Expt.	Weight of ash, Gm. Carpel.	Stem.	Seed.	Percentage of ash. Carpel.	Stem.	Seed.
1	0.0459	0.0652	0.0255	4.59	6.52	2.55
2	0.0452	0.0658	0.0252	4.52	6.58	2.52
3	0.0457	0.0654	0.0252	4.57	6.54	2.52
4	.....	.....	0.0228	....	....	2.28
Average....	.....	.....	.....	4.56	6.55	2.53

In Experiment 4 the entire seed, not the powder, was incinerated. Oswald[1] in 1892 reports an ash content of 2.81 percent for the carpels and 2.46 percent for the seeds. Schlegel[2] reports 3.5 percent for the carpels.

In the second series of determinations the material was charred until it no longer gave off vapors. It was then lixiviated and the solution filtered through a quantitative filter. The filter plus the charred mass were heated to a high temperature until all carbon had disappeared. The residue remaining after this treatment was weighed and computed as water-insoluble ash. To it was then added the filtrate which was carefully evaporated and the residue heated to a dull red heat. The crucible was again weighed and the contents computed as total ash. The difference between total ash and insoluble ash was computed as water-soluble ash. The results of the duplicate determinations are herewith tabulated:

	Carpel. I.	II.	Stem. I.	II.	Seed. I.	II.
Weight of drug, Gm.....	2.0720	1.8924	3.0611	2.8347	2.0244	2.4020
Wt. of insol. ash, Gm.....	0.0595	0.0538	0.1494	0.1394	0.0454	0.0558
Wt. of total ash, Gm.....	0.1045	0.1929	0.2092	0.1908	0.0634	0.0728
Wt. of sol. ash, Gm.....	0.0450	0.0390	0.0598	0.0504	0.0180	0.0270
Percent of total ash.....	5.04	4.91	6.83	6.77	3.12	3.25
Percent of soluble ash.....	2.17	2.06	1.95	1.81	0.89	0.96

Comparison of these figures with the corresponding data of the first series show, as was to be expected, that the results of the total ash of the second series are somewhat higher than those of the first series.

Extractions.—In order to ascertain the extractive (fatty oil, volatile oil, etc.) for such solvents as ether, heptane and petroleum ether (58 to 60°) 30 grams of No. 100 powder were exhausted in a Soxhlet on an electric plate for about 48 hours or until a portion of the extract no longer left a residue upon evaporation of the solvent. The results of the duplicate determinations are likewise tabulated:

Solvent.	Seed. I. Percent.	II. Percent.	Carpel. I. Percent.	II. Percent.	Stem. I. Percent.	II. Percent.
Heptane.....	31.52	32.50	8.46	6.67	....	....
Ether.....	28.39	28.13	7.85	6.23	5.14	5.68
Petrol. ether.....	....	....	2.41	2.11	....	....

SOME CONSTITUENTS OF THE MOUNTAIN BALM.

BY J. W. HOWARD.

The Mountain Balm (*Ceanothus Velutinus*, Douglas) grows commonly on the mountainsides throughout the Rocky Mountain district. Coulter and Nelson[1*] have described is as "a smooth shrub 7–14 dm. high, growing in dense clumps or patches: leaves orbicular-elliptic or elliptical-ovate, obtuse at both ends, coriaceous, shining above (as if varnished) balsamic fragrant, lighter beneath and slightly pubescent, strongly 3-ribbed, 5–10 cm. long, on short stout petioles, persistent: . . "

[1] *Archiv. d. Pharm.*, 229, 84.

[2] *Am. Jour. Pharm.*, 57, 426.

* Numbers refer to Bibliography.

The Indians of this district use the dried leaves as a substitute for tobacco and medicinally as a tea.

Previous work has been reported on another species of this genus, *Ceanothus Americanus*, L. (New Jersey Tea) by Clinch[2] and Buckner[3] but none has apparently been done on this species. The use of the entire leaf, as described above, made a general analysis desirable as well as a determination of some of the constituents of the fragrant exudation.

EXPERIMENTAL.

In order to get a representative sample of the leaves, they were collected in large amounts in the early fall. After drying for one month at room temperature they were analyzed with the following results:

	Percent.
Moisture	6.19
Ash	0.385
Crude protein	9.475
Crude fiber	10.62
Petroleum ether (B. P. 40–60° C.) extract	6.73

The petroleum ether removed from the leaves the exudation, which when collected and dried was of deep brown color and had the general appearance of a wax. Its predominating odor was similar to that of compounds containing the cinnamyl group. The presence of such compounds is later proved by identifying cinnamic acid as one of the hydrolysis products.

It was also found that a volatile oil could be obtained directly from the leaves by steam distillation. On account of the apparently small content of the oil and the fact that it was removed as part of the petroleum ether extract, the use of the petroleum ether was found to be the more convenient method for its collection.

For the purpose of further study a large amount of the extract was collected. This was first subjected to steam distillation to remove the volatile oil. Considerable difficulty was experienced in removing all the oil from the extract. A small amount was later obtained after refluxing the residue with sodium hydroxide solution. This would indicate the probability of its being a decomposition product. The weight of the total yield was 2.69% of the weight of the extract. The following properties of the oil have been determined:

Boiling point	166–7° C.
Index of refraction at 25° C	1.4466

Further work is in progress to determine its other physical constants as well as its chemical nature.

After the removal of the volatile oil the residue of the extract was refluxed for 12 hours with an excess of sodium hydroxide solution. On cooling a copious precipitate of sodium stearate formed throughout the solution. This was filtered off and the stearic acid set free by the addition of concentrated sulfuric acid. The identity of the acid was established by the following facts: *Stearic Acid*, $C_{18}H_{36}O_2$, m. p. 69° C. After recrystallization from 95% alcohol it had a neutralization equivalent of 282 and m. p. 67–8° C. Elementary analysis gave the following results:

Calculated.	Found.
C = 75.98	75.86
H = 12.76	12.68

The weight of the yield was 17.69% of the weight of the extract.

The alkaline filtrate (from the sodium stearate) was steam-distilled and the distillate examined thoroughly for volatile products. None was found except the small amount of the volatile oil mentioned above.

The filtrate was then made slightly acid with hydrochloric acid. The mixture of cinnamic acid and resin, which precipitated as a result, was removed by filtration. The cinnamic acid was separated from the resin by boiling water and identified as follows:

Cinnamic Acid, $C_9H_8O_2$, m. p. 133° C. After two recrystallizations from water it had a neutralization equivalent of 147.2 and m. p. 132–3° C. Elementary analysis gave the following results:

Calculated.	Found.
C = 72.94	72.76
H = 5.44	5.41

It was further confirmed by the preparation of para nitro cinnamic acid (m. p. 286–7°) and ethyl cinnamate. The weight of the yield was 2.17% of the weight of the extract.

The exudation may be classed as a balsam inasmuch as a volatile oil, a resin, and cinnamic acid appeared as hydrolysis products.

The acidified filtrate was subjected to steam distillation, but no volatile substances were present. It was then evaporated to dryness and extracted with the usual alcohol-ether mixture. The extract appeared to be a mixture of resin and unsaponified matter. It was tested for glycerin with negative results.

SUMMARY.

(1) A general analysis of the leaves of *Ceanothus Velutinus*, Douglas has been made.

(2) The fragrant exudation of the leaves was extracted and found to yield a volatile oil, a resin, cinnamic and stearic acids on hydrolysis.

(3) The exudation was properly classed a balsam.

BIBLIOGRAPHY.

(1) Coulter and Nelson, "A New Manual of Rocky Mountain Botany," p. 315.
(2) Clinch, *Am. J. Pharm.*, 56, 131, 1884.
(3) Buckner, *Am. J. Pharm.*, 63, 428, 1891.

CHEMISTRY DEPARTMENT, UNIVERSITY OF MONTANA,
MISSOULA, MONTANA.

NOTE ON THE EMODIN CONTENT OF AROMATIC FLUID EXTRACTS OF CASCARA SAGRADA.*

BY E. O. EATON.[1]

The usual indication of cascara preparations is the presence of emodin. The test for emodin in a certain medicine known to contain a small proportion of a preparation of the type aromatic fluid extract of cascara sagrada, however, was negative. In order to learn whether or not such preparations would give this test, as it had been assumed they would, 10 samples of fluid extract of cascara and similar

* Published by permission of the Secretary of Agriculture.

[1] Bureau of Chemistry.