Pisonis* Mart., which Holmes[1] refers to as "the ordinary jalap of Brazil." We are also in receipt of a personal communication from Mr. H. M. Curran, a forester in Brazil, in which he quotes a Bahai druggist

* Contribution from Pharmacognosy Laboratory, Bureau of Chemistry, Department of Agriculture, Washington, D. C.

[1] "Brazilian Jalap," *Pharm. J.*, **95**, 671 (1915).

as stating "that it is jalap of this region." The product, however, is not a true jalap, and we have preferred to call it *Piptostegia* root, in order to avoid, if possible, a confusion of names in the trade, such as exists, for example, in the case of Scammony and the so-called Mexican Scammony. *Piptostegia* root occurs in commerce in the form of transverse circular or oval sections, varying from about 3 to 8 cm. in diameter and from about 0.3 to 0.8 cm. in thickness. The pieces are marked with several concentric rings, and, aside from the pale grayish brown tint and the presence of numerous dots of translucent pale resin on the surface, bear considerable resemblance to commercial white bryony root (Fig. 1). Holmes has already (1915) noted the appearance of this drug upon the English market, and has stated that "Brazilian jalap has evidently for some time past been imported into Germany as cheap source of jalapin—*i. e.*, the portion of jalap resin which is insoluble in ether." Experiments made upon his sample by Passmore showed "over 20 percent of resin answering to all of the B. P. and U. S. P. (VIII) tests for the resin of true or Vera Cruz jalap, but only 0.85 percent is soluble in ether." Holmes concludes that: "As a source of jalapin (resin of jalap insoluble in ether) it is therefore twice the value of the Vera Cruz jalap, since it contains twice the standard quantity of resin required by the B. P."

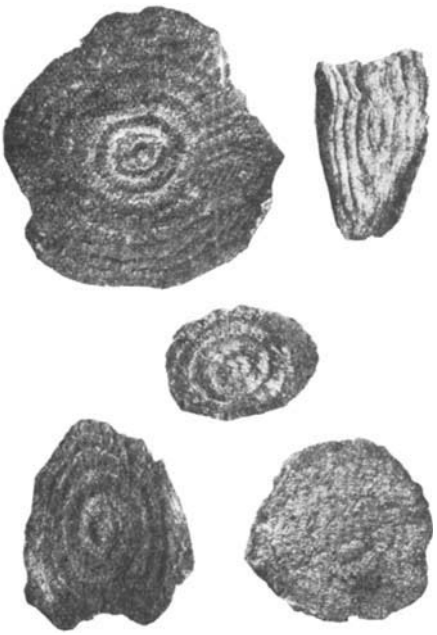

FIG. 1—*Piptostegia Pisonis* × 1/2

Some preliminary experiments, while confirming Passmore's report as to the resin content of *Piptostegia Pisonis*, and indicating that the drug possesses considerable cathartic power, yet show clearly that the resin is quite dissimilar to that of jalap, and that the term "jalapin" is incorrectly applied to it.

According to Power and Rogerson[1] "the chief portion of jalap resin which is insoluble in ether" is "commonly designated as 'convolvulin,'" although "in English pharmacy the portion of jalap resin which is insoluble in ether is still frequently designated by the original and more appropriate name 'jalapin.' The latter term, however, is now more commonly employed to denote the resin of Scammony and of Mexican Male jalap (*Ipomoea Orizabensis* Ledanois)," both of which are largely soluble in ether. The resin of *Piptostegia* root, it is true, is mostly insoluble in ether, but the following experiments clearly demonstrate that the term "jalapin," indefinite as this term is, is improperly applied to it.

Ten grammes of *Piptostegia* root in No. 60 powder, when assayed by the U. S. P. method for jalap, yielded 2.3 grammes of resin, or 23 percent. A larger amount of the resin was then prepared according to the U. S. P. method for the preparation of resin of jalap. The product was light tan colored, amorphous powder

[1] "Chemical Examination of Jalap," *J. Am. Chem. Soc.*, **32**, 80 (1910).

which complied with all the U. S. P. requirements for resin of jalap, with the exception of a slightly excessive acidity and the formation of a dirty greenish solution in five parts of ammonia water (10 percent). It may, furthermore, be distinguished from the resin of jalap by means of the specific rotation of the respective purified resins, as suggested by Guigues[1] and by means of the method of fractional extraction with various solvents, as employed by Power and Rogerson in their work on various convolvulaceous resins.

The specific rotation of the resin of *Piptostegia* root, purified by treatment with animal charcoal according to the method of Guigues, proved to be —48.5°, whereas that of true resin of jalap is reported to be in the neighborhood of —36° or —37°.[2]

Further confirmation that the resin from *Piptostegia* root is not identical with that obtained from jalap, was obtained by a fractional extraction of the resin according to the method followed by Power and Rogerson in their work upon a number of convolvulaceous resins. For the purpose of comparison our results are tabulated, together with those obtained by Power and Rogerson in their examination of resins of jalap (*Exogonium purga* Bentham),[3] scammony (*Convolvulus scammonia* Linne),[4] "Mexican Scammony" (*Ipomoea Orizabensis* Ledanois),[5] and common morning glory (*Ipomoea purpurea* Roth),[6] all of which contain active purgative resins.

PROPORTION OF RESINS EXTRACTED BY VARIOUS SOLVENTS, AND SPECIFIC ROTATION OF THE PURIFIED RESINS.

	Piptostegia Root.	Jalap.	Scammony.	Mexican Scammony.	Morning Glory.
Petroleum (b. p. 40°–60°)	2.1%	1.9%	4.5%	6.2%	8.0%
Ether	5.4%	9.7%	92.5%	64.8%	7.3%
Chloroform	73.4%	24.1%	0.4%	0.6%	9.8%
Ethyl acetate	14.2%	22.0%		24.8%	23.8%
Alcohol	4.7%	38.8%	1.8%	2.3%	49.0%
Specific rotation	—48.5°	—37.0°	—19.87°	—23.05°	—50.95°

An inspection of the above figures shows the dissimilarity of the resin of *Piptostegia* root from all the other convolvulaceous resins noted, the proportion extracted by chloroform being especially remarkable.

One-half gramme and one gramme samples of the crude resin were submitted to Dr. Schwartze, of the Pharmacological Laboratory of this Bureau, who administered them to two dogs, weighing about 15 kilos each. The larger dose produced emesis after about three-quarters of an hour, the dog showing no other symptoms, and no cathartic action was obtained. The other dog, however, retained

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[1] "Résines de Scammonée," *J. pharm. chim.*, [6] **22**, 246 (1905). "Analyse des résines de scammonée," *Bull. soc. chim.*, [4] **3**, 877 (1908).

[2] Guigues: *Loc. cit.* Cowie: "Optical Rotation in the Assay of Jalap, Scammony Orizaba and Tampico Resins," *Pharm. J.*, **82**, 89 (1909). Power and Rogerson: *Loc. cit.*, 85.

[3] *Loc. cit.*, 85.

[4] "Chemical Examination of Scammony Root and of Scammony," *J. Chem. Soc. Trans.*, **101**, 402–3 (1912).

[5] "Chemical Examination of the Root of *Ipomoea Orizabensis*," *Ibid.*, **101**, 8 (1912).

[6] "Chemical Examination of *Ipomoea purpurea*," *Amer. J. Pharm.*, **80**, 254 (1908).

the smaller dose, which produced catharsis within about four hours, the movements continuing for two days at about the rate of two or three per day.

Although lack of sufficient material has prevented us at the present time from making an extensive chemical study of this resin, similar to the investigations by Power and Rogerson of the other convolvulaceous resins noted above, we have deemed the facts thus far obtained to be worthy of record, inasmuch as they may serve to bring to the attention of the pharmaceutical and medical professions in this country a source of a new cathartic convolvulaceous resin of promising usefulness.

BORAX AND BORIC ACID.*

BY H. L. HARRIS.

The early history of borax is vague and uncertain. The word is of Arabic origin, and, as far as known, dates back only to the seventh century. Borax first came from the East. It is believed by many that it was brought by caravan from beyond China by way of Babylon and Palmyra to the Mediterranean ports, before the Christain era.

Sir Edward Bulwer Lytton, in "The Last Days of Pompeii," bears testimony to the value of borax in the days of the Republic. "Borax," says Sir Edward, "was largely used by Nero and his slaves nearly 2,000 years ago and Pansa deeply regretted that he was not rich enough to buy borax to cover the arena after the death of the combatants in the fight between Lydon and Tetraides."

It is only within the last three centuries that the chemical nature of borax has been understood. The green flame imparted to alcohol by free boric acid was first noticed by Geoffroy, a celebrated chemist, in 1732. In 1748 Baron discovered that borax was a sedative salt and soda. In 1818 Count Larderel discovered how to prepare boric acid from the lagoons of Tuscany and made a princely fortune by it. This boric acid was shipped to England and France and converted into refined borax by boiling in large pans and crystallizing in vats. About fifty years ago borate of lime was discovered in Chile, which also found its way to England. As far as is known, borax is found only in three States of the U. S., California, Nevada and Oregon.

The borax deposits in California are adjacent to the portion of the Mojave Desert called Death Valley. The history of Death Valley is found only in tradition.

In the year 1850 the number of parties of emigrants bound for California from the Eastern States was so great that their trains of wagons formed almost a continuous procession from the Missouri River to Salt Lake City, some going on the route which was afterward followed by the Central Pacific Railroad, while the rest struck down through Utah, Nevada and Southern California, through the Cajon Pass, for the regions of which Los Angeles was then, and is now, the metropolis. On reaching Salt Lake they struck off to the south, because the northern, or Truckee River, route had been traveled so much that feed and fuel (the land being a desert) were scarcer than to the south. There was nothing unusual about

* Parts of a paper read before Scientific Section, A. Ph. A., Indianapolis meeting, 1917.