

THE LEAVES OF *PENTSTEMON COBÆA*, NUTT.\*<sup>1</sup>BY LOYD E. HARRIS AND RUTH ANN CONNER.<sup>2</sup>

*Pentstemon cobæa*, Nutt., of the Scrophulariaceæ family, is commonly called



Fig. 1.—*Pentstemon Cobæa*. (Picture taken northeast of Norman, Okla., 1932.)

Beard-tongue (1), Cobacea (2) and Balmona (3). Nuttall discovered it in Arkansas in 1833 and named it *cobæa* in "Collection towards a Flora of the Territory of Arkansas" (4) in 1834. It is still widely distributed in calcareous soil from Missouri to Central Texas, where in the malarial districts its use for prevention of "the chills" is still practiced according to Indian custom. It is said to have been used in the Chickasaw nation as a cathartic. Some use the entire plant but the majority of the laity make a "tea" from either the freshly gathered or the dried leaves and take it in one teaspoonful doses as a tonic.

## EXPERIMENTAL.

The leaves were collected June 20, 1931, soon after flowering had ceased. Only leaves of the flowering stem were gathered as the basal leaves live all winter.

A sample collected in 1932 was used in a comparison of moisture determinations (5).

	Wt. of Sample.	Gm. Lost.	Per Cent Moisture.
1931	10.0038	0.9323	9.52
	10.0025	0.9590	9.58
1932	5.0	0.5055	10.11
	5.0	0.5044	10.08

Ash determinations according to the method of the Association of Official Agricultural Chemists gave the following results:

Wt. of Sample.	Total Ash.	Water-Sol. Ash.	Insol. Ash.
2.0 Gm.	8.36 per cent	2.75 per cent	5.61 per cent
2.0 Gm.	8.16 per cent	2.76 per cent	5.39 per cent

Extraction with selective solvents was carried out according to the method of Dragendorff (6), using some modifications, with the following results.

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Solvent.	Sample No. 1. 10.6594 Gm.	Sample No. 2. 11.6613 Gm.	Per Cent. Sample No. 1.	Per Cent. Sample No. 2.
Pet. ether	0.0445	0.0490	0.41	0.42
Ether	0.1445	0.1514	1.35	1.29
Alcohol	1.7427	1.9054	16.34	16.34
Water	2.0050	2.1970	18.81	18.97
Dil. alkali (2 per cent)	2.3710	2.5890	22.25	22.21
Dil. acid (1 per cent)	1.3222	1.4824	12.42	12.37
Crude fibre	1.7830	1.9292	16.61	16.55
Moisture	(Previously determined)		9.55	9.55
Total	9.5445	10.5051	97.54	97.50

## ALCOHOLIC EXTRACT.

During the preliminary extraction, crystals were noticed in the alcoholic extract, as the alcohol was allowed to evaporate spontaneously. In order to get enough of this material for study two large samples, or a total of one thousand one hundred fifteen and one-tenth grams of the ground leaves were exhausted with petroleum ether, then extracted with dehydrated alcohol. The results were:

Weight of sample	490.1 Gm.	625.0 Gm.
Total residue	78.8815 Gm.	101.08 Gm.
Per cent extracted	16.09 Gm.	16.17 Gm.
Impure crystals separated	3.0 Gm.	15.2 Gm.

The impure crystals were separated and washed with warm dehydrated alcohol. The use of a suction filter was found necessary. The washing was continued until no more green color was removed. After taking up in hot dehydrated alcohol the solvent was allowed to evaporate spontaneously. The crystals appeared cream colored and had a characteristic, although faint, sweet taste.

## Solubility of the Crystals.

Readily soluble in warm	Glycerine, Water
Slightly soluble in hot	Methyl Alcohol, Benzene
Fairly soluble in hot	Amyl Alcohol, Acetone; Ethyl Acetate
Readily soluble in boiling	Ethyl Alcohol, Isopropyl Alcohol
Insoluble	Acetic Acid

The melting point of the crystals was 163° C. (unc.). After repeated recrystallization the melting point was unaltered, however after boiling with water a substance was separated giving a different melting point (70-72° C.). Crystals from the filtrate continued to melt at 163° C.

An aqueous solution (1-20, W/V) had no effect on polarized light.

The crystals did not reduce Fehling's solution and the results were still negative after attempts to hydrolyze them with diluted hydrochloric acid in a sealed glass tube. Qualitative analysis showed the absence of sulphur, nitrogen, chlorine, bromine and iodine.

## PHARMACEUTICAL PREPARATIONS.

Since *Pentstemon cobæa* is administered medicinally in the form of a "tea" it was decided to prepare pharmaceutical preparations that would represent the constituents expected to be found in the tea.

A decoction prepared according to the U. S. P. directions and then evaporated to dryness gave the following results:

	Wt. of Powdered Leaves.	Wt. of Residue.	Per Cent of Water-Soluble Extractives.
Sample No. 1	5.0 Gm.	1.9325 Gm.	38.65
Sample No. 2	5.0 Gm.	1.9403 Gm.	38.80

An infusion was also prepared according to the general formula of the U. S. P. and the total water-soluble contents determined. The results were:

	Wt. of Powdered Leaves.	Wt. of Residue.	Per Cent of Water-Soluble Extractives.
Sample No. 1	5.0 Gm.	1.8794 Gm.	37.58
Sample No. 2	5.0 Gm.	1.8809 Gm.	37.61

#### REFERENCES.

- (1) *The Garden* (Dec. 1878); *Meehan's Monthly*, Vol. IV, page 114.
- (2) A preliminary list of the Fern and Seed Plants of Oklahoma. "Jeffs and Little, Biological Survey," Vol. II, No. 2, page 80.
- (3) So-called by people using the plant medicinally.
- (4) *Trans. Amer. Philo. Soc.*, New Ser. V, 22 (1837), 182.
- (5) Oven method, U. S. P. X.
- (6) Plant analysis by Dragendorff (trans. by Greenish).

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#### NATHANIEL LORD BRITTON.

In the following sketch, Dr. H. H. Rusby's tribute to Nathaniel Lord Britton, in *Science*, August 3rd, is quoted, in part:

"This learned and productive scientist, whose death occurred on June 25th, in his seventy-fifth year, was in all respects a son of the state and city in which he lived and died. Born and bred in Staten Island, of local ancestry, his early life and interests, which even in childhood were directed toward nature loving and studying, were closely bound up with the life of that island and have left their eternal imprint on the scientific and educational character of its community.

"While the scientific world will be content to read and refer to his published works, we, who knew him more intimately, may do well to look behind the work and consider the conditions under which it was performed and the manner of its doing and form an estimate of the character and life of the man.

"Professionally educated at Columbia, he became connected with it as instructor im-

mediately upon his graduation, and the educational relationship thus established continued throughout life. Into the affiliation of Columbia's faculty with the scientific activities of the city, Dr. Britton entered most heartily and soon he became recognized as one of the dependable supporters of the work of several of these societies. He became active in the proceedings of both the Linnæan and Microscopical societies, but his special interest was in the academy and the Torrey Botanical Club, the successful development of both of which has been largely due to his service and influence, at the same time that he was equally active in the work of the now flourishing Natural History Association of Staten Island. His later connection with the Botanical Garden, a city institution, brought him into close relations with the city government, so that he became associated with many of those who have conducted its political and financial affairs for a third of a century. Thus, while the many interests in this and foreign countries which have profited by his labors will feel his loss as a scientist, our city will also miss him as an active and distinguished citizen."